Public Health Scotland

Model-based appraisal of the potential effects of minimum pricing for tobacco in Scotland

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Contents

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2. Executive Summary

Scotland is aiming to be “tobacco-free” by 2034 [1–2]. This report examines the potential contribution that a minimum price for tobacco could make towards achieving this aim, by making the least expensive tobacco less affordable. The consideration of minimum pricing for tobacco as an additional policy that could be introduced by the Scottish Government is important due to the ongoing challenges of finding policy options that raise the cost of tobacco, especially the cheapest products like hand-rolling tobacco. In this report, we appraise the potential effects of minimum pricing as a means of preventing sales below a specified threshold and model its potential impact on tobacco purchasing, health and economic outcomes.

The report uses the same modelling platform, the Sheffield Tobacco and Alcohol Policy Model, that was used recently by the University of Sheffield to produce a report for the Scottish Government on the potential effects of changes to the minimum unit price for alcohol in Scotland [3].

Objectives

To forecast the future trajectory of smoking rates in Scotland, assuming that the past reductions in smoking rates observed from 2008–2019 continue into the future. This assumes that a continued strengthening of tobacco control policy is part of the baseline against which the effects of minimum pricing for tobacco are assessed.

- To explore the potential effects of the following five minimum price thresholds for the whole tobacco market. The lower two minimum price thresholds would affect hand-rolling tobacco only; these are 40p and 50p per stick, assuming 0.5g tobacco per hand-rolled cigarette and equating to £24 and £30 for a 30g pack. The higher minimum price thresholds, 60p, 70p and 80p per stick would affect both hand-rolling tobacco and factory-made cigarettes, increasing the price of a 20-pack of factory-made cigarettes to £12, £14, and £16, respectively. Outcomes are estimated for smoking rates in the short and long-term and the long-term effects on health and healthcare costs, including potential savings to the National Health Service (NHS).

- To determine the extent of increase in tobacco excise tax that the United Kingdom (UK) Government would need to apply to achieve outcomes for smoking and health similar to each minimum price threshold in Scotland. The effects of setting a minimum price for tobacco are then compared to continued tax increases, focusing on revenue impacts for both the tobacco industry and the UK Government from tobacco sales.

Findings

- Minimum pricing is a potentially effective tool for increasing the price of the cheapest legal tobacco and could result in modest reductions in smoking rates and consequent public health improvements. These health improvements would be larger for those living in deprived areas where smoking rates and related harms are highest. The report estimates health improvements up to the tobacco-free target of 2034, which only partly captures the lifetime health gains for the people who quit smoking due to the policy.

- The cheapest legal tobacco is hand-rolling tobacco. The 40p and 50p minimum prices would only affect the prices of hand-rolling tobacco. Conservative estimates are that they would reduce the number of people who smoke by 4,297 and 10,312 and increase average spending on tobacco for people who continue to smoke by £2.51 and £5.20 per week from a baseline of £14.20.

- The 60p, 70p and 80p minimum prices would affect the prices of hand-rolling tobacco and factory-made cigarettes. Conservative estimates are that they would reduce the number of people who smoke by 16,327, 26,209 and 39,958, and increase average spending by £7.21, £9.68 and £12.28 per week.

- An important consequence that decision-makers should be aware of is that minimum pricing could increase revenue for the tobacco industry. This is because minimum pricing is not a tax, and the additional money consumers pay for their products goes to retailers and the wider industry.

- The effect of introducing the highest minimum price threshold we model of 80 pence per stick is equivalent to the effect of increasing excise duty on tobacco by 30%.

- The most effective policy option may be to introduce a minimum price as a way to make continued rises in excise duty on tobacco products, which are set by the UK Government, more effective at improving public health in Scotland. This would raise the price of all tobacco whilst ensuring that the tobacco industry cannot maintain the cheapest products at easily affordable prices. This would help to take away the option for people to continue smoking by trading-down to cheaper tobacco products.

Summary

The model-based findings presented in this report show how minimum pricing for tobacco may reduce smoking prevalence and improve public health in Scotland. Minimum pricing introduced by the Scottish Government would do this by removing tobacco sold below a minimum price threshold from the market. A 60p minimum price would raise the price of all hand-rolling tobacco and the price of the cheapest factory-made cigarettes, resulting in an estimated 16,327 fewer people who smoke, and increase average spending for people who remain smoking of £7.21 per week. This would restrict the tobacco industry's ability to keep low-cost products on the market, reducing the availability of cheaper options for people looking to switch to more affordable tobacco. The main difference to excise tax increases applied by the UK Government is that minimum pricing would generate additional tobacco industry revenue, but this could be mitigated with complementary policy approaches, which include excise tax increases and wholesale price cap policies (an upper limit on wholesale prices to restrict profits that industry can generate from selling their more expensive tobacco products). If Scotland were to introduce a minimum price for tobacco alongside excise tax increases introduced by the UK Government, this would ensure that the tobacco industry cannot maintain cheap tobacco products below the minimum price threshold in Scotland. In addition to these proposed large tobacco price increases, there would also need to be coordinated enforcement action on the supply of illicit tobacco, which is easily affordable and could undermine the effectiveness of tobacco price rises.

3. Introduction

Tobacco use is a major contributor to health issues, premature death, and health inequalities in Scotland, with approximately 16% of all deaths linked to smoking [4]. This burden is not evenly distributed across the population, with 25% of people in the most deprived areas smoking compared to 7% in the least deprived areas [5].

The 2018 Tobacco Control Plan for Scotland [2] set a clear objective: By 2034, Scotland should achieve “tobacco-free” status, which meant having fewer than 5% of the population who currently smoke tobacco [2]. Subsequently, the Tobacco and Vaping Framework has outlined a series of actions to help Scotland reach its tobacco-free target [1].

Policies that increase the cost of tobacco, especially those that make the cheapest tobacco less affordable, are an effective means of reducing smoking rates [6–7]. Raising tobacco prices achieves this by dissuading young people from starting smoking and encouraging people who currently smoke to contemplate quitting or providing them with added motivation to do so. In England, the cost of tobacco is an important factor in motivating people to quit smoking [8].

In 2018, NHS Health Scotland conducted a review of strategies aimed at increasing the cost of the least expensive tobacco in Scotland [9]. They found that establishing a “floor” or minimum price for tobacco was a promising policy option that fell within Scotland’s devolved powers for potential implementation. Scotland does not have devolved power to set tobacco duty rates. The potential for minimum pricing for tobacco as an option to reduce the availability of cheap tobacco in Scotland was recently highlighted again as one of the potential areas of action for the Scottish Government [10]. It could augment the Conservative UK Government’s recent tobacco policy proposals in the Tobacco and Vapes Bill [11], which at the time of writing are expected to be brought back to Parliament in a revised form by the new Labour government.

Existing evidence regarding the potential impacts of minimum pricing for tobacco primarily comes from the United States [12–20]. This evidence shows that implementing a minimum pack price can increase the cost of the least expensive tobacco products and, as a result, reduce the number of people who smoke [12]. It was also estimated that a tax rise with an equivalent effect on product prices would have around half the effect of setting a minimum price [13]. In 2019, a UK survey of adults who currently smoke or used to smoke indicated that in response to a hypothetical minimum price for tobacco, approximately a fifth of people who currently smoke would smoke less or quit and almost two-fifths of people who used to smoke indicated the price rise would help them to stay quit [21].

3.1. The current UK policy approach to cheap tobacco and the potential need for further regulation

The current policy approach to influencing the price of tobacco products in the UK is through tobacco duty, set by the UK Government (Table 1). For hand-rolled tobacco the duty is a set amount per kilogram of tobacco. The duty for factory-made cigarettes has three components. The first component is an ad-valorem component which is a percentage of the retail price. This is added to the second component, specific duty, which is a set amount per 1,000 cigarettes.

Table 1. Tobacco duty rates as of 22nd November 2023.

	Specific duty rate	Ad-valorem duty rate	Minimum excise tax
Factory-made cigarettes	£316.70 per 1,000 cigarettes	16.5%	£422.80 per 1,000 cigarettes
Hand-rolled tobacco	£412.32 per kg	N/A	N/A

In 2017, the UK Government introduced the minimum excise tax (MET), which established a minimum level of excise duty that must be paid on factory-made cigarettes [22]. The MET, like the specific duty, is also a fixed amount per 1,000 cigarettes. The sum of ad-valorem and specific duty is compared to the MET, and the duty payable is the higher amount. Essentially, this policy aims to function as a type of minimum price for factory-made cigarettes. The policy creates a situation in which, if the tobacco industry wishes to sell cigarettes at such a cheap price that would mean that the duty payable is below the MET threshold, then they must pay an additional MET tax. The MET tax is paid directly to the UK Government rather than being added to the price of the cigarettes. The evidence suggests that when the MET was first introduced, it did function effectively as a minimum price for cigarettes [22]. However, more recently cigarettes are being sold at prices cheap enough that the tax payable is below the MET threshold. In addition, it is important to note that the MET has no impact on the cost of hand-rolling tobacco.

To illustrate, the current duty rates for factory-made cigarettes (as of 22 November 2023) are 16.5% of the retail price (RRP) plus £316.70 per 1,000 cigarettes – the calculation is 0.165 × RRP + £6.334 per pack of 20. The MET is £422.80 per 1,000 cigarettes – £8.456 per pack of £20. The RRP where 0.165 × RRP + 6.334 = 8.456 is the lowest RRP that can be set where the sum of ad-valorem and specific duty would cover the MET. This RRP is £12.861 per pack of 20 cigarettes, or 64.3p per cigarette. A search of the Tesco website 09/05/2024 resulted in 30 products priced at less than 64p per cigarette, with prices as low as 56p. At both 64p and 56p, the total excise duty payable will be £8.456 per cigarette, therefore pricing below 64p means industry accepting a reduction in their net revenue per stick.

The relatively low price of hand-rolling tobacco has long been recognised as a gateway to smoking for young people and a means for budget-conscious people who smoke to sustain their habit [23]. To tackle this issue, the “tobacco duty escalator” has

been used, where excise duty increases annually at a rate higher than inflation. Notably, the duty escalator has been applied more aggressively to hand-rolling tobacco compared to factory-made cigarettes. For example, in the UK Government's 2023 Autumn Statement, the duty rate on all tobacco products was set to rise annually by 2% above Retail Price Index (RPI) inflation, while the duty rate for hand-rolling tobacco was set to rise by 12% above RPI inflation [24]. However, while this policy may raise hand-rolling tobacco prices compared to factory-made cigarettes, the tobacco industry can still mitigate its effect on cheap tobacco by maintaining prices for the cheapest products at relatively lower levels, although they tend to do this against a background of generally increasing profit margins, especially on the already more expensive tobacco products [25]. This strategy has been consistently used by the tobacco industry in response to tobacco tax increases [25–27].

A minimum price differs from these existing policy approaches in that a minimum price could affect both factory-made cigarettes and hand-rolling tobacco and is more difficult for the industry to circumvent via their pricing strategies. However, a key limitation is that, in the short-term, a minimum price could enable the tobacco industry to increase their profits on products previously priced below the specified threshold. Nevertheless, in the long-term, the overall profits the tobacco industry gains from tobacco product sales should decline if the price increase leads to a reduction in the number of people who smoke.

3.2. The aim of this report

The aim of this report is to provide an appraisal of the potential effects of minimum pricing for tobacco in Scotland, in terms of its impact on rates of tobacco smoking and on health and economic outcomes related to tobacco. It uses the Tobacco and Alcohol Tax and Price Intervention Simulation Model (TAX-sim) Version 2.5.0 [28], which is built on the Sheffield Tobacco and Alcohol Policy Modelling platform (STAPM, https://stapm.gitlab.io/**).** The TAX-sim model can simulate tax and price policies for alcohol and tobacco, either separately or jointly. It has previously been used to model the potential impact of changes to the minimum unit price for alcohol in Scotland [3]. In this investigation, the model was exclusively used to examine the impact of price changes on tobacco, with no exploration of changes in alcohol pricing policy or any indirect effects on alcohol consumption.

4. Methods

4.1. The population simulation model

The model is a dynamic micro-simulation that creates a synthetic population based primarily on data from the Scottish Health Survey [29] to represent tobacco consumption in the Scottish population (see the technical description of the tobacco component of the STAPM modelling for details [30]). It incorporates trends in smoking prevalence and the average amount of cigarettes smoked per day across age, sex and Scottish Index of Multiple Deprivation (SIMD) quintiles. The SIMD is a composite measure based on various indicators like income, employment, education, housing, and more, calculated for small geographic areas in Scotland, each representing approximately 1,500 people [31]. These SIMD scores are divided into quintiles, with the first quintile representing the least deprived areas and the fifth quintile representing the most deprived ones.

The simulation advances in one-year increments until a predefined time limit is reached, which in this case is the year 2043. In each time-step, new individuals are introduced into the model at the age of 18, while individuals exit the model when they either die or reach the maximum age limit of 89.

The model operates by simulating the dynamics of smoking and its impact on tobacco expenditure and health in terms of rates of mortality and morbidity from smoking-related diseases [32]. It tracks how individuals move through three different smoking states as they age in one-year intervals: people who have never smoked, people who currently smoke, and people who formerly smoked, for a specified number of years since quitting. It then associates these states with mortality and morbidity rates. Overall trends in smoking prevalence are influenced by rates of initiation of smoking at young ages (under 30 years), quitting, relapses, and premature mortality linked to smoking.

For people who currently smoke, changes in the average number of cigarettes smoked per day as they age are simulated by keeping them at the same percentile of smoking amount, but adjusting the amount smoked that corresponds to each percentile based on different reference distributions for each age. These distributions vary by sex and SIMD quintile and are estimated from the baseline population sample. Thus, people who smoke follow a personalised smoking trajectory over time. For those who initiate or relapse back to smoking, the number of cigarettes they smoke is determined by sampling from the distribution specific to their age, sex and SIMD quintile. Although the model does not link individual smoking amounts to health outcomes, it uses this information to estimate tobacco expenditure outcomes.

Trends in smoking prevalence are associated with rates of mortality and hospital admission from 52 tobacco-related diseases among adults who smoke, derived from reviews of the literature [32]. The model also takes into account evidence on the time lag between quitting smoking and changes in disease risk, which can be immediate for some conditions but may take decades for others, such as certain types of cancer [32]. The mortality and hospitalisation rates for each of the 52 tobacco-related diseases are calculated separately by age, sex, and SIMD quintile, based on data provided by National Records Scotland and Scottish Morbidity Record (SMR01) hospital episode

statistics respectively. The rates and unit costs of hospitalisations are estimated using the same methods as our recent report on alcohol minimum unit pricing [3]. Unit costs of hospital admissions were estimated from English data and inflated to correspond to a price year of 2023/24.

The model provides estimates for various outcomes, including:

1. Consumption outcomes such as smoking prevalence and weekly spending on tobacco products;

2. Economic outcomes – mean prices paid, the distribution of all prices paid, total annual consumer spending on tobacco, UK Government tax revenues, and retailer/industry revenue; and

3. Health outcomes, which encompass total deaths from all causes, years of life lost (YLLs) due to premature death, hospitalisations from tobacco-related conditions, and the National Health Service (NHS) costs of those hospitalisations.

The approach of the STAPM TAX-sim model is to estimate a control (or "business as usual") arm against which each intervention is compared. All models start in the year 2017, and we assume any policy interventions are introduced in 2024, with the model being run for a further 20 years, until 2043, to allow for an assessment of the long-term impacts of the policy. The "policy effect year" 2024 is therefore the first year in which the intervention arm (in which policies are changed) deviates from the control arm (in which policies are assumed to remain constant). Tobacco duty structures in the control arm are assumed to remain the same after 2023, with duty rates unchanged in real terms from their 2023 values (as set in the March 2023 Spring Budget) through the duration of the model. The only exception to this is that we assume that the tobacco duty escalator, in which tobacco duty is increased each year by a certain percentage above RPI inflation, continues indefinitely at the level at which it was last set. In this case, it is assumed to continue at the level of 2% above inflation for both factory-made cigarettes and hand-rolling tobacco. Note that in the November 2023 Autumn Statement there was a one-off 12% above inflation rise in duty for hand-rolling tobacco which is not incorporated here, hence 2024 prices of hand-rolling tobacco in the model will be slight underestimates of actual prices.

Policy measures can influence tobacco consumption in several ways. They can stop individuals who would have started smoking from doing so or prompt people who currently smoke to quit. Additionally, they can reduce the amount of tobacco consumed by people who currently smoke. These effects persist in subsequent years within the model through the following four mechanisms:

1. Adjusting the tobacco smoking prevalence and consumption of new 18-year-olds who are added to the model in each year of the simulation to reflect the policy impact.

2. Individuals who change to not smoking due to the policy may, over time, change their smoking status back and forth to smoking due to the dynamic simulation of age-related changes in tobacco use via initiation, quitting and relapse. This could lead them to start smoking again, and they may subsequently quit again.

3. For individuals who keep smoking, the policy effect may shift an individual to a different percentile in the population distribution of tobacco consumption, i.e. changing the average number of cigarettes they smoke per day. Their subsequent life-course of tobacco consumption will then follow a different trajectory, corresponding to their new position in the distribution.

4. After adjusting an individual's average cigarette consumption to match age-related patterns, the model updates their tobacco product preferences to reflect changes due to ageing and also account for the relationship of tobacco product preferences to sex and SIMD subgroup and amount of cigarettes smoked per day.

At the population level, these mechanisms ensure that tobacco consumption behaviours align with trends from survey data but can also influence long-term policy outcomes for the number of people who smoke, the amount smoked and tobacco product preferences.

4.2. Objectives

The report is divided into three sections that have the following objectives:

1. To establish context by estimating the future trajectory of smoking prevalence in Scotland in the absence of further policy intervention. Understanding this trajectory is important as it illustrates potential progress towards the "tobacco-free" target in 2034 and provides a baseline against which to assess the potential impact of future pricing policies.

2. To simulate the potential impact of five minimum price thresholds: 40p, 50p, 60p, 70p, and 80p per cigarette stick. These thresholds are specified in 2024 prices, assumed to remain constant in real terms (i.e. to be increased each year in line with RPI inflation). The 40p and 50p minimum prices will only affect hand-rolling tobacco, with the higher thresholds of 60p, 70p and 80p also impacting on the price of factory-made cigarettes.

3. To determine the extent of increase in tobacco excise duty that would have to be set by the UK Government to achieve outcomes similar to those produced by each of the minimum thresholds. In separate analyses, we calculated the duty increase needed to achieve (i) the same impact on smoking rates and (ii) the same total impact on deaths by 2034. We also calculated the duty increases needed to achieve the same impact on these outcomes within the entire population and additionally within the most socio-economically disadvantaged fifth of the population. This resulted in four distinct estimates of the duty increase required to achieve the same impact as each minimum price threshold. The effects of setting a minimum price for tobacco are then compared to tax increases, with a focus on how each option would impact revenue for the tobacco industry and the UK government.

4.3. Consumer responses to price changes: Price elasticities of demand for tobacco

The estimated policy effects depend strongly on the assumptions about how consumers will respond to price rises, as estimated by the price elasticities of demand for tobacco. This report incorporates evidence on the potential responses of consumers in the UK to changes in tobacco prices, and on the extent to which changes in the price of hand-rolling tobacco could affect demand for factory-made cigarettes and vice versa [33].

The "own-price elasticity of demand" measures the percentage change in demand for a specific product resulting from a 1% increase in its price. For instance, if the own-price elasticity of demand for factory-made cigarettes is −0.5, a 1% price increase would lead to a 0.5% drop in demand. This means consumers would buy fewer cigarettes but pay more for them overall. To illustrate, suppose 1,000 people initially bought a packet of 20 cigarettes for £15.00. This would result in 20,000 cigarettes being sold at a total cost of £300,000. If the price increased by 1% to £15.15, then under a price elasticity of demand of −0.5 we would expect 19,900 cigarettes (i.e. 0.5% fewer) to be sold. However, the total cost would rise to £301,485.

Recent estimates from the University of Sheffield show that hand-rolling tobacco and factory-made cigarettes have different own-price elasticities of demand [33]. These estimates are divided into two parts: the impact of price on whether someone decides to buy a product, termed "participation", and, if they do buy, how much they purchase, termed "conditional consumption" (Table 2 & Table 3). When we apply these new price elasticity estimates to model the potential effects of price increases on tobacco demand (measured by the average number of cigarettes each person in the population smokes per week), we find that the combined own-price elasticities of demand are −0.89 for factory-made cigarettes and −0.69 for hand-rolling tobacco. This indicates a larger reduction in demand and a smaller increase in expenditure for a given price increase compared to the previously mentioned −0.5 example.

We also calculate how consumer demand for factory-made cigarettes might respond to price increases in hand-rolling tobacco, and vice versa. These are known as the "cross-price elasticities of demand". The University of Sheffield estimates show that a price increase in either factory-made cigarettes or hand-rolling tobacco leads to a decrease in demand for the other product [33]. This suggests that factory-made cigarettes and hand-rolling tobacco are complementary products: when the price of one goes up, demand for both decreases. However, there is significant uncertainty about how price changes in one product affects consumption of the other. The statistical uncertainty is wide enough to indicate a less likely, but possible, scenario where the two products could be substitutes. There is also evidence suggesting that hand-rolling tobacco can act as a cheaper substitute for factory-made cigarettes when prices rise [34]. To illustrate the impact of this uncertainty, we initially present our findings on smoking prevalence with cross-price effects included. Importantly, in the way that cross-price effects are implemented in the model, any price change for one product influences all consumers of the other product within the same age, sex and SIMD population subgroup, regardless of whether they use both products. To provide a more conservative estimate, we also present results that ignore these cross-price effects. The actual effect likely falls between these two approaches and could be

estimated more accurately by applying cross-price effects only to dual consumers. However, we have not explored this intermediate scenario in this report.

Additionally, the published evidence on potential consumer responses to tobacco price increases varies based on different data sources and methods used. According to HM Revenue and Customs (HMRC), the "short-run" price elasticity of demand for all tobacco products is estimated at −0.57, while the "long-run" elasticity is estimated at −1.19 [35, 36]. The short-run effect represents the immediate response of consumers to the price increase, typically within a year or two of the policy change. In contrast, the long-run effect, expected to manifest over about a decade, accounts for more gradual adjustments by people who smoke and can also be influenced by generational turnover. It is important to note that our modelled estimates of policy effects are more similar to the short-run effects, which means we may be underestimating the impact of the policy change on smoking prevalence. Additionally, while the policy change might normally lead people to quit gradually over several years, the model tends to shift these quits forward, clustering them in the first year after the policy is introduced.

Table 2. Participation price elasticities of demand from Pryce et al. [33]. These indicate the proportional change in the probability that someone will consume a product or not in response to a rise in product price.

	Consumption changes of factory-made cigarettes	Consumption changes of hand-rolling tobacco
Price change of factory-made cigarettes	−0.169***	−0.135
Price change of hand-rolling tobacco	−0.080	−0.089*

Statistical significance: *** p < 0.01, * p < 0.1

Table 3. Conditional consumption price elasticities of demand from Pryce et al. [33]. These indicate the proportional change in the amount of a product that people who consume at least some of it consume on average each day in response to a rise in product price.

	Consumption changes of factory-made cigarettes	Consumption changes of hand-rolling tobacco
Price change of factory-made cigarettes	−0.513***	−0.222
Price change of hand-rolling tobacco	−0.080	−0.226*

Statistical significance: *** p < 0.01, * p < 0.1

5. A potential future trajectory of smoking prevalence

Methods

This report considered only one business-as-usual future trajectory for smoking prevalence, which may be seen as an optimistic scenario for future declines in smoking prevalence. The projected trajectory is based on data from the Scottish Health Survey spanning 2008 to 2019. This data was processed using a method that estimated the underlying probabilities of smoking initiation, quitting, and relapse required to create a smoothed smoking prevalence trajectory that aligns with the observed data [37]. The same method was used, with English data, and provided smoking state transition probabilities to inform the impact assessment for the UK Government's Tobacco and Vapes Bill [38].

The application of our method to the Scottish Health Survey data resulted in estimates of time trends in the probabilities of smoking initiation, quitting, and relapse during the observed data period, with ten variations of these trends corresponding to sex and different SIMD quintiles. The chosen future trajectory, used as the baseline for this report, involves allowing the past trends in decreasing initiation and increasing quitting observed from 2008 to 2019 to continue throughout the simulated period.

Between 2024 and the tobacco-free target in 2034, the trends projected by our model reflect a reduction in the annual likelihood of individuals aged 18–30 starting to smoke. Additionally, the likelihood of people quitting smoking is expected to rise, accompanied by a projected increase in the likelihood of relapsing back to smoking, counteracting some of the projected increases in quitting.

Findings

Table 4 shows the expected baseline characteristics of smoking in Scotland in 2024. Figure 1 shows the projected paths of smoking prevalence for both the overall Scottish population and each SIMD quintile. In the modelled projection, the smoking prevalence trajectory for the entire population is projected to shift from 14.0% in 2024 to 8.5% in 2034, still above the tobacco-free target of 5%. Among the most disadvantaged SIMD quintile, the smoking prevalence is expected to be 26.3% in 2024 and is predicted to decrease to 19.7% in 2034.

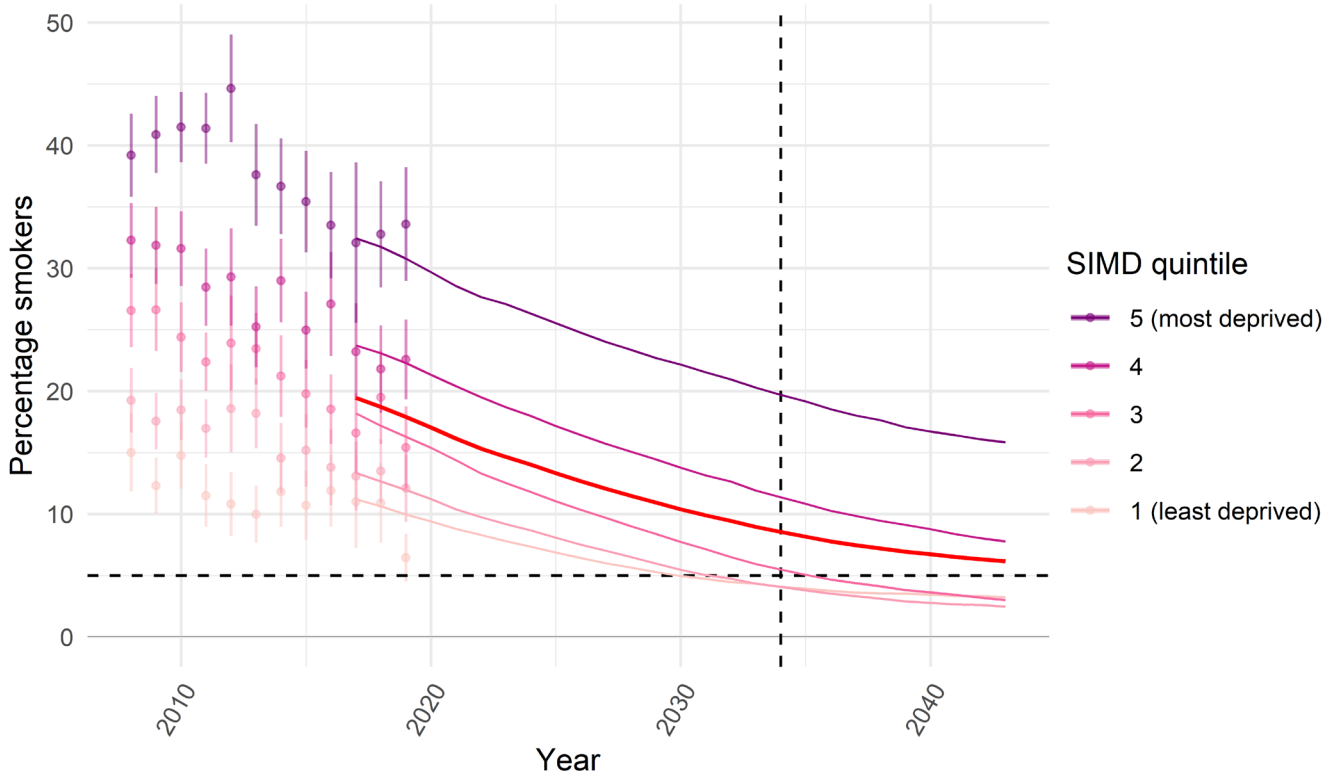
This future scenario may be considered optimistic because it assumes that the social, economic, and policy factors that drove past trends will persist into the future. However, this assumption may not hold, because the impact of past policies on current rates of smoking initiation and quitting might wane over time, the characteristics of the remaining smoker population have changed towards people who currently smoke being less likely to quit [39], and the past declines in smoking prevalence plateaued at the start of the COVID-19 pandemic [40]. It is also possible that future declines in smoking could go at a faster pace than our assumptions, driven by changes to the cost of living and new UK Government tobacco control policy.

For an illustration of how these trends could be affected by assuming less optimistic scenarios regarding future trends in smoking initiation and quitting, refer to the smoking forecast for England conducted for the Royal College of Physicians, which employs the same methodology and explores various assumptions [41].

Table 4. Modelled baseline tobacco consumption and spending in 2024 by SIMD quintile.

	Population	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Number of people who smoke	601,955	68,787	77,899	100,985	145,815	208,469
% of all people who smoke	100%	11.4%	12.9%	16.8%	24.2%	34.6%
Smoking prevalence (%)	14.0%	7.3%	8.7%	11.8%	18.0%	26.3%
Hand-rolling tobacco smoking prevalence (%)	5.9%	3.4%	3.7%	4.9%	6.7%	11.4%
Average sticks per smoker per week	84.9	69.0	80.2	90.6	86.1	88.3
Average spending per smoker per week	£42.85	£35.27	£39.96	£46.83	£44.07	£43.62
Average price per stick (all tobacco)	£0.50	£0.51	£0.50	£0.52	£0.51	£0.49
Average price per stick (factory-made)	£0.63	£0.64	£0.63	£0.64	£0.64	£0.63
Average price per stick (hand-rolling tobacco)	£0.30	£0.30	£0.30	£0.30	£0.30	£0.30

Figure 1. Observed trends in smoking prevalence by SIMD quintile from the Scottish Health Survey for 2008–2019, with 95% Confidence Intervals and the resulting forecast rates for 2017–2043. The points and error bars show the observed values from the Scottish Health Survey. The solid lines show the model forecast of smoking prevalence. The red line shows the forecast prevalence of smoking in the overall adult population. The dashed black lines refer to the tobacco-free target in Scotland of <5% people who smoke by 2034. The projected values for smoking prevalence in 2034 are 8.5% for the total population, and 4.1%, 4.1%, 5.5%, 11.4%, 19.7% for the least to the most deprived SIMD quintiles respectively.



6. The potential effects of different minimum price thresholds

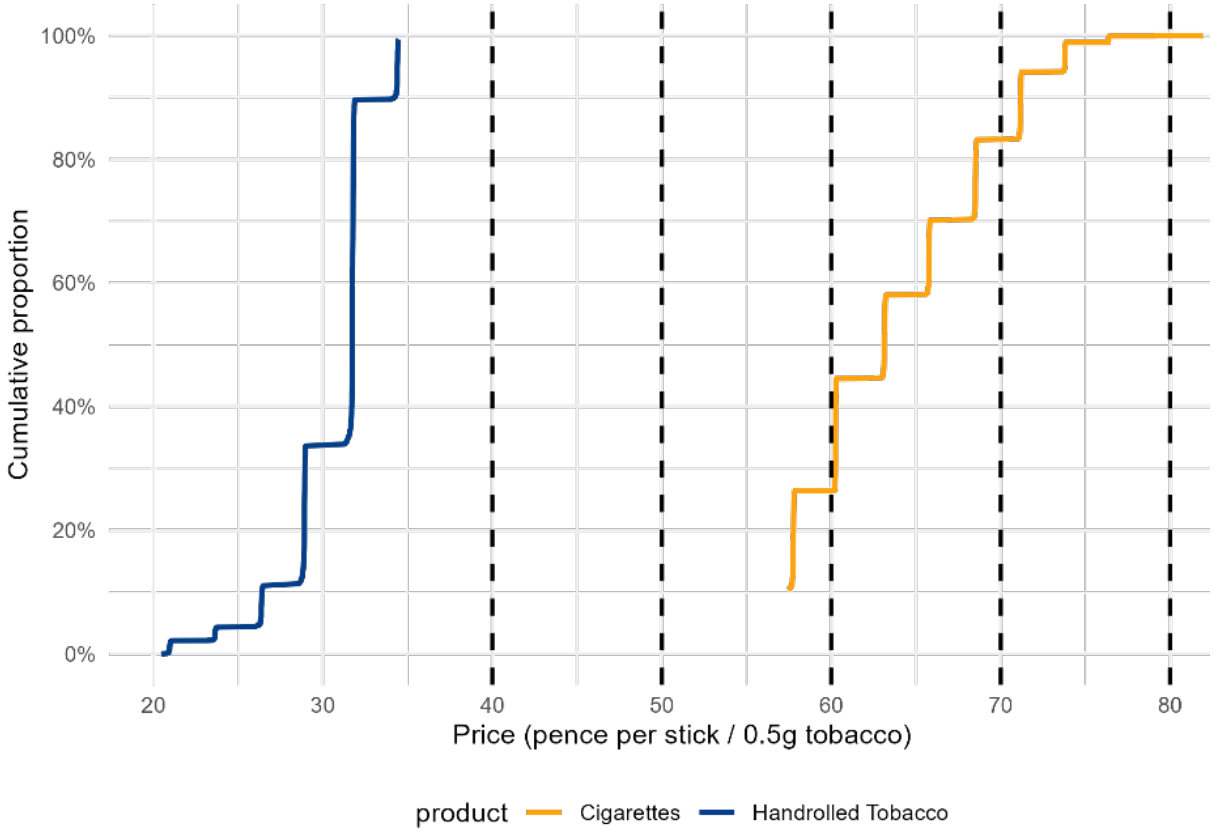
6.1. Current tobacco prices in Scotland

In 2024, the average price per stick of tobacco is estimated at 50 pence (Table 4). Factory-made cigarettes cost about 63 pence per stick, which amounts to £12.60 for a pack of 20. Hand-rolling tobacco is cheaper, at 30 pence per stick, translating to £6 for 20 sticks or £60 for 100 grams, assuming each stick contains 0.5 grams of tobacco.

The cumulative distributions of expenditure according to product price in Figure 2 show the price ranges for both hand-rolling tobacco and factory-made cigarettes, with all prices standardised in terms of pence per stick. To compute these values, data imputation methods were used to infer pack sizes from the Living Costs and Food Survey and tobacco sales data from AC Nielsen [42].

Initially, when the price distributions were estimated, they were based on 2017 prices and corresponded to a period just after the introduction of the MET. To reflect the 2024 price distribution, these distributions were updated to account for RPI inflation and any tax changes that occurred in the intervening period. An additional parameter was also incorporated to adjust the lower end of the factory-made price distribution to account for products being sold at prices below the MET threshold (see Section 1.1).

Figure 2. The cumulative distribution of consumer demand in relation to product price for hand-rolling tobacco and factory-made cigarettes. The x-axis shows the estimated retail price per tobacco stick in pence. The y-axis represents the cumulative percentage of products purchased at or below each price point. For example, the figure shows that all hand-rolled tobacco is sold at below 40p / stick, assuming that a stick contains 0.5g tobacco.



6.2. Definition of minimum price thresholds

This section outlines the definition of minimum price thresholds for tobacco and how they are applied to adjust tobacco prices in the model. See Section 4.3 for the consequent effects on tobacco consumption.

In this investigation, the minimum price is defined in terms of pence per stick of tobacco, assuming that a hand-rolled cigarette contains 0.5g of tobacco. Five minimum price thresholds for tobacco are investigated, set at 40p, 50p, 60p, 70p and 80p per cigarette stick, with these thresholds defined in 2024 prices (see Figure 2 for how these thresholds align with the distribution of tobacco prices).

We assume that the minimum price threshold is annually adjusted in line with RPI inflation. We use RPI for this purpose rather than other inflation indices because it is the measure used by the UK Government to set inflation-indexed duty rates for tobacco. Data on RPI were obtained from a combination of the Office for National Statistics [43] and the Office for Budget Responsibility (OBR), with forecasts and

assumptions about future inflation being derived from OBR's long-term economic determinants [44].

After updating the price distribution for the ongoing effects of the tobacco duty escalator in both the control and intervention arms, a copy of that distribution is taken, to which the minimum price threshold is applied in the intervention arm. This distribution represents the prices faced by consumers. Prices that fall below the minimum price threshold for that year are adjusted upward to meet the threshold. This approach is in line with the approach taken in the STAPM modelling of minimum unit pricing for alcohol [3], which closely reflected what actually happened to alcohol prices when minimum unit pricing was introduced in Scotland [45].

6.3. Effect of minimum price thresholds on tobacco consumption

Methods

To model the impact of introducing a minimum price threshold on tobacco consumption, we began by assessing how the shifting of product prices up to the new threshold affects the average prices of hand-rolling tobacco and factory-made cigarettes. We then took the proportional changes in average prices and applied the price elasticity of demand to estimate the expected effects on two aspects: whether someone consumes hand-rolling tobacco or factory-made cigarettes at all, and if they do consume, the effect on the quantity they consume.

For a price change to influence smoking prevalence, it must result in individuals who would typically consume one or both tobacco products altering their behaviour to the extent that they no longer consume either. As a result, a significant price impact on hand-rolling tobacco might have a less pronounced effect on overall smoking prevalence if consumers simply switch to smoking factory-made cigarettes instead.

Our modelling focuses on the significant health gains from quitting tobacco completely, so it does not account for the link between the amount of tobacco smoked and health outcomes. While a policy that reduces the amount of tobacco consumed by people who smoke could still impact health, even if the prevalence of smoking remains unchanged, we did not include this factor in our analysis.

Findings

Figure 3 illustrates the projected impacts of each minimum price threshold on tobacco consumption in 2024, i.e. in the first year following introduction of the policy, with the cross-price effects factored-in to the calculations. According to the model, a 40 pence per stick minimum threshold, which would raise the price of all hand-rolling tobacco, is expected to result in an immediate 0.25% reduction in smoking prevalence (Table 5). This translates to 10,749 fewer people who smoke in the Scottish population aged 18–89.

The effect on smoking prevalence is anticipated to be more pronounced in the most disadvantaged SIMD quintiles. This social differential in the impact can be attributed to a combination of factors: individuals living in more deprived conditions tend to have higher smoking rates, a greater likelihood of using hand-rolling tobacco, and a higher consumption of relatively cheaper tobacco products.

The impact on smoking prevalence becomes more substantial as the minimum price threshold is raised. However, this increase in effectiveness is not a straightforward linear response to the higher threshold. The magnitude of the incremental effectiveness depends on the extent to which the threshold covers the price distribution—in other words, the shape of the price distribution plays a crucial role in policy effectiveness.

For thresholds set at 60 pence per stick and above, they influence both the prices of hand-rolling tobacco and the prices of the least expensive factory-made cigarettes (Figure 2). In such cases, the policy's effect on smoking prevalence becomes a complex interplay of the policy's own-price and cross-price effects on each type of tobacco.

Figure 3. Modelled impacts on smoking prevalence in 2024, the first year of policy introduction. These estimated effects account for both the own-price and cross-price elasticities of demand for hand-rolling tobacco and factory-made cigarettes. These numbers are also presented in Table 5.

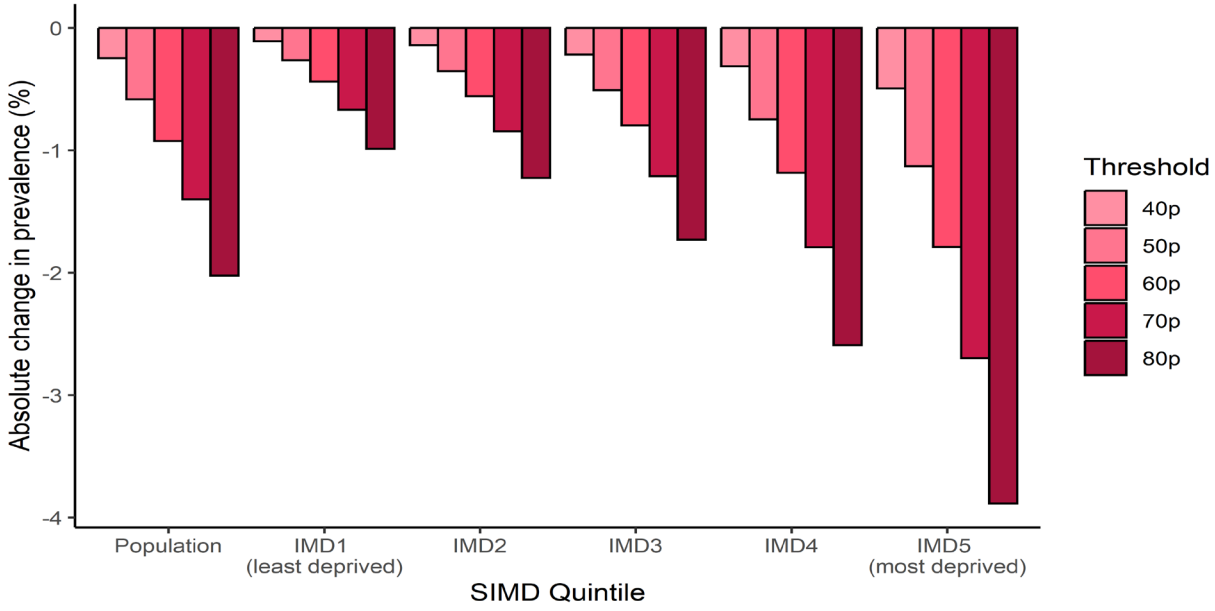


Table 5. Modelled impacts on smoking prevalence in the baseline year 2024, which is the first year of policy introduction compared to control. These numbers are also presented in Figure 3. The changes in prevalence of smoking with each minimum price threshold represent an absolute change in smoking prevalence vs control (i.e. percentage point change in smoking prevalence).

	Whole Scottish population	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Number of people who smoke in the population at baseline	601,955	68,787	77,899	100,985	145,815	208,469
Prevalence of smoking at baseline (in units of the percentage of people who smoke in the population)	14.0	7.3	8.7	11.8	18.0	26.3
Change in prevalence of smoking with a threshold of 40p	−0.25	−0.11	−0.14	−0.22	−0.31	−0.49
Change in prevalence of smoking with a threshold of 50p	−0.58	−0.26	−0.35	−0.51	−0.75	−1.13
Change in prevalence of smoking with a threshold of 60p	−0.92	−0.44	−0.56	−0.80	−1.18	−1.79
Change in prevalence of smoking with a threshold of 70p	−1.40	−0.67	−0.85	−1.21	−1.79	−2.70
Change in prevalence of smoking with a threshold of 80p	−2.02	−0.99	−1.23	−1.73	−2.59	−3.89

6.4. The influence of the cross-price elasticity of demand

The interplay between prices of hand-rolling tobacco and consumption of factory-made cigarettes can impact the expected outcomes, as described by the cross-price elasticities of demand between the two products. The cross-price elasticities used in this report indicate that when the price of hand-rolling tobacco

increases, both hand-rolling tobacco and factory-made cigarette consumption decrease. However, there is high uncertainty around these cross-price effects [33].

To estimate the magnitude of this cross-price effect, and the potential impact of considering cross-price effects on our conclusions, a sensitivity analysis was conducted, comparing the effects of each minimum threshold with and without the cross-price effects accounted for. As Figure 4 shows, when the cross-price effects are excluded from the impact estimates of each minimum threshold, the effect on smoking prevalence approximately halves. This large effect is partly due to how cross-price effects are modelled. The model assumes that all consumers of factory-made cigarettes in a specific subgroup are influenced by changes in the price of hand-rolling tobacco, even though many do not use hand-rolling tobacco and may not even be aware of the price changes. As a result of this large impact, and given the high uncertainty around the statistical estimates of the cross-price effects and how they are applied to individuals within the model, all further results are presented without cross-price effects factored-in. This means the further results are conservative, as we know cross-price effects will occur, and we expect them to show that factory-made and hand-rolled tobacco are complementary products. However, we cannot be certain of their exact direction and magnitude.

Figure 4. Modelled impacts on smoking prevalence in 2024 of a 60p minimum threshold with and without including cross-price effects between hand-rolling tobacco and factory-made cigarettes.

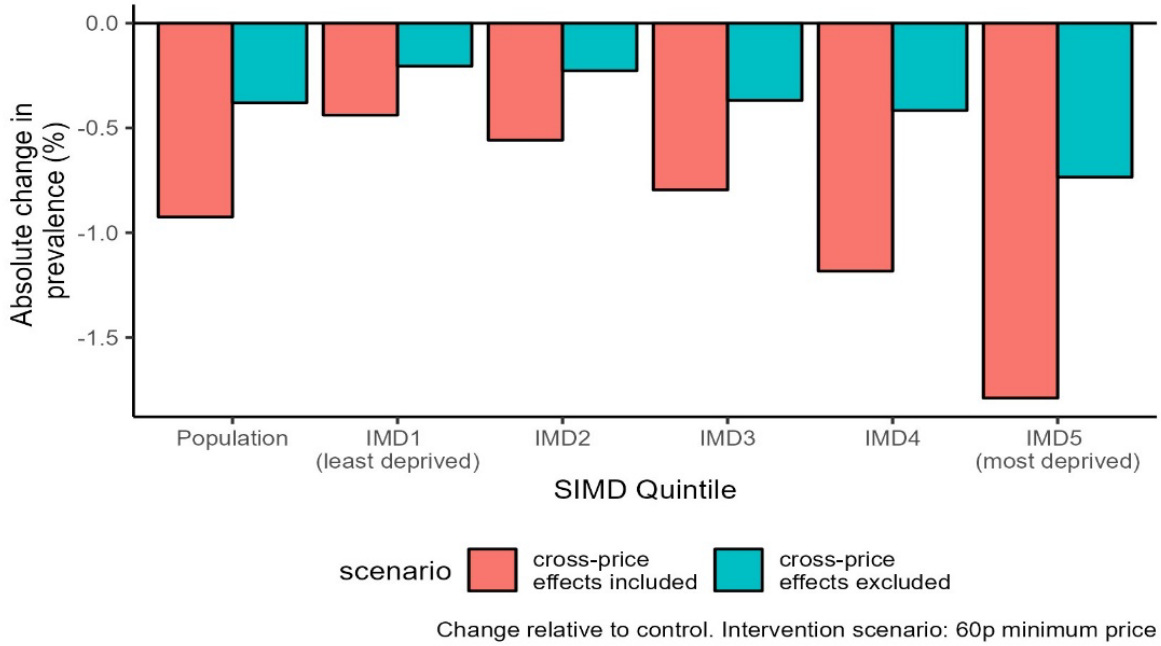


Figure 5. Modelled impacts on smoking prevalence in 2024, the year of policy introduction. These effects do not include the cross-price elasticities of demand of hand-rolling tobacco and factory-made cigarettes. This is the alternative version of Figure 3 without cross-price effects. These numbers are also presented in Table 6.

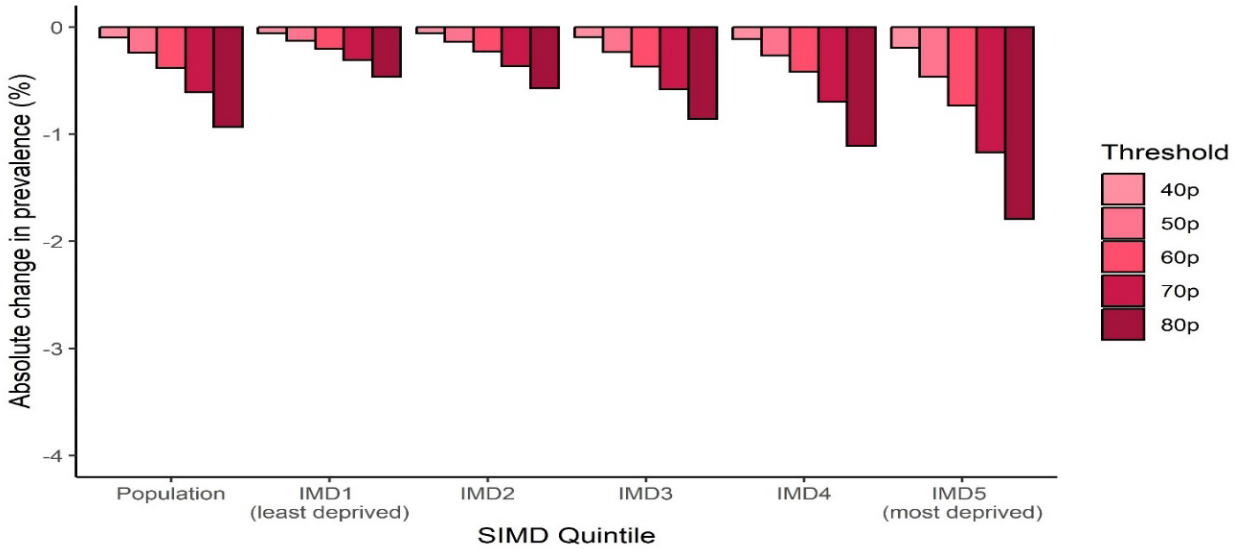


Table 6. Modelled impacts on smoking prevalence in 2024, the year of policy introduction compared to control. These effects do not include the cross-price elasticities of demand. These numbers are also presented in Figure 5. The baseline numbers differ to Table 5 because price elasticities are also used to model the 2024 situation considering tax changes from the year the model is initialised in 2017. The summary report that accompanies this report draws effect size estimates from this table.

	Whole Scottish population	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Number of people who smoke in the population at baseline	610,110	69,850	78,858	102,414	148,080	210,908
Prevalence of smoking at baseline (in units of the percentage of people who smoke in the population)	14.2	7.5	8.8	12.0	18.3	26.6
Change in prevalence of smoking with a threshold of 40p	−0.10	−0.06	−0.06	−0.10	−0.11	−0.19

	Whole Scottish population	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Change in prevalence of smoking with a threshold of 50p	−0.24	−0.13	−0.14	−0.23	−0.27	−0.47
Change in prevalence of smoking with a threshold of 60p	−0.38	−0.20	−0.23	−0.37	−0.42	−0.73
Change in prevalence of smoking with a threshold of 70p	−0.61	−0.31	−0.36	−0.58	−0.70	−1.17
Change in prevalence of smoking with a threshold of 80p	−0.93	−0.46	−0.57	−0.86	−1.11	−1.79

Figure 5 and Table 6 are the alternative version of Figure 3 and Table 5 with cross-price effects set to zero.

6.5. Long-run projection of effects on smoking prevalence in relation to the 2034 tobacco-free target

The model also assessed the impact of each price threshold on the expected smoking prevalence in 2034. In these long-term projections, there is a consistent trend of diminishing effects of the initial introduction of the minimum price threshold on smoking prevalence. For instance, the effect of a 60p minimum threshold, which initially led to a 0.38% point reduction in smoking prevalence in 2024 (Table 6), not considering cross-price effects, is projected to decrease to 0.11% in 2034 (Figure 6, Table 7). The highest threshold at 80p is projected to lead to a 0.24% decrease in smoking prevalence by 2034, still leaving Scotland at a smoking prevalence of 8.44%, short of the 5% target (Table 7).

This decreasing effect on smoking prevalence over successive years occurs because the model assumes the policy's impact is concentrated in the year it is introduced. Although the model does incorporate persistent effects over time on smoking rates for individuals aged 18, as well as the amount of tobacco consumed by people who smoke, it assumes that the underlying smoking state transition probabilities related to smoking initiation, quitting, and relapse remain unaffected by the policy. Consequently,

the model's estimated policy impact gradually diminishes in the years following its introduction, due to relapses among people who quit smoking due to the policy and generational turnover within the model.

To examine how long-term smoking prevalence might be impacted if the policy had more enduring effects, we can refer to the HMRC's estimate of the long-run price elasticity of demand (see Section 2.3 on price elasticities of demand). HMRC estimates that the "short-run" price elasticity of demand for all tobacco products is −0.57, while the "long-run" elasticity is −1.19. This means an immediate effect of −0.57 could grow to −1.19 over the long term, such as by 2034. In other words, as a rough indicator, the effect could approximately double. This would mean that the estimated 0.93% reduction in smoking prevalence in 2024 due to an 80p minimum price (Table 6) could result in a 1.94% reduction or a smoking prevalence of 6.74% by 2034.

Figure 6. Estimated change in the initial policy effects on smoking prevalence (percentage point changes) over years since the initial policy change. These effects consider own-price elasticities of demand only and not cross-price elasticities of demand between hand-rolling tobacco and factory-made cigarettes. They do not include the additional effects of assuming an ongoing, i.e. year on year, consumer response to a minimum pricing policy introduced in 2024.

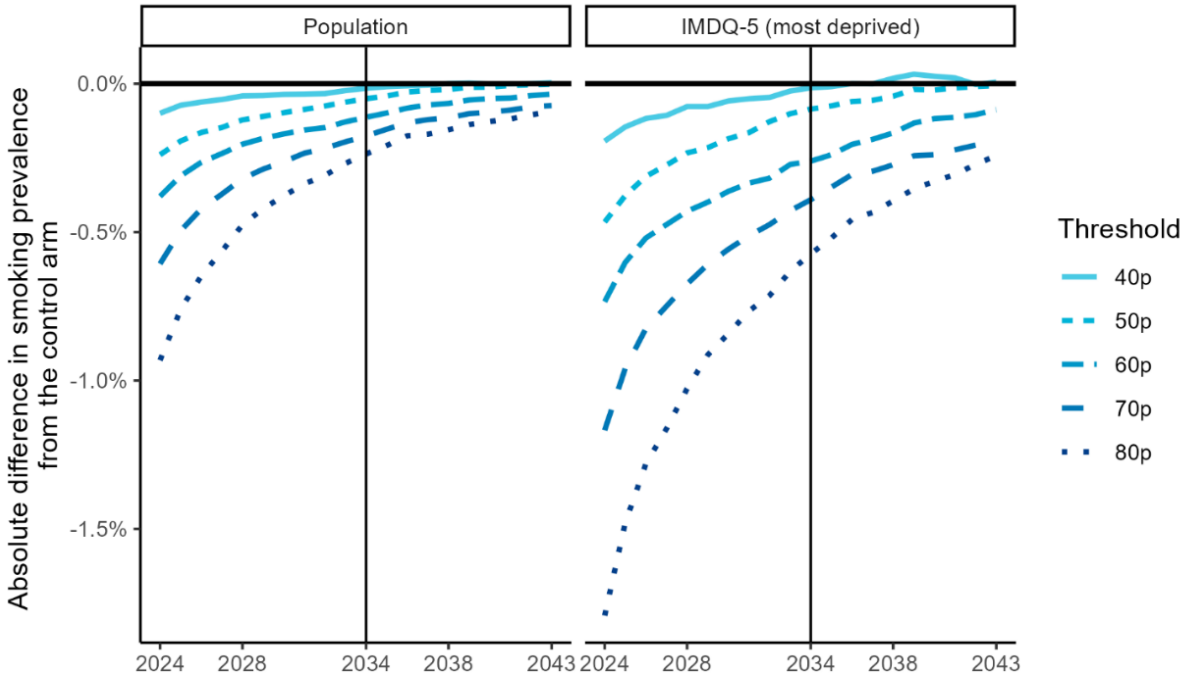


Table 7. Modelled impacts on smoking prevalence in 2034. Note that the baseline values of smoking prevalence are slightly higher than in Section 3 because the cross-price effects have not been factored-in to the effect of the duty escalator on smoking prevalence.

	All people who smoke	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Number of people who smoke in the population in 2034 (control arm)	366,132	40,073	36,118	46,468	88,371	155,102
Prevalence of smoking in 2034 (in units of the percentage of people who smoke in the population)	8.68	4.13	4.12	5.58	11.61	20.00
Thresholds	Absolute change in prevalence vs control (in units of the absolute change in the percentage of people who smoke)					
40p	−0.02	0.00	−0.02	0.00	−0.04	−0.01
50p	−0.05	−0.02	−0.03	−0.04	−0.10	−0.09
60p	−0.11	−0.04	−0.03	−0.08	−0.19	−0.26
70p	−0.18	−0.06	−0.07	−0.13	−0.28	−0.39
80p	−0.24	−0.07	−0.09	−0.18	−0.36	−0.57

6.6. Impact on consumer spending

When tobacco prices rise to meet a minimum threshold, some people who smoke will quit while others will cut back. Those who do not reduce their consumption enough will end up paying more. We analysed the expected increase in weekly tobacco spending for people who smoke who continue smoking in the first year of the policy, excluding cross-price effects. People who quit smoking and therefore reduce their spending to £0 are not included in this estimate of the change in average spending, but the loss of their spending will contribute to reduced revenue to tobacco retailers and tax to the UK Government.

Increasing the minimum price threshold means people who continue to smoke will spend more. For instance, a 60p threshold would raise the average weekly spending on tobacco by £7.21 (Figure 7, Table 8). This increase was slightly more pronounced for people who smoke in the most deprived SIMD quintiles, who typically purchase cheaper tobacco products.

Figure 7. Change in average weekly spending per person who continues to smoke.

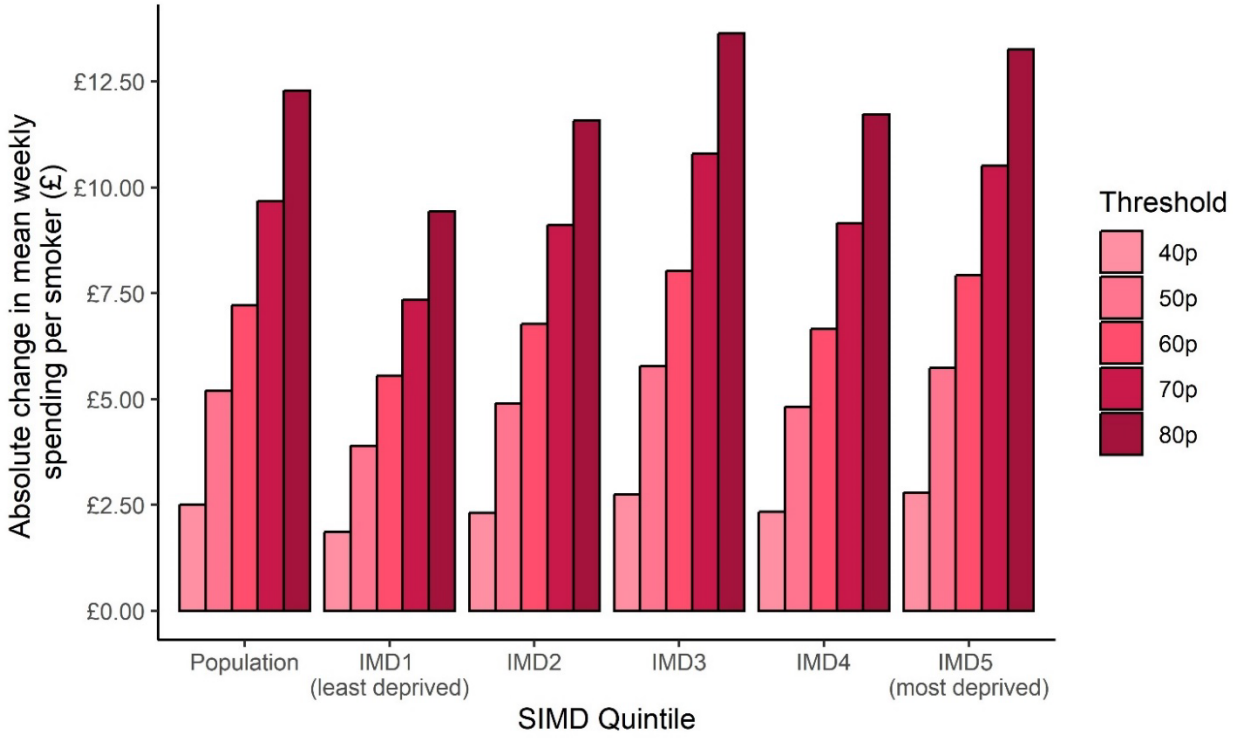


Table 8. Modelled impacts on average spending per smoker per week. These effects do not include the cross-price elasticities of demand. These numbers are also presented in Figure 8.

	All people who smoke	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Mean spending per smoker per week (control)	£14.20	£7.45	£8.77	£11.97	£18.25	£26.62
Thresholds	Absolute change in spending (£) vs. control					
40p	£2.51	£1.86	£2.32	£2.75	£2.34	£2.80
50p	£5.20	£3.90	£4.90	£5.78	£4.82	£5.73
60p	£7.21	£5.55	£6.77	£8.03	£6.66	£7.92
70p	£9.68	£7.35	£9.11	£10.79	£9.16	£10.50
80p	£12.28	£9.43	£11.58	£13.64	£11.72	£13.26

6.7. Health impacts

Using the model that does not consider cross-price effects between hand-rolling tobacco and factory-made cigarettes, we have projected the potential impacts of each minimum price threshold on deaths, years of life lost due to deaths, tobacco-related hospital admissions, and the associated costs of those hospital admissions.

Mortality

Figure 9 illustrates the expected cumulative impact on the years of life lost to premature death due to tobacco smoking from 2024 to 2034. It is important to note that limiting the reporting to 2034 won't capture the policy's full impact on mortality over the lifetimes of those affected. A 60p minimum threshold is predicted to avert 285 deaths and contribute an additional 6,792 years of life to the Scottish population, calculated cumulatively compared to the control arm up to 2034, with a more substantial impact on deaths and the years of life lost to death in individuals residing in the most deprived SIMD quintiles (Table 9 & Table 10).

Morbidity

Figure 10 shows the analogous effects on tobacco-related hospital admissions (see also Table 11). The model suggests that a 60p minimum threshold could lead to there being approximately 1,467 fewer hospital admissions by 2034. This would result in an overall cumulative cost saving to the NHS of approximately £1.2 million over five years and £2.7 million by 2034 (Table 12).

If we were to assume a long-term effect (see Section 4.5), it is likely that the health impacts would also increase in a similar manner as estimated for smoking prevalence, which could approximately double.

Figure 9. Cumulative change in the years of life lost to premature death due to tobacco. This is assessed relative to years of life lost in the control arm up to and including 2034.

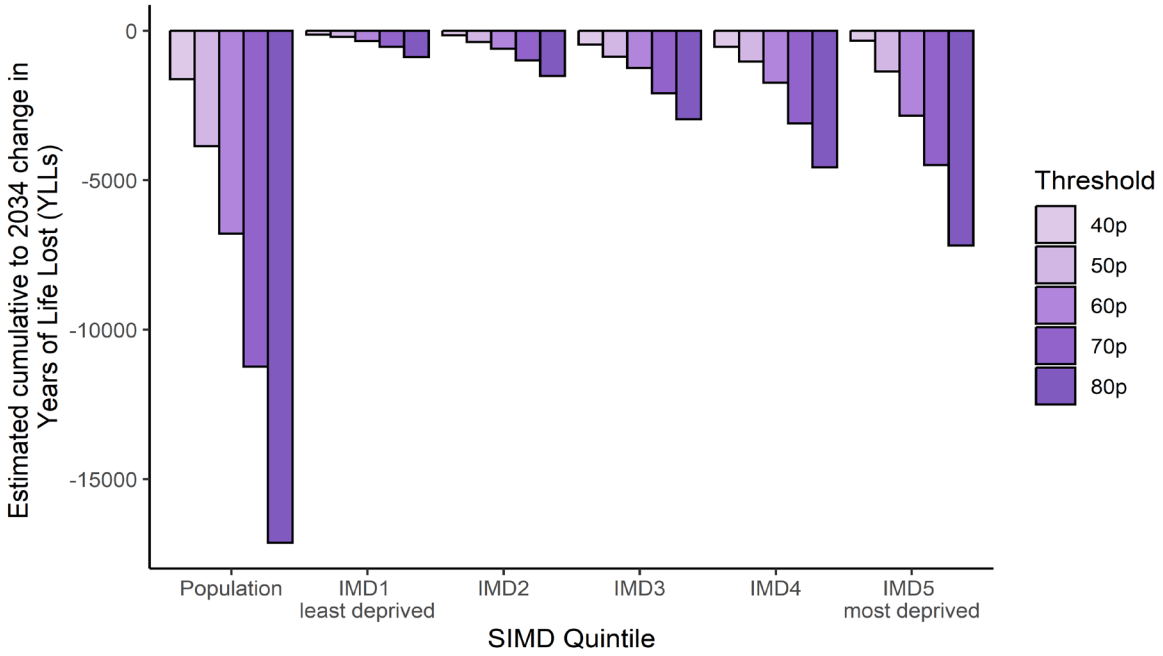


Table 9. Modelled impacts on cumulative deaths postponed relative to control, 2024–2034.

	Population	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Thresholds	Absolute change in cumulative total deaths 2024–2034					
40p	−81	−6	−7	−31	−27	−10
50p	−188	−9	−17	−50	−65	−47
60p	−285	−15	−25	−59	−84	−102
70p	−491	−26	−46	−105	−152	−161
80p	−727	−46	−72	−137	−225	−247

Table 10. Modelled impacts on cumulative year of life lost (YLLs) to death relative to control, 2024–2034.

	Population	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Thresholds	Absolute change in cumulative total YLLs 2024–2034					
40p	−1,627	−133	−155	−463	−538	−339
50p	−3,872	−209	−380	−880	−1,039	−1,363
60p	−6,792	−351	−602	−1256	−1,740	−2,842
70p	−11,245	−536	−998	−2098	−3,113	−4,500
80p	−17,137	−886	−1,519	−2,966	−4,577	−7,189

Figure 10. Cumulative change in the number of tobacco-related hospital admissions. This is assessed relative to tobacco-related hospital admissions in the control arm up to and including 2034.

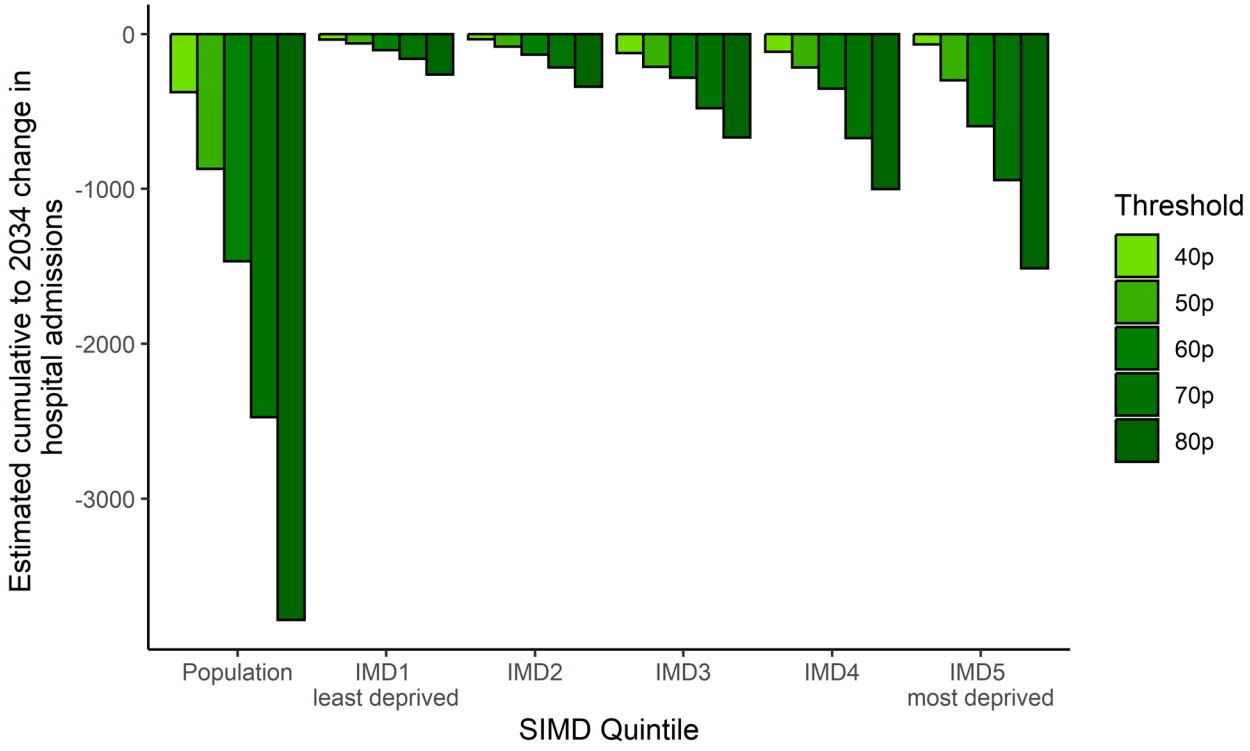


Table 11. Modelled impact on tobacco-related hospital admissions relative to control, 2024–2034.

	Population	SIMD Q1 (least deprived)	SIMD Q2	SIMD Q3	SIMD Q4	SIMD Q5 (most deprived)
Thresholds	Absolute change in cumulative total hospital admissions 2024–2034					
40p	−375	−36	−34	−124	−114	−68
50p	−871	−61	−82	−212	−217	−300
60p	−1,467	−104	−133	−283	−353	−595
70p	−2,474	−161	−217	−480	−673	−943
80p	−3,784	−263	−341	−667	−1,001	−1,512

Table 12. Cumulative impact on the costs of tobacco-related hospitalisations. This is presented over five years and up to 2034 from the policy effect year of 2024.

	Cumulative 5 year	Cumulative 2024–2034
Control	£262,078	£591,024
40p	−£322,549	−£705,786
50p	−£775,290	−£1,630,997
60p	−£1,192,763	−£2,693,594
70p	−£2,094,052	−£4,572,596
80p	−£3,477,927	−£6,952,961

7. The rise in tobacco excise duty that would be needed to produce equivalent effects

Whilst tax is a reserved matter for the UK Government, it is illustrative to ask by how much excise duty would need to rise to achieve effects on smoking prevalence and health that are equivalent to each of the minimum pricing thresholds investigated.

To make this comparison, we identify the percentage increase in excise duty on all tobacco products that would be necessary to achieve each of the following four criteria for each of the minimum price thresholds:

1. Equal effects on smoking prevalence by 2034.
2. Equal effects on cumulative deaths delayed by 2034.
3. Equal effects on smoking prevalence by 2034 among the most deprived SIMD quintile.
4. Equal effects on cumulative deaths delayed by 2034 among the most deprived SIMD quintile.

This approach for comparing two distinct policy types has been previously employed to assess the impacts of minimum pricing for alcohol versus the tax option [46]. Given that our calibration process is centred on achieving equal effects in terms of smoking prevalence and deaths by design, we focus our presentation of results on the levels of tax increase required to achieve these equivalent impacts (Table 13) as well as looking at impacts on overall consumer spending, with a further breakdown into the effects on UK Government revenue and tobacco industry profits (Figure 12, Table 14).

While the assumption is that minimum pricing would tend to favour tobacco industry profits over UK Government tax revenue, quantifying these distinctions would be challenging without this type of equivalent analysis.

Equivalent tax rises

Table 13 shows the calculated tax equivalents for each minimum price threshold. To achieve equivalent effects to a 60p minimum threshold on smoking prevalence by 2034 would require a 12.5% increase in duty on all tobacco products. For 70p and 80p thresholds, equivalence would require 19.5% and 29.0% duty increases respectively. It would take slightly different duty increases to achieve equivalent effects on deaths, due to population variation in patterns of tobacco expenditure in relation to tobacco-related deaths.

Impacts on revenue

We have only presented comparisons of the differences in impacts on tobacco industry profits and UK Government tax revenue for the 60p minimum threshold, contrasted with the corresponding calibrated equivalent levels of a 12.5% excise duty increase across both tobacco products (Figure 12, Table 14). The figures correspond to the cumulative effects on revenue over five years (2024–2028) relative to the control arm. This particular comparison estimates that the 60p minimum price would lead approximately to a £253 million reduction in UK Government tax revenue over five years because the industry would sell less tobacco, while increasing tobacco industry

revenue by £996 million, because the tobacco that is sold would be more expensive (Figure 12). It is important to note that the change in industry revenue is still estimated to be a large increase, despite the countervailing effects of people quitting smoking.

The equivalent tax increase would have the opposite effect. A 12.5% duty increase, equivalent to the effect of a 60p minimum price on smoking prevalence by 2034, would decrease UK Government tax revenue by the small amount of approximately £3 million over five years, and decrease industry revenue by approximately £73 million (Figure 12, Table 14). In this case, the tax increase reduces tax revenue because it causes people to quit tobacco smoking and change their tobacco product preferences, leading to a loss of revenue that outweighs the revenue increasing effects of people who continue to smoke paying more tax.

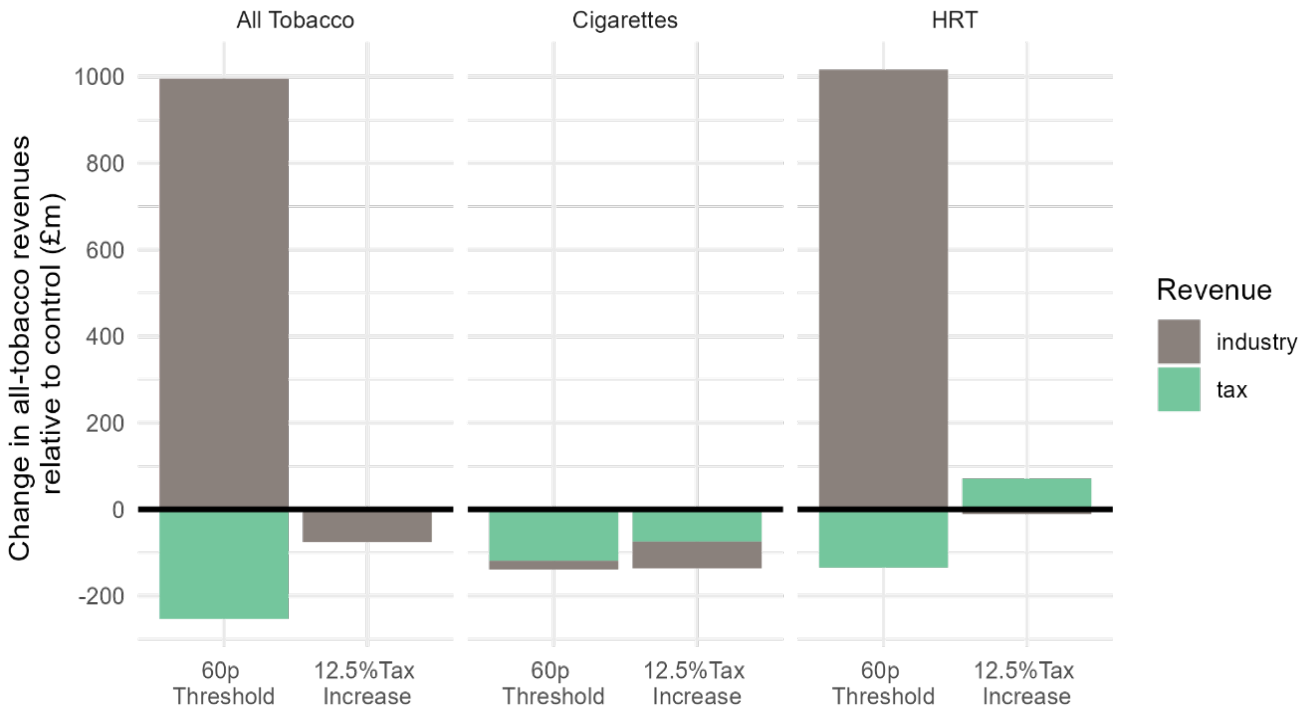
Table 13. The percentage increase in excise duty on all tobacco products that would be necessary to achieve each of the four criteria listed above.

Threshold	1. Smoking prevalence 2034	2. Cumulative deaths 2024–2034	3. Smoking prevalence 2034 (SIMD Q5)	4. Cumulative deaths 2024–2034 (SIMD Q5)	Average
40p	1.5%	3.0%	0.5%	1.0%	1.5%
50p	5.5%	7.5%	4.5%	7.0%	6.1%
60p	12.5%	11.5%	13.5%	14.0%	12.9%
70p	19.5%	20.0%	20.0%	23.0%	20.6%
80p	29.0%	35.0%	31.0%	34.5%	32.4%

Table 14. The cumulative five-year (2024–2028) impact on retail revenue and UK Government tax revenue. The policy effects represent the absolute difference from the control. Numbers correspond to Figure 12 in £ Million.

	Retail revenue			Tax revenue		
	All Tobacco	Cigarettes	Hand-rolled tobacco	All Tobacco	Cigarettes	Hand-rolled tobacco
Control arm	£1,378	£947	£431	£7,200	£5,506	£1,695
Policy effects from 60p threshold	£996	−£20	£1,016	−£253	−£119	−£135
Policy effects from 12.5% Tax Rise	−£73	−£62	−£11	−£3	−£74	£71

Figure 12. The cumulative five-year (2024–2028) impact on tobacco industry revenue and UK Government tax revenue for two scenarios: a 60p minimum price threshold and a 12.5% increase in excise duty on both tobacco products. The duty increase is calibrated to achieve the same reduction in smoking prevalence by 2034 as the 60p minimum price threshold. The key finding is that the minimum price policy results in a greater increase in tobacco industry revenue and a larger decrease in UK Government tax revenue compared to the tax increase. The differing effects on factory-made cigarettes and hand-rolling tobacco are influenced by how the minimum price and tax increase alter the average prices of these products, which in turn affects consumer product preferences.



8. Discussion

This report has outlined the potential impacts of implementing varying levels of minimum pricing for tobacco on smoking prevalence and public health in Scotland. The estimated impacts presented here are likely conservative, as they are based on a baseline scenario regarding the future trajectory of smoking prevalence in Scotland that many may consider optimistic.

Minimum pricing for tobacco is assessed to be an effective method for elevating the price of the cheapest legally available tobacco. A 60p minimum price would raise the price of all hand-rolling tobacco and the price of the cheapest factory-made cigarettes, resulting in an estimated 16,327 fewer people who smoke, and increase average spending for people who remain smoking of £7.21 per week. The impact of this policy would be more significant in areas with higher levels of deprivation, owing to the existing patterns of tobacco consumption and spending preferences. Furthermore, the effects on tobacco consumption and public health would increase with the higher

minimum price thresholds. Higher minimum thresholds would result in greater revenue for the tobacco industry from product sales, while a tax increase that produces equivalent effects would instead reduce industry profits.

Implementing both a tax increase and a minimum price for tobacco products would raise prices across the entire price range. This combined policy approach would ensure that the cheapest products become more expensive, preventing the tobacco industry from keeping these products easily affordable by absorbing some of the tax increases. This would, in turn, limit the options for people to keep smoking by switching to cheaper tobacco products. Additionally, combining these two policy measures would help offset the additional revenue the tobacco industry might otherwise gain from a minimum price alone.

8.1. Limitations of the modelling approach

The modelling approach has three main limitations. The first concerns the limited evidence on cross-price effects between hand-rolling tobacco and factory-made cigarettes. The cross-price elasticity estimates in this report suggest that hand-rolling tobacco and factory-made cigarettes complement each other [33]. This means that when the price of one product increases, consumption of both products decreases. However, the 95% confidence intervals around the estimates of the cross-price effects also leave room for the less likely possibility that they act as substitutes, where a price increase for one product would lead to increased consumption of the other. It is also unclear which consumers are most affected by these cross-price effects. One view is that they would primarily apply to consumers familiar with both products and aware of their relative prices. However, the method used to estimate the elasticities used in this report was not able to estimate how consumers with different characteristics might respond differently to price changes. Instead, the estimates reflect broader population trends in the consumer data. To explore this uncertainty, we initially estimated policy effects with cross-price effects applied to all individuals in the model (maximal cross-price effects), but then exclude cross-price effects from consideration by setting them to zero.

A second related issue arises in predicting how price changes in tobacco might prompt consumers to switch to alternative nicotine products, such as e-cigarettes. Most of the evidence in this area comes from the United States, limiting its direct applicability [47]. Similarly, there is uncertain evidence on how price increases in tobacco products might push individuals toward illicit tobacco. Recent studies indicate awareness of the illicit market among people who smoke and concern about migration to such products as a price minimising strategy [48]. Other research [34], alongside the recently introduced UK Government strategy on illicit tobacco [49], emphasises the importance of stronger enforcement to regulate illicit tobacco. Implementing large tobacco price increases without accompanying enforcement measures could amplify the demand for illicit tobacco, suggesting that coordinated action on supply is necessary to counter these effects.

Third, in terms of health outcomes, the model's estimates focus on the impact of quitting smoking completely, linking quitting to changes in mortality and morbidity rates. However, it does not consider the cumulative health effects of past smoking or the potential benefits of reducing, rather than quitting, smoking. These factors, while important, are not captured by the model. Nonetheless, the primary health benefits are

expected to arise from quitting, which is the main driver of the outcomes. The model includes 52 diseases related to smoking, providing comprehensive coverage [32]. However, it sacrifices detailed disease-specific modelling due to the complexity required to accurately represent individual disease trajectories and the nuanced relationship between smoking cessation and disease progression.

8.2. Alternative and complementary policy options

The 2022 Kahn review [50], an independent assessment of tobacco policy commissioned by the UK Government, recommended a one-off 30% increase in tobacco excise duty, which would be much larger than any prior duty rise. Taking the Kahn review's recommended 30% increase in tobacco excise duty as a reference point, the calibrations in this report indicate that this would roughly equate to the highest minimum pricing threshold of 80p per stick (Table 13).

The tax alternatives to implementing a minimum price are not limited solely to a 30% excise duty increase for all tobacco products. The range of tax options under consideration includes various structural reforms and rate adjustments [51, 52]. Among these options, two policies stand out as having effects similar to setting a minimum price.

The first option involves expanding the existing Minimum Excise Tax (MET) (see Section 1.1) to encompass Value Added Tax within the total tax amount to which the minimum tax threshold applies. This extended version was referred to as the "Minimum Consumption Tax" in the government consultation on the Minimum Excise Tax [53]. These minimum tax structures, which encompass MET and MCT, are effective only when products have an ad valorem component, which means that taxes are applied in proportion to the price of the products either before or after excise duty is added. These ad valorem tax structures incentivise the tobacco industry to increase their profits from product sales to meet the minimum tax threshold. However, although this worked initially after the MET was implemented, the industry is now apparently choosing to pay the MET on products because it values the ability to keep the least expensive tobacco products affordable (see Section 1.1).

The second option involves introducing a wholesale price cap alongside a substantial increase in excise duty [54–56]. The price cap, acting as an upper limit on wholesale prices, restricts the profits that the industry can generate from selling more expensive tobacco products. Simultaneously, the excise duty increase can be calibrated to prevent tobacco products from becoming cheaper due to the price cap while raising the prices of all tobacco products. This would result in a substantial overall price increase, an increase in UK Government revenue, and a deliberate limitation of industry profits. Moreover, it curbs the possibility of price variation in the tobacco market, which would limit the ability for the tobacco industry to use price as a marketing tool and to use pricing tactics to mitigate the effects of tax increases. By offsetting reductions in wholesale prices with increases in excise tax, previously large industry profits would transfer to an increase in UK Government tax revenues [57]. A previous investigation of this possibility using UK company account information up to 2010 suggested this could be in the region of £500 million per year [54], although those estimates are now dated. Not only could such additional UK Government tax revenue be beneficial in funding wider public health measures, but the inherent reduction in industry profitability would also materially change industry incentives for

continuing the tobacco epidemic. However, it remains unclear how a price cap policy strategy would interact with the existing Minimum Excise Tax and might necessitate its replacement.

Another category of policy options that could influence tobacco prices includes levies and fee schemes that may impose various charges directly on tobacco manufacturers, importers, and retailers. The impact of these policies on tobacco consumption primarily hinges on the reactions of the affected segments within the tobacco industry to these additional charges. Retailer licencing fees for selling tobacco are one such policy option discussed for Scotland [58]. License fees could reduce the availability of tobacco, by leading retailers to stop selling tobacco products or cease their business operations altogether. Licensing could also make tobacco more expensive, either because retailers pass the license costs on to consumers or consumers have to pay more to travel greater distances to purchase tobacco products [59]. This approach could also support the enforcement of minimum price regulations.

8.3. Policy challenges

Efforts aimed at curbing the illicit tobacco market are, in essence, a type of price regulation as illicit tobacco is notably the most affordable option. The availability of illicit tobacco can therefore undermine the effectiveness of measures to reduce smoking prevalence by providing a cheaper alternative to UK duty-paid tobacco. The tobacco industry tends to use the expectation of an increase in demand for illicit tobacco to argue against large tobacco price rises [34]. However, policies to control the supply of illicit tobacco are impactful and there has been an overall decline in levels of illicit tobacco in the UK despite continued tax increases [60]. In 2024, the Conservative UK Government introduced a new strategy to reduce the demand for and accessibility of illicit tobacco and to increase enforcement activities against the organised crime groups involved in its supply [49]. A recent survey of the English public found that the public generally agree with taking stronger action on illicit tobacco, particularly to limit cheap access to tobacco for children [48]. However, there was less agreement that illicit tobacco causes harm and that buying illicit tobacco is a major problem among people who currently smoke from lower socioeconomic backgrounds [48]. The conclusion is that carefully coordinated policy actions would be needed to prevent a rise in illicit tobacco use following the introduction of a minimum price for tobacco.

It is also important to consider that when new price regulations lead to a significant price increase for the most affordable tobacco, there is a potential risk of stigmatising or imposing financial burdens on individuals who are not yet prepared to quit or may not be in a position to quit [52; 61]. In the event of substantial price increases, it is therefore crucial to consider the complementary policies that could alleviate these adverse consequences. For instance, new pricing policy might be paired with additional investments in specialised stop-smoking services, offering support to those who want to quit but face barriers to doing so. In Scotland, the actions outlined in the Tobacco and Vaping Framework [1] include implementing the recommendations from the Public Health Scotland review of smoking cessation services, increasing their promotion and accessibility [62].

8.4. Conclusion

The implementation of a minimum price for tobacco products in Scotland could effectively increase the cost of the least expensive tobacco. This, in turn, holds the potential for significant reductions in smoking rates, overall health improvements, and a decrease in health inequalities. Nevertheless, it is important to also acknowledge the necessity of supplementary policy strategies including those aimed at curbing illicit trade and supporting individuals who rely on inexpensive tobacco to quit smoking.

9. References

[1] Scottish Government. Tobacco and vaping framework: Roadmap to 2034 (2023) https://www.gov.scot/publications/tobacco-vaping-framework-roadmap-2034/

[2] Scottish Government. Raising Scotland's tobacco-free generation: Our tobacco control action plan 2018 (2018) https://www.gov.scot/publications/raising-scotlands-tobacco-free-generation-tobacco-control-action-plan-2018/

[3] Angus C, Morris D, Leeming G, et al. New modelling of alcohol pricing policies, alcohol consumption and harm in Scotland (2023) https://sarg-sheffield.ac.uk/wp-content/uploads/2023/09/sarg-scottish-mup-report-2023.pdf

[4] Scottish Public Health Observatory. Tobacco use: Smoking attributable deaths (2019) https://www.scotpho.org.uk/behaviour/tobacco-use/data/smoking-attributable-deaths/

[5] Scottish Government. The Scottish Health Survey 2022 – volume 1: main report (2023) https://www.gov.scot/publications/scottish-health-survey-2022-volume-1-main-report

[6] Chaloupka FJ, Powell LM, Warner KE. The Use of Excise Taxes to Reduce Tobacco, Alcohol, and Sugary Beverage Consumption. Annual Review of Public Health 2019;40:187-201.https://doi.org/10.1146/annurev-publhealth-040218-043816

[7] U.S. National Cancer Institute, World Health Organization. The Economics of Tobacco and Tobacco Control (2016). Bethesda, MD:U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; and Geneva, CH: World Health Organization. https://cancercontrol.cancer.gov/brp/tcrb/monographs/21/docs/m21_complete.pdf

[8] Jackson SE, Cox S, Buss V, et al. Trends in motives for trying to stop smoking: a population study in England, 2018-2023. BMJ Public Health 2024;2(1):e000420.https://doi.org/10.1136/bmjph-2023-000420

[9] NHS Health Scotland. Strengths and limitations of tobacco taxation and pricing strategies (2018) http://www.healthscotland.scot/publications/impact-of-tobacco-pricing-on-smoking-prevalence

[10] Public Health Scotland. Stopping tobacco smoking and youth vaping: A position statement on behalf of the scottish public health system (2024) https://publichealthscotland.scot/media/26387/2024-03-stopping-tobacco-smoking-and-youth-vaping-english.pdf

[11] UK Government. Tobacco and Vapes Bill (2024) https://bills.parliament.uk/bills/3703

[12] Doogan NJ, Wewers ME, Berman M. The impact of a federal cigarette minimum pack price policy on cigarette use in the USA. Tobacco control 2018;27(2):203-208.https://doi.org/10.1016/j.ypmed.2021.106444

[13] Golden SD, Farrelly MC, Luke DA, et al. Comparing projected impacts of cigarette floor price and excise tax policies on socioeconomic disparities in smoking. Tobacco Control 2016;25(Suppl 1):i60-i66.https://doi.org/10.1136/tobaccocontrol-2016-053230

[14] Tynan MA, Ribisl KM, Loomis BR. Impact of cigarette minimum price laws on the retail price of cigarettes in the USA. Tobacco Control 2013;22(e1):e78-e85.https://doi.org/10.1136/tobaccocontrol-2012-050554

[15] McLaughlin I, Pearson A, Laird-Metke E, et al. Reducing tobacco use and access through strengthened minimum price laws. American Journal of Public Health 2014;104(10):1844-1850.https://doi.org/10.2105/AJPH.2014.302069

[16] Huang J, Chriqui JF, DeLong H, et al. Do state minimum markup/price laws work? Evidence from retail scanner data and TUS-CPS. Tobacco Control 2016;25(Suppl 1):i52-i59.https://doi.org/10.1136/tobaccocontrol-2016-053093

[17] Golden SD, Kim K, Kong AY, et al. Simulating the impact of a cigarette minimum floor price law on adult smoking prevalence in California. Nicotine and Tobacco Research 2020;22(10):1842-1850.https://doi.org/10.1093/ntr/ntaa046

[18] Boettiger DC, White JS. Effects of a minimum floor price law on cigarette use in Oakland, California: a static microsimulation model. Preventive Medicine 2021;145:106444.https://doi.org/10.1016/j.ypmed.2021.106444

[19] Ribisl KM, Golden SD, Huang J, et al. Addressing lower-priced cigarette products through three-pronged comprehensive regulation on excise taxes, minimum price policies and restrictions on price promotions. Tobacco Control 2022;31(2):229-234.https://doi.org/10.1136/tobaccocontrol-2021-056553

[20] Ma H, Golden SD. Impact of New York City Cigarette Floor Price Policy on Reducing Smoking Disparities. Nicotine and Tobacco Research 2024:ntae122.https://doi.org/10.1093/ntr/ntae122

[21] Critchlow N, Moodie C, Best C, et al. Anticipated responses to a hypothetical minimum price for cigarettes and roll-your-own tobacco: an online cross-sectional survey with cigarette smokers and ex-smokers in the UK. BMJ open 2021;11(3):e042724.https://doi.org/10.1136/bmjopen-2020-042724

[22] Hiscock R, Augustin NH, Branston JR, et al. Standardised packaging, minimum excise tax, and RYO focussed tax rise implications for UK tobacco pricing. PloS one 2020;15:e0228069.https://doi.org/10.1371/journal.pone.0228069

[23] Gilmore AB, Tavakoly B, Hiscock R, et al. Smoking patterns in Great Britain: the rise of cheap cigarette brands and roll your own (RYO) tobacco. Journal of Public Health 2015;37(1):78-88.https://doi.org/10.1093/pubmed/fdu048

[24] HM Revenue & Customs. Increases to tobacco duty rates from 22 November 2023 (2023) https://www.gov.uk/government/publications/changes-to-tobacco-duty-rates-from-22-november-2023/increases-to-tobacco-duty-rates-from-22-november-2023

[25] Wilson LB, Pryce R, Hiscock R, et al. 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.https://doi.org/10.1136/tobaccocontrol-2020-055931

[26] Gilmore A, Tavakoly B, Taylor G, et al. Understanding tobacco industry pricing strategy and whether it undermines tobacco tax policy: The example of the UK cigarette market. Addiction 2013;108(7):1317-1326.https://doi.org/10.1111/add.12159

[27] Sheikh ZD, Branston JR, Gilmore AB. Tobacco industry pricing strategies in response to excise tax policies: a systematic review. Tobacco Control 2023;32(2):239-250.https://doi.org/10.1136/tobaccocontrol-2021-056630

[28] Morris D, Brennan A, Angus C, et al. Tobacco and Alcohol Tax and Price Intervention Simulation Model (TAX-sim): full technical documentation. The University of Sheffield URL: https://osfio/nfa4v 2023.10.17605/OSF.IO/KR23Z

[29] ScotCen Social Research. Scottish Health Survey. UK Data Service 2019:SN: 2000047.http://doi.org/10.5255/UKDA-Series-2000047

[30] Gillespie D, Brennan A. The Sheffield Tobacco Policy Model (STPM): full technical documentation. Version 2.0.1 (2023). https://osf.io/96e5b:The University of Sheffield. doi.https://doi.org/10.17605/OSF.IO/FR7WN

[31] Scottish Government. Scottish Index of Multiple Deprivation 2020 (2020) https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/

[32] Webster L, Angus C, Brennan A, et al. Smoking and the risks of adult diseases. 2018.https://doi.org/10.15131/shef.data.7411451

[33] Pryce R, Wilson LB, Gillespie D, et al. Estimation of integrated price elasticities for alcohol and tobacco in the United Kingdom using the living costs and food survey 2006–2017. Drug and Alcohol Review 2023.https://doi.org/10.1111/dar.13773

[34] Partos TR, Hiscock R, Gilmore AB, et al. Impact of tobacco tax increases and industry pricing on smoking behaviours and inequalities: a mixed-methods study (2020):NIHR Journals Library, Southampton (UK). https://www.ncbi.nlm.nih.gov/books/NBK555628

[35] Czubek S, Johal M. Econometric analysis of cigarette consumption in the UK (2010):HM Revenue & Customs. https://www.gov.uk/government/publications/econometric-analysis-of-cigarette-consumption-in-the-uk

[36] HM Revenue and Customs. Update to HMRC Working Paper Number 9: Econometric Analysis of Cigarette Consumption in the UK (2015) https://assets.publishing.service.gov.uk/media/5a80075ae5274a2e8ab4dc29/Update_to_HMRC_Working_Paper_Number_9.pdf

[37] Gillespie D, Webster L, Leeming G, et al. smktrans: An R Package for estimating smoking state transition probabilities from cross-sectional survey data. R package version 1.6.0. Open access code: https://github.com/STAPM/smktrans. url: https://stapm.gitlab.io/r-packages/smktrans/: University of Sheffield 2024.

[38] Department of Health and Social Care. Tobacco and Vapes Bill: impact assessment (2024) https://www.gov.uk/government/publications/tobacco-and-vapes-bill-impact-assessment

[39] Garnett C, Tombor I, Beard E, et al. Changes in smoker characteristics in England between 2008 and 2017. Addiction 2019.https://doi.org/10.1111/add.14882

[40] Jackson SE, Tattan-Birch H, Shahab L, et al. Have there been sustained impacts of the COVID-19 pandemic on trends in smoking prevalence, uptake, quitting, use of treatment, and relapse? A monthly population study in England, 2017–2022. BMC Medicine 2023;21(1):474.https://doi.org/10.1186/s12916-023-03157-2

[41] Gillespie D, Langley T, Agrawal S. Section 2.6 - Model-based projections of alternative scenarios for the future trajectories of smoking prevalence in England and corresponding differences in quality-adjusted years of life. 'Smoking and health 2021: A coming of age for tobacco control?' (2021):Royal College of Physicians. https://www.rcplondon.ac.uk/projects/outputs/smoking-and-health-2021-coming-age-tobacco-control

[42] Wilson LB, Angus C, Pryce R, et al. 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(9):2538-2547.https://doi.org/10.1111/add.15430

[43] Office for National Statistics. Consumer price inflation time series (2023) https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/consumerpriceindices

[44] Office for Budget Responsibility. Economic and fiscal outlook (2022) https://obr.uk/docs/dlm_uploads/CCS0822661240-002_SECURE_OBR_EFO_November_2022_WEB_ACCESSIBLE.pdf

[45] MESAS, Public Health Scotland. Evaluating the impact of alcohol minimum unit pricing in Scotland: Observational study of small retailers (2020) https://www.healthscotland.scot/media/3094/evaluating-the-impact-of-alcohol-minimum-unit-pricing-in-scotland-observational-study-of-small-retailers.pdf

[46] Meier PS, Holmes J, Angus C, et al. Estimated Effects of Different Alcohol Taxation and Price Policies on Health Inequalities: A Mathematical Modelling Study. PLOS Medicine 2016;13(2):---.https://doi.org/10.1371/journal.pmed.1001963

[47] Tobacco Advisory Group of the Royal College of Physicians. E-cigarettes and harm reduction: An evidence review (2024). London https://www.rcp.ac.uk/policy-and-campaigns/policy-documents/e-cigarettes-and-harm-reduction-an-evidence-review/

[48] Davies N, Langley T, Jayes L, et al. Attitudes And Exposure To Illicit Tobacco In England, 2022. Nicotine and Tobacco Research 2024.https://doi.org/10.1093/ntr/ntae118

[49] Border Force, HM Revenue & Customs. Stubbing out the problem: A new strategy to tackle illicit tobacco (2024) https://www.gov.uk/government/publications/stubbing-out-the-problem-a-new-strategy-to-tackle-illicit-tobacco/stubbing-out-the-problem-a-new-strategy-to-tackle-illicit-tobacco

[50] Kahn J. The Khan review: making smoking obsolete (2022). London:Office for Health Improvement and Disabilities. https://www.gov.uk/government/publications/the-khan-review-making-smoking-obsolete

[51] Hatchard J, Buykx P, Brennan A, et al. Options for modifying UK alcohol and tobacco tax: A rapid scoping review of the evidence over the period 1997–2018 [version 1; peer review: awaiting peer review]. NIHR Open Research 2023;3(26).https://doi.org/10.3310/nihropenres.13379.1

[52] Hatchard J, Buykx P, Wilson L, et al. Mapping alcohol and tobacco tax policy interventions to inform health and economic impact analyses: A United Kingdom based qualitative framework analysis. International Journal of Drug Policy 2023;122:104247.https://doi.org/10.1016/j.drugpo.2023.104247

[53] HM Treasury. Closed consultation: Minimum excise tax (2014) https://www.gov.uk/government/consultations/minimum-excise-tax/minimum-excise-tax

[54] Branston JR, Gilmore AB. The case for Ofsmoke: the potential for price cap regulation of tobacco to raise 500 pound million per year in the UK. Tobacco Control 2014;23(1):45-50.https://doi.org/10.1136/tobaccocontrol-2011-050385

[55] Gilmore AB, Branston JR, Sweanor D. The case for OFSMOKE: How tobacco price regulation is needed to promote the health of markets, government revenue and the public. Tobacco Control 2010;19(5):423-430.https://doi.org/10.1136/tc.2009.034470

[56] Scollo M, Branston JR. Where to next for countries with high tobacco taxes? The potential for greater control of tobacco pricing through licensing regulation. Tobacco Control 2022;31:235-240.https://doi.org/10.1136/tobaccocontrol-2021-056554

[57] Branston JR. Industry profits continue to drive the tobacco epidemic: A new endgame for tobacco control? Tobacco Prevention & Cessation 2021;7(45).https://doi.org/10.18332/tpc/138232

[58] Valiente R, Tunstall H, Kong AY, et al. Geographical differences in the financial impacts of different forms of tobacco licence fees on small retailers in Scotland. Tobacco Control 2024.https://doi.org/10.1136/tc-2023-058342

[59] Pearson AL, Cleghorn CL, van der Deen FS, et al. Tobacco retail outlet restrictions: health and cost impacts from multistate life-table modelling in a national population. Tobacco Control 2017;26(5):579-585.https://doi.org/10.1136/tobaccocontrol-2015-052846

[60] HM Revenue and Customs. Measuring tax gaps 2021 edition - tax gap estimates for 2019 to 2020 (2021) https://webarchive.nationalarchives.gov.uk/ukgwa/20220614163810/https://www.gov.uk/government/statistics/measuring-tax-gaps

[61] Hoek J, Smith K. A qualitative analysis of low income smokers' responses to tobacco excise tax increases. International Journal of Drug Policy 2016;37:82-89.https://doi.org/10.1016/j.drugpo.2016.08.010

[62] Public Health Scotland. Review of smoking cessation services in Scotland (2023) https://publichealthscotland.scot/publications/review-of-smoking-cessation-services-in-scotland/review-of-smoking-cessation-services-in-scotland-advisory-group-report/