



A rapid evidence review of the effectiveness and cost-effectiveness of alcohol control policies: an English perspective

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This paper reviews the evidence for the effectiveness and cost-effectiveness of policies to reduce alcohol-related harm. Policies focus on price, marketing, availability, information and education, the drinking environment, drink-driving, and brief interventions and treatment. Although there is variability in research design and measured outcomes, evidence supports the effectiveness and cost-effectiveness of policies that address affordability and marketing. An adequate reduction in temporal availability, particularly late night on-sale availability, is effective and cost-effective. Individually-directed interventions delivered to at-risk drinkers and enforced legislative measures are also effective. Providing information and education increases awareness, but is not sufficient to produce long-lasting changes in behaviour. At best, interventions enacted in and around the drinking environment lead to small reductions in acute alcohol-related harm. Overall, there is a rich evidence base to support the decisions of policy makers in implementing the most effective and cost-effective policies to reduce alcohol-related harm.

Introduction

Alcohol-related harm is determined by the volume of alcohol consumed and frequency of drinking occasions, at both the individual and population level.^{1,2} Harm is influenced by three key drivers: price (affordability), how easy it is to purchase (availability), and social norms (acceptability).³

Alcohol sales in England and Wales have increased by approximately 42%, from roughly 400 million litres in the early 1980s, with a peak at 567 million litres in 2007–08, and a subsequent decline to 533 in 2015–16 (figure 1).⁴ This increase in sales has been predominantly driven by increased consumption among women, a shift to higher

strength products, and the increasing affordability of alcohol, particularly throughout the 1980s and 1990s.^{4–6} Alcohol-related mortality has also increased over this period, which is in stark contrast to the trend of liver disease mortality in much of western Europe.⁷

Alcohol is a prominent commodity in the UK marketplace, and is widely used in numerous social situations. The majority of people in England drink alcohol,⁸ and for many, it is associated with positive aspects of life. However, a substantial number of people experience harm from their own or others' drinking. Combined data from the 2012 to 2014 Health Survey for England indicate that 16·0% of the population are

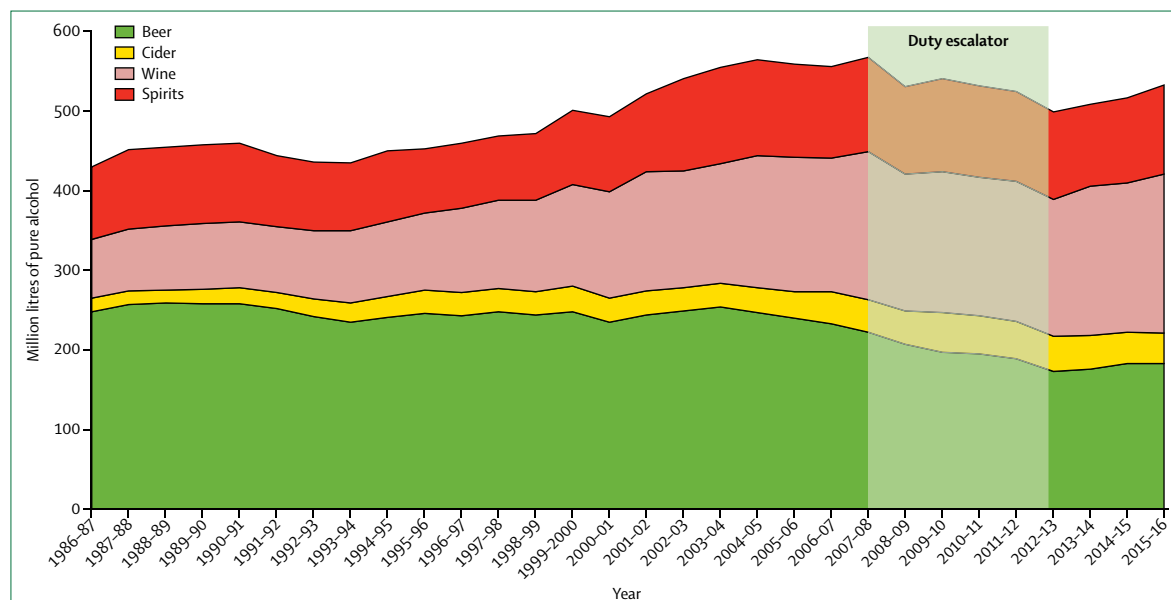


Figure 1: Cumulative consumption of alcohol in England and Wales, by alcohol type⁴

Million litres of pure alcohol as calculated from HM Revenue and Customs Bulletin using the following conversions: wine (12·58), cider (5·03), and beer (41·7); conversion are from British Beer and Pub Association Statistical Handbook 2009.

For statistics from the British Beer and Pub Association see <http://www.beerandpub.com/statistics>

non-drinkers, 58·8% drink at lower-risk levels (defined as ≤ 14 standard units per week [units are 10 mL or 8 g of alcohol]), 20·8% at increasing-risk levels (>14 units to <35 units per week for women and <50 units per week for men), and 3·1% at higher-risk levels (≥ 35 [women] and ≥ 50 [men] to <75 units per week).⁴ There is also an important subpopulation of people who drink 75 units of alcohol or more per week and have been termed extreme drinkers.⁴ This group comprise 1·3% of the population, and alongside the higher-risk drinkers, make up 4·4% of the population; these two groups (higher-risk and extreme drinkers) consume over one-third of all self-reported alcohol (figure 2). The combination of increasing-risk, higher-risk, and extreme drinkers account for about 25% of the population and over 75% of the total self-reported alcohol consumption.

For people aged 15–49 years in England, alcohol misuse is the biggest risk factor attributable to early mortality, ill health, and disability, and for all ages it is the fifth most important.⁹ In England in 2015, there were an estimated 167 000 working years lost due to alcohol (16% of all working years lost). More working years are lost to alcohol than the ten most frequent cancer types combined. Figure 3 shows the causes of death which lead to the greatest number of working years lost in England and the contribution that alcohol makes to each of these causes. The most significant of these is liver disease with 50 000 working years lost due to alcohol each year.

Many of the harms related to alcohol consumption are typified by the drinkers' volume and pattern of drinking.¹⁰ Injury is associated with a single bout of heavy drinking,¹¹ while regular drinking is associated with an increased risk of cancer.¹² Repeated heavy drinking can lead to alcohol dependence¹³ and liver cirrhosis.¹⁴

The relationship between alcohol consumption and harm can also be complex. For example, excessive alcohol consumption can increase the risk of unemployment; but unemployment can also increase alcohol consumption.¹⁵ Furthermore, alcohol can act as a mechanism to cause harm in ways that are both acute and chronic. For example, acute intoxication can increase the propensity to attempt suicide, and long-term consumption increases the likelihood of suicidal ideation.¹⁶

Individual risk factors moderate the susceptibility to alcohol-related harm. Of these, perhaps the most important is genetic, with approximately 60% of the tendency to develop an alcohol-related mental health issue inherited.¹⁷ Other factors include age, gender, and socioeconomic status.¹⁰ People who are less affluent are more likely to die or suffer an alcohol-related disease, despite reporting similar or lower levels of average consumption.¹⁸ Of over 1 million hospital admissions in 2014–15 where an alcohol-related condition was a feature, 47% occurred in the lowest three socioeconomic deciles.¹⁹ The explanation for this association is not certain, but may reflect lower resilience or compounding health factors in less affluent groups.¹⁸

The harm arising from alcohol is an internationally-accepted public health challenge, with substantial costs to individual drinkers, to people around them, and to society. The economic burden of alcohol use is consistently high, with UK Government estimates placing the annual cost at over £21 billion in 2012,²⁰ amounting to 1·3% of gross domestic product (GDP). A review of studies in high-income countries that had comparable methodologies shows the gross economic costs of alcohol to range from 1·4% to 2·7% of GDP, equivalent to between £27 billion and £52 billion in 2016.²¹ Few studies report costs on the magnitude of harm to people other than the drinker so the economic burden of alcohol consumption is generally underestimated.²² The financial burden that alcohol-related harm places on society is not reflected in its market price, with the costs to individual consumers being lower than the impact of alcohol on taxpayers.

Review methodology

This Review was commissioned by the Department of Health who asked Public Health England to provide an overview of alcohol-related harm in England and possible policy solutions. There have been several previous reports on this issue, including an Academy of Medical Sciences report,²³ an expert synthesis,²⁴ an overview by WHO,²⁵ and most recently, a review by the Organisation for Economic Co-operation and Development (OECD).²⁶

Our Review offers a broad and rigorous summary of the current evidence for the effectiveness and cost-effectiveness of alcohol control policies. Effectiveness is defined as the degree to which an intervention reduces

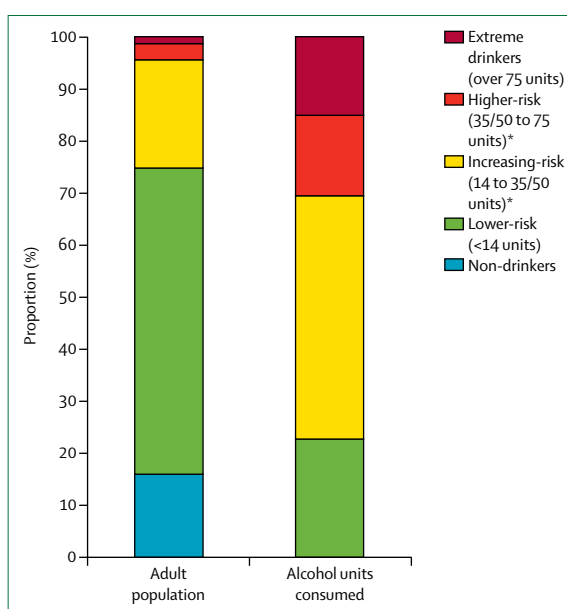


Figure 2: Alcohol consumption recorded in the 2012 to 2014 Health Survey for England, by level of alcohol consumption

*Female/male units per week. Adapted from Sheron et al.⁴

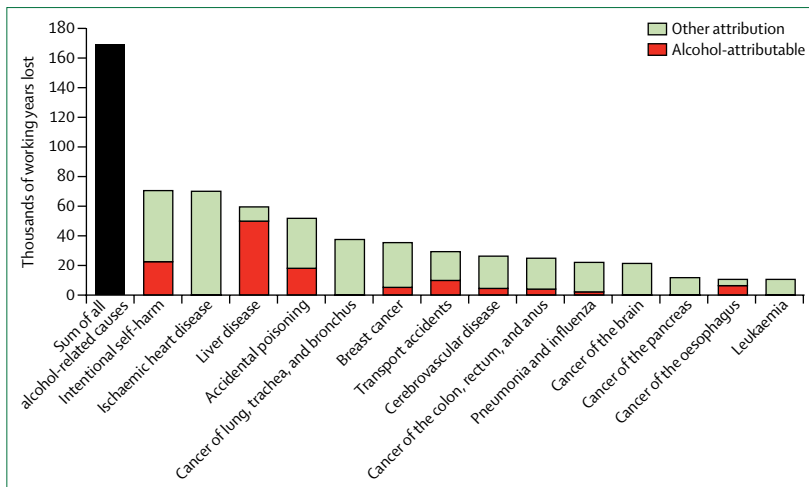


Figure 3: Working years lost in the UK in 2015, broken down into alcohol-related harms and other attributable harms

Based on analysis of mortality data from Office for National Statistics.

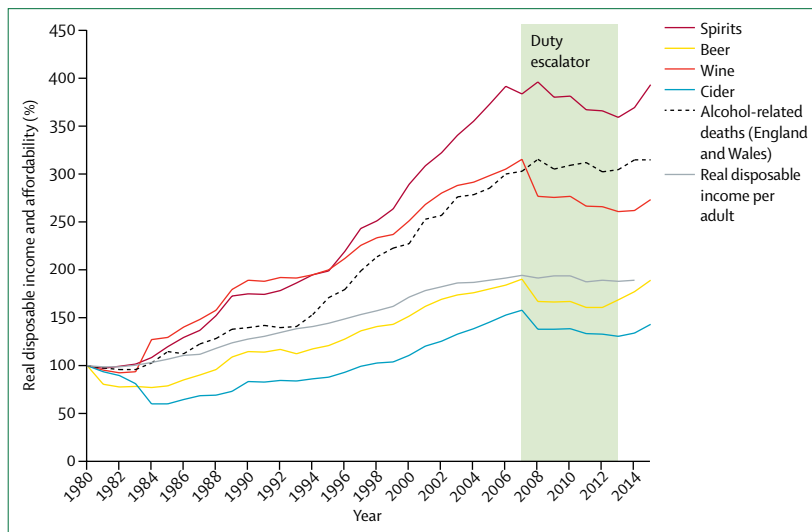


Figure 4: Trends in the affordability of alcohol, disposable income, and alcohol-related mortality in England and Wales

Income and affordability normalised to 100% in 1980. Consumption of beer and lager is split between weak and strong beers with a cut-off of around 4.2% alcohol by volume. Real disposable income per adult (≥ 18 years) based on quarter 3 of 2015. Adapted from Sheron et al.⁴

using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) criteria.^{27,28}

The main findings are presented following a narrative synthesis of the data by policy area. In this synthesis, contextual information (such as the evidence detailing the mechanisms or prevalence of harm) provides a more detailed description of the effectiveness and cost-effectiveness of each policy. Therefore, additional references to those retrieved by the literature search are used throughout this text. References used as evidence for each policy are in the appendix.

Role of the funding source

The work was commissioned by the Department of Health. Resources were provided by Public Health England. The Department of Health had no role in study design, the synthesis and interpretation, or the writing of this report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Policy area A: Taxation and price regulation

Since the affordability of alcohol (a function of price and income) is an important determinant of alcohol consumption and harm,^{26,29–36} taxation or price regulation represents an important element of national policy. These policies affect consumer demand by increasing the cost of alcohol relative to alternative spending choices. The demand is also influenced by income levels (income elasticity) and the extent to which real incomes have changed over time. In theory, the impact of price increasing policies could be mitigated if real incomes were rising sufficiently fast, but this has not been the case in recent years.

In the UK, the affordability of alcohol has risen steadily with strong alcohols now more affordable than in 1980 (figure 4).³⁷ Alcohol-related deaths have also increased over this period. In 2008, a duty escalator was introduced to increase alcohol duties by 2% above inflation each year. This escalation was repealed in 2013 and 2014 for beer and then cider and spirits, and there have been further freezes to beer, cider, and spirit duty.⁴ Since 2007–08, the affordability of alcohol decreased more than household incomes, suggesting that of the multiple economic factors influencing alcohol consumption, the 2% duty escalator may have had a relatively large effect.

Reviews and meta-analyses report that an increase in alcohol price is consistently associated with a decrease in its consumption, with a 10% price increase associated with a 5% decrease in consumption, on average (price elasticity).^{26,29–36} Individuals respond less to price changes of beer than of wine and spirits;³⁴ however, in the UK off-trade (supermarkets, etc), individuals respond more to price changes of beer.³⁸ Moderate drinkers may be more sensitive to price changes than heavy drinkers;³⁴ however, in absolute terms, the reduction in consumption among heavy drinkers is

the public health burden (health, social, and economic) of alcohol. The findings are interpreted within the English context with specific relevance for public health professionals and policy makers in the health and non-health sectors.

A detailed overview of the methodology is available in the appendix. Briefly, electronic database searches combined with hand-searching of reference lists and input from an independent expert group were used to identify reviews and primary studies that evaluated the effectiveness and cost-effectiveness of alcohol control policies. Inclusion periods ranged from 2000 to 2016 and varied across policy areas. Data were extracted using a uniform template, and quality of evidence was assessed

See Online for appendix
For mortality data from the Office for National Statistics see <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths>

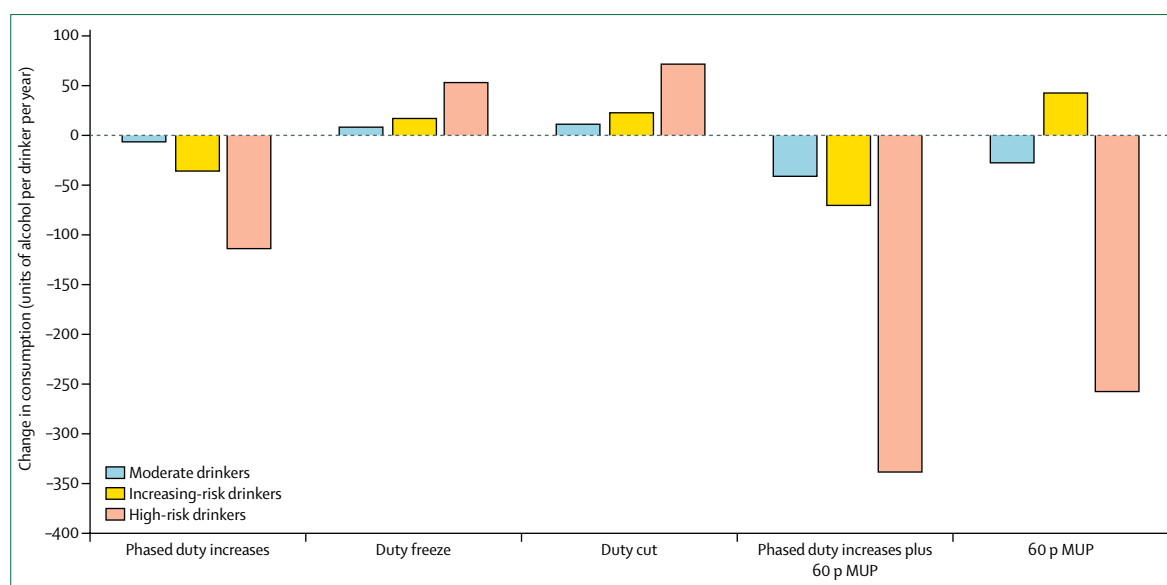


Figure 5: Change in mean consumption for each drinking group, by policy⁴³

Phased duty increases are defined as annual duty increases in line with inflation plus 2%; a cut in duty is defined as a one-off 2% duty cut, followed by a 4 year duty freeze; and a 60 p MUP policy is modelled assuming duty remains constant in real terms. MUP=minimum unit price.

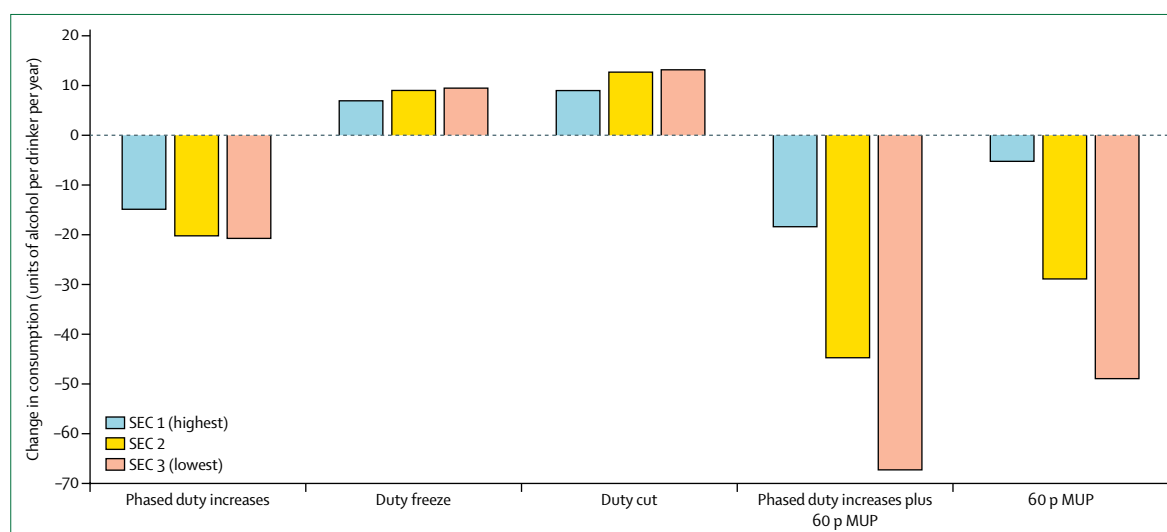


Figure 6: Change in mean consumption for each socioeconomic group, by policy⁴³

Phased duty increases are defined as annual duty increases in line with inflation plus 2%; cut in duty is defined as a one-off 2% duty cut followed by a 4 year duty freeze; and a 60 p MUP policy is modelled assuming duty remains constant in real terms. MUP=minimum unit price. SEC=National Statistics Socio-Economic Classification.

considerably higher than among moderate drinkers. Within the UK, heavy drinkers are more price sensitive than moderate drinkers for most products, although they tend to switch to cheaper products when the price of their preferred product increases (cross-price elasticity).³⁹ There has been relatively less research attention to the cross-price elasticity of demand for alcohol. However, one UK study has shown that off-trade wine and cider act as substitutes, such that consumers increase their demand for one product following a rise in the price of the other.³⁸

A tax increase can lead to significant improvements in health.³¹ A meta-analysis reported that doubling tax rates decreases alcohol-related mortality by an average of 35%, with further reductions in violence, crime, road fatalities, and sexually transmitted infections.³⁵ Modelling studies all predict that taxation leads to large gains in health and life expectancy and is a cost-effective approach to prevention and health improvement, despite disparate geographical settings, assumptions, and methodological approaches.^{26,40–42} In England, a 10% increase in the price of alcohol is estimated to substantially reduce

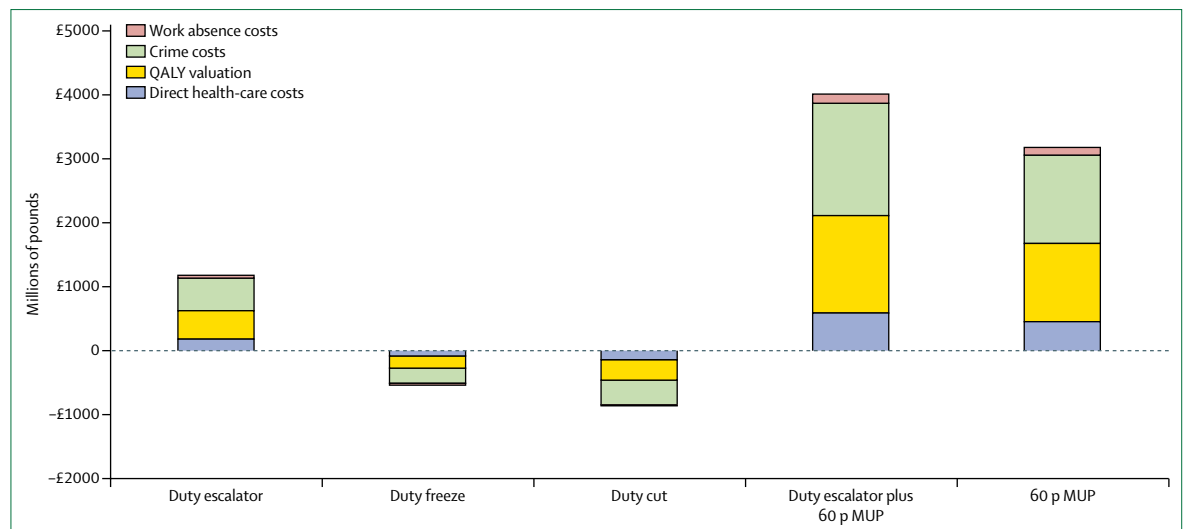


Figure 7: The cumulative value of reductions in alcohol-related harm over 5 years, by outcome⁴³
 QALY valued at £60 000. QALY=quality-adjusted life-years. MUP=minimum unit price.

alcohol-related hospital admissions and deaths, amounting to over £22 billion in societal benefits over a 20 year period.⁴³ According to the UK Treasury, the recent cuts in alcohol duty are projected to have cost taxpayers £3.45 billion over 5 years.^{44–46}

A potential concern regarding tax increases is that they may have a greater financial impact on less affluent people who tend to spend a larger proportion of their income on alcohol. However, on average, less affluent households consume less alcohol than high-income consumers and are more likely to be abstainers. As such, they are less likely to be financially impacted by changes in taxation. Analyses suggest that an increase in alcohol taxation is progressive when considering all households, but regressive when considering only those who consume alcohol.^{47,48} However, to the extent that less affluent groups are more likely to suffer the harms associated with alcohol consumption,⁴⁸ increasing the price of alcohol through tax has the potential to reduce health inequalities.⁴⁹

For tax increases to bring about reductions in harm, they need to be passed onto consumers through an increase in the price of the product. Mostly these are passed on,⁵⁰ however strategic behaviour of manufacturers and retailers may moderate the effect. For example, by increasing the price of their cheaper products by less than the tax increase and the price of more expensive alcohol by more than the tax increase.⁵¹

To ensure price increases are passed onto the consumer, governments can legislate a minimum price below which alcohol cannot be sold. The evidence for this policy comes from modelling studies in England and Australia and natural experiments in Canada. English modelling studies estimate the impact of a minimum unit price (MUP) set between 45 p and 60 p and demonstrate that MUP reduces alcohol-related deaths and hospital admissions, with high-risk drinkers and less affluent people experiencing the

greatest gains in health.^{43,52,53} These results are confirmed by Australian modelling studies showing that a AUS\$2 MUP has a greater impact on heavy drinkers and low-income households who consume larger quantities of alcohol.⁵⁴ Moderate drinkers are minimally affected by an MUP policy,^{43,52,55} so this is a highly targeted measure that is supported by observational research.^{56,57} In England, taxation would need to increase by 28% to achieve the reductions in alcohol-related deaths estimated with a 50 p MUP.⁵⁸

The results of the minimum price policy implemented in some Canadian provinces confirm the findings of English modelling studies. In Saskatchewan, a 10% increase in the minimum price of alcohol reduced total alcohol consumption by 8.4% within 2 years, with greater reductions for beer and spirits and the off-trade.⁵⁹ In British Columbia, 1 year after implementation, the same price increase was associated with reductions in alcohol-related deaths (by around 32%), acute and chronic alcohol-related hospital admissions (by around 9%), traffic violations (by around 19%), and crime (by around 9%).^{60–62}

Taxation and price regulation can be implemented simultaneously. English modelling studies show that combining phased duty increases (annual increases in line with inflation plus 2%) with a 60 p MUP would have the greatest impact in reducing alcohol consumption and harm (figures 5, 6, 7).^{49,63} This is estimated to reduce alcohol-related hospital admissions at the 20th year by about 28 000 compared with about 17 000 for MUP only and about 11 000 for phased duty increases alone. The benefits are mostly accrued by high-risk drinkers and those in the lowest socioeconomic groups.

Over a period of 5 years, freezing duty is estimated to cost society over £540 million, while cutting duty would cost £870 million (figure 7). A 2% phased duty increase (followed by a 4 year freeze) is estimated to save

£1.2 billion, a 60 p MUP £3.2 billion, and the two in combination over £4 billion.

In 2014, the UK Government implemented a ban on the sale of alcohol below the cost of excise duty and value added tax (VAT) in England and Wales. Modelling estimated that this reduced consumption by less than 0.1%, leading to no reduction in harm, while MUP had a 40–50 times greater impact.⁶⁴ This arose because the ban affected only 1% of units consumed by harmful drinkers compared with 44% of units under a 50 p MUP policy. This was reiterated by an observational study.⁶⁵ In 2011, the Scottish Government introduced a ban on off-trade quantity-based price discounts such as ‘buy one, get one free’. Straightforward discounting such as ‘half-priced wine’ remained permissible. Two studies evaluated the impact of this ban,^{66,67} with the higher-quality study reporting associated reductions of around 3% by 2012, largely driven by reductions in sales of wine and premixed beverages.⁶⁷ A modelling study estimated the impact of a complete ban on off-trade discounting in England and reported small reductions in consumption, largely because these price promotions affect a small proportion of sales.⁶⁸ Such restrictions can be easily circumvented by, for example, lowering the price of a product.

Cross-border trade, illicit trade, and home production are important phenomena that governments need to take into account when implementing pricing policies. However, there is a lack of data on the changes in alcohol price and tax avoidance and the illicit trade.⁶⁹ Another concern is the relationship between alcohol’s price and consumption of alternative unhealthy substances such as tobacco or psychoactive drugs, for which there is no robust evidence. Qualitative interviews from Scotland suggest there is little evidence that people substitute alcohol for illicit alcohol or drugs.⁷⁰

Policy area B: Regulating marketing

Marketing is a commercial strategy with the goal of increasing the market size and share for a product. This is achieved by initiating sales from new consumers and away from those of rival products, and by increasing the frequency of purchase and driving brand preference. Publicly available information on alcohol marketing is scarce and this has hindered research on the effects on alcohol consumption and harm. However, manufacturers Inbev and Diageo report spending 15% of their global sales on marketing annually, equivalent to US\$7 billion and £1.6 billion, respectively.^{71,72}

Short-term aggregate measures of advertising elasticity report that for each 10% increase in advertising expenditure, there is a 0.3% increase in adult consumption.^{33,73} Marketing occurs at the brand level where the marginal effect is small, so the loss of variance due to national aggregation leaves little room for correlation with alcohol consumption. Such shortcomings are more pronounced when measuring underage consumption, which tends to be concentrated among a small number of brands.⁷³

The strongest evidence for the impact of advertising on alcohol consumption comes from reviews of longitudinal and cohort studies observing children.^{74–77} These studies report consistently that exposure to alcohol advertising is associated with an increased likelihood that children will start to drink or will drink greater quantities if they already do. The effect is not explained by children’s previous experiences of drinking or exposure to other non-alcohol-related media. This is an important effect because people who start drinking early are more likely to become binge and problem drinkers, and underage drinking is associated with educational problems and violent behaviour.^{78–82} While the relationship between marketing and child alcohol consumption does not directly provide evidence that limiting marketing will reduce consumption, the evidence is sufficient to support policies that reduce children’s exposure to marketing.

There are two main aspects of marketing that governments can regulate: the population exposure and the content of advertising. The advertising industry in the UK is governed by codes of practice that are set by two industry Committees—the Committee of Advertising Practice and the Broadcast Committee of Advertising Practice. The codes are enforced by the Advertising Standards Authority, and in the case of broadcasting, also overseen by the independent statutory regulator Ofcom.

Adverts should not include a range of content, for example they should not encourage irresponsible or unhealthy consumption of alcohol or link alcohol consumption to social or sexual success. They should not be shown during programmes of “particular appeal” to children, deemed to be one that attracts an audience where 10–15 year-olds are over-represented by 20% in relation to their share of the total TV audience.⁸³ A study has shown that UK adverts often contain content that could appeal to children, and 10–15 year-olds were 11% more likely to see TV alcohol adverts than adults, increasing to 51% for adverts for alcopops.⁸⁴

Complete marketing bans are rarely implemented, so their evaluation depends mostly on modelling studies. These estimate that advertising bans represent one of the most effective and cost-effective approaches to prevention and health improvement, with the level of effectiveness decaying as the policy moves from a complete to a partial ban.^{26,41,85} Among 11–18 year-olds, UK modelling estimates that a TV-based advertising ban reduces consumption by 9%.⁶⁸ Contrary to the consistent findings of modelling studies, a review reported that the impact of banning marketing was inconclusive.⁸⁶ All four studies included in the review had a high risk of bias. Three studies evaluated bans that were implemented in areas that received a considerable amount of cross-border programming that had no restrictions on alcohol marketing.

A pragmatic alternative to a complete marketing ban is to implement legislation that dictates what advertisers are permitted to do. In 1991, France passed the *Loi Évin*, which

stipulated what advertising media can be used and the content of transmitted messages. The legislation permits alcohol advertising in adult media only, and ensures that promotional messages are factual and verifiable. The *Loi Évin* represents a real-world framework for marketing regulation that is closed to interpretation and cannot be easily circumvented, and where strict penalties for contravening the law deter inappropriate marketer activity.

Given that more than half of all TV alcohol adverts seen by children in the UK are aired before 9pm,⁸³ watershed bans have been identified as an appropriate policy.⁸⁷ When the Netherlands introduced a watershed ban, commercial operators responded by increasing alcohol advertising shown after 9pm from over 7500 adverts to over 23 000.⁸⁷ Exposure of all ages increased as a result, but whereas exposure of adults increased by 52%, exposure of children aged 12–17 years increased by 62% and exposure of children aged 6–11 years increased by only 5%. A subsequent study compared incidence rate ratios (IRR) for TV alcohol adverts between the UK and Netherlands between December, 2010, and May, 2011.⁸⁸ Dutch children aged 6–12 years had an IRR of 0·7 (adult IRR=1), lower than UK children aged 4–9 years (IRR 0·8). Older children in both the Netherlands (aged 12–19 years IRR 1·3) and the UK (aged 10–15 years IRR 1·1) were exposed to more TV alcohol advertising than adults. Watershed bans can protect young children from exposure to TV alcohol advertising, but more effective measures are required to protect teenagers with later bed times.

Given that studies report a positive relationship between exposure to alcohol sports sponsorship and alcohol consumption among adults who participate in sports and schoolchildren,⁸⁹ bans on sports sponsorship may represent an important approach to marketing regulation. To date, no research has evaluated the impact of banning sports sponsorship, despite it resulting in a considerable number of children being exposed.⁹⁰

Digital and social media have changed the nature of marketing, with alcohol companies increasingly moving into this area.⁹¹ The potential power and reach of digital marketing is demonstrated by the fact that 86% of the UK adult population has regular access to the internet, increasing to 99% of those aged 16 to 24 years.⁹² Little data exist that measure the prevalence of online alcohol marketing, however social media case studies show a considerable media presence of alcohol brands featuring marketer-generated and user-generated content, blurring the boundaries between advertiser and consumer, and limiting the scope of advertising regulations.⁸⁴ Age-verification filters request that a viewer of a website confirm they are aged 18 years and older, but in their current form are inadequate and easily circumvented.⁹³ Nonetheless, using similar approaches to online gambling could enable correct verification of 85% of the UK adult population.⁹⁴

The likely impact of comprehensive marketing regulations can be drawn from the experience of tobacco

control. Evidence suggests that reduced exposure to tobacco advertising and promotion significantly reduces exposure to pro-tobacco marketing influences⁹⁵ and is expected to benefit prevention and cessation efforts by reducing environmental cues to smoke.⁹⁶

Marketing regulations can be embedded by law (statutory regulation), by industry codes of conduct (self-regulation), or by a combination of both (co-regulation). Three reviews have demonstrated considerable violations of content guidelines within self-regulated alcohol marketing codes, suggesting that the self-regulatory systems that govern alcohol marketing practices are not meeting their intended goal of protecting vulnerable populations.^{29,97,98}

Policy area C: Regulating availability

Policies that regulate the availability of alcohol are based on the theory that easier access to alcohol increases alcohol consumption and harm. Regulation can occur at the retail level by specifying where and when alcohol can be purchased and to whom it can be sold, and at the production level by encouraging producers to market lower strength products. In England, the retail availability of alcohol is largely regulated by the *Licensing Act 2003*.

The majority of research reporting the relationship between alcohol outlet density, alcohol consumption, and harm is carried out in Australia and North America.^{62,99–107} Reviews report mixed results, partly due to heterogeneity in research design. Broadly speaking, the evidence for a relationship between higher outlet density and social disorder is strong; for alcohol consumption, the evidence is less clear; and for chronic health harms, the evidence is emerging. The causality underpinning these relationships is uncertain. Additional complexities, such as people driving to out-of-town shopping centres or purchasing alcohol online, are largely unaccounted for in the scientific literature to date.

International reviews and studies report that increasing the time and days on which alcohol is sold increases alcohol consumption and harm, particularly road traffic crash and injury,^{29,108–110} and a series of robust, well designed Australian studies demonstrate that reducing late-night hours of on-trade (bars, etc) sale substantially reduces rates of violence.¹¹¹ Reducing on-trade outlet opening hours targeting the most densely populated areas with simultaneous enforcement is cost-effective.²⁶ Nonetheless, changes in the *Licensing Act 2003*, which staggered opening hours, presents a more mixed picture. On the whole, a small body of research reports that the Act did not increase total violence, but shifted it later into the night,^{112,113} while for most hospitals, admissions relating to alcohol increased.^{114–118} Nonetheless, since the mid-20th century, licensing in England has been increasingly viewed as an administrative process in a system primarily defined by market demand.¹⁰² This may have led to the overprovision of availability, explaining the limited changes observed in evaluations of the Act.

Using the evidence relating to the availability of alcohol within the constraints of the *Licensing Act 2003* has proved difficult. Legislation requires that all licensing decisions examine evidence about specific outlets or local areas and consider the licensing objectives. Public health is not a licensing objective and so local authorities may struggle to present a health argument as a counterpoint to a licensing decision. Furthermore, health bodies typically present data at the population level and cannot demonstrate causal links between individual outlets and harm. Nonetheless, local areas with more effective licensing strategies have demonstrated a small additional reduction in alcohol-related hospital admissions compared with their less stringent counterparts.¹¹⁹

In March 2011, the English Government launched the “Responsibility Deal”, a public–private partnership involving voluntary agreements by businesses and public bodies to make health promoting changes.¹²⁰ A specific pledge was to “remove 1 billion units of alcohol sold through improving consumer choice of lower alcohol products”. While an initial government evaluation reported that the pledge had been successful,¹²⁰ other research questioned the validity of this analysis, arguing that consumer responses and changes in alcohol duty were not adequately accounted for.¹²¹ Further analysis confirmed these concerns, concluding that most industry activity would have happened regardless of the pledge.¹²² Most actions related to the launch and promotion of new lower-strength products, potentially increasing the total number of alcohol units in the market.

Policy area D: Providing information and education

UK health surveys show that while many respondents can correctly identify liver disease as a potential harm caused by alcohol, fewer are able to freely recall other harms such as cancer.¹²³ Policies that provide information and education can help to reduce this knowledge deficit, while additionally overcoming the potential barrier of public opinion, because people who are aware that alcohol is a risk factor for cancer are more likely to support alcohol control policies, including increases in taxation and strict marketing regulations.¹²⁴ Furthermore, as with other products, consumers have a right to understand the risks associated with alcohol consumption, and policies in this area reflect this right. These policies are typically delivered as mass media, social norms, or social marketing campaigns, education programmes conducted in school and higher education settings, and by the labelling of alcoholic beverages.

Evaluation data for mass media, social marketing, and social norm campaigns are often available, but not always in a form that meets the standards required for academic publishing. Furthermore, the published evaluations tend to use poor quality designs and lack the detail required to support confident conclusions on effectiveness and cost-effectiveness.^{3,26,125–127} However, well executed campaigns

attaining high public exposure are sufficient for raising awareness, particularly for the links between alcohol consumption and cancer.¹²⁸ Industry-sponsored messages and campaigns are reported to be ineffective.^{26,129–131} Emerging research evaluating voluntary, temporary, abstinence-based challenges such as ‘Dry January’ suggest this is associated with change toward healthier drinking.¹³²

Alcohol education programmes in schools and higher education settings are a popular intervention, but their effectiveness is poorly supported by the evidence,^{3,133–135} so are not cost-effective.²⁶ Reported beneficial effects tend to be seen only in the short term and are often not replicated.

The principles underpinning the effect of information labels on behaviour change have been firmly established for tobacco and food. Health warning messages on tobacco products have led to lower initiation and increased cessation rates,¹³⁶ and nutrition labels on pre-packaged foods guide consumers towards healthier choices.¹³⁷ Evaluations of labels on alcoholic beverages report that this information increases consumer awareness but are insufficient to change alcohol consumption.^{138–144} Nonetheless, evaluations rely largely on voluntary action by industry, or poorly-implemented mandatory labels in the USA. Neither the label content, nor its form, are stipulated sufficiently and these are important aspects of an effective health warning.^{145,146}

In England, alcohol labelling is subject to a voluntary agreement between industry and government. In 2011, industry signatories pledged to ensure that 80% of alcohol products would have clear, legible labelling consisting of information on alcohol units, government consumption guidelines, and a pregnancy warning. Despite signatories meeting this pledge, only 57% of labels met best practice as defined by the Portman Group.¹⁴⁷ This was mirrored by a previous evaluation of a voluntary agreement in 2007, where there was widespread non-compliance with only 2% of samples using the agreed format.¹⁴⁸ The use of small fonts and small labels with poor tonal contrast, colours, and backgrounds may have obscured many messages. Similar circumvention is seen with industry ‘drink responsibly’ messages,^{129,144} and the OECD concludes that “the delivery of education messages by private sponsors [is found to] have no significant public health effects”,²⁶ a view echoed by the British Medical Association¹³¹ and confirmed by empirical evidence.¹³⁰

Despite alcohol’s high calorific value,¹⁴⁹ there are no voluntary or mandated agreements to display nutritional information on alcoholic beverages in the UK. Yet alcohol accounts for nearly 10% of the calorie intake amongst adults who drink.¹⁴⁹ Against a backdrop of increasing liver disease and obesity,⁷ and with recognition of the synergistic impact of obesity and alcohol consumption on liver disease,¹⁵⁰ the absence of research literature on nutritional labelling of alcohol is noteworthy.

The overarching finding that providing information and education does not produce sustained behavioural changes may arise from the fact it is delivered in an environment

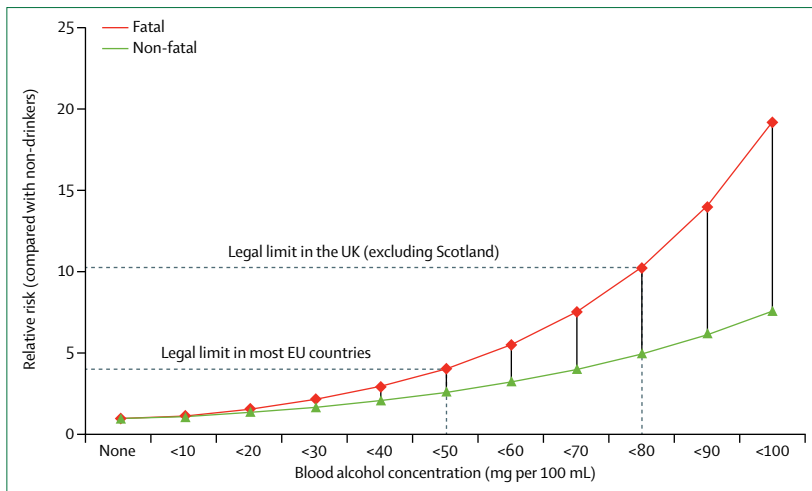


Figure 8: The relative risk of being involved in a fatal or non-fatal road traffic crash in England and Wales by blood alcohol concentration

EU=European Union. Adapted from the Department of Transport.¹⁷⁵

with widespread and unrestricted marketing of alcohol.¹²⁵ The alcohol industry attempts to “reinforce and exaggerate strong pro-alcohol social norms”,¹³¹ which have the power to overshadow health information campaigns.¹²⁵

Policy area E: Managing the drinking environment

The night time economy refers to economic activity that occurs between the hours of 6pm to 6am and involves the sale of alcohol for consumption on-trade (eg, bars, pubs, and restaurants). The night-time economy provides local employment, economic investment, and regeneration, but these areas are known to be associated with heavy drinking and high levels of acute alcohol-related harm.^{107,151,152} Excessive drinking damages health, while managing night-life drunkenness and associated problems places demands on the police, local authorities, and health services.^{153–155} The prevalence of harm within these areas merits a specific focus for the implementation of relevant interventions. Many of these interventions are viable for local implementation, but may be resource-intensive and few studies carry out health economic evaluations.

Community-based multicomponent programmes typically mobilise communities, increase enforcement activity, and improve serving practices and standards of licensed premises, attempting to coordinate and strengthen local prevention activity. The existing research literature is characterised by studies with methodological shortcomings;^{156–159} however, a well implemented and evaluated programme in Stockholm reported that these programmes can reduce the sale of alcohol to intoxicated customers and police-recorded violent crime.^{160,161} The reduction in violent crime permeated wider to neighbouring areas.¹⁶¹ The programme was cost-effective, saving €39 for every €1 invested,¹⁶² and a large-scale roll out was demonstrated, suggesting the intervention is

highly feasible.¹⁶⁰ Emerging evaluations of similar approaches in England also report reductions in the propensity to serve alcohol to people who are intoxicated.¹⁶³

Server training educates servers of alcohol about the harms of serving alcohol to people who are underage or intoxicated, and while based on solid principle, no strong evidence has emerged of their effectiveness.^{3,158,164,165} When training increases knowledge and reduces the self-reported propensity to overserve, the impact is generally small. Larger beneficial effects are reported for server liability, which holds servers legally responsible for harm caused by their customers, yet implementation is expensive and there are issues regarding burden of proof.¹⁶⁶ Increasing policing and enforcement also brings about small reductions in sales to underage or intoxicated customers in the short term;¹⁵⁸ however, the cost of these resources is currently overlooked in published evaluations.

In the UK, glassware and bottles can cause injury to customers and staff and represented £4.08 million in victim compensation costs between 1996 and 1998.¹⁶⁷ Replacing glassware with plastic alternatives is a rational response, although empirical evidence does not demonstrate that this substantially reduces violence or police-recorded crime, largely due to the small numbers of observations included in current studies.^{168,169} In practice, many establishments use glass alternatives, which is included as an example of good practice in the guidance for UK licensing conditions.¹⁷⁰

While most interventions in the night-time economy are carried out in and around on-trade licensed premises, some interventions have focused on the harm associated with off-trade alcohol purchases. An example is the voluntary agreement by local retailers to remove the sale of high-strength alcohol products, mostly defined as those that are stronger than 6.5% alcohol by volume (ABV). Over a period of 1 year in Manchester, removing the sale of high-strength alcohol was associated with greater reductions in alcohol-related crime and antisocial behaviour relative to areas that continued to sell high-strength alcohol.¹⁷¹ The scheme was reliant on the ability to deploy resources from the local neighbourhood teams, and its effectiveness may be undermined if alcohol is readily available from nearby areas.

Public drinking bans, operationalised in England as Designated Public Place Orders, are implemented to address crime and disorder in public places that is caused by street drinking, and do not aim to reduce alcohol consumption per se. Low-quality evidence shows these spatial restrictions negatively impact marginalised groups, particularly homeless people, and can result in displacement to more covert and less safe places.¹⁷²

Policy area F: Preventing drink-driving

There is a direct relationship between the quantity of alcohol consumed and the ability to drive safely,¹⁷³ with an increased risk of crash occurring above a dose of about 40 mg of alcohol per 100 mL of blood (figure 8).¹⁷⁴ The

current English drink-driving limit is 80 mg/100 mL. This level is associated with a risk of fatality 13 times greater than that for zero consumption.¹⁷⁴ Typical legal limits in Europe are 50 mg/100 mL or lower.¹⁷⁵

Drink-driving prevention policies use statutory measures that are rooted in the principles of deterrence and law obedience. Some additional non-statutory approaches have been used, which aim to inform people of the risks of drink-driving and to adopt safer alternatives. Despite these approaches, some drivers continue to reoffend or are involved in further crashes. Specific interventions directed at this group have been developed with the aim of reducing reoffending.

High-quality evidence supports setting and enforcing a legal blood alcohol concentration (BAC) limit for drivers and applying a penalty if the law is broken.^{173,176–184} Estimates for Great Britain reported that lowering the legal BAC limit from 80 mg/100 mL to 50 mg/100 mL would avert about 25 deaths and 100 serious injuries each year,¹⁸⁴ and the beneficial impact of these policies would be seen soon after implementation.^{173,183} Increasing the punishment for driving over the legal limit by immediately revoking a person's licence upon failing a breath test across all levels of BAC reduces crashes to a greater degree than punishments that are determined by judicial review.^{176,179,180} Few health economic evaluations were identified for drink-driving policies; however, a review of the cost-effectiveness of breath testing reports benefit–cost ratios ranging from 2:1 to 57:1.¹⁸²

In some countries, the legal BAC limit is set lower for different population groups such as novice or commercial drivers.¹⁷⁷ These lower limits can be implemented alongside other restrictions such as driving curfews and passenger restrictions.¹⁸⁵ Median reductions of 8–14% among young drivers are observed in graduated driver programmes,^{186,187} with a scheme with restrictions usually including night-time driving curfews and passenger restrictions averting as many as 47% of injuries in young drivers in Great Britain, equivalent to savings of up to £849 million per year.¹⁸⁸

Mass media campaigns are commonly used to inform people of the risks and punishments associated with drink-driving, and in countries with existing drink-driving prevention activities, reduce drink-driving and alcohol-related road traffic crashes.^{189,190} These campaigns can be cost-effective, despite the high costs of development and implementation,¹⁹⁰ and may have additional positive impacts by playing an agenda setting role and influencing public perceptions.¹⁹⁰

Designated driver programmes can be enacted at the population level, for example a campaign that encourages designated driver use, or can be carried out in drinking establishments where people are given incentives to act as designated drivers. Analysis of self-reported data showed that a population programme increased the propensity to use a designated driver, but did not change the prevalence of people drink-driving or riding with a

drink-driver.¹⁹¹ Mixed effects were reported for incentive programmes and inexplicably, one study showed that at post-test, there were increases in the proportions of customers reporting “always” and “never” having selected a designated driver.

Despite the approaches that are in place in many OECD countries, some drivers with drink-driving convictions continue to drink-drive and are rearrested or involved in further crashes. Policies with the specific aim of preventing drink-driving reoffending include alcohol ignition interlocks and preventive education programmes.

Alcohol ignition interlocks are installed in a vehicle and measure the driver's alcohol consumption using breath testing. In order to start the engine, the driver must provide a valid sample and subsequent samples at the random request of the device. Invalid samples are logged and an alarm is triggered until the engine is switched off. Ignition interlocks reduce reoffending in both first-time and repeat offenders and can be cost-effective.^{192–194} If the device is uninstalled, reoffending rates return to those recorded before installation.

Preventive education programmes focus on increasing awareness of the impact of alcohol on driving and provide advice for changing behaviour. Some evaluations have demonstrated reductions in drink-driving reoffending associated with these programmes; however, it is difficult to ascertain their independent effect because many programmes include additional components.¹⁹⁵

Policy area G: Brief interventions and treatment

Identification and brief advice (IBA) involves the administration of a screening questionnaire about current drinking patterns followed by advice and information, and can be given in a diverse range of settings. Although the exact content varies, core features are that they are delivered by generalist health-care workers, target a population of non-treatment-seeking drinkers, and aim to reduce alcohol consumption.

Primary health care is the most extensively studied setting for the evaluation of IBA, and reviews and meta-analyses consistently report that IBA reduces hazardous and harmful consumption at 6 months and 12 months.^{196–200} Modelling the delivery of IBA to every patient at their next registration with a new general practitioner (GP) in England estimated that over 20 years, IBA would reduce alcohol-related deaths by almost 2500 and alcohol-related hospital admissions by almost 125 000.⁶³ People in the lowest socioeconomic groups experience the greatest absolute reduction in harm but the lowest relative reduction because they have a higher baseline level of alcohol-related harm. Delivery is cost saving, with net savings estimated at £282 million,⁶³ a finding supported by a systematic review.²⁰¹

Similar findings are reported from studies of IBA in the criminal justice setting and electronic IBA studies; however, reductions in hazardous and harmful consumption are seen only in the short term.^{202,203} Broadly,

Nature	Grade	Limitations	Effect	Coverage	Economic impact	Implementation	Inequalities	Summary
A. Taxation and price regulation								
A1. Taxation 4 meta analyses 5 reviews 6 modelling studies	High	Not identified	Increased tax is associated with a proportionate reduction in alcohol consumption and harms Impact starts in 1-2 years	All alcohol drinkers Can be targeted at beverage types	Cost-effective and cost-saving	Government budgetary measure (legislation is in place) Policy can be undermined if tax increases are not passed onto the consumers and are not adjusted for inflation	The health benefits are greater for heavy drinkers who experience the greatest harm	Increasing tax is a highly effective and cost-effective approach to health improvement
A2. Minimum pricing 4 natural experiments 8 modelling studies 1 observational study 1 field study	Moderate	Not identified	UK modelling shows improvements in health, crime, and productivity Mortality substantially reduced in natural experiments of similar minimum pricing strategies in Canada Impact starts within 12 months	Applies only to alcohol which is cheap relative to its strength At levels discussed, moderate drinkers and the on-trade are minimally affected	Cost-effective and cost-saving	Requires primary legislation; low implementation costs for Government The Court of Session in Scotland have ruled MUP is legal	Targeted at extreme and heavy drinkers Greater reduction in health inequalities than taxation alone	Minimum prices effectively reduces health and other harms, is targeted at the heaviest drinkers who experience the greatest harm, and is cost-effective
A3. The relative impact of combined taxation and other pricing policies 2 modelling studies	Low	Not identified	Taxation + MUP improves health, crime, productivity and Exchequer revenue, to a greater extent than implementing either policy in isolation Impact starts in 12 months, full impact in 20 years	See A1 and A2	See A1 and A2	See A1 and A2	Targeted at extreme and heavy drinkers Greater reduction in health inequalities than taxation alone, but lower than the reduction achieved with a MUP	Combined taxation plus MUP increases impact and improves cost-effectiveness compared with MUP alone
A4. Banning the sales of alcohol below the cost of taxation (duty plus VAT) 1 modelling study 1 observational study	Low	Not identified	Little impact on population-level alcohol consumption and no health improvement	Applies only to heavily discounted alcohol (<1% of units in the market)	Not identified	Legislation is in place; low implementation costs for Government	Not identified	The ban on selling alcohol below the cost of taxation had minimal impact
A5. Bans or restrictions on price promotions 2 natural experiments 1 modelling study	Moderate	Contradictory research findings No evidence on market response (eg, alternative pricing strategies)	Higher quality evidence suggests that restricting price promotions was associated with reductions in consumption, especially off-trade wine and premixed beverages	Applies to alcohol being sold as part of price promotions covered by policy	Not identified	Requires primary legislation; low implementation costs for Government Can be undermined by lowering non-promotional prices	Not identified	Restrictions on price promotions may reduce consumption, but more evidence is needed
B. Regulating marketing								
B1. Advertising bans 2 reviews 3 modelling studies	Moderate	Inherent limitations in advertising elasticity studies Contradictory research findings	International modelling shows complete advertising bans are more effective at reducing alcohol-related morbidity and mortality than partial bans	Entire population (can be targeted at under 18 year olds)	Cost-effective and cost-saving	Evidence supports a statutory approach; low implementation costs for Government Costs of enforcement can be divided between Government and/or commercial operators	Can be designed and directed at those aged under 18 years	Complete advertising bans are a highly effective and cost-effective approach to health improvement
B2. Industry self-regulation of alcohol marketing 2 systematic reviews 1 qualitative study	Low	Not identified	The current self-regulatory systems that govern marketing are not meeting their intended purpose of restricting children from exposure to marketing in the UK	Entire population (can be targeted at under 18 year-olds)	Not identified	Low implementation costs for Government; costs borne by commercial operators; evidence supports statutory approaches	Can increase health and social harm among young people	Industry self-regulation is unlikely to be effective Little evidence of beneficial effect

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Nature	Grade	Limitations	Effect	Coverage	Economic impact	Implementation	Inequalities	Summary
(Continued from previous page)								
B3. Specific actions to protect children from exposure to alcohol marketing	Very Low	Research evaluated a poorly implemented intervention	'Watershed' bans decrease exposure of young children Age-verification filters currently ineffective (easily circumvented)	Primarily under 18 year-olds (interventions will also impact on the adult population)	Not identified	Low implementation costs for Government; costs borne by commercial operators and/or Government; evidence supports statutory approaches Impact on older children undermined if commercial operators respond by increasing the number of adverts after the watershed	Can be designed and directed at those aged under 18 years	Reducing child exposure to alcohol marketing would theoretically impact alcohol consumption by children
C. Regulating availability								
C1. Density of alcohol outlets	Low/moderate	Mostly international evidence base	Strong relationship between greater outlet density and levels of social disorder; mixed findings on consumption, emerging evidence for chronic health harms	Licensed premises	Not identified	Using the evidence within the Licensing Act 2003 is challenging Administrative and enforcement costs borne by licensing authorities and police Undermined if alcohol is readily available from neighbouring areas	Can be implemented in areas with greater deprivation	Reducing the density of alcohol outlets may reduce social disorder and road traffic crashes
C2. Hours and days of sale	Moderate	Mixed research findings internationally and within England	International evidence links hours of sale to alcohol consumption and harm, particularly for availability during late night hours in the on-trade English research suggests violence shifted later into the night and hospital admissions increased by a small amount in some areas	Licensed premises	Cost-effective	Using the evidence within the Licensing Act 2003 is challenging Costs borne by licensing authorities and police Undermined if alcohol is readily available from neighbouring areas	None identified	Reducing hours of sale may reduce alcohol-related harm
C3. The responsibility deal pledge to "remove 1 billion units of alcohol sold annually from the market by" ... "improving consumer choice of lower alcohol products"	Very low	Over simplistic assumptions regarding consumer response and changes in duty	Most actions would have occurred regardless of the pledge; no demonstrable impact on harm	All alcohol drinkers	Not identified	Potential for new low alcohol products to expand the alcohol market overall	Not identified	Public-private partnerships are not shown to bring about effective changes which benefit public health
D. Providing information and education								
D1. Mass media campaigns which aim to change alcohol consumption	Low	Research outcomes poorly specified	Can increase knowledge and awareness, direct impacts on behaviour usually small and short-term Commercially sponsored messages have no health benefits	Entire population (can be targeted at specific groups)	Not cost-effective	Cost of development and deployment Policy can be undermined by pro-drinking marketing	Can be directed at inequality groups	(Non-industry sponsored) campaigns increase knowledge and awareness; little direct impact on behaviour, not cost-effective
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Nature	Grade	Limitations	Effect	Coverage	Economic impact	Implementation	Inequalities	Summary
D2. Social marketing approaches	Low	Not identified	Mixed findings of impact on risky drinking and behaviour	Entire population (can be targeted at specific groups)	Not identified	Cost of development and deployment Policy can be undermined by pro-drinking marketing	Can be directed at inequality groups	No firm conclusions can be made
D3. Social norm approaches	Very low/low	Failure to report allocation concealment High levels of attrition	Effects were small and inconsistent among students	Entire population (can be targeted at specific groups)	Not identified	Cost of development and deployment	Can be directed at inequality groups	No firm conclusions can be made
D4. Alcohol education programmes	Very low/low	Contradictory research findings with methodological issues	Evidence inconclusive Small, short term beneficial effects have not been replicated	Under 18 year-olds	Not cost-effective	Cost of development and deployment Implementation has proven difficult with many schools not able to deliver education programmes in their entirety	Designed and directed at those aged under 18 years	Little (lasting) evidence of effectiveness or cost-effectiveness
D5. Labelling of alcoholic beverages	Low	Research evaluated a poorly implemented intervention	Improvements in consumer knowledge and awareness, no impact on behaviour Voluntary implementation by commercial operators ineffective	All alcoholic beverages	Not identified	Evidence supports a statutory approach; low costs are borne by commercial operators	Not identified	Labels increase knowledge and awareness
E. Managing the drinking environment								
E1. Multicomponent community programmes	Low/moderate	Not identified	Small reductions in alcohol-related violence with benefits seen in neighbouring areas	Drinkers in and around the night-time environment	Cost-saving and cost-effective	Can be implemented at scale Costs borne by local authorities, licensing authorities, police and commercial operators	Can be implemented in areas with greater deprivation	Small reductions in acute harms, cost-effective, cost-saving and can be scaled up
E2. Server training	Very low/low	Most outcomes measure self-reported behaviour	Mixed results, at best a small impact on violence or propensity to serve	Customers in on-trade and off-trade premises	Not identified	Low implementation costs for Government Training costs borne by commercial operators	Can prevent the sale of alcohol to underage consumers	Impact is small and the research is characterised by self-reported measurements
E3. Server liability	Moderate	Entirely international evidence base	Small reductions in road traffic crash fatalities, homicides, and poor health	Customers and servers in on and off-trade premises	Not identified	Requires primary legislation, possible legal issues around burden of proof Legal costs borne by servers	Can prevent the sale of alcohol to underage consumers	Impacts are small and predominantly focus on acute harms
E4. Replacing glassware with safer alternatives	Very low	Small sample size (number of observations)	Small number of observations, some evidence for reduced violent injuries	Customers in on-trade premises	Not identified	Low implementation costs for Government Costs borne by commercial operators	The health benefits may be greatest for young men	Replacing glassware with safer alternatives is based on sound principle and may reduce injuries
E5. Voluntary removal of the sale of high strength alcohol	Very low	Small sample size (number of observations)	Infrequently evaluated with an association between intervention and small reductions in alcohol-related crime and anti-social behaviour	Customers in off-trade premises	Not identified	Policy can be undermined if high strength alcohol is readily available from neighbouring areas	Can be implemented in areas with greater deprivation	Voluntary removals of high strength alcohol may reduce acute alcohol-related harm but easily undermined
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Nature		Grade	Limitations	Effect	Coverage	Economic impact	Implementation	Inequalities	Summary						
E6. Policing and enforcement approaches	1 systematic review	Low/moderate	Inconsistent findings: may result from increased detection	Some beneficial effects on sales to underage or intoxicated customers, effects small and short term	Drinkers and servers in and around the night-time economy	Not identified	Costs of enforcement borne by police	Can prevent the sale of alcohol to underage consumers	Resource intensive interventions with possible short term reductions in acute harm						
E7. Public drinking bans	1 systematic review	Very low	All studies included in the review were from grey literature	Harmful impact on marginalised groups, small increases in perception of public safety, no impact on consumption and harm	Drinkers consuming alcohol in prohibited public spaces	Not identified	Legislation is in place by police	Can displace marginalised groups to new, less safe, areas	Negatively impact marginalised groups, such as the homeless with little benefit						
F. Preventing drink-driving															
F1. BAC limits	1 meta-analysis 4 reviews (2 systematic)	High	Not identified	Small reductions in drinking driving and related crashes resulting from reducing BAC limits from 80 mg to 50 mg Effects seen within 1 year	All drivers	Not identified	Legislation is in place Policy can be undermined if not enforced	Affects all drinking drivers equally	Lowering the drink-driving limit would reduce road traffic crashes, casualties, and fatalities, by a small amount						
F2. Breath testing	1 meta-analysis 2 systematic reviews	High	Not identified	Breath testing drivers (selective or random testing) reduces drink-driving and road traffic crashes, casualties, and fatalities	All drivers	Both random and selective breath testing shown to be cost-saving and cost-effective	Legislation is in place for selective breath testing, primary legislation is required for random breath testing Costs of enforcement borne by the police	Not identified	Breath testing drivers is an effective and cost-effective way of reducing drink-driving, road traffic crashes, casualties, and fatalities						
F3. Graduated driver licensing	3 systematic reviews 1 retrospective analysis	High	The retrospective analysis was not able to take account of the lower legal BAC component of a graduated driver licensing programme	Graduated driver licensing programmes reduce drink-driving and the associated road traffic crashes, casualties, and fatalities Effects seen within 1 year	Novice drivers	Cost-effective	Requires primary legislation; costs of enforcement borne by the police and courts Undetermined if drivers reach an age threshold and believe they can drink more May restrict civil liberties or economic and education opportunities for young drivers, particularly in rural areas	The health benefits of graduated driver licensing programmes are greatest for young, predominantly male, drivers	Effective in reducing road traffic crashes, casualties, and fatalities in novice drivers Cost-effective but requires resources						
F4. Immediate licence revocation	1 meta-analysis 2 natural experiments	High	Entirely based on international evidence base	Modest reduction in drink-driving and casualties and fatalities compared to current process	All drivers	Not identified	Requires primary legislation Low implementation costs for government Costs of enforcement borne by the police and courts	Not identified	Immediate licence revocation is effective in North America, transferability may be limited						
F5. Alcohol ignition interlock devices	2 systematic reviews 1 health economic analysis	High	Not identified	Ignition interlocks reduce reoffending in first-time and repeat offenders by a modest amount	Drink-driving offenders	Results depend on the level of effectiveness	Administrative and enforcement costs divided between offender and/or government Following removal of the device, reoffending rates return to those prior to installation	Not identified	Alcohol ignition interlock effectively reduce drink-driving reoffending whilst installed and can be cost-effective						
F6. Preventive education programmes targeting drink-driving offenders	1 systematic review	Low	Research was not able to exclude confounders	Small variable reductions in reoffending findings variable, independent effect unclear	Drink-driving offenders	Not identified	Costs borne by government	Not identified	Preventive education programmes may reduce reoffending						
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Nature	Grade	Limitations	Effect	Coverage	Economic impact	Implementation	Inequalities	Summary						
F7. Designated driver programmes	Low	Most outcomes measure self-reported behaviour	Small impact on behavioural intentions no impact on behaviour (drink-driving or passenger of a drink-driver)	All alcohol drinkers/drivers	Not identified	Cost of development and deployment	Not identified	Firm conclusions cannot be made, on balance, may reduce the propensity to drink-drive or agree to be a passenger of a drink-driver						
F8. Mass media campaigns to prevent drink-driving	Moderate/high	Not identified	Modest reductions in drink-driving and alcohol-related road traffic crashes	Entire population	Not identified	Cost of development and deployment Policy can be undermined by pro-drinking marketing	Can be directed at inequality groups	Mass media campaigns are effective in reducing drink-driving and the associated crashes, casualties, and fatalities						
F. Brief interventions and treatment														
G1. IBA in primary health care	High	Not identified	IBA is effective for reducing the prevalence of harmful and hazardous consumption over 6 and 12 months	Harmful and hazardous drinkers attending primary health care	Cost-effective	The effectiveness depends on sufficient health delivery systems and dedicated funding	Those in the lowest socioeconomic groups are estimated to experience the greatest absolute reduction in harms	IBA is effective in reducing hazardous and harmful consumption in primary health care, and is cost-effective						
G2. IBA in emergency departments	Moderate	Not identified	Small to moderate beneficial effect of IBA	Harmful and hazardous drinkers attending emergency departments	Not identified	The effectiveness depends on sufficient health delivery systems and dedicated funding	Not identified	IBA is efficacious at reducing hazardous and harmful alcohol consumption						
G3. IBA in criminal justice settings	Low	Not identified	Hazardous and harmful alcohol consumption reduced, offending reduced with most intensive interventions	Harmful and hazardous drinkers in the probation setting	Not identified	The effectiveness depends on sufficient delivery systems	Reduces alcohol consumption and harm in offenders	Hazardous and harmful alcohol consumption reduced, offending reduced with most intensive interventions						
G4. eIBA	Moderate	High levels of attrition	eIBA reduced hazardous and harmful consumption, effect mitigated after 12 months	Harmful and hazardous drinkers recruited into digital interventions	Not identified	eIBA could be a lower cost delivery option with the potential for widespread delivery	Not identified	Short-term, reductions in hazardous and harmful consumption						
G5. IBA in adolescents	Low	Not identified	Evidence still emerging	Adolescents who drink	Not identified	It is not clear what the appropriate setting or screening tools are for this group	Potential to reduce harm in adolescents	Currently no clear evidence of benefit in this age group						
G6. IBA in sexual health clinics	Low	Not identified	IBA did not lead to meaningful reductions in alcohol consumption	Harmful and hazardous drinkers attending sexual health clinics	Not cost-effective	Not identified	Not identified	Evidence suggests sexual health clinics are not effective settings for IBA						
G7. IBA in pharmacies	Moderate	It is possible that the pharmacists were undertrained in the delivery of IBA	IBA did not lead to meaningful reductions in alcohol consumption	Harmful and hazardous drinkers attending pharmacies	Not identified	Not identified	Not identified	Evidence suggests pharmacies are not effective settings for IBA						
G8. IBA in the workplace	Low	Not identified	Effective in reducing hazardous and harmful consumption in the workplace, differing effectiveness across worker type unknown	Harmful and hazardous drinkers in employment	Not identified	Employees may not wish to disclose heavy drinking to their employer	Not identified	Promising results; not clear which employee type may benefit most Some employees may be unwilling to disclose information						
(Table continues on next page)														

reviews report that workplace IBA is effective; however, it is not clear for which type of employee IBA may be most beneficial.²⁰⁴ Furthermore, employees may be anxious about the potentially negative consequences of self-disclosing heavy drinking to their employer. The effectiveness and appropriate screening tool and setting for IBA in adolescents is currently not clear.²⁰⁵

Meta-analyses report that IBA in emergency departments is effective at reducing mean weekly alcohol consumption at 6 months and 12 months;^{200,206} however, a pragmatic, multicentre, cluster randomised controlled trial in England suggested that delivering IBA in a typical emergency department setting might be difficult without substantial additional external staff support.²⁰⁷

A literature review found little empirical support for the effectiveness of IBA in community pharmacies,²⁰⁸ mirrored by a pragmatic randomised controlled trial carried out in England.²⁰⁹ While there were no methodological concerns with the latter, it is possible that the pharmacists were undertrained in the delivery of IBA. There is also a small evidence base that reports that IBA is not effective or cost-effective within a sexual health setting.²¹⁰

For specialist treatment, the National Institute for Health and Care Excellence (NICE) has published national guidelines for the treatment of harmful and dependent drinking, which includes a review and pooled analysis of treatment effectiveness.²¹¹ The approaches are broadly categorised as pharmacological or psychosocial.

NICE reviewed 12 different psychosocial therapies for effectiveness in reducing harmful and dependent drinking.²¹¹ Broadly, evidence supported the use of couple's therapy, cognitive behavioural therapy, social behaviour and network therapy (SBNT), and behavioural therapies over control conditions and other active interventions. NICE identified an Australian study reporting that motivational enhancement therapy (MET) was cost-effective compared with control, which was confirmed by a UK study that used SBNT as the comparator. In the UK study, at 12 months combining costs and QALYs, the MET groups had an incremental cost-effectiveness ratio of £18 230 compared with SBNT, and the intervention had a 58% probability of being more cost-effective than SBNT. A further study reported that MET had the largest potential for health-care savings over 3 years, however coping and skills training, a therapy called behavioural self-control training (BSCT), and marital or family therapy all demonstrated net savings ranging from about £274 000 for coping and skills training to about £80 450 for BSCT compared with standard care.

NICE reviewed four pharmacological therapies that aim to prevent relapse back to dependent or heavy drinking.^{211,212} They endorsed acamprosate, naltrexone, and nalmefene, but not disulfiram because of lower-quality research and a greater potential for harm. NICE proposed that pharmacological treatments should be delivered in combination with psychosocial support.

Nature		Grade	Limitations	Effect	Coverage	Economic impact	Implementation	Inequalities	Summary
(Continued from previous page)									
G9. Psychosocial and psychological interventions	1 expert review	Moderate	Not identified	Many treatments effective: behavioural couple's therapy, MET, CBT, SBNT compared to treatment as usual, controls, and other active interventions	Alcohol dependent adults	MET was cost-effective Coping and skills training, marital or family therapy and behavioural self-control training were cost saving	Not identified	Not identified	Behavioural couple's therapy, CBT, SBNT, MET, and behavioural interventions recommended by NICE as an effective therapy
G10. Pharmacological interventions	1 expert review 1 technical appraisal 1 health economic analysis	High	Not identified	The use of nalmefene endorsed for mild dependence, acamprosate, and naltrexone for moderate to severe dependence, disulfiram not endorsed, given that the evidence was poorer quality and the potential for harm was greater	Alcohol dependent adults	Acamprosate and naltrexone were cost-effective Nalmefene was cost-saving	Not identified	Not identified	Recommended by NICE as an effective therapy (with an adjunct of psychosocial therapy)

MUP=minimum unit price. VAT=value added tax. RCT=randomised controlled trial. BAC=blood alcohol concentration. IBA=identification and brief advice. eIBA=electronic identification and brief advice. MET=motivational enhancement therapy. CBT=cognitive behavioural therapy. SBNT=social behavioural and networks therapy. NICE=National Institute for Health and Care Excellence. Grade is based on GRADE approach. Limitations are those above and beyond those reflected in grade. Inequalities list the impact of an intervention on an inequality group as defined by the Equality Act 2010.

Table: Summary of overall findings of alcohol control policies

By comparison with standard care, acamprosate resulted in net health-care savings of about £68 900 (findings mirrored by a German study), while naltrexone and disulfiram resulted in net economic costs of about £83 400 and £153 200 respectively.²¹¹ An Australian study reported conjunctive naltrexone and counselling was cost-effective compared with standard care only, reporting an incremental cost-effectiveness ratio of about AUS\$13 000.

Conjunctive nalmefene with a psychosocial intervention averted about 4900 alcohol-related disease and injuries and 250 deaths per 100 000 patients compared with a psychosocial intervention alone at 5 years.²¹² A larger gain of QALYs with nalmefene was observed than with psychosocial interventions alone (a difference of 0·071 QALYs).

Discussion

An extensive number of policies seek to mitigate the health, social, and economic harms caused by alcohol (table). While these policies vary in their effectiveness and cost-effectiveness, evidence supports those that reduce the affordability of alcohol as the most effective and cost-effective approach to prevention and health improvement. Increases in taxation, for example, increase government revenue and deliver substantial health and social returns.^{43,63} The combination of tax increases and setting a MUP are estimated to lead to substantial reductions in harm and increases in government revenue greater than those achieved by a MUP in isolation. Additionally, robust marketing regulations are strongly supported by the evidence base, particularly those that reduce the levels of exposure in children.^{29,85,105,111,213,214} Like taxation, marketing regulations return large health benefits and have the potential to change drinking behaviour at an early age, thus preventing later problems.

Policies that sufficiently reduce the hours during which alcohol is available for sale, particularly late-night on-trade sale, can substantially reduce the public health burden of alcohol¹¹¹ and are cost-effective when simultaneously enforced and targeted at the areas with the highest alcohol outlet density. While there is a clear relationship between the density of alcohol outlets and social disorder, the research is more mixed for other outcomes and causation is unclear.

Other interventions supported by the evidence include health interventions aimed at drinkers who are already at risk such as IBA and specialist treatment for those with harmful drinking patterns and dependence.^{197,198,200} Both interventions show favourable returns on investment, but success depends on large-scale implementation and dedicated treatment staffing and funding streams, without which they are less effective.

Enforced legislative measures to prevent drink-driving are effective and cost-effective,^{173,177–179,182} but in England are estimated to lead to minimal public health gains compared with policies such as taxation. Nonetheless, reducing drink-driving is an intrinsically desirable societal goal.

Both should be considered complementary components to a wider strategy that aims to influence drinkers to adopt less risky patterns of alcohol consumption.

Although playing an important role in increasing knowledge and awareness, there is little high-quality evidence to suggest that providing information and education is sufficient to lead to substantial and lasting reductions in alcohol-related harm,^{3,126,127} and education programmes are not cost-effective.²⁶ However, these policies increase public support for more stringent (and effective) policies.¹²⁴ Finally, labels on alcoholic beverages may not change drinking behaviour, but consumers have a right to be better informed. These policies should be considered as an important component in any overall policy approach.

At best, interventions enacted in and around the drinking environment lead to small reductions in acute alcohol-related harm. But their implementation is resource intensive and many of their benefits could be achieved by wider environmental policies. Multicomponent community programmes have proven effectiveness and cost-effectiveness,^{160–162} and are amenable to local implementation. Other interventions in this policy area, while not firmly supported by the evidence, may be enacted based on solid principles, such as the use of safer glassware alternatives.

The OECD suggests that combining alcohol policies may create a critical mass effect, changing social norms around drinking to increase the impact on alcohol-related harm.²⁶ A similar notion is demonstrated by research from the USA where stronger overall policy environments are found to be associated with lower levels of binge drinking and alcohol-related cirrhosis mortality.^{215,216} Together, this supports an overall policy approach that is coherent and consistent. For example, warning labels highlighting the risks of alcohol consumption should not be undermined by a unit price that encourages heavy consumption. Such consistency is essential to creating a supportive environment for society, including for individuals who wish to adopt healthier lifestyles by reducing their alcohol consumption and for those who drink at hazardous and dependent levels. The challenge for policy makers is to implement the most effective and cost-effective set of policies for the English context. This Review provides evidence to identify those policies.

Contributors

RB drafted the paper with input from NS, CH, JM and DL. All other authors contributed to data acquisition, quality assurance, data interpretation and synthesis, redrafting and editing. All authors agreed the final manuscript.

Declaration of interests

All authors are employed by Public Health England. FG holds an honorary senior lecturer position at Imperial College London. BF holds an honorary Chair at the University of York, UK. CB is employed part-time at the University of Liverpool/Laurate Education, UK. RB holds a visiting research associate post at King's College London. VM is studying a part-time PhD at Sheffield University. JM is supported by research grants from the Department of Health, the Institute for Health Research (NIHR), Medical Research Council, and the NIHR Biomedical

Research Centre for Mental Health at South London and Maudsley NHS Mental Health Foundation Trust. He has received honoraria from Merck Serono (2013, 2015; clinical oncology medicine) and Indivior (via PCM Scientific) as a faculty member and conference (2012–13), and co-chair (2015–16) for Improving Outcomes in Treatment of Opioid Dependence conference. NS has received research grants from British Liver Trust, Alcohol Education Research Council, and various other funding bodies. He has undertaken paid consultancy work and received travelling expenses from Pabrinex and Norgine for developing drugs for the treatment of inflammatory bowel disease, liver disease, and viral hepatitis and been paid for medicolegal work in the area of hepatitis C and alcohol-related liver disease. He is a clinical adviser to Public Health England, a scientific adviser to European Public Health Alliance, and Royal College of Physicians representative on EU Alcohol Policies, EU Alcohol Forum. He has advised for the Alcohol Health Alliance UK, UK Department of Health, Home Office, Department of Transport, Southampton City Council, British Liver Trust, European Association for the Study of the Liver (EASL), British Association for the Study of the Liver (BASL), and British Society of Gastroenterology (BSG). All other authors declare no competing interests.

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