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The INDEPENDENT REVIEW OF THE EFFECTS OF ALCOHOL PRICING AND PROMOTION

Summary of Evidence to Accompany Report on Phase 1: Systematic Reviews

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Introduction

This evidence summary accompanies the full report of results of the first phase of an independent review of the effects of pricing and promotion on alcohol consumption and related harm in the UK, commissioned through the Policy Research Programme, Department of Health.

Aims and Objectives

The primary objective of our research was to provide answers to key questions about the relationship between alcohol promotions including pricing, level of consumption, alcohol-related harm and the likely social, health and economic costs and benefits of planned or potential policy interventions.

Specifically, our team was commissioned to

- a) systematically review the evidence on the link between the price and promotion of alcohol on the one hand and patterns of consumption and alcohol-related harm on the other as well as the effectiveness of related policy interventions (Phase 1)
- b) as part of Phase 1, indicate how the promotion and pricing of alcohol affects total alcohol intake, and patterns of consumption in groups identified as priorities by government, namely
 - underage drinkers (persons under the age of 18),
 - young adult binge drinkers (persons aged 18-25, drinking more than the equivalent of 6 UK units (women)/8 UK units (men) on a single occasion)
 - harmful drinkers (persons regularly drinking more than the equivalent of 35 UK units per week for women/50 UK units per week for men)¹, and
 - those on low incomes and
- c) model the potential implications of changes to current policies, especially the impact on health, crime, and the economy (Phase 2).

In Phase 1, the topic of this first report, we have carried out a systematic review of the evidence base on the relationships between the various types of alcohol promotions, alcohol pricing, alcohol consumption and alcohol-related harm. Where evidence permits, we report separately on the above-mentioned policy priority groups. Harms are defined widely and include health, social and crime-related harms on individuals and communities.

In Phase 2, based on the findings of the review and available data, we will select a limited number of evidence-based policy alternatives, and model their differential impact on alcohol consumption and alcohol-related harms. Where possible, we will model the effects of policy changes on the identified priority groups. The full report covering both phases is expected in September.

Background to the reviews

The research question was conceived in three separate and yet connected parts:

1. Investigating the relationship between **Tax/Price** and **Alcohol Consumption** or directly to **Harm [Review 1]**
2. Investigating the relationship between **Advertising/Promotion** and **Alcohol Consumption** or directly to **Harm [Review 2]**
3. Investigating the relation between **Alcohol Consumption** and **Outcomes**. Outcomes include either health and health service-related outcomes (e.g. those relating to chronic disease, traffic accidents) or societal outcomes (e.g. those relating to crime or employment) **[Review 3]**

¹ Throughout this summary and the main report the review team uses the terminology “harmful drinkers” consistently to represent this category. However where study authors use different terminology e.g. “heavy drinkers” we preserve the original usage by the authors.

These reviews were conceived as three separate analyses each requiring a different type of evidence base and engaging with different bodies of literature.

Systematic Review Methodology

The reviews were undertaken according to systematic review principles. The methodology used closely followed the review framework described in the NHS Centre for Reviews and Dissemination (CRD) Report No. 4, *Undertaking Systematic Reviews of Research on Effectiveness* (Khan et al. 2001). Reviews 1 and 2 were conceived as reviews of primary and secondary literature. For Review 3 on the relationship between alcohol consumption and outcomes, a review of reviews was undertaken. According to the Government Social Research Unit² a review of reviews is appropriate where there has already been considerable research and a number of research reviews undertaken in a particular area. The limitation is that it will obviously not pick up research outside of existing reviews. Also, as reviews are of variable quality each individual review needs to be screened to assess how systematic and comprehensive it is. The review of reviews shares the systematic approach with other systematic review methods. It has the advantage of generally being quicker than other types of full systematic review.

The following interventions/exposures were included for Reviews 1 and 2:

Price:

- Tax increase(s)
- Tax decrease(s)
- Price increase(s)
- Price decrease(s)

Policy:

- Change in coverage of tax policies
- Policies with a direct effect on pricing (e.g. minimum pricing)

Promotion:

- Advertising and other promotional interventions, including price-based promotions

The main methodological challenge for research linking pricing and promotion to consumption or harm, as in virtually all studies on policy effects, is to seek to establish a causal link between a change in pricing and/or promotion and subsequent observations regarding consumption and/or harm. We have used Bradford Hill's principles for establishing possible causation (Hill, 1965) to facilitate the quality assessment process across a wide spectrum of designs and types.

Characteristics of the Evidence Base

4234 potentially relevant titles were identified through the database searches, of which 978 were retained after the coding of abstracts. Of these, 572 were coded as potentially relevant for the three reviews; the remainder was classified as "background information". Final inclusion criteria were met by

- 63 studies including 2 meta-analyses for Review 1
- 70 studies including 2 meta-analyses for Review 2
- 32 systematic reviews or meta-analyses for Review 3.

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http://www.gsr.gov.uk/professional_guidance/reia_toolkit/what_is_an_reia/methods_for_reviewing_evidence/review_of_reviews.asp

Review 1: The effect of pricing and taxation on alcohol consumption

This review includes both significant primary studies and the results of systematic reviews. The following table reports the respective yield for the major topics covered by this review.

<i>Section</i>	<i>Number of studies included</i>	<i>Number of studies covered³</i>
Pricing/Taxation to Consumption	Gallet meta-analysis (2007)	132
	Wagenaar et al meta-analysis (2008)	91
	15 other studies	15
Taxation/Pricing to Harm	46	46

Pricing and taxation effects on the consumption of alcoholic beverages

Two major systematic reviews of price elasticities have been identified by this review.

Gallet (2007) has conducted a meta-analysis of 132 studies reporting elasticities. His meta-analysis is of reasonable quality and is certainly superior to any such analysis possible within the time and resource constraints of our study. Gallet's data is therefore used below with special emphasis given to any studies conducted in a UK setting or to those completed subsequent to his data collection.

Wagenaar et al (2008) recently conducted a new and highly comprehensive meta-analysis. This review systematically searched nine major scholarly databases of published research material covering health, social, behavioural and economic disciplines for relevant studies enabling numeric estimates to be made of the relationship between price changes and changes in the consumption of alcohol. Inclusion criteria were met by 91 individual studies that cover the relationship between either pricing or taxation and alcohol consumption.

Both meta-analyses report on studies that measured price or tax elasticity using a variety of methods for specifying alcohol demand. 1172 estimated price/tax elasticities are reported.

In addition to those included in the meta-analyses, a further 15 relevant studies were identified. All studies were published in English, with the earliest being published in 1993. The majority of studies (n=7) were conducted in the USA. Only one study was based specifically in the UK.

Evidence statement 1: There is strong and consistent evidence to suggest that price increases and taxation (assuming increases pass through to retail price) have a significant effect in reducing demand for alcohol. The evidence base is derived from studies from four different countries (US, Australia, Switzerland and the UK) and uses a variety of study designs and methodologies.

Evidence statement 2: There is strong evidence to suggest that young drinkers, binge drinkers and harmful drinkers tend to choose cheaper drinks. Low income groups have not been studied specifically.

³ This includes studies accessed via the results of large meta-analyses or studies that, due to logistic constraints or agreed limitations of the scope of this review (e.g. date, language), are not included in the accompanying evidence tables.

Evidence statement 3: There is low quality but demonstrable specific evidence to suggest that minimum pricing might be effective as a targeted public health policy in reducing consumption of cheap drinks. There is also evidence to suggest that such a policy may be acceptable to many members of the community. Further research is required to validate these findings for UK populations and for policy priority groups.

Pricing and taxation effects on harm

24 studies met the inclusion criteria for taxation studies. The majority of the studies (n=20) were conducted in the USA. None of the studies were conducted in the UK. No studies exclusively examined policy priority groups although several studies included subsets of data examining impact on binge drinkers or harmful drinkers. 22 studies met the inclusion criteria for pricing studies. 14 studies were conducted in the U.S. Four of the studies were conducted in the UK. While most of the studies examined effects on the general population several looked for effects on harmful drinkers. In addition, some of the outcome measures were specifically chosen for investigation by researchers because there is strong evidence on their link to problematic alcohol use, and they are therefore likely to reflect the behaviours of at risk groups.

Evidence statement 4: A large number of studies consistently suggest evidence for an association between increases in taxation or pricing of alcohol and reductions in harm.

Implications for particular policy priority groups

This Section identifies studies that help to explain in a qualitative way how the association of price or tax with consumption or with harm may impact on specific policy priority groups.

Underage drinkers may be especially sensitive to price because they often have little money of their own. A recent UK study found a strong relationship between teenagers' disposable income and their likelihood of binge drinking (Bellis et al 2007).

In a U.S. study Laixuthai and Chaloupka (1993) projected that raising beer prices through taxation would cut both the overall number of young drinkers and the number of those who drink heavily. Higher beer prices were found to significantly reduce the likelihood for drinking, drinking frequency and binge drinking in underage and adult female drinkers (but not male drinkers, Chaloupka & Wechsler, 1996).

Young binge drinkers are more likely than the general population to choose cheaper drinks (Wechsler et al, 2000). In a U.S. study Keng & Huffman (2007) found that binge drinking by young people is highly responsive to state taxes on alcohol. They conclude that an increase in local alcohol price decreases the occasions of binge drinking, and the individual is less likely to become a regular binge drinker (Keng & Huffman 2007).

Wagenaar (2008) found in his meta-analysis that price/tax significantly affects those involved in **harmful drinking** ($p<.01$), however, the magnitude of the effect was smaller than effects on overall drinking. In contrast, several individual empirical studies linking price or tax changes directly to harm found that harm reduced more significantly in heavy (i.e. harmful) drinkers than in light or moderate drinkers.

No studies specifically examined **low income groups**.

Targeting policy at different price points and substitution effects

A study in Sweden suggests that influencing the prices of the cheapest drinks on the market by raising "floor prices" has a larger impact on total consumption than does increasing the prices of more expensive drinks (Ponicki et al 1997; Gruenewald & Treno 2000). A subsequent study (Gruenewald et al 2006) showed that price increases lead to a quality/volume trade-off. Consumption decreases, but drinkers also switch to low cost brands to maintain their consumption. There was no strong evidence to suggest that price changes lead consumers to migrate between alcoholic beverage categories.

The evidence base on substitution effects of alcohol with other substances, in relation to price increases of alcohol, is underdeveloped. Higher alcohol prices decrease both alcohol consumption and smoking participation (suggesting complementarity). However, higher cigarette prices tended to increase drinking (Decker & Schwartz 2000). Further research is needed to better understand this potential link.

Review 2: The effect of promotion on alcohol consumption

This review includes both significant primary studies and the results of systematic reviews. The following table reports the respective yield for the major sections of this report.

<i>Section</i>	<i>Number of studies included</i>	<i>Number of studies covered^a</i>
Advertising in general	Gallet (2007) meta-analyses	132 econometric studies
Specific advertisements and promotions	Smith and Foxcroft (2007) 57 and 1 meta-analysis	7 cohort studies 65
Bans and other restrictions	10	10
Counter Advertising and Public Service Announcements	To follow in final report	To follow in final report

^aThis includes studies accessed via the results of large meta-analyses or studies that, due to logistic constraints or agreed limitations of the scope of this review (e.g. date, language etcetera), are not included in the accompanying evidence tables.

General effects of alcohol advertising on consumption

Gallet's (2007) meta-analysis of 132 studies reporting elasticities has already been analysed in the section on price and consumption. In addition to data concerning price elasticities, Gallet reports data on advertising elasticities (322 values). Again special emphasis is given to studies conducted in a UK setting or to those completed subsequent to his data collection.

A further systematic review of 7 cohort studies specifically looking at the link between alcohol advertising and consumption in "young people of school or college age" was conducted by Smith and Foxcroft (2007).

Evidence statement 5: There is conclusive evidence of a small but consistent association of advertising with consumption at a population level. There is also evidence of small but consistent effects of advertising on consumption of alcohol by young people at an individual level.

Evidence statement 6: There is an ongoing methodological debate on how advertising effects can and should be investigated and further research and methodological developments for establishing a definite causal relationship is required.

Price & Point of Sales Promotions

12 studies met the inclusion criteria. All studies were published in English, with the earliest being published in 2000. 11 studies were conducted in the USA, with one example from Australia. Longitudinal studies were the most common design with other designs including surveys and audits. Several included studies were conducted in ethnic groups that are untypical of a UK population. Some studies considered particular at risk groups such as under age drinkers, heavy drinkers and binge drinkers. No studies examined effects on those from low income groups.

Evidence statement 7: There is moderate but consistent evidence to suggest that point of purchase promotions are likely to affect the overall consumption of under age drinkers, binge drinkers and regular drinkers.

Outdoors and print media advertising

10 studies met the inclusion criteria. Most of these examined either magazines or billboards. All studies were published in English, with the earliest being published in 1997. Most studies were conducted in the USA. Several studies examined specific at risk groups of interest specifically underage drinkers and binge drinkers.

Evidence statement 8: There is consistent evidence to suggest that exposure to outdoor advertising, or advertisements in magazines and newspapers may increase the likelihood of young people starting to drink, the amount they drink, and the amount they drink on any one occasion. Further research is required on whether what young people say they are going to do at a particular point in time translates into actual subsequent behaviour.

Alcohol related merchandising

Four US-based studies were identified that examined the use of alcohol related merchandising. All of these studies consider the impact of alcohol related merchandising in relation to alcohol awareness or participation.

Evidence statement 9: There is consistent evidence from cross-sectional studies that there are high levels of ownership of alcohol related merchandise among young people, particularly underage drinkers and binge drinkers. There is some evidence, although not conclusive, to suggest that ownership of such items is associated with initiation or current drinking.

Broadcast media

31 studies met the inclusion criteria. 21 studies were conducted in the USA, 5 in the UK, 3 in New Zealand and 1 in Belgium and 1 in Canada. Ten studies employed longitudinal designs with one being a prospective cohort study. Two econometric studies examined total advertising spend. There was one qualitative study. The majority of studies targeted under age drinkers. Two studies specifically targeted binge drinkers as the population of interest. Several studies are limited in examining the effects of home-viewing of videos rather than new technologies such as DVDs.

Evidence statement 10: There is consistent evidence from longitudinal studies that exposure to TV and other broadcast media is associated with inception of and levels of drinking. Evidence for the effect of watching videos is equivocal.

Advertising bans and other restrictions

10 studies met the inclusion criteria. With one exception, studies were conducted in the USA. Nevertheless, some of these studies constitute international comparative studies using cross-national level data. Evidence comprises either econometric studies projecting the effect of a ban or natural experiments where the effect in a particular country or region has been evaluated. No studies specifically examined the differential effect of bans on different types of drinkers. However, a study by Saffer & Dave (2003) did find that the cheaper the price of alcohol the more likely people are to binge (price to binge participation elasticity of about 0.14). Based on this data they estimate that complete elimination of alcohol advertising could reduce adolescent monthly alcohol participation by about 24 percent and binge participation by about 42 percent.

Evidence statement 11: There is some inconclusive evidence that suggests that advertising bans have a positive effect in reducing consumption. Differences in contextual factors are a likely explanation for these differences. It is methodologically challenging to control for all possible confounding factors.

Evidence statement 12: There is some evidence to suggest that bans have an additive effect when accompanied by other measures within a general environment of restrictive measures.

Review 3: The effect of alcohol consumption on alcohol related harm

Alcohol consumption and health consequences

Alcohol consumption is related to a wide variety of negative health outcomes including morbidity, mortality, and disability (Rehm et al. 2003). Gutjahr and Gmel (2001) examined three major social cost studies to produce a state of the art list of alcohol-related fatal medical conditions for which causal evidence exists. This list has been fairly stable over the ensuing decade and a broad general consensus exists regarding both long-term conditions and acute effects. The evidence is more equivocal, however, where it relates to the possible beneficial effects of consumption or, indeed, the particular thresholds for harmful levels of consumption and the necessary duration of exposure for (chronic) harm to be effected.

The systematic review (review of reviews) by Rehm et al (2003) used published meta-analyses to establish the relationship of alcohol consumption to burden of disease for over 60 conditions. Three groups of conditions were considered: wholly alcohol-attributable conditions, with an alcohol-attributable fraction (AAF) of 100%; chronic conditions where alcohol is a contributing cause; and acute conditions where alcohol is a contributing cause. These conditions include several cancers, diabetes, neuropsychiatric disorders, cardiovascular disorders, digestive disorders, conditions arising during pregnancy and injuries.

Our study seeks to add **findings from systematic reviews and meta-analyses conducted from 2001 onwards** to those from the previous review (Rehm et al. 2003). The emphasis was on examining whether findings from this previous review have been confirmed, strengthened or possibly overturned.

Alcohol and all-cause mortality

Five studies met the inclusion criteria. All studies were published in English between 2002 and 2006. Two of these studies were specifically conducted using data from England and Wales (White et al, 2002; White et al, 2004).

Evidence statement 13: There is consistent evidence to suggest that alcohol consumption is associated with substantially increased risks of all-cause mortality even in people drinking lower than recommended limits, and especially among younger people. . High levels of alcohol consumption have detrimental effects. The evidence is more equivocal, however, where it relates to establishing cut-off points for lower risk versus harmful levels of consumption. There is an ongoing controversy as to whether or not there are beneficial (cardio-protective) effects at low levels of alcohol consumption.

Coronary heart disease

Our review identified three further meta-analyses of coronary heart disease (CHD), performed by Corrao et al (2004), Burger et al (2004) and Iestra et al (2005). Corrao et al (2004) selected 28 cohort studies from an initial pool of 51 studies. Burger et al (2004) found 18 studies that met quality criteria and used them to evaluate the risk association of alcohol consumption for CHD. Iestra et al (2005) specifically examined 5 studies that looked at risk of moderate alcohol drinking among patients diagnosed with coronary artery disease,

Evidence statement 14: There is moderate, but methodologically disputed, evidence to suggest that light alcohol consumption is associated with a decreased level of risk

from coronary heart disease. High levels of alcohol consumption (defined here as 100g/day) have detrimental effects (RR = 1.13 (95% CI 1.06-1.21)).

Stroke

Our review identified one further meta-analysis of stroke, performed by Reynolds et al (2003). This examined a total of 35 observational studies (19 cohort and 16 case-control studies). Included populations were categorised according to average alcohol intake of less than 12g/day; 12-24g/day; 24-60g/day and over 60g/day.

Evidence statement 15: There is strong evidence that heavy alcohol consumption increases the risk of stroke. Light or moderate consumption may be protective against total and ischaemic stroke, although the evidence on this is not as clear and it is important to acknowledge that this effect is not consistent for all types of stroke.

Cancers

8 systematic reviews were included. The largest number of reviews was located for colon cancer and rectal cancer (3 studies each). Stomach cancer was not covered in any identified reviews - this replicated an earlier finding from the review by Rehm et al (2003).

Evidence statement 16: There is strong evidence for statistically significant associations with a wide range of cancers including some of the most common cancers in the UK. However the evidence is not consistent across all neoplastic conditions. Further research is required for stomach and lung cancer in particular.

Traffic injuries and deaths

Two meta-analyses were identified examining the effects of alcohol consumption on the incidence of traffic injuries and mortality.

Evidence statement 17: There is a significant and consistent effect between alcohol consumption and serious injury and for heavy drinking and road accidents. Heavy drinking levels of 5 drinks or more were found to be positively predictive of injury.

Suicides

Three systematic reviews consider the relationship between alcohol consumption, both in terms of chronic alcohol dependence or acute episodes of heavy drinking, and suicide (E950-959) or attempted suicide.

Evidence statement 18: There is moderate and consistent evidence to suggest that alcohol dependence is associated with increased risks of suicide (OR 2.13 95% CI 1.18-3.85) and suicide attempts (OR 2.50 95% CI 1.38-4.52). There are methodological difficulties in making an attribution of suicide to the harmful effects of alcohol.

Sexually transmitted diseases

One systematic review of the relationship between alcohol consumption and sexually transmitted diseases (STD) was identified.

Evidence statement 19: There is moderate evidence (from eight out of eleven studies included in a systematic review) to suggest that alcohol consumption is associated with increased incidence of sexually transmitted diseases. Because there are other possible explanations for risk behaviours there are significant difficulties in establishing a consistent mechanism for direct causal effects. However, this finding is supported by studies directly associating taxation or pricing changes for alcohol with changes in rates of sexually transmitted diseases including gonorrhoea.

Alcohol consumption and social harm

Gmel and Rehm (2003) provide a definitive overview of social consequences of alcohol abuse. They begin by linking social consequences with the following elements of alcohol abuse: 1. Failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance, neglect of children or household). 2. Continued drinking even in situations where it is physically hazardous (e.g., driving an automobile or operating machinery). 3. Recurrent alcohol-related legal problems (e.g., arrests for disorderly conduct while drinking). 4. Continued drinking despite persistent or recurrent social or interpersonal problems it may cause (e.g., arguments with spouse, physical fights). In accordance with this, researchers have looked at such consequences as workplace absenteeism, unintentional injuries, and violence.

Violence

Gil-Gonzalez and colleagues (2006) conducted a systematic review and meta-analysis of quantitative studies of alcohol related intimate partner violence conducted between 1966–2004. For 11 papers included in the meta-analysis by Gil-Gonzalez et al (2006) the overall pooled odds ratio of partner alcohol use being associated with incidents of violence was 4.57 (95% CI 3.30–6.35), but a high degree of heterogeneity was observed. The magnitude of the effect was inversely associated with the year of publication. The biggest odds ratios were obtained in studies with small sample sizes. Corrao et al (2004) included violence as an outcome of interest in their review of 15 health conditions attributable to alcohol. Grouping violence with injuries (there is no separate analysis) they observed a consistent and significant effect of alcohol at various levels of intake (25g/day 1.12 (1.06 –1.18); 50g/day 1.26 (1.13– 1.40) and 100g/day 1.58 (1.27 –1.95).

Evidence statement 20: There is a consistent and statistically significant effect of alcohol on violence and injury at even quite low levels (25g/day) of consumption. Further research of higher quality using more rigorous designs is required to establish a robust causal explanation.

Divorce and marital problems

In a meta analysis including 60 studies, Marshal (2003) reports strong associations between alcohol consumption and marital dissatisfaction, negative interactions, and violence, and some empirical evidence of positive effects of light alcohol consumption on marital functioning.

Evidence statement 21: There is a strong and consistent association between alcohol consumption and marital dissatisfaction, a risk factor for subsequent divorce. Further research is required to establish the direction of cause and effect.

Crime other than violence and employment-related outcomes

Evidence statement 22: No recent systematic reviews or meta-analyses were identified that examined the effects of alcohol on crime other than violence or on employment-related outcomes such as unemployment or absenteeism. There is sufficient non-review evidence to suggest that a significant proportion of criminal behaviour can be associated with alcohol misuse. However it is methodologically difficult to ascertain the alcohol attributable fraction for this association.

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