

Have restrictions on alcohol advertising in Ireland affected awareness among adults? A comparative observational study using non-probability repeat cross-sectional surveys

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ABSTRACT

Objective: Since November 2019, Ireland has restricted alcohol advertising at the cinema and outdoors (e.g., near schools), and banned alcohol advertising on public transport. Although awareness of such advertising had decreased one year after the restrictions, measures to limit COVID-19 transmission complicated interpretation. We examine: (1) changes in awareness two years post-restrictions, when COVID-19 mitigation measures had eased; and (2) how changes in Ireland compare to Northern Ireland, where the restrictions do not apply.

Method: Repeat cross-sectional surveys of adults recruited from non-probability online panels, with three waves in Ireland (October 2019 [pre-restrictions] and October 2020/2021 [post-restrictions]; $n=3,029$) and two in Northern Ireland (October 2020/2021; $n=1,011$). Participants self-reported past-month awareness of 13 alcohol marketing activities, including public transport, cinema, and outdoor advertising (coded: Any past-month awareness/No awareness/Not sure).

Results: In Ireland, the odds of reporting no past-month awareness (vs. any) were higher in 2021 and 2020 versus 2019 for all restricted advertising activities (e.g., 2021 vs. 2019 for public transport: $OR_{Adj}=1.88$, 95% CI: 1.53-2.32). Interactions between wave and jurisdiction indicated that in 2021, compared to 2020, the odds of reporting no past-month awareness of public transport and cinema advertising (vs. any) were higher in Ireland than Northern Ireland, despite increased opportunities for exposure in both jurisdictions through eased pandemic mitigation measures. There was no interaction for outdoor advertising, suggesting between-wave trends did not differ by jurisdiction.

Conclusions: Ireland's restrictions have reduced past-month awareness of alcohol advertising at the cinema and on public transport, but not outdoor. Continued monitoring is required.

Keywords: Alcohol marketing; Alcohol advertising; Marketing controls; Ireland; Northern Ireland; Repeat cross-sectional surveys

INTRODUCTION

Research consistently demonstrates that exposure to alcohol advertising has a causal relationship with consumption (Jernigan et al., 2017; Sargent & Babor, 2020). To counteract this influence, the World Health Organization (2017) recommend that countries enact and enforce statutory bans or comprehensive restrictions on alcohol advertising. Several countries already have such statutory restrictions, such as France and Norway (Gallopel-Morvan et al., 2017; Purves et al., 2022; Rossow, 2021), but there remains limited robust evidence about their real-world effectiveness (Saffer, 2020; Siegfried et al., 2014).

Through the Public Health (Alcohol) Act 2018 (hereafter ‘the Act’), Ireland is in the process of introducing statutory controls on alcohol advertising and other marketing activities (Irish Statute Book, 2018), thus providing a real-world opportunity to examine the impact of such restrictions. The Act was passed in October 2018. Phased commencement began on 12th November 2019 with section 14 banning alcohol advertising on public transport or at designated stops (e.g., bus stops and train stations) and restricting outdoor advertising in certain locations (e.g., not within 200 metres of a school or in a park or open space maintained by a local authority), and section 20 restricting cinema advertising (e.g., not permitted unless an 18+ certified film or as part of licensed premises in the cinema). The full scope of the Act, which also includes measures such as minimum pricing per gram of alcohol and health warnings on packaging, is described elsewhere (Irish Statute Book, 2018; O’Dwyer, 2019).

We used repeat cross-sectional surveys to examine whether these initial restrictions influenced advertising awareness among adults in Ireland, with data collected using non-probability online panels. Between October 2019 (when data was first collected) and October 2020, we observed decreases in awareness of alcohol advertising at the cinema, on public transport, and outdoors (posters/billboards), all activities subject to the November 2019 restrictions (Critchlow & Moodie, 2021). The period between these two waves, however,

1 included the onset of the COVID-19 pandemic and mitigation measures aimed at limiting social
2 interaction. As such, the observed decreases in awareness may be partly or wholly attributable
3 to these mitigation measures – for example, reduced footfall on public transport or at cinemas
4 – rather than the advertising restrictions. This confounding effect was evident through between-
5 wave decreases in awareness of other marketing activities not yet subject to restrictions, such
6 as lower awareness of sponsorship while events were cancelled or required to operate with
7 reduced capacity. Consequently, the potential impact of the pandemic on consumers and
8 marketing practice means that short-term post-commencement data in Ireland may be
9 insufficient alone to understand the impact of the advertising restrictions.

10 The island of Ireland consists of two separate jurisdictions. The first is the sovereign
11 state of Ireland. The second is Northern Ireland, which is part of the United Kingdom (UK) but
12 governed by a devolved administration. Alcohol use and associated harms are important issues
13 in both jurisdictions (O'Dwyer et al., 2021; Russell, 2020). Ireland's statutory restrictions for
14 alcohol advertising do not directly apply to Northern Ireland. The latter has devolved powers
15 to regulate some alcohol marketing activities (e.g., in or around licensed premises), but others
16 are controlled by the UK Government (e.g., broadcast) (Department of Health, 2021). As in
17 the rest of the UK, alcohol advertising in Northern Ireland is largely self-regulated through
18 non-statutory codes of conduct administered by the alcohol, retail, and advertising industries,
19 with some co-regulation of broadcast advertising with the Office for Communications (Institute
20 of Alcohol Studies, 2020; Responsible Retailing Code Northern Ireland, 2018; Retail of
21 Alcohol Standards Group, 2017). The absence of comparable statutory controls in Northern
22 Ireland gives rise to a natural experiment to examine how Ireland's advertising restrictions have
23 affected consumer awareness. It also provides an opportunity to examine the impact of
24 Ireland's advertising restrictions versus changes in consumer behaviour and marketing activity

1 resulting from the pandemic. Cross-jurisdiction comparisons have also been used to evaluate
2 tobacco advertising restrictions (Harris et al., 2006; Kasza et al., 2011; Li et al., 2013).

3 The current study builds on our existing report of between-waves changes in Ireland by
4 considering data from a new 2021 wave in Ireland and from two previously unreported waves
5 in 2020 and 2021 in Northern Ireland. We examine: (1) changes in past-month awareness of
6 the advertising activities restricted in Ireland (cinema, public transport, outdoor) two years
7 post-commencement, when COVID-19 mitigation measures had eased and opportunities for
8 exposure had increased; and (2) how changes in Ireland between 2020 and 2021 compared to
9 Northern Ireland, where the advertising restrictions do not directly apply.

11 **METHODS**

12 **Design: Repeat cross-sectional online surveys**

13 Online repeat cross-sectional surveys were conducted with adults (18+) in Ireland and Northern
14 Ireland. Data in Ireland were collected before the advertising restrictions commenced (14th to
15 25th October 2019, $n=1,007$) and one year (8th to 18th October 2020, $n=1,020$) and two years
16 (6th to 12th October 2021, $n=1,002$) after commencement. For the post-commencement waves,
17 comparative data were also collected in Northern Ireland (8th to 12th October 2020, $n=501$; 7th
18 to 14th October 2021, $n=510$). Funding was not available to collect Northern Ireland data in
19 2019. The study was reviewed by the University of Stirling's General University Ethics Panel
20 (GUEP756; GUEP [19 20]963).

22 **Recruitment: Non-probability online market research panels**

23 Fieldwork was conducted by YouGov, a market and social research company. For each survey
24 wave, YouGov recruited a cross-sectional sample of adults (18+) in Ireland and Northern
25 Ireland through direct invitations to non-probabilistic online market research panels.

Participants received reward points, redeemable to monetary values once thresholds are met, in remuneration. In all waves, YouGov provided a cross-sectional weight (based on age, gender, and region) to adjust descriptive data to be broadly representative of the adult populations in Ireland and Northern Ireland.

Non-probability online market research panels have limitations regarding panel representativeness, self-selection bias, non-response, and data quality, which may limit the extent to which data represent population-level trends (Newman et al. 2020; Porter et al. 2019; Walter et al. 2019). This approach, however, was necessary as the limited time and resources available to conduct the 2019 wave meant that online market research panels were the only feasible option to collect baseline data. It was important to continue this approach for post-commencement waves to avoid introducing unknown sampling bias into between-wave comparisons. Use of a commercial market research company also provided the opportunity to introduce counterfactual data from Northern Ireland at a later wave while maintaining a similar mode of recruitment and survey delivery, thus reducing bias in the between-jurisdiction comparisons. Moreover, our aim is to examine trends in awareness over time using between-group analyses of participants recruited in a similar manner, rather than provide exact point-estimates of awareness in the population. Non-probability online panel data are considered suitable for such purposes, providing best practice guides are adhered to and the limitations acknowledged (Newman et al. 2020; Porter et al., 2019; Walter et al. 2019). Non-probability panels have been used in evaluations of other marketing controls, such as standardised cigarette packaging in the UK (e.g., Moodie et al., 2021) and the Évin law controls on alcohol advertising in France (Gallopel-Morvan et al., 2022).

COVID-19: Context during fieldwork

Mitigation measures to reduce transmission of COVID-19 applied in all survey waves, except the 2019 wave in Ireland. National and localised measures were set by the relevant governing administration in each jurisdiction and were not intentionally aligned across the island of Ireland. Restrictive pandemic mitigation measures applied in both Ireland and Northern Ireland in 2020, but neither jurisdiction was in a full nationwide ‘lockdown’ in the month before data collection (September 2020), the timeframe for self-reporting marketing awareness. Instead, mitigation measures included limits on where and how many people could meet and mandatory requirements for social distancing, protective measures, and capacity limits for out-of-home settings that were permitted open (Government of Ireland, 2020a; National Public Health Emergency Team Policy Unit, 2021; Northern Ireland Audit Office, 2021; Northern Ireland Executive Office, 2020a; 2020b). The severity of the pandemic was escalating in Ireland and Northern Ireland during the 2020 fieldwork, with both jurisdictions implementing stricter mitigation measures shortly after data collection concluded (Government of Ireland, 2020b; Northern Ireland Executive Office, 2020c).

At the time of the 2021 fieldwork, pandemic mitigation measures in both jurisdictions had eased relative to the previous wave, albeit some restrictions and guidance remained. The nature of easing was similar in both jurisdictions, albeit there were nuances concerning the timing and specifics of measures eased. For example, Northern Ireland removed the requirement for social distancing on public transport in mid-August 2021 (Northern Ireland Executive Office, 2021a), while Ireland returned to full capacity on public transport at the start of September (Government of Ireland, 2021). With respect to cinemas, Ireland increased the numbers permitted at indoor events (including cinemas) in early September 2021, so long as all patrons were vaccinated (Government of Ireland, 2021), while Northern Ireland removed the requirement for social distancing at indoor venues (including cinemas) towards the end of

September (Northern Ireland Executive Office, 2021b; Northern Ireland Executive Office, 2021c).

Measures: Sample characteristics

YouGov provided data on age, gender, and region from information held about panellists (Table 1). Drinking status was assessed using the frequency of consumption question from the three-item Alcohol Use Disorders Identification Test–Concise (O’Shea et al., 2017). As with previous waves, participants were categorised as non-drinkers, current drinkers, or not stated (Critchlow & Moodie, 2021).

[Table_1_Sample_characteristics]

Measures: Past-month awareness of alcohol marketing

In all waves, participants were asked to self-report how often, if at all, they had seen or heard alcohol being marketed through 13 activities in the past month (Table 2). This included the three activities subject to recent restrictions in Ireland: public transport advertising, cinema advertising, and outdoor advertising (posters/billboards). Although the remaining 10 activities are not a direct focus of this study, they provide a sensitivity check of how patterns for restricted activities compare to wider marketing trends, particularly in the comparisons between Ireland and Northern Ireland as pandemic mitigation measures eased.

For each activity, frequency of past-month awareness was self-reported on a six-point scale (1=‘Everyday’ to 6=‘Not at all’) with an additional ‘Not sure if seen in the last month’ option. Scale responses were recoded into three categories: (1) Reported *any* past-month awareness; (2) Reported *no* past-month awareness; and (3) Reported *not sure* for past-month awareness. Although the original scale provided more granularity, such greater frequency may

also be more sensitive to confounding influence from the pandemic mitigation measures, both directly in 2020 and residually in 2021 (e.g., increased working from home may have reduced frequency of using public transport). We therefore considered past-month awareness a more appropriate threshold to detect changes related to the Act rather than the pandemic. Past-month awareness has been used in previous studies evaluating the impact of tobacco marketing bans (Ford et al. 2020; Li et al., 2013) and compares favourably to the six-month reference period in some evaluations of tobacco advertising restrictions (Harris et al., 2006; Kasza et al., 2011).

[Table_2_past_month_awareness]

Analysis

All analyses were conducted on SPSS version 28. Descriptive data were weighted using YouGov's cross-sectional weights to adjust for slight differences in sample profile between waves. Among participants from Ireland, multinomial regressions examined changes in past-month awareness across the three waves, with separate models computed for each marketing activity. In each model, wave was the key independent variable (2021 or 2020 [post-restrictions] vs. 2019 [pre-restrictions]), while age, gender, and region were covariates. In each model, category of past-month awareness was the outcome variable, with recall of any past-month awareness the reference category. This enabled each model to compare affirmative recall of awareness to both 'no past-month awareness' and 'not sure'. Although not sure responses are not definitive rejections of exposure, they represent an absence of affirmative recall, which may indicate reduced visibility of advertising among consumers. Retention of not sure responses also enabled models to be computed with no missing data.

Pooled multinomial regressions then examined whether changes in past-month awareness between 2021 and 2020 (i.e., as pandemic mitigation measures eased) differed

between Ireland (where the advertising restrictions applied) and Northern Ireland (where they did not). Separate models were computed for each marketing activity. In each model, the key independent variables were jurisdiction (Ireland vs. Northern Ireland) and wave (2021 vs. 2020) and the two-way interaction between these. For the three restricted advertising activities, and other marketing activities where interactions were observed in the pooled models, post-hoc multinomial regressions (stratified by jurisdiction) were used to probe how the trends varied in Ireland and Northern Ireland. In both the pooled and stratified models, category of past-month awareness was the outcome variable for each marketing activity, with affirmative recall of any past-month awareness the reference category (vs. no awareness or not sure) for the same rationale as above. Age and gender were covariates.

RESULTS

Sample characteristics and past-month awareness of alcohol marketing

Table 1 reports the unweighted and weighted sample characteristics for Ireland and Northern Ireland at each wave. For each marketing activity, Table 2 reports the weighted proportion who self-reported any past-month awareness, no past-month awareness, or stated not sure.

Awareness of alcohol marketing in Ireland between 2019 and 2021

Among participants in Ireland, Table 3 presents the multinomial regressions which examined the association between past-month awareness and wave (2021/2020 [post-advertising restrictions] vs. 2019 [pre-advertising restrictions]), controlling for age, gender, and region.

For all three restricted advertising activities – public transport, cinema, and outdoor (posters/billboards) – the odds of reporting no past-month awareness (vs. any) were higher in 2020 (one-year post-restrictions) and 2021 (two years) compared to 2019 (pre-restrictions). For all three activities, the odds of reporting not sure for awareness (vs. any) were also higher in

2021 (two years post-restrictions) compared to 2019 (pre-restrictions), but there was no difference in odds between 2020 (one-year post-restrictions) and 2019 (pre-restrictions).

For the 10 unrestricted marketing activities, there was a sustained increase in the odds of reporting no awareness (vs. any) in 2020 and 2021 versus 2019 for print advertising, radio advertising, sport and event sponsorship, and competitions (Table 3). Sport and event sponsorship also had a sustained increase in the odds of reporting not sure for awareness (vs. any) in both 2020 and 2021 versus 2019. For social media advertising, branded merchandise, and special price offers, there was no change between 2020 and 2021 versus 2019 for either reporting no awareness or not sure (vs. any). Between-wave comparisons for the other unrestricted activities are reported in Table 3.

[Table_3_MLR_Ireland]

Awareness of alcohol marketing in Ireland and Northern Ireland between 2020 and 2021

Among all participants in 2020 and 2021, pooled multinomial regressions examined whether there were two-way interactions between wave (2021 [eased pandemic mitigation measures] vs. 2020 [stricter pandemic mitigation measures]) and jurisdiction (Ireland [advertising restrictions apply] vs. Northern Ireland [advertising restrictions do not directly apply]), after controlling for age and gender.

There was an interaction for reporting no awareness of public transport advertising (interaction $OR_{Adj}=2.05$, 95% CI: 1.41, 2.98, $p<0.001$). When stratified by jurisdiction, there was an increase in the odds of reporting no awareness (vs. any) in Ireland between 2020 and 2021, but a decrease in Northern Ireland (Figure 1a). There was also an interaction between wave and jurisdiction for reporting not sure for awareness of public transport advertising (interaction $OR_{Adj}=2.13$, 95% CI: 1.37, 3.31, $p<0.001$). When stratified by jurisdiction, there

was an increase in the odds of reporting not sure for awareness (vs. any) in Ireland between 2020 and 2021, but no change in Northern Ireland (Figure 1b).

There was also an interaction between wave and jurisdiction for reporting no past-month awareness of cinema advertising (interaction $OR_{Adj}=2.12$, 95% CI: 1.31, 3.45, $p=0.002$). When stratified by jurisdiction, the odds of reporting no past-month awareness (vs. any) were unchanged between 2020 and 2021 in Ireland, but the odds decreased in Northern Ireland (Figure 1c). There was also an interaction between wave and jurisdiction for reporting not sure for awareness of cinema advertising (interaction $OR_{Adj}=1.91$, 95% CI: 1.10, 3.32, $p=0.021$). When stratified by jurisdiction, there was an increase in the odds of reporting not sure for awareness (vs. any) in Ireland between 2020 and 2021, but no change in Northern Ireland (Figure 1d).

There were no interactions between wave and jurisdiction for outdoor advertising (posters/billboards), either for reporting no past-month awareness (interaction $OR_{Adj}=1.39$, 95% CI: 0.97, 1.99, $p=0.072$) or not sure (interaction $OR_{Adj}=1.27$, 95% CI: 0.84, 1.92, $p=0.259$). This suggests that changes in awareness of outdoor advertising did not differ between Ireland and Northern Ireland as pandemic mitigation measures eased (Figures 1e and 1f).

For the unrestricted activities, there were no interactions between wave and jurisdiction for reporting no past-month awareness (vs. any) (range $p=0.105$ to $p=0.829$). For 8/10 unrestricted activities, there was also no interaction between wave and jurisdiction for reporting not sure for awareness (vs. any) (range $p=0.062$ to $p=0.881$). The two exceptions were television advertising (interaction $OR_{Adj}=1.94$, 95% CI: 1.25, 3.00, $p=0.003$) and adverts on catch-up/streaming services (interaction $OR_{Adj}=1.57$, 95% CI: 1.03, 2.39, $p=0.036$). When stratified by jurisdiction, the odds of reporting not sure for awareness (vs. any) for both television advertising and adverts on catch-up/streaming services increased between 2020 and 2021 in Ireland but did not differ for Northern Ireland (Supplementary File 1).

[Figure_1_Forest_plots]

DISCUSSION

These non-probability cross-sectional surveys provide insight into the impact of Ireland's restrictions for alcohol advertising on public transport, at the cinema, and in certain outdoor spaces. In Ireland, the odds of reporting no past-month awareness (vs. any) were higher in both 2020 (one-year post-restrictions) and 2021 (two years) compared to 2019 (pre-restrictions) for all three restricted advertising activities. This is despite the easing of pandemic mitigation measures creating more opportunities for exposure at two years post-commencement, relative to the first follow-up. The odds of reporting not sure for awareness (vs. any) were also higher in 2021 compared to 2019 for all three restricted advertising activities. Although not sure responses are not definitive rejections of exposure, they represent an absence of affirmative recall which may indicate reduced visibility of advertising among consumers.

Relying exclusively on post-commencement data in Ireland, however, may limit our understanding of the impact of the advertising restrictions, given the direct and residual impact of the pandemic on consumers and marketing activity. Inclusion of Northern Ireland data in 2020 and 2021 therefore allowed us to compare awareness trends in Ireland to a similar jurisdiction where the advertising restrictions do not directly apply. If the decreases observed in Ireland one year after the restrictions had commenced (i.e., between 2019 and 2020), were predominately attributable to the pandemic, rather than the restrictions, we would expect similar trends in both jurisdictions as pandemic mitigation measures eased. Conversely, if the advertising restrictions did have some effect, we would expect awareness to decrease further in Ireland, or for any decreases observed one-year post-commencement to be maintained despite increased opportunities for exposure, and for this pattern to differ from Northern

1 Ireland. Our analyses support the latter interpretation. In 2021 compared to 2020, interactions
2 showed that the odds of reporting no past-month awareness or not sure (vs. any) were higher
3 in Ireland than Northern Ireland for both public transport and cinema advertising. These
4 interactions provide a degree of confidence that some of the decrease observed for these
5 activities in Ireland one-year post-commencement is likely a consequence of the restrictions,
6 and not solely driven by the pandemic. These conclusions, however, are precautionary. Longer-
7 term monitoring is needed to examine whether decreases in Ireland, and differences with
8 Northern Ireland, are sustained when few or no pandemic mitigation measures apply.

9 For outdoor advertising (posters/billboards), the absence of an interaction between
10 jurisdiction and wave suggests that awareness trends did not differ between Ireland and
11 Northern Ireland as pandemic mitigation measures eased and opportunities for exposure
12 increased. Therefore, at this point, our data cannot determine to what extent, if at all, the
13 between-wave decreases in awareness of outdoor advertising observed in Ireland are
14 attributable to the restrictions rather than other extraneous factors. One explanation for the lack
15 of an observable effect is that Ireland's Act only restricts outdoor alcohol advertising where
16 young people may be exposed (e.g., within 200 metres of a school) and in outdoor spaces
17 owned or maintained by a local authority (e.g., parks), and exemptions are made for advertising
18 as part of licenced premises (e.g., pubs/bars) and premises where alcohol is manufactured or
19 sold by wholesale (e.g., breweries). Consequently, the limited nature of these controls may
20 have had less impact on advertising activity and awareness among adults in Ireland compared
21 to the, arguably, more restrictive steps of prohibiting all alcohol advertising on public transport
22 and limiting cinema advertising to only 18+ films (only a small proportion of releases) (Irish
23 Film Classification Office, n.d) or licensed premises in the cinema.

24 In Ireland, there were sustained decreases in awareness for some marketing activities
25 not yet subject to restrictions. In isolation, it could be argued this compromises our ability to

1 infer some causal effect of the Act, as the extraneous factors behind sustained decreases for
2 unrestricted activities may also explain the decreases observed for public transport and cinema
3 advertising. However, the absence of interactions between wave and jurisdiction for most
4 unrestricted activities, including no interactions for the four activities with sustained decreases,
5 suggests that these trends did not differ between Ireland and Northern Ireland. This contrasts
6 with the between-jurisdiction differences for public transport and cinema advertising, where
7 the most plausible explanatory factor is Ireland's restrictions. There are myriad factors to
8 explain sustained decreases for unrestricted activities. For example, expenditure on print media
9 advertising was reportedly lower in 2021 and 2020 compared to 2019 in both Ireland and
10 Northern Ireland (Core, 2022). Moreover, while analyses of the Irish sponsorship market have
11 highlighted some recovery in 2021 from the pandemic, the sector had still not returned to pre-
12 pandemic levels and some disruption continued (O'Connor, 2022; Onside, 2022). For example,
13 Dublin was removed as a host city of the delayed UEFA Euro 2020 football tournament
14 (Fallon, 2021) and other high-profile events in 2021 were required to operate with no spectators
15 or reduced capacity, for example the All-Ireland final and Six Nations Championships
16 (Baldock, 2021; Fogarty, 2021).

17 It is noteworthy that around two-fifths of participants in Ireland recalled seeing alcohol
18 advertising on public transport after restrictions had commenced, despite this activity being
19 prohibited. Some of this recall is likely explained by the limitations of self-reported awareness,
20 which could be addressed through more objective exposure measures (e.g., Chambers et al.,
21 2018; Nyborn et al. 2009). Continued awareness, however, is also congruent to on-going
22 debates about circumvention of Ireland's restrictions and the efficacy of monitoring and
23 enforcement mechanisms (Houghton, 2021; Purves et al., 2022). Alcohol companies are
24 reportedly using brand-sharing to circumvent the restrictions, such as advertising beverages
25 with zero alcohol-strength-by-volume (ABV) using the same brand iconography as the now

restricted ‘regular strength’ counterparts (Alcohol Action Ireland, 2022; Critchlow et al., 2022). Whether brand-sharing contravenes the Act has yet to be legally established in Ireland. In Norway, their ban has been extended to apply to advertising for other products which carry the same brand or distinctive mark as an alcohol beverage, including lower-strength products (Purves et al., 2022), thus avoiding the situation observed in Ireland. Similar debates about circumvention and enforcement exist in other countries with statutory controls. In France, for example, alibi marketing has been used to circumvent the Évin law restrictions on alcohol advertising during sport (Barker et al., 2021; Purves et al., 2017h; Purves & Critchlow, 2021).

There are two avenues for further research. The first is examining displacement of marketing activity. Displacement is important as restrictions on specific advertising activities may not achieve reductions in alcohol use and related harms if the overall volume of marketing is unaffected. Although this survey captured data on unrestricted advertising activities, the changeable pandemic mitigation measures between waves confound the ability to meaningfully attribute changes in awareness to displacement versus other factors. Such analyses may be possible using longer-term awareness data when few or no mitigation measures apply. Analyses of data relating to alcohol advertising expenditure and volume (e.g., Jernigan & Ross, 2020; White et al., 2015) would also provide more objective insight into displacement, particularly if trends in Ireland were compared to a counterfactual (e.g., Northern Ireland or the UK). Given the debates about circumvention, any analysis of displacement should consider advertising trends for both alcoholic drinks and related products with zero-ABV. Second, this study only focused on adults. Reducing youth initiation is a key aim of Ireland’s Act, so research is needed to monitor the impact of restrictions on young people. This could be achieved by repeating pre-commencement research (Fox et al., 2015) or by using surveys such as the European Schools Project on Alcohol and Other Drugs, which collect data in Ireland (Sunday et al., 2020), to compare to jurisdictions where similar restrictions do not apply.

To our knowledge, this is one of the first studies to analyse real-world changes in consumer awareness before and after statutory restrictions on alcohol advertising. We also use data from Northern Ireland as a quasi-control to explore the extent to which changes in Ireland may be attributable to the advertising restrictions versus the pandemic. Nevertheless, the study has important limitations. The data are self-reported and from a non-probability online panel and, therefore, subject to recall errors and limitations regarding panel representativeness, self-selection bias, non-response, and data quality. It is unknown to what extent the findings generalise to the wider population. Future evaluations of statutory controls for alcohol advertising should plan to use probability sampling. Moreover, funds were only available to collect data in Ireland before the restrictions commenced, and there is no Northern Ireland data pre-dating the pandemic and Ireland's advertising restrictions. The study also did not capture data on other factors that may also explain or confound changes in awareness between waves and jurisdictions, for example cross-border travel to where the restrictions do not apply (or vice versa), lifestyle changes instigated by the pandemic (e.g., frequency of using public transport), or knowledge of the restrictions from related news coverage (e.g., Cionnaith, 2019, Finn, 2019; Lesch & McCambridge, 2021). Furthermore, while the pandemic mitigation measures were similar between jurisdictions in 2020 and 2021, data are not available to determine whether alcohol advertising activity was also comparable (e.g., volume, expenditure, or individual campaigns). Finally, we only analysed changes in reporting any past-month awareness, but not frequency. We considered that granular changes in frequency of awareness would be too sensitive to confounding influence from the pandemic, but this will be considered in future waves if fewer or no mitigation measures apply.

In conclusion, the data suggest that Ireland's restrictions have reduced past-month awareness of alcohol advertising on public transport and at the cinema. For both, the odds of reporting no past-month awareness (vs. any) were higher one- and two-years post-

commencement, compared to the baseline. Moreover, the odds of reporting no awareness (vs. any) were higher in Ireland compared to Northern Ireland in 2021 versus 2020, despite eased pandemic mitigation measures increasing opportunities for exposure in both jurisdictions. Our ability to infer some causal effect is further strengthened by the lack of differences between Ireland and Northern Ireland for marketing activities not yet subject to restrictions. Although the odds of reporting no awareness of outdoor advertising (vs. any) were higher in both post-commencement waves in Ireland, the trends did not significantly differ to Northern Ireland as pandemic mitigation measures eased. As such, there is greater uncertainty about whether Ireland's restrictions have reduced awareness of this advertising activity. It is important these findings are scrutinised through longer-term monitoring to fully assess the contribution of the advertising restrictions versus pandemic mitigation measures. Further research is also required to monitor other factors which may influence consumer awareness, such as circumvention through brand sharing (e.g., zero-ABV products) and displacement of marketing activity.

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Table 1. Unweighted and weighted sample characteristics, by wave and jurisdiction

Variable	Ireland						Northern Ireland			
	October 2019 (n=1,007)		October 2020 (n=1,020)		October 2021 (n=1,002)		October 2020 (n=501)		October 2021 (n=510)	
	U/W (%)	W (%)	U/W (%)	W (%)	U/W (%)	W (%)	U/W (%)	W (%)	U/W (%)	W (%)
Gender										
Male	44.5	49.6	49.8	49.6	49.0	49.5	46.3	48.3	47.5	48.3
Female	55.5	50.4	50.2	50.4	51.0	50.5	53.7	51.7	52.5	51.7
Age										
18-24 years	12.1	11.0	11.9	11.1	10.1	10.9	5.4	13.8	7.5	13.8
25-34 years	18.4	17.1	18.4	16.6	17.5	17.1	16.6	16.4	15.3	15.3
35-44 years	22.6	21.5	22.1	21.3	21.9	21.5	20.2	19.6	19.2	19.0
45-54 years	20.1	18.1	19.6	18.3	18.3	18.1	19.8	17.9	20.8	19.6
55+ years	26.8	32.3	28.0	32.7	32.3	32.4	38.1	32.3	37.3	32.3
Region (Ireland)										
Dublin	30.9	28.3	33.3	28.3	28.5	28.3	-	-	-	-
Rest of Leinster	26.3	27.0	25.0	27.0	27.0	27.0	-	-	-	-
Munster	24.3	26.9	24.4	26.9	27.1	26.9	-	-	-	-
Connaught & part of Ulster	18.5	17.8	17.3	17.8	17.3	17.8	-	-	-	-
Region (Northern Ireland)										
North & East	-	-	-	-	-	-	25.3	24.0	25.7	24.0
Belfast, Lisburn, & Castlereagh	-	-	-	-	-	-	28.5	26.0	29.4	26.0
South	-	-	-	-	-	-	29.3	29.0	28.0	29.0
Mid & West	-	-	-	-	-	-	16.8	21.0	16.9	21.0
Drinking status										
Non-drinker	10.1	10.2	10.5	10.7	15.0	15.0	15.4	15.1	15.9	16.0
Current drinker	87.7	87.6	87.4	87.2	82.6	82.5	83.0	83.4	81.6	81.6
Not stated	2.2	2.2	2.2	2.1	2.4	2.4	1.6	1.5	2.5	2.4

Notes: U/W = Unweighted data; W = Weighted data; Not stated for drinking status = Don't know / Can't recall on first AUDIT-C measure, which measured frequency of consumption

Table 2. Self-reported past-month awareness of alcohol marketing

	Ireland			Northern Ireland		
	2019 (n=1,007)	2020 (n=1,020)	2021 (n=1,002)	2019 (n=0)	2020 (n=501)	2021 (n=510)
Restricted activities	%	%	%	%	%	%
<i>Public transport</i>						
Any past-month awareness	53.2	46.4	40.0	-	21.7	26.7
No past-month awareness	29.2	38.5	38.9	-	56.5	47.3
Not sure for awareness	17.6	15.1	21.2	-	21.9	26.1
<i>Outdoor (posters/billboards)</i>						
Any past-month awareness	67.1	59.5	59.7	-	45.9	51.1
No past-month awareness	20.0	26.5	23.9	-	35.0	26.4
Not sure for awareness	13.0	14.0	16.3	-	19.2	22.6
<i>Cinema advertising</i>						
Any past-month awareness	28.8	22.1	19.6	-	9.9	13.6
No past-month awareness	48.7	60.0	58.0	-	71.6	61.0
Not sure for awareness	22.5	17.9	22.4	-	18.5	25.4
Unrestricted activities						
<i>Print (newspapers / magazines)</i>						
Any past-month awareness	61.3	54.6	53.9	-	37.1	36.8
No past-month awareness	23.1	31.2	27.9	-	44.3	39.0
Not sure for awareness	15.6	14.3	18.2	-	18.6	24.1
<i>TV (incl. prog. sponsorship†)</i>						
Any past-month awareness	79.4	72.2	72.4	-	56.1	62.6
No past-month awareness	12.9	18.8	14.9	-	24.3	20.9
Not sure for awareness	7.7	9.0	12.7	-	19.6	16.5
<i>Catch-up / streaming services</i>						
Any past-month awareness	40.0	44.7	40.7	-	30.9	31.5
No past-month awareness	41.7	41.8	38.2	-	46.2	38.8
Not sure for awareness	18.3	13.5	21.1	-	22.9	29.7
<i>Radio adverts</i>						
Any past-month awareness	46.7	43.1	38.0	-	16.8	17.7
No past-month awareness	36.7	42.6	42.1	-	64.2	59.4
Not sure for awareness	16.6	14.2	19.9	-	19.0	22.9
<i>Social media adverts</i>						
Any past-month awareness	48.1	47.3	48.7	-	37.3	34.3
No past-month awareness	36.3	38.2	34.6	-	45.8	42.7
Not sure for awareness	15.6	14.5	16.7	-	16.9	23.0
<i>Celebrity endorsement</i>						
Any past-month awareness	69.2	65.3	73.3	-	58.4	62.3
No past-month awareness	15.5	21.0	14.4	-	22.7	17.7
Not sure for awareness	15.4	13.7	12.3	-	18.9	20.0
<i>Branded merchandise</i>						
Any past-month awareness	63.0	59.5	61.8	-	46.9	49.0
No past-month awareness	21.6	26.0	22.7	-	32.9	24.8
Not sure for awareness	15.4	14.5	15.5	-	20.1	26.2
<i>Sport / event sponsorship</i>						
Any past-month awareness	76.1	63.3	65.3	-	46.6	47.5
No past-month awareness	12.4	21.1	18.7	-	33.2	27.0
Not sure for awareness	11.4	15.6	16.0	-	20.1	25.5
<i>Special price offers</i>						
Any past-month awareness	80.4	78.7	78.2	-	69.9	67.2
No past-month awareness	12.5	13.3	13.3	-	18.4	15.2
Not sure for awareness	7.2	8.0	8.5	-	11.7	17.6
<i>Competitions or prize draws</i>						
Any past-month awareness	45.4	42.0	39.7	-	30.9	29.4
No past-month awareness	34.8	42.7	39.7	-	48.2	47.0
Not sure for awareness	19.8	15.3	20.6	-	20.9	23.6

Notes: Base = All participants, all waves; Data are weighted; No data collection in Northern Ireland, 2019; † For television advertising the phrase ‘including programme sponsorship’ only measured in 2020 and 2021

Table 3. Multinomial regressions examining past-month awareness of alcohol marketing in 2020 (one-year post-restrictions) and 2021 (two years) versus 2019 (pre-restrictions) among participants from Ireland.

Restricted activities	No awareness (vs. Any)			Not sure awareness (vs. Any)		
	ORAdj.	95% CI	p	ORAdj.	95% CI	p
Public transport						
2020 vs. 2019 [reference]	1.48	1.21, 1.82	<0.001	0.98	0.76, 1.27	0.901
2021 vs. 2019 [reference]	1.88	1.53, 2.32	<0.001	1.70	1.33, 2.16	<0.001
Outdoor (posters / billboards)						
2020 vs. 2019 [reference]	1.48	1.19, 1.84	<0.001	1.22	0.93, 1.59	0.148
2021 vs. 2019 [reference]	1.41	1.13, 1.76	0.002	1.47	1.14, 1.91	0.003
Cinema advertising						
2020 vs. 2019 [reference]	1.60	1.29, 1.98	<0.001	1.04	0.80, 1.35	0.771
2021 vs. 2019 [reference]	1.83	1.46, 2.29	<0.001	1.54	1.19, 2.01	0.001
Unrestricted activities						
Print (newspapers / magazines)						
2020 vs. 2019 [reference]	1.46	1.18, 1.79	<0.001	0.98	0.76, 1.26	0.881
2021 vs. 2019 [reference]	1.36	1.10, 1.68	0.004	1.30	1.02, 1.65	0.035
TV (incl. prog. sponsorshipΔ)						
2020 vs. 2019 [reference]	1.53	1.20, 1.96	<0.001	1.22	0.89, 1.67	0.228
2021 vs. 2019 [reference]	1.26	0.97, 1.63	0.078	1.75	1.30, 2.36	<0.001
Catch-up / streaming services						
2020 vs. 2019 [reference]	0.86	0.71, 1.05	0.143	0.65	0.50, 0.84	<0.001
2021 vs. 2019 [reference]	0.92	0.75, 1.13	0.429	1.12	0.88, 1.43	0.344
Radio adverts						
2020 vs. 2019 [reference]	1.23	1.01, 1.49	0.040	0.90	0.70, 1.17	0.435
2021 vs. 2019 [reference]	1.41	1.16, 1.72	<0.001	1.46	1.14, 1.87	0.003
Social media adverts						
2020 vs. 2019 [reference]	1.06	0.86, 1.30	0.593	0.92	0.71, 1.20	0.535
2021 vs. 2019 [reference]	0.89	0.80, 1.21	0.888	1.07	0.83, 1.38	0.625
Celebrity endorsement						
2020 vs. 2019 [reference]	1.43	1.13, 1.82	0.003	0.93	0.72, 1.19	0.545
2021 vs. 2019 [reference]	0.89	0.69, 1.15	0.381	0.75	0.58, 0.97	0.027
Branded merchandise						
2020 vs. 2019 [reference]	1.23	0.99, 1.52	0.065	0.97	0.75, 1.25	0.824
2021 vs. 2019 [reference]	1.06	0.85, 1.33	0.578	1.04	0.81, 1.33	0.780
Sport / event sponsorship						
2020 vs. 2019 [reference]	2.09	1.63, 2.68	<0.001	1.67	1.28, 2.19	<0.001
2021 vs. 2019 [reference]	1.82	1.41, 2.34	<0.001	1.72	1.32, 2.25	<0.001
Special price offers						
2020 vs. 2019 [reference]	1.07	0.82, 1.40	0.615	1.08	0.78, 1.51	0.638
2021 vs. 2019 [reference]	1.11	0.85, 1.44	0.461	1.19	0.86, 1.65	0.299
Competitions or prize draws						
2020 vs. 2019 [reference]	1.29	1.06, 1.58	0.011	0.79	0.61, 1.01	0.610
2021 vs. 2019 [reference]	1.33	1.09, 1.63	0.005	1.17	0.93, 1.49	0.187

Notes: Base = All participants from Ireland (2019 $n=1,007$; 2020 $n=1,020$; 2021 $n=1,002$); Analyses are unweighted and control for age (18-34 years vs. 35 to 55+ years), gender (male vs. female), and region (Munster, Connacht, and part of Ulster vs. Dublin and Rest of Leinster); ORAdj.= Adjusted Odds Ratio; 95% CI = 95% Confidence Interval; Δ For television advertising the phrase ‘including programme sponsorship’ only measured in 2020 and 2021

Past-month awareness of public transport advertising Δ

Fig. 1a: No awareness (vs. Any awareness)

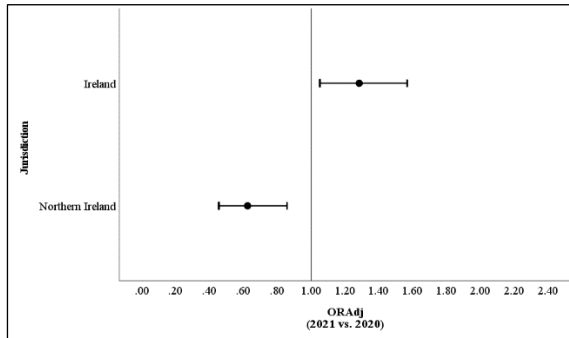
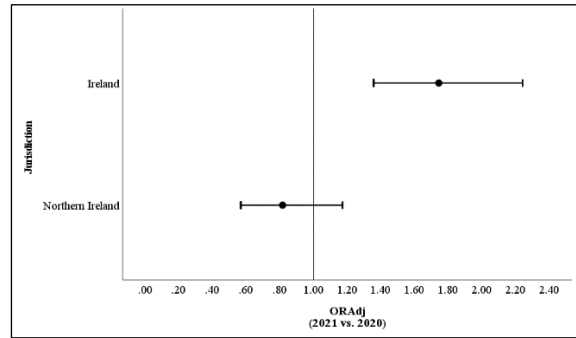


Fig. 1b: Not sure (vs. Any awareness)



Past-month awareness of cinema advertising Δ

Fig. 1c: No awareness (vs. Any awareness)

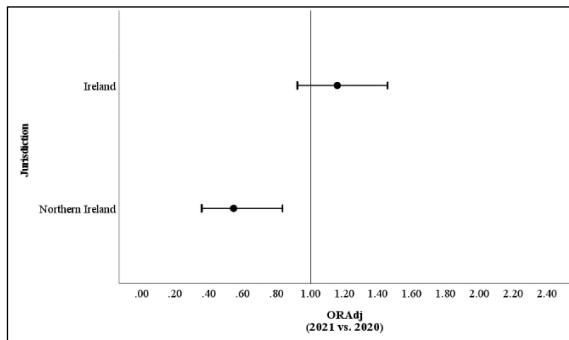
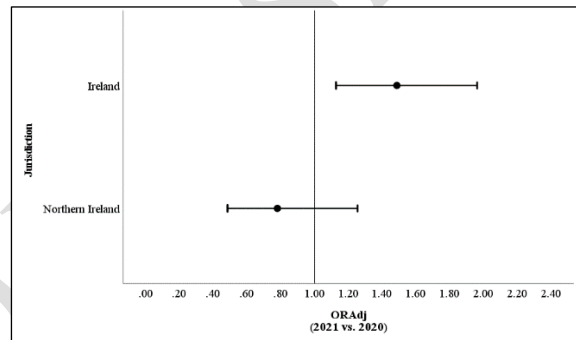


Fig. 1d: Not sure (vs. Any awareness)



Past-month awareness of outdoor advertising (posters / billboards) \dagger

Fig. 1e: No awareness (vs. Any awareness)

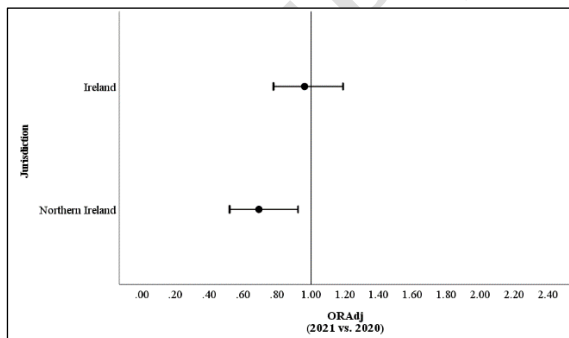


Fig. 1f: Not sure (vs. Any awareness)

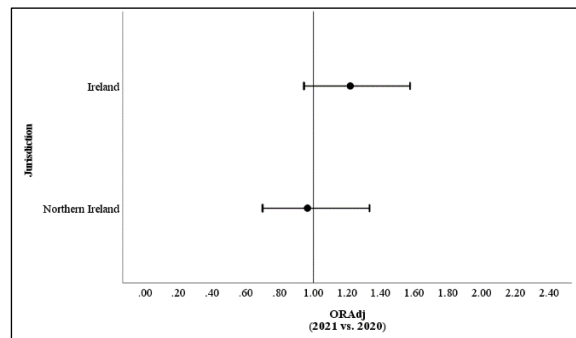


Fig. 1. Stratified multinomial regressions probing the two-way interactions between wave (2021 vs. 2020) and jurisdiction (Ireland vs. Northern Ireland) for past-month awareness of the advertising activities restricted in Ireland

Notes: Base = Participants from 2020 (Ireland $n=1,020$; Northern Ireland $n=501$) and 2021 (Ireland $n=1,002$; Northern Ireland $n=510$); Δ = Activity had an interaction in pooled model (see main text); \dagger = Activity did not have an interaction in pooled model; Analyses are unweighted and control for age (18-34 years vs. 35 to 55+ years) and gender (male vs. female); OR_{Adj} = Adjusted Odds Ratio.

Supplementary File 1. Stratified multinomial regressions probing interactions between wave (2021 vs. 2020) and jurisdiction (Ireland vs. Northern) for past-month awareness of adverts on television and catch-up / streaming services

Past-month awareness of adverts on television (incl. programme sponsorship)

Fig. S1a: No awareness (vs. Any awareness) †

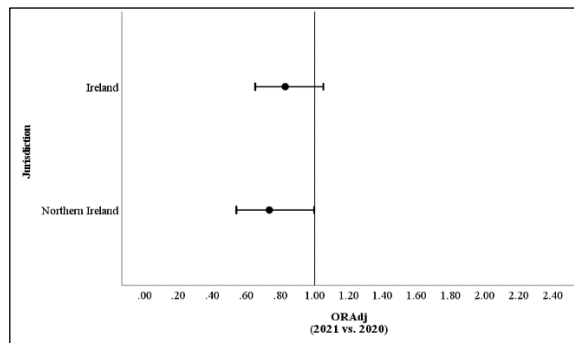
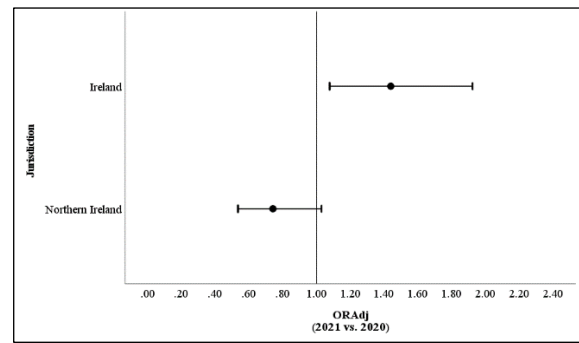


Fig S1b: Not sure (vs. Any awareness) Δ



Past-month awareness of adverts on catch-up / streaming services

Fig. S1c: No awareness (vs. Any awareness) †

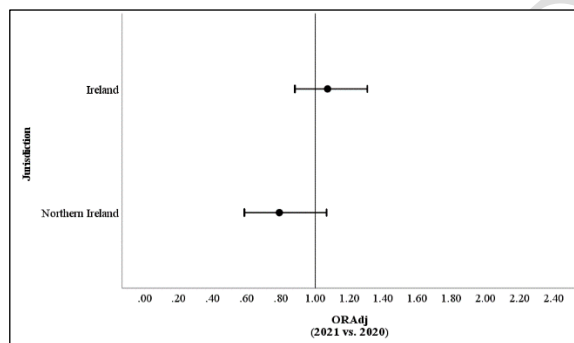
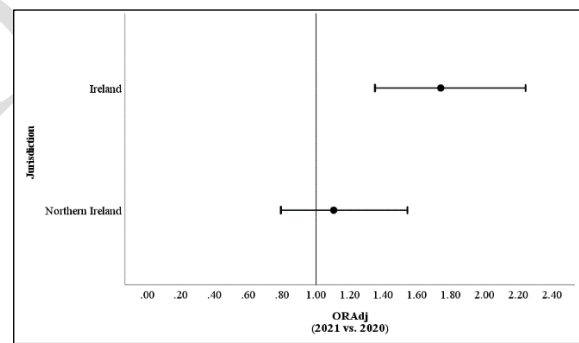


Fig S1d: Not sure (vs. Any awareness) Δ



Notes: Base = All participants from 2020 (Ireland $n=1,020$; Northern Ireland $n=501$) and 2021 (Ireland $n=1,002$; Northern Ireland $n=510$); Analyses are unweighted and control for age (18-34 years vs. 35 to 55+ years) and gender (male vs. female); *ORAdj.*= Adjusted Odds Ratio; Δ = Two-way interaction in pooled model (see main text); † = No two-way interaction in pooled model; *ORAdj.*= Adjusted Odds Ratio