

Article

Population Level Effects of a Mass Media Alcohol and Breast Cancer Campaign: A Cross-Sectional Pre-Intervention and Post-Intervention Evaluation

Neil Martin^{1,*}, Penny Buykx², Colin Shevills¹, Claire Sullivan³, Lynsey Clark⁴, and Dorothy Newbury-Birch⁵

¹Balance—The North East Alcohol Office, Bede House, Ground Floor East, Unit 3, Belmont Business Park, Durham DH1 1TW, UK, ²School of Health and Related Research, University of Sheffield, Sheffield S1 4DA, UK, ³Public Health England, Waterfront 4, Newburn Riverside, Newcastle upon Tyne NE15 8NY, UK, ⁴Bluegrass Research Limited, Design Works, William Street, Gateshead NE10 0JP, UK, and ⁵School of Health & Social Care, Teesside University, Middlesbrough, Tees Valley TS1 3BX, UK

*Corresponding author: Balance—The North East Alcohol Office, Bede House, Ground Floor East, Unit 3, Belmont Business Park, Durham DH1 1TW, UK. Tel: +44-191-333-7150; E-mail: neil.martin@balancenortheast.co.uk

Received 1 December 2016; Revised 3 August 2017; Editorial Decision 7 September 2017; Accepted 12 September 2017

Abstract

Aims: To examine the relationship between a TV-led breast cancer mass-media campaign in the North East of England (conducted in two waves: Jul/2015 and Nov/2015), awareness of the link between alcohol and cancer, intention to reduce alcohol consumption and support for alcohol related policies.

Methods: Three cross-sectional surveys were conducted; one over the 2 weeks pre-campaign ($n = 572$); one immediately following campaign wave 1 ($n = 576$); and another immediately following campaign wave 2 ($n = 552$). Survey questions assessed; campaign exposure; awareness of the links between alcohol and related cancers; intention to change alcohol consumption; and support for alcohol related policies.

Results: The proportion of respondents indicating awareness of alcohol as a cancer risk factor was larger post-campaign compared to pre-campaign. The largest increase was seen for breast cancer with 45% aware of the links post-campaign wave 2 compared to 33% pre-campaign. The proportion of respondents indicating 'strong support' of the seven alcohol related policies significantly increased between surveys. The proportion of respondents both aware of alcohol as a cancer risk factor and supportive of the seven alcohol related policies significantly increased between surveys. There was no significant change in self-reported intention to reduce alcohol consumption amongst increasing/higher risk drinkers.

Conclusion: These findings indicate that a mass-media campaign raising awareness of the links between alcohol and breast cancer is associated with increased awareness and alcohol related policy support at a population level. However, there was no association found with a change in short-term drinking intentions.

Short summary: A mass-media campaign raising awareness of the links between alcohol and breast cancer is associated with increased awareness and alcohol policy support at a population level but does not appear to be associated with a change in short term drinking intentions.

INTRODUCTION

Alcohol consumption and its associated harms remain a global public health concern despite research efforts to both understand the problem and identify a range of comprehensive solutions (Rehm *et al.*, 2009; Vineis and Wild, 2014). The World Health Organization states that the protection of health by preventing risky drinking is a public health priority (World Health Organization, 2014). The number of alcohol-related deaths in the UK has risen from 9.1 per 100,000 people in 1994 to 14.3 per 100,000 in 2014 (Office for National Statistics, 2014). Across England, 13–20% of hospital admissions are alcohol related, accounting for 1,059,390 admissions in 2013/14 (Health and Social Care Information Centre, 2014; Public Health England, 2015).

Alcohol is linked to seven cancers (Tramacere *et al.*, 2010; Parkin, 2011; Seitz *et al.*, 2012; Bagnardi *et al.*, 2013) and is estimated to contribute to 4% of cancers in the UK, around 12,800 cases a year (Cancer Research UK, 2015). Mass-media campaigns are one strategy to address health harms and can produce positive changes or prevent negative changes in health-related behaviours across large populations (Wakefield *et al.*, 2010). However, product marketing, competing messages, social norms and the drive of addiction can all impact on the outcomes of health campaigns which are being delivered in a media and policy climate arguably weighted towards promotion of alcohol and an ‘alco-genic environment’ (Wakefield *et al.*, 2010; Durkin *et al.*, 2012; Petticrew *et al.*, 2016).

Alcohol-warning advertising which induces negative emotion appeared to be a useful strategy for reducing alcohol consumption in young adults (Stautz *et al.*, 2017) and evidence from an Australian evaluation revealed that a mass-media campaign improved women’s awareness and knowledge regarding alcohol and cancer (Dixon *et al.*, 2015). It is important to pursue information strategies as people have a right to know the health risks associated with the consumption of products—as is the case with graphic warnings on tobacco packaging in the UK.

Almost 90% of people in England do not associate alcohol with an increased risk of cancer when asked unprompted (Buykx *et al.*, 2015). Our research was also influenced by research showing that people are aware of the link between alcohol and cancer are more likely to support alcohol public health policies (Buykx *et al.*, 2014).

The North East of England is noted for innovative public health awareness campaigns through its regional alcohol and tobacco offices, ‘Balance’ and ‘Fresh’. Studies comparing different message types in tobacco adverts have found that negative health harm messages are most effective at generating increased knowledge of the range of diseases caused by smoking and for also achieving quit attempts (Durkin *et al.*, 2012). Following the success of graphic smoking campaigns promoted and up-weighted by Fresh in the North East (NHS Smokefree, 2012; NHS Smokefree, 2013), Balance used tumour imagery in a 2013 campaign (Balance, 2013a) in order to challenge alcohol’s positive image (Casswell, 2012) and position it closer to tobacco in terms of damage to health. Hard-hitting tobacco mass-media campaigns have been found to increase awareness of harms; generate quit attempts; and build support for the introduction of effective tobacco control policies (Durkin *et al.*, 2012; Richardson *et al.*, 2014). Balance aimed to test if an alcohol campaign could produce similar results using a breast cancer message.

In a 2014 campaign Balance re-ran the previous years’ tumour imagery but also introduced a short online video highlighting the links between alcohol and breast cancer by using wine glasses in the shape of a woman’s cleavage (Balance, 2014). The following 2015

TV-led campaign focussed mainly on breast cancer, taking a hard hitting approach showing a breast tumour developing (Balance, 2015a) whilst also talking about the range of cancers caused by alcohol. The enhanced focus on breast cancer was chosen for several reasons: low awareness of the links with alcohol in the North East (Balance, 2013b); breast cancer being the most prevalent alcohol related hospital admission cancer group making up 35% of the regional total (Balance, 2015b); and a 5-year survival rate for breast cancer in the North East significantly lower than the national average (Public Health England, 2016). Findings from Balance’s unpublished perceptions survey also revealed that awareness of the links between alcohol and breast cancer would probably increase support for policy. Tobacco related public health campaigns have shown that an individual needs to be regularly exposed to advertisements (around four per month) to impact on smoking prevalence (Sims *et al.*, 2014). In 2015, Balance’s breast cancer campaign was delivered over two separate phases of activity with a diluted intensity of messaging but overall running for twice as long as previous cancer campaigns.

Evaluation of the campaign aimed to answer the following: (a) Is a mass-media campaign intended to raise awareness of the links between alcohol and cancer/breast cancer associated with improved knowledge? (b) Is a mass-media campaign highlighting links between alcohol and cancer/breast cancer associated with an increase in the proportion of increasing/higher risk drinkers intending to change drinking behaviour? (c) Is a mass-media campaign intended to increase awareness of the link between alcohol and cancer/breast cancer associated with increased levels of support for alcohol related policy interventions?

METHODS

We conducted three cross-sectional surveys with pre-campaign BaseLine survey (BL, $n = 572$) and Wave 1 (W1, $n = 576$) and Wave 2 (W2, $n = 552$) surveys post-campaign activity.

A structured questionnaire was used in on-street, face-to-face interviews for the three survey waves with quota sampling undertaken by age, gender and National Statistics Socio Economic Classification (NS-SEC) for each of the four sub-regional areas of North of Tyne; South of Tyne; County Durham and Darlington; and Teesside. Interview responses were then weighted before analysis to the socio-demographic and geographic profile of North East population. A range of sample points were used within each area based on socio-demographic factors and with the same sample points being used in each of the three waves for consistency and comparability.

Due to the campaign predominantly targeting breast cancer, females were oversampled in all three survey waves. This was to facilitate higher powered significance testing for gender specific results outside the scope of this article.

Participation was voluntary and based on the principle of informed consent with only individuals aged 18+ invited to complete the survey. Fieldwork was managed by Bluegrass Research with interviewing conducted by qualified and experienced interviewers working to the Market Research Society Code of Conduct (Market Research Society, 2014). An application submitted to the ethics board of Teesside University determined ethical approval was not required as the evaluation was only exploring campaign exposure, awareness and attitudes. Feedback from the board did however recommend providing an information sheet outlining how the

findings would be used and offering contact details for the researchers. A steering group was set up to monitor the conduct of the work throughout the study period.

Campaign

The principal element of the campaign was a 40 s TV advert visualising the links between alcohol and breast cancer with a voice-over talking about the range of other cancers caused by alcohol (https://www.youtube.com/watch?v=UTTdY_Hok_Y; Balance, 2015a). The same advert was also shown on promoted posts in Facebook to target an online audience. The campaign activity was supported by local media stories highlighting the presence and content of the advert. There were two waves of campaign activity each lasting 4 weeks throughout July and November 2015.

The advert was designed to reach a large audience but was focussed more towards females given that women are generally more interested in health issues and are often the gatekeepers of good health within a family context (Fullagar, 2009; O'Brien *et al.*, 2014). Advertising slots were specifically chosen that would predominantly target both the 35+ age group, given the subject matter of cancer, and a less affluent demographic, as lower income groups suffer disproportionately from the harms caused by alcohol (Institute of Alcohol Studies, 2014; Jones *et al.*, 2015). Although the campaign visually focussed on breast cancer, all seven cancers caused by alcohol are clearly mentioned in the advert voiceover. This study considers males and females given that both genders will have seen and heard the advert and the effects of exposure wanted to be understood for the whole North East population.

TV was chosen because it is the medium which reaches the greatest proportion of the population, an important factor when raising awareness of health issues. Consumers of commercial television are also more likely to be female, older and from lower income groups (Broadcasters Audience Research Board, 2015). Facebook was chosen for online activity due to the ability to selectively target the desired demographic and geographic audience.

Television Ratings (TVRs) were used to measure the extent to which the population in the media market were exposed to an advertisement on average each week. The first wave of campaign exposure across the North East population was slightly lower than the second, with TVR values of 123 and 126 per week respectively (Broadcasters Audience Research Board, 2015), this was due to a higher advertising spend. For the digital element of the campaign, the equivalent rating points for the online audience were 50 and 44 per week for waves one and two respectively. A segment of the breast cancer advert was used in the on-street survey to determine campaign exposure from either TV, online or other media sources. As a proportion of the North East 18+ population this was found to be 58% in the W1 survey and 60% in W2.

Outcome measures

The on-street survey was undertaken in June 2015, before the first wave of campaign activity, to establish baseline data for the three research questions. Measures included strength of awareness of the links between alcohol and different cancers; whether or not steps had been taken to reduce consumption; and strength of support for various alcohol related policies.

Data analysis

Survey results were analysed using SPSS v22 and were weighted to the North East population based on age, gender, NS-SEC and area

of residence. A Chi-square analysis was conducted on the weighted data to determine whether sample drinker characteristics differed at each survey wave.

Research Q1—awareness of alcohol-cancer risks

Significance testing on ordinal scale responses for alcohol-cancer awareness ('greatly increases'/increases a little'/does not increase the risk') was carried out using Mann-Whitney *U* test (*Z* values) between those who had/had not seen the campaign at W1 or W2. Responses of 'greatly increases' or 'increases a little' were grouped into an 'increases risk' variable to allow for the identification of significant percentage differences (PDs) at the 95% level between survey waves.

Research Q2—behaviour change

Intention to reduce consumption was measured using a 10-point scale (1 = extremely unlikely, 10 = extremely likely). *T*-tests were used for significance testing between increasing/higher risk drinkers, as measured by a score of five or more on AUDIT-C (Bush *et al.*, 1998), who had/had not seen the campaign in the W1 or W2 survey. A dichotomous variable was then created in the BL, W1 and W2 surveys to indicate intended positive behaviour change and allow for the identification of significant differences at the 95% level between survey waves. Participants scoring in the range of 6–10 were categorised as having an 'intention to reduce', ensuring analysis only included people at the 'likely' end of the 10-point scale.

Research Q3—increasing policy support through a mass-media campaign

To answer this research question required identification of the group within each wave that had both knowledge of the alcohol-cancer link and were supportive of policy (Buykx *et al.*, 2014). Therefore, ordinal responses to each of the policy questions of 'strongly support' or 'support to some extent' were grouped into an overall 'support' variable. This was intersected (for each policy question) with the 'increases risk' variable described above, to determine the percentage of the sample at each wave both (a) aware of the links between alcohol and cancer and (b) supportive of different policies. Pearson chi-square was used to test for significant differences between those 'aware and supportive' of different policies dependent upon campaign exposure as measured through the prompted recall question in the survey. Significant differences at the 95% level between survey waves were also tested using the same variable.

RESULTS

Demographics

The composition of respondents for BL ($n = 572$), W1 ($n = 576$) and W2 ($n = 552$) was 52% females, 12% 18–24 s, 16% 25–34 s, 15% 35–44 s, 18% 45–54 s, 16% 55–64 s and 23% were 65 or over. The three samples were also weighted to National Statistics Socio-Economic Classification (NS-SEC) so that 30% were 'managerial and professional', 20% 'intermediate', 42% 'routine and manual' and 8% 'never worked/student' (Table 1). The percentage of respondents who were categorised as increasing or higher risk drinkers using AUDIT-C was 44% for BL ($n = 253$), 43% for W1 ($n = 246$) and 39% for W2 ($n = 218$). There were no significant differences in drinker categories between the three survey waves ($\chi^2 = 7.37$, $P = 0.117$).

Table 1. Survey demographics

	Un-weighted sample			Weighted sample (all waves) (%)
	Baseline (<i>n</i> = 572) (%)	Wave 1 (<i>n</i> = 576) (%)	Wave 2 (<i>n</i> = 552) (%)	
Female	59.6	60.1	58.7	51.6
Male	40.4	39.9	41.3	48.4
18–24	17.5	16.0	16.5	12.4
25–34	16.8	17.5	16.8	15.7
35–44	15.7	18.4	14.9	15.2
45–54	17.1	16.1	17.8	18.2
55–64	17.5	15.3	16.5	15.6
65+	15.3	16.7	17.6	23.0
North of Tyne	25.3	24.5	26.3	30.6
South of Tyne	24.8	24.1	27.2	24.1
County Durham & Darlington	27.1	25.7	22.6	23.7
Tees Valley	22.7	25.7	23.9	21.5
Managerial and professional	31.3	29.9	29.7	30.2
Intermediate	22.6	25.2	25.2	20.3
Routine and manual	37.9	35.9	35.1	42.0
Student/never worked	8.2	9.0	10.0	7.5

Table 2. Knowledge of the links between alcohol and different types of cancer

Increases risk of	Baseline	Wave 1	Wave 2	Baseline—Wave 1			Baseline—Wave 2		
	(<i>n</i> = 572) (%)	(<i>n</i> = 576) (%)	(<i>n</i> = 552) (%)	Percentage difference (%)	Lower 95% (%)	Upper 95% (%)	Percentage difference (%)	Lower 95% (%)	Upper 95% (%)
Cancer generally	57.9	62.2	65.6	4.2	−1.4	9.9	7.7*	2.0	13.3
Mouth cancer	50.4	55.1	56.5	4.7	−1.1	10.4	6.1*	0.3	11.9
Liver cancer	84.9	74.7	79.1	−10.2	−14.8	−5.6	−5.8	−10.3	−1.3
Pharyngeal cancer	49.6	54.2	54.6	4.6	−1.2	10.4	5.0	−0.8	10.9
Bowel cancer	50.7	54.4	59.4	3.7	−2.1	9.5	8.7*	2.9	14.5
Oesophageal cancer	47.8	51.3	54.6	3.5	−2.3	9.3	6.8*	0.9	12.6
Laryngeal cancer	48.9	51.4	53.5	2.4	−3.3	8.2	4.6	−1.3	10.4
Breast cancer	33.0	44.3	44.7	11.3*	5.7	16.9	11.7*	6.0	17.4

*Significant at 95% level.

Note: 'Increases risk' in the above table represents combined responses of 'greatly increases' and 'increases the risk a little'.

Awareness of the links between alcohol and cancer

Within W1 there was a significant difference between those who had/had not seen the campaign and awareness that alcohol causes both cancer generally ($Z = -4.185$, $P < 0.0005$) and breast cancer ($Z = -3.969$, $P < 0.0005$), with people seeing the campaign having a higher mean rank score and therefore greater strength of awareness. This was also the case for W2 for both cancer generally ($Z = -2.375$, $P = 0.018$) and breast cancer specifically ($Z = -3.120$, $P = 0.002$).

Between BL and W1 awareness only increased significantly for knowledge of the link between alcohol and breast cancer (BL = 33%, $n = 189$; W1 = 44%, $n = 255$; PD = $11 \pm 6\%$). This significantly increased level of awareness was also maintained between BL and W2 (W2 = 45%, $n = 247$; PD = $12 \pm 6\%$). Levels of awareness between BL and W2 were also shown to be significantly increased for knowledge of the links between alcohol and cancer generally and mouth, bowel and oesophageal cancer specifically (Table 2).

Intention to reduce consumption

There was no significant difference between increasing/higher risk drinkers who had/had not seen the campaign and intended to reduce consumption at W1 (seen, $n = 133$; not seen, $n = 113$; $t = 0.322$,

$P = 0.748$) or W2 (seen, $n = 144$; not seen, $n = 74$; $t = -0.076$, $P = 0.940$). There was also no significant difference between BL and either W1 or W2 in the percentage of increasing/higher risk drinkers who intended to reduce consumption in the next 3 months (BL = 12%, $n = 40$; W1 = 15%, $n = 38$; W2 = 12%, $n = 28$).

Support for alcohol related policy

Between BL and W1 a significant increase was only seen in 'strong support' for 'labels on alcohol containers showing nutritional value and calorie content' (BL = 37%, $n = 209$; W1 = 44%, $n = 252$; PD = $7 \pm 6\%$) (Table 3). Between BL and W2 a significant increase was seen for 'strong support' or 'support' for a 'ban on TV alcohol advertising before 9 pm' (BL = 68%, $n = 387$; W2 = 75%, $n = 415$; PD = $8 \pm 5\%$) whilst significant increases were seen for 'strong support' across all seven of the policies questioned.

Participants both aware of alcohol-cancer links and supportive of policy

In both W1 and W2 the proportion with a combined awareness of the general alcohol-cancer links and support for any of the seven

Table 3. Support for alcohol related policy

	Baseline	Wave 1	Wave 2	Baseline—Wave 1			Baseline—Wave 2		
	(<i>n</i> = 572) (%)	(<i>n</i> = 576) (%)	(<i>n</i> = 552) (%)	Percentage difference (%)	Lower 95% (%)	Upper 95% (%)	Percentage difference (%)	Lower 95% (%)	Upper 95% (%)
Pricing alcoholic drinks based on amount of alcohol they contain (MUP)									
Any support	59.8	57.8	65.5	-2.0	-7.7	3.7	5.6	0.0	11.3
Strongly support	33.6	36.0	44.5	2.4	-3.1	7.9	11.0*	5.3	16.6
Labels on alcohol containers showing nutritional value and calorie content									
Any support	62.9	67.6	67.6	4.8	-0.7	10.3	4.7	-0.8	10.3
Strongly support	36.6	43.7	47.9	7.1*	1.5	12.8	11.3*	5.5	17.0
Labels with information on how alcohol can affect health									
Any support	75.7	73.1	78.4	-2.5	-7.6	2.5	2.8	-2.2	7.7
Strongly support	48.6	49.6	56.8	0.9	-4.8	6.7	8.2*	2.3	14.0
Ban on TV alcohol advertising before 9 pm									
Any support	67.7	67.3	75.2	-0.4	-5.8	5.0	7.5*	2.3	12.8
Strongly support	46.0	45.5	55.3	-0.5	-6.3	5.2	9.3*	3.5	15.1
Restricting alcohol companies sponsoring sporting events									
Any support	47.0	46.6	51.9	-0.4	-6.1	5.4	4.9	-1.0	10.7
Strongly support	28.8	29.6	36.3	0.8	-4.5	6.0	7.4*	2.0	12.9
Restricting alcohol sales to a single area in supermarkets									
Any support	63.4	59.8	63.5	-3.6	-9.3	2.0	0.1	-5.5	5.7
Strongly support	34.5	37.4	45.2	2.9	-2.6	8.5	10.7*	5.0	16.4
Restricting alcohol sales in off licenses to between 10 am and 10 pm									
Any support	61.7	59.5	62.2	-2.2	-7.8	3.5	0.5	-5.2	6.2
Strongly support	35.3	34.0	45.3	-1.3	-6.8	4.2	10.0*	4.3	15.7

*Significant at 95% level. Note: ‘Any support’ in the above table represents combined responses of ‘support’ and ‘strongly support’.

Table 4. Proportion of participants who have/have not seen campaign and both aware of links between alcohol and cancer and supportive of policy

	Wave 1				Wave 2			
	Not seen campaign (<i>n</i> = 244) (%)	Seen campaign (<i>n</i> = 332) (%)	χ^2	<i>P</i>	Not seen campaign (<i>n</i> = 223) (%)	Seen campaign (<i>n</i> = 329) (%)	χ^2	<i>P</i>
Aware that alcohol increases the risk of cancer generally and any support for								
Pricing by strength (MUP)	34.8	40.1	1.63	0.201	45.4	47.0	0.135	0.713
Nutritional labels	42.2	46.7	1.14	0.286	47.5	46.6	0.042	0.838
Health labels	44.3	51.5	2.96	0.086	53.4	53.1	0.005	0.946
TV ad before 9 pm	38.1	48.5	6.15	0.013	48.3	55.7	2.939	0.086
Sporting events	29.5	32.2	0.49	0.486	37.8	37.1	0.032	0.858
Restricting supermarket sales	36.1	41.9	1.98	0.159	40.3	45.0	1.214	0.271
Off licenses 10 am and 10 pm	35.1	39.5	1.14	0.286	40.3	45.8	1.615	0.204
Aware that alcohol increases the risk of breast cancer and any support for								
Pricing by strength (MUP)	23.0	30.4	3.96	0.047*	24.5	35.7	7.708	0.005*
Nutritional labels	29.9	35.5	2.01	0.157	26.2	35.0	4.76	0.029*
Health labels	32.0	39.5	3.41	0.065	28.8	40.7	8.149	0.004*
TV ad before 9 pm	29.1	36.1	3.15	0.076	26.0	43.2	16.877	<0.005*
Sporting events	21.7	29.2	4.10	0.043*	21.1	30.0	5.443	0.020*
Restricting supermarket sales	28.7	32.2	0.83	0.363	22.8	35.4	9.981	0.002*
Off licenses 10 am and 10 pm	27.5	30.4	0.60	0.440	20.3	34.5	13.018	<0.005*

*Significantly different at *P* < 0.05 level.

Notes: ‘Any support’ in the above table represents combined responses of ‘support’ and ‘strongly support’ ‘Increases risk’ in the above table represents combined responses of ‘greatly increases’ and ‘increases the risk a little’.

policies was not significantly different between those who had/had not seen the campaign (Table 4).

The proportion with a combined awareness of alcohol-breast cancer links and support for ‘pricing alcoholic drinks based on amount of alcohol they contain’ and ‘restricting alcohol companies sponsoring sporting events’ in W1 was significantly higher for those who had seen the campaign (pricing: not seen = 23%, *n* = 56; seen = 30%, *n* = 101; χ^2 = 3.96, *P* = 0.047; sports: not seen = 22%, *n* = 53;

seen = 29%, *n* = 97; χ^2 = 4.10, *P* = 0.043). In W2 the proportion with a combined awareness of the alcohol-breast cancer links and support for policy was significantly higher across all seven policies for participants who had seen the campaign.

Between BL and W1 a significant increase was seen in the proportion of participants who both support ‘labels on alcohol containers showing nutritional value and calorie content’ and were aware that alcohol increases the risk of cancer generally (BL = 39%,

Table 5. Proportion of participants both aware of links between alcohol and cancer and supportive of policy

	Baseline	Wave 1	Wave 2	Baseline—Wave 1			Baseline—Wave 2		
	(<i>n</i> = 572) (%)	(<i>n</i> = 576) (%)	(<i>n</i> = 552) (%)	Percentage difference (%)	Lower 95% (%)	Upper 95% (%)	Percentage difference (%)	Lower 95% (%)	Upper 95% (%)
Aware that alcohol increases the risk of cancer generally and any support for									
MUP	37.2	37.8	46.4	0.6	-5.0	6.2	9.2*	3.4	14.9
Nutritional labels	38.9	44.9	46.9	5.9*	0.2	11.6	8.0*	2.2	13.8
Health labels	49.1	48.4	53.2	-0.7	-6.5	5.0	4.1	-1.7	9.9
TV ad ban before 9 pm	43.1	44.1	52.7	1.0	-4.7	6.7	9.6*	3.8	15.4
Restricting sporting events	29.1	31.0	37.4	1.9	-3.4	7.2	8.2*	2.7	13.7
Restricting supermarket sales	37.0	39.5	43.1	2.6	-3.1	8.2	6.1*	0.4	11.9
Off licenses 10 am and 10 pm	37.1	37.6	43.5	0.5	-5.1	6.1	6.4*	0.7	12.1
Aware that alcohol increases the risk of breast cancer and any support for									
MUP	21.0	27.2	31.2	6.3*	1.3	11.2	10.2*	5.1	15.3
Nutritional labels	24.2	33.1	31.4	9.0*	3.8	14.2	7.2*	2.0	12.5
Health labels	28.0	36.3	35.9	8.3*	2.9	13.7	8.0*	2.5	13.4
TV ad ban before 9 pm	25.9	33.2	36.2	7.3*	2.1	12.6	10.4*	5.0	15.8
Restricting sporting events	16.6	26.0	26.4	9.4*	4.7	14.1	9.9*	5.1	14.6
Restricting supermarket sales	22.4	30.7	30.3	8.3*	3.2	13.4	7.9*	2.7	13.0
Off licenses 10 am and 10 pm	23.3	29.2	28.8	5.9*	0.8	11.0	5.4*	0.3	10.6

*Significant at 95% level.

Notes: 'Any support' in the above table represents combined responses of 'support' and 'strongly support' 'Increases risk' in the above table represents combined responses of 'greatly increases' and 'increases the risk a little'.

n = 223; W1 = 45%, *n* = 259; PD = 6 ± 6%). With the exclusion of 'labels with information on how alcohol can affect health' significant increases were seen between BL and W2 in the proportion of participants both supporting any of the other six policies and being aware of the general alcohol-cancer links.

Between BL and both W1 and W2, significant increases were seen in the proportion of participants both supporting any of the seven policies and being aware of the links between alcohol and breast cancer (Table 5).

DISCUSSION

Evidence from this article indicates an effect of a mass media campaign in the North East of England. Individuals who reported seeing the campaign were more likely to be aware of the link between alcohol consumption and different cancer types than those who had not and there was an increase in the overall proportion at population level aware of these links after campaign delivery. These findings were in line with those of a previous study showing that a mass-media campaign can raise the awareness of the links between alcohol and cancer (Dixon *et al.*, 2015).

The campaign only focused on health information and made no mention of any alcohol policies. Nonetheless, an increase in 'strong support' for policy was seen at the population level, especially after the second wave of campaign activity. The most supported policies were health labelling and a pre 9 pm TV advertising ban, consistent with previous studies demonstrating stronger support for the least restrictive policy options (Australian Institute of Health and Welfare, 2011; Buykx *et al.*, 2014). Health labelling on bottles is seen as a 'non-restrictive' policy but has the potential to encourage high risk drinkers to reduce their alcohol consumption comparably to lower risk drinkers (Pettigrew *et al.*, 2016).

There were also some inconsistent policy support findings within this study. Support levels for non-restrictive 'nutritional and calorie labelling' was similar to that of the more restrictive policies (MUP,

supermarket sales and off-license hours) whilst restricting alcohol companies sponsoring sporting events, a non-restrictive policy, had consistently low support across all three survey waves.

This study makes an important advance on previous work (Buykx *et al.*, 2014; Dixon *et al.*, 2015) by demonstrating that an alcohol and breast cancer mass media campaign is associated with not only an increase cancer awareness, but also increased public support for alcohol policy. W1 and W2 survey data show that the proportion of participants with a combined awareness of alcohol-breast cancer links and support for policy was significantly greater for those who reported seeing the campaign. In addition, at the population level, the proportion who were both aware of alcohol-cancer links and supportive of policy increased significantly between BL and W2 for both cancer generally (six out of seven policies) and breast cancer (all policies).

In line with previous alcohol studies, campaign exposure was not associated with increased intention to reduce consumption (Spath *et al.*, 2008; Wakefield *et al.*, 2010; Millward Brown, 2012; Dixon *et al.*, 2015). This is despite evidence from tobacco mass-media campaigns that 'hard-hitting' imagery regarding cancer and other harms may alter intentions (Durkin *et al.*, 2012; Richardson *et al.*, 2014). The low number of TVRs per week for the Balance breast cancer campaign may, however, have been a factor impacting on the unsuccessful change of intention to reduce consumption.

Limitations

The campaign was only executed in the North East of England and it is not known whether the results would be replicated when conducting a similar campaign across a wider population. There were also no available resources to conduct a control study outside of the North East region to determine population level changes in awareness, intention to reduce consumption and policy support in the absence of the campaign. The North East has some of the highest levels of alcohol related mortality and morbidity in England (Public

Health England, 2015) and it is unclear whether this makes people more or less receptive to an alcohol and cancer campaign in comparison to other areas.

The sample size of each survey wave ($552 \leq n \leq 576$) was determined by the resources available for the study. The on-street survey was designed to select respondents via quota sampling from the population in order to obtain a representative sample of North East residents. However, there may have been some interviewer selection bias that could affect the representativeness of the sample. The participants were also limited to people who used the shopping centres of the major conurbations chosen as sample points in the study.

As the timings of campaign waves were dictated by budget and TV advertising availability, it is possible that alcohol consumption and motivations to reduce consumption were influenced by seasonal effects. The W1 survey was undertaken during summer and the W2 survey in the run up to Christmas, both times when alcohol consumption may be higher than usual (Bellis *et al.*, 2015). However, in W2, some participants may have been responding to survey questions with the view of a post-Christmas decrease in their alcohol consumption (Bellis *et al.*, 2015; de Vocht *et al.*, 2016). It was not possible to avoid these potential seasonal influences in conducting the study alongside a health promotion campaign dictated by other factors.

While a key strength of this study was the undertaking of an initial survey to establish population level baseline attitudes and awareness prior to campaign implementation, it was not possible to control between survey waves for other news and media regarding alcohol and health circulating during the campaign period which may have also exerted an influence on study outcomes.

CONCLUSION

Using a campaign highlighting the links between alcohol and breast cancer appears to be associated with a significant increase in awareness of risk factors and levels of public support for a range of restrictive and non-restrictive alcohol policies.

Mass-media information campaigns that raise awareness of the harm caused by alcohol help to inform consumption decisions, satisfy the consumer's right to know and, in the UK context, can also support the updated UK drinking guidelines. Petticrew *et al.* (2016) argue that alcohol advertising is a 'system level intervention' which seeks to influence not just consumption, but to also increase awareness, attitudes and social norms around alcohol. With this in mind a case is presented for alcohol related public health campaigns to adopt a similar approach, tackling harmful consumption levels alongside a range of other factors that seek to change the environmental context surrounding alcohol related harm.

FUNDING

This research was funded by Balance—The North East Alcohol Office.

CONFLICT OF INTEREST STATEMENT

The authors are solely responsible for the content of this paper and declare that they have no conflicts of interest.

REFERENCES

Australian Institute of Health and Welfare, 2011. *2010 National Drug Strategy Household Survey report*. [Online] <http://www.aihw.gov.au/publication-detail/?id=32212254712> (8 March 2016, date last accessed).

- Bagnardi V, *et al.* (2013) Light alcohol drinking and cancer: a meta-analysis. *Ann Oncol* 24:301–8.
- Balance. (2013a) *Balance 'Tumour'*. [Online] https://www.youtube.com/watch?v=F0yH_5_tFqQ (19 April 2016, date last accessed).
- Balance. (2013b) *Balance public perceptions survey* (unpublished).
- Balance. (2014) *TV Star Says Think Twice About How Much You're Drinking*. [Online] <http://www.balancenortheast.co.uk/latest-news/tv-star-says-think-twice-about-how-much-youre-drinking> (22 March 2016, date last accessed).
- Balance. (2015a) *A Spot Of Lunch*. [Online] https://www.youtube.com/watch?v=UTTdY_Hok_Y (19 April 2016, date last accessed).
- Balance. (2015b) *Analysis of 2013/14 Hospital Episode Statistics* (unpublished).
- Bellis MA, Hughes K, Jones L, *et al.* (2015) Holidays, celebrations, and commiserations: measuring drinking during feasting and fasting to improve national and individual estimates of alcohol consumption. *BMC Med* 13: 113. doi:10.1186/s12916-015-0337-0.
- Broadcasters Audience Research Board. (2015) *Trends in television viewing*.
- Bush K, *et al.* (1998) The AUDIT Alcohol Consumption Questions (AUDIT-C): an effective brief screening test for problem drinking. *Arch Intern Med* 158:1789–95.
- Buykx P, *et al.* (2014) Public support for alcohol policies associated with knowledge of cancer risk. *Int J Drug Policy* 26:371–9.
- Buykx P, *et al.* (2015) *An Investigation of the Link Between Alcohol and Cancer*. University of Sheffield and Cancer Research UK.
- Cancer Research UK. (2015) *How Alcohol Causes Cancer*. [Online] <http://www.cancerresearchuk.org/about-cancer/causes-of-cancer/alcohol-and-cancer/how-alcohol-causes-cancer> (19 April 2016, date last accessed).
- Casswell S. (2012) Current status of alcohol marketing policy—an urgent challenge for global governance. *Addiction* 107:478–85.
- de Vocht F, Brown J, Beard E, *et al.* (2016) Temporal patterns of alcohol consumption and attempts to reduce alcohol intake in England. *BMC Public Health* 16:917–26.
- Dixon H, *et al.* (2015) Using a mass media campaign to raise women's awareness of the link between alcohol and cancer: cross-sectional pre-intervention and post-intervention evaluation surveys. *BMJ Open* 5. doi: 10.1136/bmjopen-2014-006511.
- Durkin D, Brennan E, Wakefield M, *et al.* (2012) Mass media campaigns to promote smoking cessation among adults: an integrative review. *Tob Control* 21:127.
- Fullagar S. (2009) Governing healthy family lifestyles through discourses of risk and responsibility. In Wight J, Harwood V (eds). *Biopolitics and the Obesity Epidemic*. London: Routledge. pp. 108–26.
- Health and Social Care Information Centre. (2014) *Statistics on Alcohol*. [Online] <http://www.hscic.gov.uk/catalogue/PUB10932/alc-eng-2013-rep.pdf> (22 March 2016, date last accessed).
- Institute of Alcohol Studies. (2014) *Alcohol, Health Inequalities and the Harm Paradox: why some groups face greater problems despite consuming less alcohol*.
- Jones L, Bates G, McCoy E, *et al.* (2015) Relationship between alcohol-attributable disease and socioeconomic status, and the role of alcohol consumption in this relationship: a systematic review and meta-analysis. *BMC Public Health* 15:400. doi: 10.1186/s12889-015-1720-7.
- Market Research Society. (2014) *Code of Conduct*. [Online] https://www.mrs.org.uk/standards/code_of_conduct/ (19 April 2016, date last accessed).
- Millward Brown. (2012) *Why let good times go bad? DrinkAware Campaign Evaluation*.
- NHS Smokefree. (2012) *Every 15 cigarettes you smoke cause a mutation that can become cancer*. <https://www.youtube.com/watch?v=K9NTmAFQvfs> (6 September 2017, date last accessed).
- NHS Smokefree. (2013) *Everytime you smoke your blood gets thick and dirty with toxins*. <https://www.youtube.com/watch?v=c6U19Q1fBno> (6 September 2017, date last accessed).
- O'Brien W, Lloyd K, Ringuet-Riot C. (2014) Mothers governing family health: from an 'ethic of care' to a 'burden of care'. *Womens Stud Int Forum* 47:317–25.
- Office for National Statistics. (2014) *Alcohol-related deaths in the United Kingdom, deaths registered 1994 to 2014*.

- Parkin DM. (2011) Cancers attributable to the consumption of alcohol in the UK in 2010. *Br J Cancer* 105:514–8.
- Petticrew M, *et al.* (2016) Alcohol advertising and public health: systems perspectives versus narrow perspectives.
- Pettigrew S, *et al.* (2012) The extent and nature of alcohol advertising on Australian television. *Drug Alcohol Rev* 31:797–802.
- Pettigrew S, *et al.* (2016) The effect of cancer warning statements on alcohol consumption intentions. *Health Educ Res* 31:60–9.
- Public Health England. (2015) *Local Alcohol Profiles for England*. [Online] http://www.lape.org.uk/downloads/LAPE_LA_Dataset_PHE_030914_FINAL.xlsx (8 March 2016, date last accessed).
- Public Health England. (2016) Analysis of cancer incidence and survival statistics (unpublished).
- Rehm J, *et al.* (2009) Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet* 373:2223–33.
- Richardson S, *et al.* (2014) How does the emotive content of televised anti-smoking mass media campaigns influence monthly calls to the NHS Stop Smoking helpline in England? *Prev Med* 69:43–8.
- Seitz H, Pelucchi C, Bagnardi V, *et al.* (2012) Epidemiology and pathophysiology of alcohol and breast cancer: update 2012. *Alcohol Alcohol* 47:204–12.
- Sims M, *et al.* (2014) Effectiveness of tobacco control television advertising in changing tobacco use in England: a population-based cross-sectional study. *Addiction* 109:986–94.
- Spoth R, Greenberg M, Turrissi R. (2008) Preventive interventions addressing underage drinking: state of the evidence and steps toward public health impact. *Pediatrics* 121:S311–36.
- Stautz K, Frings D, Albery IP, *et al.* (2017) Impact of alcohol-promoting and alcohol-warning advertisements on alcohol consumption, affect, and implicit cognition in heavy-drinking young adults: A laboratory-based randomized controlled trial. *Br J Health Psychol* 22:128–50.
- Tramacere I, *et al.* (2010) A meta-analysis of alcohol drinking and oral and pharyngeal cancers. Part 1: Overall results and dose-risk relation. *Oral Oncol* 46:497–503.
- Vineis P, Wild CP. (2014) Global cancer patterns: causes and prevention. *Lancet* 383:549–57.
- Wakefield M, Loken B, Hornik R. (2010) Use of mass media campaigns to change health behaviour. *Lancet* 376:1261–71.
- World Health Organization. (2014) Global status report on alcohol and health.