

Article

Quantifying the Nature and Extent of Children's Real-time Exposure to Alcohol Marketing in Their Everyday Lives Using Wearable Cameras: Children's Exposure via a Range of Media in a Range of Key Places

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Abstract

Aims: Children's exposure to alcohol marketing is typically measured using self-report data, television viewing data or street marketing audits, which are subject to bias and often do not provide quantifiable measures of daily exposure. This article describes an innovative methodology to capture the world in which children live using wearable cameras.

Short summary: Children wearing wearable cameras were exposed 4.5 times per day to alcohol marketing in multiple places and via a range of marketing media. The results reinforce calls for legislative restrictions and a global response to alcohol marketing in order to protect children and reduce alcohol-related harm.

Methods: Children aged 11–13 years ($n = 167$) wore cameras that automatically captured images approximately every 7 s for a 4-day period between June 2014 and July 2015. Content analysis of images ($n = 700,000$) was manually undertaken to assess children's exposure to alcohol marketing.

Results: On average, children were exposed to alcohol marketing 4.5 (95% CI: 3.3, 6.0) times per day, excluding within off-licence retailers, on screens and product packaging. Children were exposed at home (47%), on-licence alcohol retailers (19%), off-licence shop fronts (16%) and sporting venues (12%), and via sports sponsorship (31%) and shop front signage (31%) and merchandise (25%). The highest exposure rates were found among Māori (5.4 times higher than New Zealand European) and Pacific (3.0 times higher than New Zealand European), and boys (2.0 times higher than girls).

Conclusions: These findings highlight the urgent need to implement strict legislative restrictions on all forms of alcohol marketing to fulfil the World Health Organization Global Alcohol Strategy.

INTRODUCTION

Burden of alcohol-related harm

Children under 18 years as defined by the United Nations Convention on the Rights of the Child (UNICEF, 2014), and young people (those aged under 25) are particularly susceptible to harms from alcohol consumption due to their developing brains and inexperience regarding consumption risks (Babor *et al.*, 2017). For example, early onset drinking is linked with various adverse psychological, physical and social outcomes, such as alcohol dependence (Hingson *et al.*, 2006), neurological dysfunction (Bellis *et al.*, 2005) and risky or unwanted sexual interactions (Stueve and O'Donnell, 2005). In New Zealand (NZ), over half (57%) of children aged 15–17 consumed alcohol, with 7.8% drinking hazardously (Alcohol Use Disorders Identification Test [AUDIT] score ≥ 8 , a screening tool used to define hazardous drinking) (Ministry of Health, 2016). Māori (indigenous population in NZ) aged 15 years and older are 1.5 times more likely than non-Māori to be hazardous drinkers. Additionally, people living in the most deprived neighbourhoods are 1.4 times more likely to drink hazardously than those in the least deprived neighbourhoods (Ministry of Health, 2016). Neighbourhood deprivation is measured using NZDep2013, an area-level measure of socioeconomic status derived from Census data.

Alcohol marketing and alcohol consumption

There is mounting evidence, including multiple systematic reviews, that childhood exposure to alcohol marketing increases the likelihood children will begin drinking alcohol and increases consumption in current drinkers (Anderson *et al.*, 2009; Smith and Foxcroft, 2009; Babor *et al.*, 2010; Jernigan *et al.*, 2017). However, studies to date have typically focused on a single place or marketing medium, with the majority of research on television marketing (Jernigan *et al.*, 2016). Moreover, children's exposure to alcohol marketing is typically measured using self-report Likert scale data, television viewing data or street marketing audits, which are subject to recall bias and often do not provide quantifiable measures of daily exposure (Jernigan *et al.*, 2016). For example, Likert scale responses typically require the participant to indicate on a scale from one to five how often they see alcohol marketing, with one being never and five being daily. Consequently, these studies may not provide accurate nor quantifiable measures of the extent or nature of children's exposure to alcohol marketing.

Measuring the extent of children's exposure to alcohol marketing

There appears to be only one study that has attempted to quantify children's exposure using another method (Collins *et al.*, 2016). Using handheld electronic computers, capable of taking photos and manually entering survey data, the authors found children saw alcohol marketing 3.06 (95% confidence intervals [CI]: 3.04, 3.07) times per day in real-time, across a range of marketing media. While this is an improvement over self-report Likert scale measures, the study results are likely an underestimate as the method required the participants' conscious recognition of exposure and high user compliance, and ignored repeat exposures of the same marketing later in the day. Thus, while important, this and other previous studies often do not provide a quantifiable measure of the nature and extent of children's daily exposure to alcohol marketing.

Wearable cameras provide a novel methodological tool with the potential to overcome the shortcomings of other alcohol exposure

measurements. Health researchers have utilized wearable cameras to study a range of exposures and behaviours including exposure to food marketing (Signal *et al.*, 2017a), physical activity (Doherty *et al.*, 2013) and mobility patterns (Chambers *et al.*, 2017a). These studies demonstrated that wearable cameras are a feasible methodology to study a range of health-related exposures and behaviours. As such, the current study used wearable cameras to measure children's exposure to alcohol marketing.

Alcohol marketing regulation

Industry self-regulation of marketing has consistently been shown to be ineffective at restricting children's exposure to alcohol marketing (Noel *et al.*, 2017). Self-regulation typically relies on industry developing, monitoring and enforcing their codes of good marketing practice. A recent systematic review of the effectiveness of alcohol self-regulation concluded that 'self-regulatory systems that govern alcohol marketing practices are not meeting their intended goal of protecting vulnerable populations' (Noel *et al.*, 2017, p. 45). This conclusion is reinforced by the alcohol industry's failure in multiple countries to effectively adhere to their codes of conduct and restrict children's exposure to alcohol marketing (Noel *et al.*, 2017). Self-regulation tends to focus on traditional broadcast media, and slow to develop new codes for emerging forms of promotion in the alcohol industry's expanding marketing mix (Advertising Standards Authority, 2018; Advertising Standards Authority (UK); The Advertising Standards Authority of South Africa). Sponsorship and in-store promotions tend to sit outside the scope of most self-regulatory systems but have overtaken traditional forms of marketing for alcohol companies (Casswell, 2012). In NZ, permitted places and times for alcohol marketing is self-regulated by the advertising industry via the Advertising Standards Authority (ASA) (Advertising Standards Authority, 2018). In response to the significant burden of alcohol-related harm in NZ, there have been calls for legislative restrictions on alcohol marketing (New Zealand Law Commission, 2010; Ministry of Health, 2014), including a comprehensive report from the Government-initiated Law Commission report in 2010 (New Zealand Law Commission, 2010). The 2012 Sale and Supply of Alcohol Act (SSAA) contained the majority of the Law Commission recommendations but notably excluded restrictions on alcohol marketing (Kypri *et al.*, 2013), one of the three best buys for reducing alcohol-related harm (World Health Organization, 2010). In 2014, the Ministerial Forum on the Alcohol Advertising and Sponsorship recommended a complete ban on alcohol sponsorship of sport (Ministry of Health, 2014). At the time of writing, the Forum is awaiting a government response.

This research aimed to quantify the nature and extent of children's exposure to alcohol marketing in their everyday lives using wearable cameras. Specifically, it sought to provide a quantitative measure of children's exposure to alcohol marketing by place, marketing medium and sociodemographic characteristics.

METHODS

Study design overview

The current research is a sub-study of the larger Kids'Cam project, a cross-sectional observational study of randomly selected children aged 11–13 years ($n = 168$) from the Wellington region of NZ (with sampling of schools as the first stage, and children within schools as a second stage) (Signal *et al.*, 2017a). Each child wore a wearable camera (Autographer, www.autographer.com), during waking

hours over a 4-day period (Thursday–Sunday) between July 2014 and June 2015. The camera automatically captured a 136° image of the scene ahead approximately every 7 s. During data collection, researchers prompted children in the mornings to wear and turn on their camera, and then again in the evenings to put their device onto charge before going to bed. At the conclusion of the 4-day data collection period, the researchers downloaded the image data onto a secure server at the University of Otago, Wellington. Customized software facilitated manual coding of each image. The University of Otago Human Ethics Committee (Health) (13/220) granted ethical approval for this study. In total, 43% of invited children consented to participate in the study. Kids'Cam aimed to examine the world in which children live. Kids'Cam was initially funded by the Health Research Council of New Zealand (HRC) to quantify the nature and extent of children's exposure to food marketing. The Kids'Cam dataset has also been used to study sun safety (Gage *et al.*, 2017), bluespace (Pearson *et al.*, 2017) and children's mobility patterns (Chambers *et al.*, 2017a). Further information on the Kids'Cam study design, sampling strategy and data collection is available elsewhere (Signal *et al.*, 2017a).

Image content analysis

In total, the children collected ~1.3 million images. Of these, only images captured outside school times (9 am–3 pm on weekdays), defined as 'leisure time', were coded for alcohol marketing. One child with no leisure time data was excluded, leaving 167 children in analyses. Approximately 700,000 images (~1400 observation hours) were coded using manual content analysis (around 95% of images collected were codable) by a single researcher over 3 months, guided by a protocol designed for alcohol marketing assessment (Supporting Information 1).

We used the European Alcohol Policy Alliance definition of marketing; 'a mix of sophisticated, integrated strategies, grouped around four main elements: the product, its price, its place (distribution) and its promotion'. (Tricas-Sauras and Garnes, 2014, p.6). Images were coded using a three-tiered framework for (a) place; (b) promotion; and (c) number of exposures (full rules in Supporting Information 1). Places included homes, sports venues, on-licence alcohol retailers and off-licence shop fronts. Promotion [here on referred to as marketing medium] included shop front signage, sports sponsorship and merchandise (definitions in Supporting Information 1). We did not code for price as children are not permitted to purchase alcohol, however, initial image assessment suggests this would be possible in future studies. Exposures within off-licence retailers were too extensive to code as children could be exposed to 10–100 s of brands on a single visit. Therefore, exposures within off-licences were excluded as these exposures were conceptually different to the individual marketing exposures occurring outside such places, however, the shop fronts of off-licences were coded. Likewise, in line with other exposure analyses (Collins *et al.*, 2016), product packaging was not coded for in this study. Additionally, in a previous study using wearable cameras (Signal *et al.*, 2017b), marketing was not clear enough on screens to quantify the exposure via this media, thus exposures via screens were not coded for in this analysis.

STATISTICAL ANALYSES

Statistical analyses were conducted in Stata v14 (StataCorp, College Station, TX, USA). Inverse sampling weights accounted for the stratified sampling (by ethnicity and school deprivation status) to

produce representative total estimates for the age-specific population in the Wellington region. Inferential statistics (95% CI, *P*-values) also accounted for sample stratification and clustering of children within schools using Stata's *svy* prefix commands and associated weighting options. Analyses were conducted using univariate and multivariable models (to adjust for confounders).

The number of exposures was summed by child; aggregate counts were determined across all places/types of exposure for each child to estimate total alcohol marketing exposures and subset by place and medium. Cameras automatically captured images every 7 s, thus, each image was considered 7 s of observation time (the average camera capture rate). Cleaning and aggregation of coded data were completed in R version 3.2.3 (R Institute, Vienna). Analyses of sociodemographic characteristics included sex, age, ethnicity and neighbourhood deprivation. Student ethnicity was determined by the NZ Ministry of Education (MoE) records. Participants' addresses were geocoded and linked with a measure of neighbourhood-level deprivation measures derived from the national census which is commonly used in NZ research (NZDep2013) (Atkinson *et al.*, 2014).

Marketing exposure rates were calculated using negative binomial regression models for count data. Total (leisure) observation time for each child was included in these models as an offset term to allow calculation of rates. Mean rates and rate ratios are presented with 95% CI. Multivariable models were mutually adjusted for sex, ethnicity and neighbourhood deprivation. Results are reported as rates per day, 10 h represented a typical day over the 4-day period, so this metric was used to help present the data in a meaningful way.

SOCIODEMOGRAPHIC CHARACTERISTICS

Our study included similar numbers of boys (47.3%) and girls (52.7%) (Table 1), with a mean age of 12.6y (sd = 0.5), and a larger proportion of NZ European (39.5%) than Māori (35.9%) and Pacific (24.6%). More children lived in neighbourhoods of high (34.7%) and low (34.1%) deprivation than moderate deprivation (28.2%). These results largely reflected the intentional sampling design, which was stratified by ethnicity and school socioeconomic status (Signal *et al.*, 2017a).

RESULTS

Exposure to alcohol marketing

Overall, children had an average of 4.5 (95% CI: 3.3, 6.0) exposures to alcohol marketing per day (Table 2), excluding within off-licence retailers, on screens and product packaging. Most exposure took place in the home (mean rate 2.1, 95% CI: 1.2, 3.6), which accounted for 47.4% of all exposures (Fig. 1A). Exposures at home occurred primarily through sports sponsorship and merchandise (53.7 and 37.4% of all home exposures, respectively). On-licence premises accounted for 18.7% of all exposures, at a rate of 0.8 (95% CI: 0.5, 1.4) per day (Fig. 1B). Similar levels of exposure occurred at off-licence shop fronts (16%) (Fig. 1C) and sporting venues (12%) (Fig. 1D), with public spaces (5.8%) accounting for the least exposure.

Regarding marketing media, sports sponsorship accounted for 31.4% of all exposures with a mean rate of 1.4 (95% CI: 0.8, 2.6) per day (Table 2 and Fig. 2A). Similar exposure rates were observed for shop front signage (mean rate 1.4, 95% CI: 0.8, 2.3) and merchandise (mean rate 1.0, 95% CI: 0.5, 2.4) (Table 2, Fig. 2B and C) with the remaining 14% being a combination of signs, print and in-store marketing.

Table 1. Sociodemographic characteristics of study population

Sociodemographic characteristics	<i>n</i>	%
Total	167	100
Sex		
Female	88	52.7
Male	79	47.3
Age		
11	13	7.8
12	122	73.1
13	25	15.0
14	1	0.6
Mean (SD)		
12.6 ± 0.5		
Total	161 ^a	96.4
Ethnicity		
NZ European	66	39.5
Māori	60	35.9
Pacific	41	24.6
Total	167	100
Neighbourhood deprivation NZDep 2013 (Meshblock)		
High	58	34.7
Medium	47	28.2
Low	57	34.1
Total	162 ^b	97.0

^aSix participants were missing demographic information on age and household deprivation.

^bFive participants had missing address information.

Table 2. Mean rate of alcohol marketing exposures (per day, with 95% CI, from negative binomial regression) for total exposures, by place and marketing medium (with percentage share of all exposures)

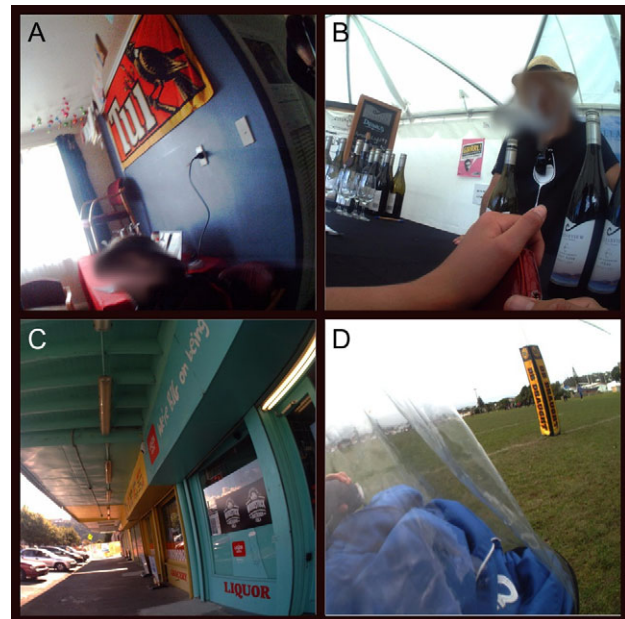
Total/Place/Medium	Rate per day (95% CI)	% of total
Total (any place/medium)	4.5 (3.3, 6.6)	100
Place		
Home	2.1 (1.2, 3.6)	47.4
On-licence ^a	0.8 (0.5, 1.4)	18.7
Off-licence shop fronts	0.7 (0.3, 1.8)	16.0
Sporting venues	0.5 (0.2, 1.4)	12.0
Public places	0.3 (0.1, 0.6)	5.8
Medium		
Sports sponsorship	1.4 (0.8, 2.6)	31.4
Shop front	1.4 (0.8, 2.3)	30.1
Merchandise ^b	1.0 (0.5, 2.4)	24.5
Sign	0.4 (0.1, 1.1)	8.2
Print	0.2 (0.04, 0.8)	4.0
In-store marketing	0.1 (0.02, 0.3)	1.8

^aOn-licence includes all venues that have licences to sell alcohol for consumption on premise. Examples include bars, pubs and restaurants (except sports venues that have their own category).

^bExcluding sports merchandise with alcohol branding.

SOCIODEMOGRAPHIC DIFFERENCES IN ALCOHOL MARKETING EXPOSURE

Table 3 shows unadjusted and adjusted differences in children's rate of exposure by sociodemographic groups. In the unadjusted models, Māori and Pacific children had 4.13 (95% CI: 2.44, 6.99) and 2.62 (95% CI: 1.31, 5.20) times higher rates of exposure than NZ European children, respectively. Children living in the most deprived

**Fig. 1.** Marketing exposure by place. (A) Home [Tui beer brand]. (B) On-licence [Clearview wine brand]. (C) Off-licence shop front [Woodstock Bourbon RTD]. (D) Sports venue [DB Draught beer brand].**Fig. 2.** Alcohol marketing by marketing media. (A) Sports sponsorship [Hurricanes is the regional rugby team, Tui beer brand]. (B) Merchandise [Speights beer brand]. (C) Shop front signage [Woodstock Bourbon RTD].

neighbourhoods had rates of exposure 3.06 (95% CI: 1.63, 5.73) times those of children in the least deprived neighbourhoods. Following adjustment for ethnicity and neighbourhood deprivation, boys had a significantly higher rate of exposure than girls (Rate ratio (RR) = 1.96, 95% CI: 1.60, 2.41). Higher rates were also observed for Māori (RR = 5.45, 95% CI: 3.23, 9.20) and Pacific (RR = 3.02, 95% CI: 1.55, 5.86) children compared to NZ European children,

Table 3. Univariate models and adjusted models (mutually adjusted for sex, ethnicity and neighbourhood deprivation) showing the mean rate (per day, with 95% CI, from negative binomial regression) of exposure to alcohol marketing by sociodemographic characteristics, accounting for complex sampling strategy and variations in observation time

Sociodemographic characteristics	Mean rate per day (95% CI)	Univariate models Rate ratio between groups (95% CI)	P value	Adjusted model Rate ratio between groups (95% CI)	P value
Total	4.5 (3.3, 6.0)				
Sex					
Female	3.3 (2.0, 5.2)	1 (reference)		1 (reference)	
Male	5.8 (4.0, 8.4)	1.78 (0.96, 3.30)	0.065	1.96 (1.60, 2.41)	<0.001
Ethnicity					
NZ European	2.5 (1.8, 3.6)	1 (reference)		1 (reference)	
Māori	10.5 (7.0, 15.8)	4.13 (2.44, 6.99)	<0.001	5.45 (3.23, 9.20)	<0.001
Pacific	6.7 (3.7, 12.1)	2.62 (1.31, 5.20)	0.009	3.02 (1.55, 5.86)	0.003
Neighbourhood deprivation					
Low	3.4 (2.6, 4.5)	1 (reference)		1 (reference)	
Moderate	2.7 (2.0, 3.7)	0.79 (0.53, 1.17)	0.230	0.38 (0.21, 0.70)	0.004
High	10.5 (5.8, 18.9)	3.06 (1.63, 5.73)	0.001	1.37 (0.76, 2.47)	0.280

when adjusting for sex and neighbourhood deprivation. While the differences by neighbourhood deprivation were reduced and not statistically significant other than children living in moderately deprived neighbourhoods having significantly less (RR = 0.38, 95% CI: 0.21, 0.70) exposure to alcohol marketing than children living in the least deprived neighbourhoods.

DISCUSSION

Children in this study were exposed to alcohol marketing 4.5 times per day, on average, in a variety of places and via a range of media. Most exposures occurred in the home, at on-licence retailers, off-licence shop fronts and sports venues, predominantly via sports sponsorship and shop front signage. Sociodemographic differences were evident, with Māori, Pacific children and boys having higher rates of exposure than New Zealand European children and girls.

These results highlight potential places for intervention to prevent children's alcohol marketing exposure. Homes were the most common place of exposure. The responsibility for exposure within the home is often placed upon guardians, making this a challenging place for intervention. However, because many exposures at home occurred through sports sponsorship and merchandise (53.7 and 37.4% of all home exposures, respectively), regulation of such media may serve to protect children within the home environment. Rates of exposure were similar from sports venues, off-licence shop fronts and on-licence alcohol retailers, highlighting the pervasive alcohol marketing seen by young sportspeople. The only restriction on shop fronts is that over half of the window must be free of alcohol marketing (Health Promotion Agency, 2015). Children in New Zealand are permitted within on-licence retailers while supervised, thus, exposures occurring within on-licences were supervised in this study. The current research demonstrates a pressing need for increased restrictions on alcohol retailers' shop fronts and reinforces the need for effective regulation on alcohol sponsorship of sport, particularly as sporting venues are key health-promoting places for children.

In this study, sports sponsorship was the most common form of marketing. Alcohol companies' sponsorship of sport led to the exposure of children to alcohol marketing in their homes, via their sporting heroes, on their clothing, and in traditional health-promoting environments (e.g. sports venues). This, combined with evidence of the association between alcohol marketing exposure via

sports sponsorship and alcohol consumption (Brown, 2016), reinforces the need for crucial global action to ban alcohol sponsorship of sport (World Health Organization, 2010). In NZ, a governmental response to the recommendations of the Ministerial Forum on Alcohol Advertising and Sponsorship is required (Ministry of Health, 2014). Ideally, to protect children from the harmful effects of alcohol marketing, a ban on all alcohol sponsorship of sport is needed. Viable models of sponsorship replacement exist. Australia and NZ implemented a sponsorship replacement programme to ban tobacco sponsorship (Beaglehole, 1991; Woodward, 2001), and the sponsorship revenue in Australia increased by 45% in the year after the tobacco sponsorship ban (Woodward, 2001). Contemporary examples of sponsorship replacement exist, with revenue generated from the alcopops tax in Australia being diverted into sports sponsorship replacement programmes (Richards, 2015). Similarly, in Western Australia, the health promotion agency Healthway has a programme to buy out alcohol and junk food sponsorships of sport within the state (Healthway, 2016).

The sociodemographic differences in the rates of exposure to alcohol marketing found in this study may partially explain health inequalities. In particular, Māori children had higher exposure levels than NZ European children. One explanation is that Māori children may be more likely to visit sports venues and have merchandise from sporting teams with alcohol sponsorship. The differences may also be attributable to alcohol outlet density, which is highest in the most deprived neighbourhoods, and in which Māori are over-represented (Ayuka *et al.*, 2014). Thus, Māori children are more likely to encounter shop front marketing from alcohol outlets in their neighbourhoods, and in turn leading to higher exposure rates. Māori (over age 15) are 1.46 times more likely than non-Māori to be hazardous drinkers (Ministry of Health, 2016). In this context, the government is not meeting its obligations to Māori under the Treaty of Waitangi, which ensures Māori have at least the same level of health as non-Māori.

Trends in alcohol marketing exposure were observed by sex, with boys having higher rates than girls. One rationale for this difference is sports traditionally favoured by boys such as rugby (secondary school participation numbers, 23,000 boys versus 3800 girls) and cricket (7800 boys versus 1700 girls) are more likely to have alcohol sponsorship than sports that appeal more to girls such as netball (27,000 girls versus 700 boys) and volleyball (11,000 girls

versus 6000 boys) (New Zealand Secondary Schools Sports Council, 2017). Differences by sex are concerning given that New Zealand men are 2.10 times (95% CI: 1.85, 2.37) more likely to be hazardous drinkers than women, while there is also a strong cultural link between masculinity, sport and drinking in New Zealand culture (Gee and Jackson, 2010). These findings highlight the potential of restrictions on such forms of alcohol marketing to reduce health inequalities.

The findings expose NZ's current system of industry self-regulation as ineffective in preventing children's exposure to alcohol marketing. They also highlight inadequacies of self-regulation with regards to children's exposure to marketing outside alcohol retailers, and via sports sponsorship (Advertising Standards Authority, 2018). It is likely that greater restrictions on sports sponsorship and alcohol merchandising would decrease overall exposure and in particular, those exposures occurring within the home.

Our results are consistent with previous research that has highlighted the inadequacy of industry self-regulation (Noel *et al.*, 2017). Further, these results support the recommendation of WHO's Global Alcohol Strategy (World Health Organization, 2010) that regulation with a legislative basis is required to prevent children's exposure to alcohol marketing. A total ban or rigorous regulation such as that implemented in France with Évin Law is preferable. The Évin Law applies to any drinks over 1.2% alcohol by volume and includes strict restrictions on alcohol marketing such as bans on television, sports sponsorship and in cinemas (Gallopel-Morvan *et al.*, 2017). However, it should be noted that persistent alcohol industry lobbying has successfully weakened important aspects of the Évin Law (Gallopel-Morvan *et al.*, 2017), highlighting the need for continuous advocacy and public support even when robust legislation is introduced.

In this study, wearable cameras provided a quantifiable measure of children's exposure to alcohol marketing in their everyday lives across multiple places and marketing media. The use of wearable cameras provides a unique and robust analysis of children's lived experiences, and the study methodology overcomes some limitations of other research methodologies such as self-report and street marketing audits. Moreover, it provides a comprehensive view of the range of children's exposures, except on screens, via product packaging and within off-licence alcohol retailers. The exclusion of screen-based marketing, product packaging and marketing within off-licence alcohol retailers means these findings are likely an underestimate of children's overall exposure. However, they highlight the impact of often overlooked marketing media and places such as non-televised alcohol sponsorship, and marketing outside alcohol retailers, and in private places such as the home.

A limitation of this study was the conservative coding criteria used to define a marketing exposure that required at least 50% of the brand to be visible to code the image. Often a brand is identifiable when <50% of the brand is visible or when the brand is blurry due to camera quality but these exposures went uncounted. Another limitation was the decision to exclude exposure to alcohol marketing within off-licence alcohol retailers such as supermarkets and liquor stores. The large number of individual marketing exposures that occur at these retailers were too difficult to count as well as being conceptually different to the quantifiable marketing brand exposures that occur outside such places. While children used multiple screens over the study period, the content in these images was often not clear enough to meet the coding criteria due to poor lighting, low screen resolution and camera positioning. However, the technological advancements in wearable camera technology, such as

greater sensor resolution, may overcome the limitation in coding screens and enhance the utility of the methodology. There is already solid evidence of the rates of children's exposure to alcohol marketing via television (Tanski *et al.*, 2015) and Internet-based marketing (McClure *et al.*, 2016). For example, conservative estimates suggest children are exposed to one alcohol advertisement on television per day (Collins *et al.*, 2016). In addition to direct television marketing, a recent analysis of televised sport in NZ revealed viewers were exposed to alcohol marketing 1.6–3.8 times per minute via sports sponsorship on televised sport (Chambers *et al.*, 2017b). Finally, this was a cross-sectional study and does not have a behavioural outcome, and so we cannot assess the impact of children's exposure to alcohol on their alcohol-related behaviours. However, the mounting evidence provided by longitudinal studies and multiple systematic reviews suggests that any exposure to alcohol marketing by children is unacceptable, and these results support urgent action to fulfil our obligations under the United Nations Convention on the Rights of the Child (UNICEF, 2014).

Although the study was conducted in NZ, the global nature of alcohol marketing means the findings are likely to be of relevance to similar jurisdictions, particularly those that permit alcohol-related sports sponsorship and industry self-regulation of marketing.

CONCLUSION

Children were exposed to alcohol marketing on average 4.5 times per day, in multiple places and via various marketing media, with concerning inequalities by sex and ethnicity. These findings add weight to existing evidence that self-regulatory systems are inadequate at preventing exposure of children to alcohol marketing and highlight a pressing need to implement strict legislative restrictions on all forms of alcohol marketing to protect children from harm (World Health Organization, 2010).

SUPPLEMENTARY MATERIAL

Supplementary data are available at *Alcohol And Alcoholism* online.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest to declare.

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Announcement

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Announcement

ESBRA Nordmann Award 2018

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The European Society for Biomedical Research on Alcoholism (ESBRA) is pleased to introduce the **2018 ESBRA-Nordmann Award** to a young scientist for significant scientific contribution to biomedical research on alcoholism. The applicant should be a European scientist under the age of 35, whose past and present work is mostly based in European institutions. Furthermore the application has to be recommended by a letter from an ESBRA member.

In 2018, the award will consist of 3.000 Euro, and will be delivered during the ESBRA Nordmann Award Meeting 2018. The Congress will be held in Louvain-la-Neuve (near Brussels), Belgium from October 11th–12th, 2018.

For the ESBRA-NORDMANN AWARD each submission shall include:

- The curriculum vitae of the applicant, including a list of his/her published articles.
- His/her most significant publications.
- An original text of 5 pages maximum representing either unpublished data or a synthesis of already published results.

The deadline for the receipt of submission is the 31th of July 2018!

All applications should be sent to:

e-mail: office@jesbra.com

Phone: +43-676-6430320