

Article

# Association Between Alcohol Sports Sponsorship and Consumption: A Systematic Review

Katherine Brown\*

Institute of Alcohol Studies, Alliance House, 12 Caxton Street, London SW1H 0QS, UK

\*Corresponding author: Tel.: +44-20-7222-4001; Fax: +44-207-799-2510; E-mail: [kbrown@ias.org.uk](mailto:kbrown@ias.org.uk)

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## Abstract

**Aim:** Concerns have been raised about the impact of alcohol sports sponsorship on harmful consumption, with some countries banning this practice or considering a ban. We review evidence on the relationship between exposure to alcohol sports sponsorship and alcohol consumption.

**Methods:** Search of electronic databases (PubMed, Cochrane Library, Google Scholar and International Alcohol Information Database) supplemented by hand searches of references and conference proceedings to locate studies providing data on the impact of exposure to alcohol sports sponsorship and outcomes relating to alcohol consumption.

**Results:** Seven studies met inclusion criteria, presenting data on 12,760 participants from Australia, New Zealand, the UK, Germany, Italy, Netherlands and Poland. All studies report positive associations between exposure to alcohol sports sponsorship and self-reported alcohol consumption, but the statistical significance of results varies. Two studies found indirect exposure to alcohol sports sponsorship was associated with increased levels of drinking amongst schoolchildren, and five studies found a positive association between direct alcohol sports sponsorship and hazardous drinking amongst adult sportspeople.

**Conclusion:** These findings corroborate the results of previous systematic reviews that reported a positive association between exposure to alcohol marketing and alcohol consumption. The relationship between alcohol sports sponsorship and increased drinking amongst schoolchildren will concern policymakers. Further research into the effectiveness of restrictions on alcohol sports sponsorship in reducing harmful drinking is required.

## BACKGROUND

The impact of alcohol marketing on consumption and its associated harms has received considerable attention, both in terms of research and public policy. Several systematic reviews have concluded that exposure to alcohol marketing increases the likelihood that young people will start to drink and increase their consumption if already drinking (Booth *et al.*, 2008; Anderson *et al.*, 2009; Smith and Foxcroft, 2009; Jernigan, 2010). In addition, the World Health Organisation (WHO) has identified the regulation of alcohol marketing as one of three 'best buy' policies in its Global Alcohol Strategy (WHO, 2010), alongside restrictions on availability and affordability.

Marketing, as a discipline, is a diverse collection of activities including broadcast and print media advertisements, outdoor billboards, in-store promotions, social media and sponsorship of sporting and cultural events. Concerns have been raised about the impact of alcohol sports sponsorship on harmful drinking amongst children and young people (University of Stirling, 2013), with some countries banning this practice (France, LegiFrance, 1991; Norway, Österberg and Karlsson, 2002) or expressing an intention to do so in the near future (Republic of Ireland, House of Oireachtas, 2013; New Zealand, New Zealand Ministry of Health, 2014). Concerns have also been raised about the effects of alcohol sports sponsorship on the participants themselves

particularly as a review by Lisha and Sussman (2010), showed that participation in sport is already related to higher levels of alcohol consumption. Suggested explanations for this trend include increased competitiveness amongst sportspeople (to prove they can 'hold their liquor'), sport-related stress and exposure to alcohol advertising during sporting events (Lisha and Sussman, 2010). A more recent review by Sonderland *et al.* (2014) showed evidence of higher rates of alcohol use and violence amongst athletes when compared against non-athletes, with potential factors linking sport and violence including masculinity, violent social identity and antisocial norms associated with certain sports including excess alcohol consumption and violence (Sonderland *et al.*, 2014).

This evidence, combined with the large numbers of children and young people following major alcohol-sponsored sporting events, has generated concerns that alcohol sports sponsorship may increase rates of harmful and hazardous drinking both at population level and amongst vulnerable groups (Alcohol Health Alliance UK, 2014).

To date, few reviews have focussed on the evidence of an association between alcohol sports sponsorship and alcohol consumption, and specifically, none of the reviews have included direct-to-user forms of alcohol sponsorship for example the provision of free or price discounted alcohol to players. The aim of this review is to examine the relationship between alcohol sports sponsorship and alcohol consumption.

## METHODS

### Eligibility criteria

Primary studies using a randomized controlled, cohort, cross-sectional or case-control design, published in the English language, that examined the relationship between alcohol sports sponsorship and alcohol consumption were considered for inclusion; descriptive studies, commentaries and editorials with no primary analysis were excluded. The exposure of interest was alcohol industry sponsorship of sporting activities at all levels, including individual, team, club and event/competition. The 'alcohol industry' was defined as any company that produces, markets or distributes alcoholic beverages. Studies that reported any outcomes related to alcohol consumption, including self-reported alcohol use and drinking intentions were included. Studies that only reported attitudes towards drinking were excluded, as were studies that only reported awareness of or attitudes towards alcohol sports sponsorship, without measuring effects on consumption.

### Identification of studies

The electronic databases PubMed and the Cochrane Library were searched from their inception to June 2015, supplemented with searches of Google Scholar and the International Alcohol Information Database. Hand searches were conducted of key journals, the proceedings of the Kettil Bruun Society and Global Alcohol Policy Alliance conferences and reference lists of identified studies.

The search strategy combined the following sets of terms:

- (1) Alcohol consumption (alcohol\* and (intoxicat\* or us\* or consumption or drunk\* or drink\* or binge or purchase\*))
- (2) Sports sponsorship (sport\* and sponsor\*)

### Study selection and synthesis

Titles and abstracts of studies retrieved from electronic database searches were screened by the author for eligibility. Studies were discarded if the title and/or abstract did not focus on the relationship between alcohol sports sponsorship and alcohol consumption. Where

the exposure or outcome was unclear, the full texts of the studies were retrieved and screened. This method of screening was applied to all studies and publications retrieved from hand searches, conference proceedings and searches of reference lists.

### Data extraction

Results relating to the impact of the chosen exposure (alcohol sports sponsorship) and outcome (alcohol consumption) were extracted from each study.

### Critical appraisal

All studies were subjected to a systematic critical appraisal by the author using a Centre for Evidence-Based Management (CEBM) checklist to determine the strength and appropriateness of each study design (CEBM, 2014). Table 1 outlines the results of this process for each study. The appropriateness of the statistical methodology used in each study was also assessed. A narrative review of the studies' findings was reported as the significant heterogeneity of the study populations and the exposures measured precluded use of meta-analytical techniques

## RESULTS

The electronic database searches identified 44 potentially relevant articles. An additional 11 publications were identified following searches of reference lists and conference proceedings. After screening, 37 articles were obtained as full text publications. After screening each full text article for review eligibility, 30 were excluded leaving seven articles for review inclusion. The majority of articles excluded were cross-sectional studies ( $n = 23$ ) that offered no data on the relationship between alcohol sponsorship and consumption. Also excluded were commentaries ( $n = 2$ ) or reviews ( $n = 2$ ) with no primary analysis. See Fig. 1 for the search results.

### Description of included studies

A total of seven studies met the inclusion criteria (Table 2). The seven studies provide data on 12,760 participants aged between 13 and 46 years from Australia, New Zealand, the UK, Germany, Italy, Netherlands and Poland. Data were collected between 2006 and 2012. Two of the studies reported findings from participants under the age of 18 and were conducted in a school-based setting (Davies, 2009; De Bruijn *et al.*, 2012). Three studies recruited participants from university sports settings (O'Brien *et al.*, 2011, 2014; Kelly *et al.*, 2014), and two from community sports clubs and training grounds (O'Brien and Kypri, 2008; Kingsland *et al.*, 2013).

Six of the studies were cross-sectional surveys and one study was a longitudinal survey looking at data from four countries (De Bruijn *et al.*, 2012), with one follow-up period 13 months after the baseline data collection. Six studies used self-reported questionnaires, either completed on paper or online. One study used a computer assisted telephone survey (Kingsland *et al.*, 2013).

All studies relied on self-reported levels of alcohol consumption. Of the studies using adult participants, three measured alcohol consumption using the Alcohol Use Disorders Identification Test (AUDIT), a screening tool devised by the World Health Organisation to detect early signs of hazardous and harmful drinking and identify mild dependence (O'Brien and Kypri, 2008; O'Brien *et al.*, 2011, 2014). AUDIT scores of  $>8$  are defined as indicating hazardous drinking (Babor *et al.*, 2001). Two studies based consumption measures on frequency and volume of consumption, with drinking  $>5$  drinks

**Table 1.** Summary of critical appraisal of studies, using CEBM checklist

Appraisal questions	O'Brien 2008		Davies 2009		O'Brien 2011		De Bruijn 2012		Kellie 2013		Kingsland 2013		O'Brien 2014	
	Yes	Can't tell	No	Can't tell	No	Can't tell	No	Can't tell	No	Can't tell	No	Can't tell	No	Can't tell
Did the study address a clearly focussed question/issue?	X		X		X		X		X		X		X	
Is the study design appropriate for answering the research question?	X		X		X		X		X		X		X	
Is the method of selection of the subjects clearly described?	X		X		X		X		X		X		X	
Could the way the sample was obtained introduce selection bias?	X			X	X		X		X		X		X	
Was the sample of subjects representative with regard to the population to which the findings will be referred?	X			X		X		X		X		X		X
Was the sample size based on pre-study considerations of statistical power?		X				X			X			X		
Was a satisfactory response rate achieved?	X		X		X		X		X		X		X	
Are the questionnaires likely to be valid and reliable?	X		X		X		X		X		X		X	
Was the statistical significance assessed?	X		X		X		X		X		X		X	
Are confidence intervals given for the main results?	X		X		X		X		X		X		X	
Could there be confounding factors that haven't been accounted for?	X		X		X		X		X		X		X	
Can the results be applied to your organization?	X		X		X		X		X		X		X	

on one occasion defined as risky or binge drinking (Kingsland *et al.*, 2013; Kelly *et al.*, 2014); one of these (Kelly *et al.*, 2014) also used the CAGE questionnaire, an internationally recognized short screening test for problem drinking and potential alcohol problems (Ewing, 1984). Of the studies with participants under 18 years of age, alcohol consumption was recorded using questions from the established European Schools Survey Project on Alcohol and Other Drugs (ESPAD) (<http://www.espad.org/>) (De Bruijn *et al.*, 2012), and student intentions to drink or get drunk the weekend following completion of the survey (Davies, 2009).

Exposure to alcohol sports sponsorship was measured using multiple methods. Receipt of alcohol sponsorship by participants at the individual, team and/or club level was recorded in the five adult studies (O'Brien and Kypri, 2008; O'Brien *et al.*, 2011, 2014; Kingsland *et al.*, 2013; Kelly *et al.*, 2014). Of the two studies using schoolchildren, general awareness of alcohol sports sponsorship was recorded by one (Davies, 2009) and exposure to alcohol sponsorship via viewing of major football tournaments known to be sponsored by alcohol companies was measured by the second (De Bruijn *et al.*, 2012).

**Methodological quality**

All studies were considered focussed, with clear research questions and use of appropriate methodology, although there were a number of limitations (*vide infra*). The studies' response rates were recorded ranged from 80 to 96%, although in one study (Kingsland *et al.*, 2013) response rates were much lower amongst managers (32%) than members (85%). The longitudinal study (De Bruijn *et al.*, 2012) reported an attrition rate of 31.5%.

Purposive and stratified sampling, as opposed to random sampling, was used by all studies which presents limitations to the generalizability of the data. Authors of three studies (O'Brien and Kypri, 2008; O'Brien *et al.*, 2011, 2014) justify their purposive sampling method both on the basis of resource capacity and to reduce the risk of bias from approaching clubs in receipt of alcohol sponsorship that may have been unwilling to allow access to the population of interest. The authors awarded priority to establishing sufficient heterogeneity in the exposure of interest for disaggregating results according to potential confounders, over obtaining a representative sample. This acted to counter the studies' design limitations.

Whilst the adult studies cannot be seen as representative of adult and university sportspeople in the countries of interest, the purposive sampling approaches mean the results can be viewed as indicative of potential relationships which require validation in more robustly sampled studies. Similarly, whilst the studies using schoolchildren cannot be seen as representative of schoolchildren in the countries of interest, one study (Davies, 2009) selected participants from two contrasting socioeconomic areas to improve the generalizability of the findings to Welsh schoolchildren in year 10 (age 14/15 years) while the other study (De Bruijn *et al.*, 2012) selected a stratified sample of schools from rural and urban areas to improve the generalizability of schoolchildren in four European countries.

A major limitation of six of the studies is their cross-sectional design, which precludes the possibility of causal attribution. Although several studies controlled for known confounders such as age, gender, and age of intoxication debut (O'Brien and Kypri, 2008; O'Brien *et al.*, 2011; Kelly *et al.*, 2014) and disposable income (O'Brien *et al.*, 2014), residual confounding may be possible as adjustments were not carried out with regards to ethnicity and peer use of alcohol (Moore *et al.*, 2005; Patrick and Schulenberg, 2010). Two studies (Kingsland *et al.*, 2013; O'Brien *et al.*, 2014) accounted for reverse-association of heavy drinkers seeking out alcohol sponsorship.

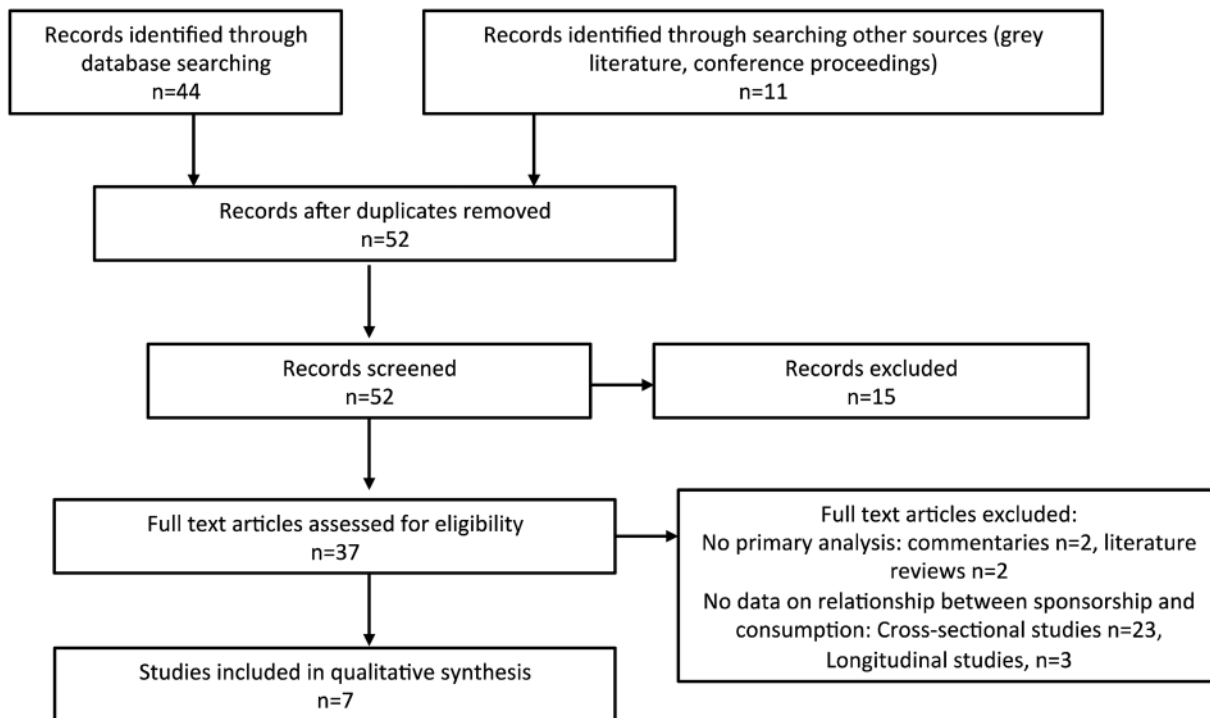


Fig. 1. Results of searches of electronic databases and hand searches.

The review included one longitudinal study with one follow-up period, which also controlled for the above confounders plus smoking and education status. Clustering within samples was only addressed in two studies: clustering within sports was accounted for by O'Brien *et al.* (2014) and clustering at the club level was accounted for by Kingsland *et al.* (2013).

Only one study (O'Brien *et al.*, 2014) referenced pre-study consideration to the statistical power of sample size. Whilst sample sizes were generally small (ranging from  $n = 294$  to  $n = 6651$ ) they permitted the detection of significant relationships between the focal variables.

### Study results

All studies report positive associations between exposure to alcohol sports sponsorship and increased levels of self-reported consumption, however the statistical significance of results varies. Two studies examined the impact of indirect exposure to alcohol sports sponsorship on alcohol consumption amongst schoolchildren, defined as an awareness or viewing of alcohol-sponsored sports. Davies (2009) found that awareness of alcohol sports sponsorship amongst year 10 (aged 14–15) pupils of Welsh Schools predicted the likelihood of boys drinking ( $\beta = 0.17$ ) and of boys and girls getting drunk the following weekend ( $\beta = 0.17$ ,  $\beta = 0.13$  respectively)  $P = 0.05$ . This study found that this awareness interacted with positive drinking attitudes amongst schoolchildren, increasing the predicted likelihood of boys ( $\beta = 0.26$ ) and girls ( $\beta = 0.27$ ) drinking the following weekend  $P = 0.05$ . De Bruijn *et al.* (2012) reported in their multi-country study of schoolchildren of a slightly younger age (13–14 years) that exposure to alcohol branded sports sponsorship, measured via frequency of viewing alcohol-sponsored football championships, was associated with increased positive alcohol expectancies ( $\beta = 0.11$ ,  $P < 0.001$ ) and drinking in the last 30 days ( $\beta = 0.7$ ,  $P = 0.01$ ).

The remaining five studies examined the impact of direct exposure to alcohol sports sponsorship on adult sportspeople, defined as being in receipt of sponsorship at the individual, team or club level). O'Brien *et al.* reported on similar studies conducted at community sports settings in New Zealand (O'Brien and Kypri, 2008) and university sports settings in Australia (O'Brien *et al.*, 2011) and the UK (O'Brien *et al.*, 2014). In New Zealand, sportspeople in receipt of alcohol industry sponsorship at the individual, team and club level reported average AUDIT scores 2.4 points higher than non-sponsored sportspeople. In Australia, alcohol-sponsored sportspeople reported AUDIT scores 1.67 points higher than non-sponsored sportspeople, and rates of hazardous drinking (defined as AUDIT scores  $>8$ ) were significantly higher amongst alcohol-sponsored sportspeople (68.6%) compared to non-sponsored sportspeople (58.6%)  $P = 0.005$ . In the UK, sportspeople sponsored by alcohol companies, at the individual, team and club level reported average AUDIT scores 1.27 points significantly higher than non-sponsored sportspeople,  $P = 0.001$ , and higher rates of hazardous drinking (Adj OR = 4.12,  $P = 0.05$ ) compared to non-sponsored sportspeople.

Kelly *et al.* (2014) found small but not significant associations between receipt of alcohol sponsorship at the individual or team level amongst Australian university sportspeople and acute ( $\beta = 0.018$ ) and disordered ( $\beta = 0.046$ ) consumption. There was no relationship between receipt of sponsorship and chronic consumption ( $\beta = -0.006$ ) or binge drinking ( $\beta = -0.025$ ). When assessing the impact of direct-to-user sponsorship only, that is receipt of discounted or free alcohol, prizes, product samples etc. a small but significant difference was reported in rates of chronic drinking (partial  $\eta^2 = 0.02$ ) and disordered consumption (partial  $\eta^2 = 0.01$ ) amongst sponsored versus non-sponsored sportspeople. These findings are in accord with the results of O'Brien and Kypri (2008) that receipt of free or discounted alcohol in the form of direct-to-user

**Table 2.** Summary of studies included in review

Study	Participants	Exposure	Results
<p><i>Study:</i> O'Brien <i>et al</i> (2008) 'Alcohol industry sponsorship and hazardous drinking among sportspeople'</p> <p><i>Design:</i> cross-sectional survey</p> <p><i>Location:</i> Auckland, Canterbury and Otago, New Zealand</p> <p><i>Analysis:</i> multiple regression analysis of covariance (ANCOVA) conducted to assess association of various sponsorship variables with AUDIT scores, adjusting for age, gender, and age of intoxication debut</p>	<p><i>Sample:</i> <math>n = 1279</math> sportspeople agreed to participate, 96% provided complete and usable data (<math>n = 1233</math>).</p> <p><i>Sex:</i> 48% female</p> <p><i>Age:</i> mean age 30.6 years, SD 13.4 years</p> <p><i>Data collection:</i> questionnaires completed by in-season sportspeople at training grounds, for a variety of sports (field, racquet and other team sports plus swimming)</p>	<p>Receipt of alcohol industry sponsorship at the individual, team or club level was recorded, alongside receipt of free and/or discounted alcohol, and whether participants felt obliged to consume a sponsor's product or attend a sponsor's pub/club. Alcohol consumption was measured via an AUDIT test, included in the questionnaire.</p>	<p>Individuals in receipt of industry sponsorship at individual, team and club level had AUDIT scores on average 2.4 points higher (95% CI 0.70 to 4.09) than those who received no sponsorship. Those in receipt of free and/or discounted alcohol has AUDIT scores on average 1.56 points higher (95% CI 0.62 to 2.51) than those not in receipt. Feeling obliged to attend a sponsor's bar/club was associated with AUDIT scores 1.91 points higher (95% CI 0.85 to 2.98) than those who did not.</p>
<p><i>Study:</i> Davies, F (2009) 'An investigation into the effects of sporting involvement and alcohol sponsorship on underage drinking'</p> <p><i>Design:</i> cross-sectional survey</p> <p><i>Location:</i> Wales, UK</p> <p><i>Analysis:</i> multiple regression analyses</p>	<p><i>Sample:</i> <math>n = 322</math> students from five Welsh schools eligible. Final sample was 294 students completing questionnaires.</p> <p><i>Sex:</i> 55% (<math>n = 161</math>) Male, 45% (<math>n = 133</math>) Female.</p> <p><i>Age:</i> Year 10 (age 14/15 years)</p> <p><i>Data collection:</i> Self-administered questionnaire</p>	<p>Awareness of alcohol sponsorship, sporting involvement, attitudes towards alcohol and intentions drink the following weekend were measured.</p>	<p>Awareness of alcohol sponsorship (Aw) predicted likelihood of boys drinking (<math>\beta = 0.17</math>) and of both boys and girls getting drunk the following weekend (<math>\beta = 0.17</math>, <math>\beta = 0.13</math> respectively) <math>P = 0.05</math>. Interactive effects of Aw combined with attitudes towards drinking increased the predicted likelihood of boys (<math>\beta = 0.26</math>) and girls (<math>\beta = 0.27</math>) drinking the following weekend <math>P = 0.05</math>. For girls, the interaction of Aw in combination with Subjective norms for coaches predicted likelihood of drinking the following weekend (<math>\beta = 0.22</math>, <math>P = 0.05</math>)</p> <p>Rates of hazardous drinking (AUDIT score &gt;8) were greater in those receiving than those not receiving alcohol sponsorship (68.6% vs 58.6%, <math>P \leq 0.005</math>). After multiple regression, sportspeople in receipt of alcohol industry sponsorship had higher AUDIT scores than those not in receipt of alcohol industry sponsorship (Adj <math>\beta = 1.67</math>, 95% CI 0.56 to 2.78). Being in receipt of non-alcohol industry sponsorship, and being in receipt of both alcohol industry and non-alcohol industry sponsorship, were not significant predictors of AUDIT scores.</p>
<p><i>Study:</i> O'Brien <i>et al</i> (2011) 'Alcohol industry and non-alcohol industry sponsorship of sportspeople and drinking'</p> <p><i>Design:</i> cross-sectional survey</p> <p><i>Location:</i> New South Wales, Australia</p> <p><i>Analysis:</i> multiple regression analysis controlling for known predictors of hazardous drinking (age, gender, location, age of intoxication debut, team vs individual sport and level or sporting participation)</p>	<p><i>Sample:</i> <math>n = 652</math> sportspeople from two large multi-campus universities. Response rate: 80%</p> <p><i>Sex:</i> 51% female</p> <p><i>Age:</i> 18–45 (mean = 20.74, SD = 3.28 years)</p> <p><i>Data collection:</i> participants completed questionnaires after being approached at community and campus sportsgrounds and non-sporting venues</p>	<p>Receipt of alcohol and/or non-alcohol industry sponsorship of any kind at individual, team and club level (e.g. monies, uniforms, equipment and other products). An AUDIT test was included to measure alcohol consumption.</p>	<p>Rates of hazardous drinking (AUDIT score &gt;8) were greater in those receiving than those not receiving alcohol sponsorship (68.6% vs 58.6%, <math>P \leq 0.005</math>). After multiple regression, sportspeople in receipt of alcohol industry sponsorship had higher AUDIT scores than those not in receipt of alcohol industry sponsorship (Adj <math>\beta = 1.67</math>, 95% CI 0.56 to 2.78). Being in receipt of non-alcohol industry sponsorship, and being in receipt of both alcohol industry and non-alcohol industry sponsorship, were not significant predictors of AUDIT scores.</p>

Continued

Table 2. Continued

Study	Participants	Exposure	Results
<p><i>Study:</i> De Bruijn <i>et al.</i> (2012) 'AMPHORA Report on European alcohol marketing exposure on alcohol expectancies and youth drinking'</p> <p><i>Design:</i> cross-sectional cross-country, longitudinal survey</p> <p><i>Location:</i> Germany, Italy, Netherlands, Poland</p> <p><i>Analysis:</i> Hierarchical regression analysis controlling for gender, age, smoking, education and sport participation.</p>	<p><i>Sample:</i> <math>n = 6651</math> students participating in both waves 1&amp;2 (9709 participated in wave 1). Country breakdown: Germany = 1398, Italy = 1771, Netherlands = 1525, Poland = 2001</p> <p><i>Sex:</i> 51.1% female, 48.5% male</p> <p><i>Age:</i> mean age 13.95 years (SD 0.72)</p> <p><i>Data collection:</i> self-administered online anonymous questionnaires completed at two time periods (1 = Nov 2010–Feb 2011, 2 = Mar–Apr 2012).</p>	<p>Association between exposure to alcohol branded sports sponsorship (measured by frequency of viewing alcohol-sponsored football championships) at time 1 with alcohol use (in past 30 days, based on ESPAD questions) and alcohol expectancies (recorded using shortened version of AEQ-A) at time 2 was investigated</p>	<p>Exposure to alcohol branded sports sponsorship increased the odds of drinking in last 30 days (<math>\beta = 0.7</math>, <math>t = 3.23</math>, <math>P \leq 0.01</math>) at time 2.</p>
<p><i>Study:</i> Kelly <i>et al.</i> (2014) 'The impact of alcohol sponsorship in sport upon university sportspeople'</p> <p><i>Design:</i> cross-sectional survey</p> <p><i>Location:</i> Australia, all territories except Northern</p> <p><i>Analysis:</i> multiple regression analysis conducted to assess association of 5 indicators for consumption with sponsorship status, controlling for known predictors (age, gender, location age of intoxication debut). Direct to user sponsorship effect subjected to multivariate MANCOVA analysis, using Wilks Criterion.</p>	<p><i>Sample:</i> <math>n = 501</math> university sportspeople from Australian universities. 33% reported receipt of alcohol sponsorship (<math>n = 167</math>).</p> <p><i>Sex:</i> sponsored sportspeople = Female 51%. Unsponsored sportspeople = Female 55%</p> <p><i>Age:</i> sponsored sportspeople mean age = 21.8 years, SD = 3.6. Unsponsored sportspeople mean age = 22.3 years, SD = 5.2</p> <p><i>Data collection:</i> Self-administered online questionnaire</p>	<p>Receipt of alcohol industry sponsorship of any kind at the individual or team level. Volume and frequency of alcohol consumption recorded, including acute (total drinks in past 7 days), chronic (average frequency and no. drinks consumed on average drinking day over last 12 months), binge (&gt;5/4 drinks consumed by men/women in 2 h, past 12 months), and disordered consumption (CAGE questionnaire).</p>	<p>Small but not significant effect of receipt of alcohol sponsorship found on consumption amongst sportspeople. After multivariate regression, receipt of sponsorship associated with increase in acute consumption (<math>\beta = 0.018</math>, CI = <math>-0.188</math> to <math>0.170</math>), a decrease in chronic consumption (<math>\beta = -0.006</math>, CI = <math>-0.178</math> to <math>0.192</math>), a decrease in binge drinking (<math>\beta = 0.025</math>, CI = <math>-0.186</math> to <math>0.186</math>) and an increase in disordered consumption (<math>\beta = 0.046</math>, CI = <math>-0.045</math> to <math>0.324</math>). Comparing sportspeople in receipt of direct to user sponsorship with unsponsored sportspeople resulted in significant but small effects for chronic drinking (<math>F = 7.71</math>, <math>P = 0.06</math>, partial <math>\eta^2 = 0.02</math>) and disordered consumption (<math>F = 5.92</math>, <math>P = 0.015</math>, partial <math>\eta^2 = 0.01</math>)</p>
<p><i>Study:</i> Kingsland <i>et al.</i> (2013) 'Alcohol consumption and sport: A cross-sectional study of alcohol management practices associated with at-risk alcohol consumption at community football clubs'</p> <p><i>Design:</i> cross-sectional survey</p> <p><i>Location:</i> New South Wales, Australia</p> <p><i>Analysis:</i> univariate association between club alcohol management practices and at risk consumption by club members</p>	<p><i>Sample:</i> Football club management representatives <math>n = 72</math> (response rate 32%), club members <math>n = 1428</math> (response rate 85%). Analysed members who reported drinking <math>n = 1335</math></p> <p><i>Sex:</i> 83% male, 17% female</p> <p><i>Age:</i> mean age 34 years, (SD 12)</p> <p><i>Data collection:</i> computer assisted telephone surveys</p>	<p>Club management practices, including receipt of alcohol sponsorship and sponsorship in form of free/discounted alcohol were compared with alcohol consumption levels of club members whilst at their club in last three months (frequency of consumption measured using modified GFI). Consumption of &gt;5 drinks at least once a month was classed as harmful drinking.</p>	<p>Members of clubs with sponsors who make, distribute or sell alcohol were no significantly more likely to report risky drinking than members of clubs without alcohol sponsors (28 vs 24%, <math>P = 0.382</math>). Members of clubs in receipt of alcohol from sponsors were not significantly more likely to report risky drinking than members of clubs not in receipt of alcohol (34 vs 26.3%, <math>P = 0.248</math>)</p>

**Study:** O'Brien *et al.* (2014) 'Alcohol industry sponsorship and hazardous drinking in UK university students who play sport'

**Design:** cross-sectional survey

**Location:** UK

**Analysis:** multiple regression analysis adjusting for age, gender, location and disposable income used to examine associations between alcohol sponsorship variables and alcohol consumption.

**Sample:** Sportspeople,  $n = 2048$  (response rate 83%  $n = 2450$  approached) from several universities across the UK

**Sex:** 44% female

**Age:** mean age 19.97 years

**Data collection:** participants completed questionnaires after being approached at university sports venues

**Receipt of alcohol industry sponsorship at the individual, team or club level was recorded.**

**Alcohol consumption was measured using AUDIT-C test, with scores >8 recorded as hazardous drinking.**

**After adjusting for covariates, sportspeople in receipt of alcohol sponsorship reported significantly higher alcohol consumption than non-sponsored sportspeople ( $\chi^2(1643) = 431.17, P \leq 0.0001$ ).**

**These results were seen amongst those in receipt of sponsorship at the team level ( $\beta = 0.41, 95\% CI = 0.07, 0.75, P = 0.05$ ), at club level ( $\beta = 0.73, 95\% CI = 0.012, 1.34, P = 0.05$ ), at both team and club level ( $\beta = 0.79, 95\% CI = 0.28, 1.29, P = 0.01$ ) and with a combination of individual sponsorship and team or club level ( $\beta = 1.27, 95\% CI = 0.42, 2.11, P = 0.001$ ).** For hazardous drinking the overall association with alcohol sponsorship was significant ( $\chi^2(4) = 11.93, P = 0.018$ ).

**Hazardous drinking was associated with sponsorship at the team level (Adj OR = 1.25, 95% CI = 0.82, 1.91), at the club level (Adj OR = 1.78, 95% CI = 0.87, 3.63), at team and club level (Adj OR = 2.04, 95% CI = 1.04, 3.99,  $P \leq 0.05$ ) and with combination of personal and team or club level (Adj OR = 4.12, 95% CI = 1.29, 13.15,  $P \leq 0.05$ )**

sponsorship was associated with higher AUDIT scores (1.56) amongst New Zealand sportspeople.

Kingsland *et al.* (2013) reported positive but not significant associations between members of football clubs in receipt of alcohol sponsorship and risky drinking rates compared to members of non-sponsored football clubs (28 vs 24%  $P = 0.382$ ). In univariate analysis looking at the size and location of clubs, the price of alcoholic drinks served on club premises, proportion of club staff who had received responsible beverage server training and members of clubs in receipt of sponsorship in the form of alcohol were no more likely to report risky drinking in the club setting than members of non-receiving clubs (34 vs 26.3%  $P = 0.248$ ).

## DISCUSSION

All of the studies included in this review report positive associations between exposure to alcohol sports sponsorship and increased levels of consumption, including risky drinking amongst adult sportspeople and schoolchildren, however the statistical significance of results varies. These findings corroborate the findings of previous systematic reviews that reported positive associations between exposure to alcohol marketing and alcohol consumption amongst young people (Booth *et al.*, 2008; Anderson *et al.*, 2009; Smith and Foxcroft, 2009; Jernigan, 2010).

Whilst all studies reported similar associations between alcohol sports sponsorship and consumption, the review found heterogeneity within the results in relation to statistical significance, effect size and level of sponsorship. These differences may be partly attributable to differences in study design, but they may also provide evidence of an association between different pathways or mechanisms for action that lead to increased drinking amongst sponsored sportspeople. Mechanisms identified in the literature include: increased exposure to alcohol advertising via sports sponsorship agreements may lead to increased consumption rates, free/discounted alcohol offered to sponsored athletes may increase consumption, and sports clubs in receipt of alcohol sponsorship that have licensed venues may be more prone to irresponsible serving practices (Lisha and Sussman, 2010; Sonderland *et al.*, 2014).

O'Brien *et al.* (O'Brien and Kypri, 2008; O'Brien *et al.*, 2011, 2014) and Kelly *et al.* (2014) selected participants from a variety of sports settings, and reported on their general consumption habits, whereas Kingsland *et al.* (2013) selected only members of football clubs and reported only on their consumption within the club setting. The latter study's use of narrower parameters may explain the lack of significance in its findings on the association between receipt of club level sponsorship and increased consumption, if it is hypothesized that footballers are less affected than other sportspeople by sponsorship, or drinking within a sports club environment was less conducive to risky or harmful drinking practices. However, given that there is some evidence to indicate that sports club management practices may increase the likelihood of risky drinking, including serving to underage drinkers (Rowland *et al.*, 2012), the lack of a significant association found by Kingsland *et al.* (2013) between consumption within clubs and risky drinking amongst sportspeople indicates further investigation is needed into this theory.

Amongst adult sportspeople, direct-to-user sponsorship in the form of free or discounted alcohol, alongside sponsorship at the individual level was found to have the strongest associations with increased consumption and risky drinking (O'Brien and Kypri, 2008; O'Brien *et al.*, 2011, 2014; Kingsland *et al.*, 2013; Kelly *et al.*, 2014). This corroborates Australian research indicating that football

players in receipt of alcohol promotions in the form of drinks cards, free and/or discounted alcohol reported higher rates of risky drinking than those not in receipt of such promotions (Dietze *et al.*, 2008).

Two studies reported a significant association between exposure to sports sponsorship and alcohol consumption amongst children (Davies, 2009; De Bruijn *et al.*, 2012). These findings will be of concern to policymakers, particularly in light of the breadth of evidence to suggest that exposure to alcohol marketing in general increases the likelihood that young people drink at an earlier age and drink more if they already use alcohol (Booth *et al.*, 2008; Anderson *et al.*, 2009; Smith and Foxcroft, 2009; Jernigan, 2010).

An inherent weakness of the findings of this review is that six of the studies are cross-sectional surveys, with one longitudinal study included. Whilst most studies adjusted results for known predictors of drinking, it is impossible to know if all relevant variables and confounding factors were accounted for and it is also not possible to rule out reciprocal influences. Similarly, this review may well be subject to publication bias, and it is impossible to predict what impact unpublished data would have on its findings.

All of the studies included in this review were conducted in countries where alcohol sports sponsorship is legal. No comparative studies were identified that compared drinking behaviours of sportspeople or schoolchildren living in countries where alcohol sports sponsorship is banned, such as France and Norway.

Based on this review it is clear that more research is required into the effectiveness of restrictions on alcohol sports sponsorship and harmful alcohol consumption. Longitudinal studies provide the highest level of evidence available for evaluation of alcohol marketing exposure and subsequent drinking behaviour (Smith and Foxcroft, 2009) and this would be the design recommended for any future studies. A comparison of drinking behaviours between areas of exposure and no exposure, or longitudinal studies that consider drinking behaviours before and after a sponsorship ban could provide a higher level of evidence for an association between alcohol sports sponsorship and consumption. With countries such as Ireland and New Zealand considering this policy intervention, researchers should be alert to possible opportunities for important evaluative studies in this area.

## CONCLUSION

There is a positive association between exposure to alcohol sports sponsorship and increased alcohol consumption amongst adult sportspeople and schoolchildren, but statistical significance of study results varied. Amongst adult sportspeople, direct-to-user sponsorship in the form of free or discounted alcohol was associated with increased levels of harmful drinking. The findings of this review, particularly in regard of the impact on children, warrant close attention from public health policymakers. Further research is required to investigate the impact of alcohol sports sponsorship and the cost-effectiveness of sponsorship restrictions in reducing harmful drinking.

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## CONFLICT OF INTEREST STATEMENT

None declared.

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