

*Review of selected papers examining alcohol
advertising*

Dr Robert Weir

New Zealand
Health Technology Assessment

Department of Public Health and General Practice
Christchurch School of Medicine and Health Sciences
Christchurch, New Zealand

Acknowledgements

NZHTA is a Research Unit of the University of Otago funded under contract to the New Zealand Ministry of Health.

This report was commissioned by the Public Health Directorate, Ministry of Health on behalf of a steering group set up to review the regulation of alcohol advertising in New Zealand.

Disclaimer

New Zealand Health Technology Assessment (NZHTA) takes great care to ensure the information supplied within the project timeframe is accurate, but neither NZHTA, the University of Otago, nor the contributors involved can accept responsibility for any errors or omissions. The reader should always consult the original database from which each abstract is derived, along with the original articles, before making decisions based on a document or abstract. All responsibility for action based on any information in this report rests with the reader. NZHTA and the University of Otago accept no liability for any loss of whatever kind, or damage, arising from reliance in whole or part, by any person, corporate or natural, on the contents of this report. This document is not intended as personal health advice. People seeking individual medical advice are referred to their physician. The views expressed in this report are those of NZHTA and do not necessarily represent those of the University of Otago or the New Zealand Ministry of Health.

Copyright

This work is copyright. Apart from any use as permitted under the *Copyright Act 1994* no part may be reproduced by any process without written permission from New Zealand Health Technology Assessment. Requests and inquiries concerning reproduction and rights should be directed to the Director, New Zealand Health Technology Assessment, Christchurch School of Medicine and Health Sciences, P O Box 4345, Christchurch, New Zealand.

Contact details

New Zealand Health Technology Assessment (NZHTA)
Department of Public Health and General Practice
Christchurch School of Medicine and Health Sciences
PO Box 4345
Christchurch
New Zealand
Tel: +64 3 364 3696 Fax: +64 3 364 3697

Email: nzhta@chmeds.ac.nz

Web Site: <http://nzhta.chmeds.ac.nz/>

Executive summary

Background

Nine studies were provided by the Ministry of Health on behalf of a steering group set up to review the regulation of alcohol advertising in New Zealand (the review). These studies were selected by the working group for the review using the following criteria:

1. Recent systematic reviews of alcohol advertising research literature
2. A selection of studies that add to the findings of the latest systematic review, including:
 - Key longitudinal studies , which were considered to add an important part of the body of literature about alcohol advertising
 - NZ qualitative research on alcohol advertising and young people

NZHTA was asked to assess these studies for their suitability to base policy on.

Methods

Standard methods of appraisal were used to assess the validity of the papers supplied. Levels of evidence were assigned where appropriate. These results are reported in evidence tables.

Results

Four consumer studies, one econometrics paper, one qualitative study and three reviews were provided. In general, econometrics papers are considered to be of lower quality than consumer studies. Particular limitations include:

- Use of highly aggregated data result in an inability to study subgroups of the population (such as young people)
- Reliance on a range of assumptions in modelling papers
- Concerns that simplistic models do not accurately reflect the complex interactions involved.

Most econometrics papers find no association between exposure to alcohol advertising and alcohol drinking behaviour. However, the econometrics study included in this review overcame one common problem of econometrics studies: having adequate variation in exposure. It may be for that reason that an association was observed between advertising bans and reduced alcohol consumption (though the association was at the 10% significance level rather than the usual 5% level).

Three of the four consumer studies used alcohol consumption as the key outcome variable. In two studies, exposure to various types of alcohol advertising was associated with increased alcohol consumption. In the other study using alcohol consumption as the outcome variable, a range of exposure measures were used. In general, the results favoured a positive association between alcohol advertising exposure and subsequent alcohol consumption, though there was some level of inconsistency across the different exposure measures. Specifically, of the five

different exposure measures, one was associated with a negative association with alcohol consumption. However, the preponderance of exposure measures favoured a positive association with subsequent consumption. The fourth consumer study focussed on alcohol outcome expectancies as the key outcome measure. This study focussed on the role of social influences and social bonding rather than exposure to alcohol advertising (although the latter information was collected). Exposure to alcohol advertising was not associated with alcohol positivity (tendency to rate favourable outcomes as more likely to occur when drinking than unfavourable outcomes) or alcohol potency (tendency to rate all outcomes, regardless of valence, as likely) after controlling for a range of potential confounders. This result implied social bonds/influences had a greater role in determining alcohol intake than exposure to alcohol advertising. The four studies all had limitations, which are described in this report, but they were generally well conducted.

The qualitative study was conducted in New Zealand. The study was based on transcripts of focus groups of people aged 14-18 years. Three themes were identified: participants actively engaged with alcohol marketing, demonstrated identification with marketing and brands at social and personal levels, and had varied ways of adopting alcohol identities for use in personal and social settings. The study lacked some detail about the methodology. It was unclear if divergent views could be expected from the sampling strategy used. The impact of the researchers, especially the focus group mediators, was unclear due to the lack of information provided.

Two of the three reviews could best be described as narrative reviews. These reviews provided minimal detail on the study methodology. In particular, there was no information on databases searched, search terms, selection criteria, method of assessing study quality and method of extracting data and critically appraising the literature. These studies would not normally be included for appraisal in reviews conducted by NZHTA. The third study, provided some more detail although difficulties remained. The databases searched and search terms used were well described. However, information on selection criteria, data extraction and critical appraisal methods was lacking. Therefore, it was difficult to assess the completeness of the studies selected. Nevertheless, this review reiterated the problems with econometric papers and went on to describe the apparent complexity evident from consumer studies. They suggested a two way relationship existed: advertising encourages targeted drinkers to drink and drinking will encourage attention to advertising by those consumers.

Discussion

A range of questions bear consideration:

1. Does advertising influence non-drinkers to start drinking?
2. Does advertising influence the level of intake of alcohol amongst drinkers?
3. Does drinking generate positive attitudes to alcohol advertising?
4. What is the relative impact of television advertising when compared with other factors such as peer and parental approval and price?

In the papers provided, some results were consistent with advertising influencing drinkers to start drinking. There were data supporting the hypothesis that exposure to alcohol advertising influenced the level of intake amongst drinkers. There was also some agreement with drinking generating a positive attitude to alcohol advertising.

Finally, one paper was consistent with peer and adult approval being more important determinants of alcohol intake than exposure to alcohol advertising.

While there were limitations to the review papers, it was apparent that inconsistencies in results existed between relevant studies. The studies that were more robust provided some support for a positive association between exposure to alcohol advertisements and alcohol consumption.

Table of Contents

Executive summary.....	iii
Background.....	iii
Methods.....	iii
Results.....	iii
Discussion.....	iv
Table of Contents.....	vi
List of Tables.....	vii
List of abbreviations.....	vii
Introduction.....	1
Methods.....	1
Appraisal of studies.....	1
Limitations of the review.....	2
Results.....	3
Consumer studies.....	3
Econometrics paper.....	16
Qualitative study.....	19
Review articles.....	22
Discussion.....	27
References.....	29
Appendix 1 NHMRC levels of evidence.....	30

List of Tables

Table 1: Evidence tables for the consumer studies	8
Table 2: Evidence table for the econometrics study	17
Table 3: Evidence table of qualitative research	20
Table 4: Evidence table of systematic reviews	25
Table 5 Strength of evidence	30
Table 6 Designations of levels of evidence	30

List of abbreviations

95% CI	95% confidence interval
BAC	Brewers Association of Canada
CFA	confirmatory factor analysis
OECD	Organisation for Economic Co-operation and Development
OR	odds ratio
NZHTA	New Zealand Health Technology Assessment
RR	relative risk
USA	United States of America

Introduction

The New Zealand Health Technology Assessment unit (NZHTA) was approached by Jo Burgi, Senior Analyst, Public Health Directorate, Ministry of Health, to critically review eight selected articles/reports (henceforth known as studies). The timeframe available for this assessment was short (request was received on 28 August 2006 and delivery date was September 8, 2006). One additional paper was supplied on 29 September 2006. The assessment was requested to assist in the considerations of the steering group set up to review the regulation of alcohol advertising in New Zealand (henceforth known as the steering group). NZHTA agreed to critically appraise the nine studies, present these findings and to present an overall comment on the studies.

The studies were selected by the working group (which provides secretariat support for the steering group) using the following criteria:

1. Recent systematic reviews of alcohol advertising research literature
2. A selection of studies that add to the findings of the latest systematic review, including:
 - Key longitudinal studies, which were considered to add an important part of the body of literature about alcohol advertising
 - NZ qualitative research on alcohol advertising and young people

Methods

Appraisal of studies

The evaluation initially classified studies according to National Health and Medical Research Council (National Health and Medical Research Council 2000) levels of evidence criteria, where possible, so as to rank them in terms of quality according to a pre-determined “evidence hierarchy” (see Appendix 1). These evidence levels are only a broad indicator of the quality of the research. The levels describe groups of research which are broadly associated with particular methodological limitations. However, these levels are only a general guide to quality because each study may be designed and/or conducted with particular strengths and weaknesses. High level evidence is provided by a well conducted randomised-controlled trial. Each study included in the review was also appraised using standard criteria for the specific study design.

Summaries of appraisal results are shown in tabular form as **Evidence Tables** where appropriate. The tables include:

- reference (authors, publication date) and country where study was principally conducted
- design
- evidence level

- study setting
- patient characteristics
- patient inclusion and exclusion criteria
- results
- study limitations
- authors' conclusions

Systematic reviews and meta-analyses are described and critiqued in terms of their search strategy, inclusion/exclusion criteria, data synthesis and interpretation.

Limitations of the review

A single reviewer was responsible for data extraction, critical appraisal and report preparation.

This report was prepared over a limited timeframe (29 August, 2006 – 8 September, 2006) with the additional study reviewed over 29 September -2 October 2006.

The studies selected have inherent limitations that are discussed in the following sections.

Results

Nine studies were provided for review. These studies could be characterised as follows:

- four consumer studies (Ellickson et al. 2005; Martino et al. 2006; Snyder et al. 2006; Stacy et al. 2004)
- one econometrics paper (Saffer and Dave 2002)
- one qualitative study (McCreanor et al. 2005)
- three reviews (Cooke et al. 2002; Foundation for Advertising Research Undated; Hastings et al. 2005)

Key features of these studies are discussed in the text below and, where appropriate, are supported by evidence tables.

Consumer studies examine how people's drinking knowledge, attitudes and behaviour vary with their exposure to alcohol advertising. Econometric studies examine the relationship between overall levels of alcohol consumption (usually in terms of sales) with overall levels of advertising (usually in terms of expenditure).

Consumer studies

Stacy et al 2004

This cohort study (level III-2 evidence) was set in 20 Los Angeles County middle schools. In a cluster design, 20 schools were randomly selected with all pupils in seventh grade during the baseline year being approached to participate in the study. The strength of this study was its use of multiple measures of exposure to alcohol advertising. Both "opportunity-based" and "memory-based" measures were used. The opportunity-based methods relied on viewing of certain TV programmes as a proxy measure of alcohol advertisement exposure. Three memory-based measures were used, as described in Table 1. Outcomes were measured in eighth grade. Key outcome measures were current and past alcohol consumption. Logistic regression was used in the data analysis.

Adjusted odds ratios found significant positive associations between:

- watching TV shows and beer drinking (OR 1.44, 95% CI 1.27-1.61)
- watching TV sports programmes and beer drinking (OR 1.20, 95% CI 1.05-1.37)
- self-reported frequency of exposure to alcohol advertising on TV and beer consumption (OR 1.21, 95% CI 1.04-1.41)
- watching TV shows and wine/liquor drinking (OR 1.34, 95% CI 1.17-1.52)
- watching TV shows and three drink episodes (OR 1.26, 95% CI 1.08-1.48)

Non-significant, positive associations were also found between:

- Cued memory recall test and beer drinking (OR 1.17, 95% CI 0.97-1.38)
- self-reported frequency of exposure to alcohol advertising on TV and wine/liquor consumption (OR 1.18, 95% CI 0.98-1.32)
- Cued memory recall test and wine/liquor drinking (OR 1.07, 95% CI 0.91-1.26)

- watching TV sports programmes and three drink episodes (OR 1.07, 95% CI 0.91-1.26)
- self-reported frequency of exposure to alcohol advertising on TV and three drink episodes (OR 1.06, 95% CI 0.89-1.27)
- Cued memory recall test and three drink episodes (OR 1.17, 95% CI 0.91-1.44)

Non-significant, negative associations were found between:

- Draw an event memory test and wine/liquor drinking (OR 0.92, 95% CI 0.81-1.03)
- Draw an event memory test and three drink episodes (OR 0.91, 95% CI 0.78-1.06)

Statistically significant, negative associations were found between:

- Draw an event memory test and beer drinking (OR 0.86, 95% CI 0.75-0.99)

There were limitations to this study, including:

- 25% loss to follow up, producing a selection bias
- Likely misclassification of exposure due to self report, need for recall and use of proxy measures. Nevertheless, the range of methods of measuring exposure was useful, though the inconsistent results raised concerns about the most valid measure to use.
- Potential misclassification of outcome due to the use of self-report data
- Lack of clarity concerning whether the analyses were adjusted for the clustering effect. If there was no such adjustment, the confidence intervals presented would be too narrow resulting in over-interpretation of the level of significance of the results. For example, if no adjustment had been made for the cluster design, it is unlikely that the negative association between draw an event memory test and beer drinking would have been statistically significant.
- Concerns about generalisability from this USA based study

Ellickson et al 2005

This study was set in 41 middle schools in South Dakota, USA (Ellickson et al. 2005). These schools were participating in a cluster randomised controlled trial examining the effectiveness of drug prevention programmes (termed treatment) in the curricula. The study aimed to examine the effect of alcohol advertising on subsequent drinking behaviour of USA adolescents and the effectiveness of the drug prevention programmes at mitigating the effects of advertising.

Data collection occurred at three time points: baseline data were collected in grade 7, advertising exposure data in grade 8 and drinking behaviour in grade 9. Proxy measures were used to classify exposure to advertising and these are described in the evidence table (see Table 1). Participants were divided into drinkers and non-drinkers at baseline and were analysed separately. A logistic regression model was fitted for the non-drinkers and a linear regression model was fitted for the drinkers.

At baseline, 39% of the participants were non-drinkers and a further 48% of these baseline non-drinkers became drinkers over the next two years. Among the non-drinkers, after controlling for drug prevention programme, television habits, other drinking predictors, social context variables, bonds with family, school and religion, attitudes and behaviour and demographic factors, exposure to in-store displays was the only statistically significant association with subsequent drinking behaviour. This exposure was associated with increased odds of drinking (OR 1.42, $P < 0.05$). Note, this result differs from that presented in Table 2 of the original study (where exposure to a concession stand was significantly associated with subsequent alcohol consumption and in-store displays were not). This error was subsequently corrected to the estimate above and now matches the description in the text of the study. Among baseline drinkers, both exposure to magazine advertising and in-store advertising were significantly associated with increased drinking behaviour (both $P < 0.05$). In both groups, randomisation to a drug prevention programme was associated with a decreased risk of subsequent drinking and specifically mitigated the effects of exposure to in-store advertising among the non-drinkers.

There were limitations to this study, including:

- Non-participation of 18% of the eligible students, with differences between the eligible and analysed populations, resulting in selection bias
- Potential for information bias due to the use of self-report data
- The need to recall exposure and outcome data, often over a one year period, resulting in the potential for information bias
- Concerns about generalisability from this USA based study.

The study used an observational design (level III-2 evidence), resulting in concerns about the effects of confounding. However, the study used a multivariate approach to control potential confounders and included a wide range of appropriate variables. Despite the limitations the study was generally well conducted.

Martino et al 2006

Martino et al (2006) aimed to investigate “the prospective influence of social influence and social bonding variables on the development of alcohol outcome expectancies among adolescents with and without drinking experience”. Alcohol outcome expectancies are individuals’ beliefs about the probable consequences of alcohol use. This study was set in 19 middle schools in South Dakota, USA. These schools were participating in a cluster randomised controlled trial examining the effectiveness of drug prevention programmes (termed treatment) in the curricula. The study was conducted by the same group as described in Ellickson et al (2005), although baseline measurements occurred at 8th grade rather than 7th grade as occurred in Ellickson et al.

Exposure data were measured in grade eight and the outcome data were measured in grade 9. The same approach was used as that in Ellickson et al for estimation of exposure to alcohol advertising. Data collection also included variables for drinking status, peer and adult influences and social bonding. An adapted (simplified for younger age groups) version of the alcohol expectancy questionnaire – adolescent form was used for the measurement of alcohol outcome expectancies. Confirmatory factor analysis (CFA) was used to develop the measurement model for alcohol outcome expectations. Four scores were derived related to alcohol positivity and

alcohol potency. Alcohol positivity is the tendency to rate favourable outcomes as more likely to occur when drinking than unfavourable outcomes. Alcohol potency is the tendency to rate all outcomes, regardless of valence, as likely. It reflects the belief that alcohol affects all outcomes, both good and bad. Multivariate analysis was used to assess the effect of the predictor variables measured in grade 8 on alcohol outcome expectancies in grade 9.

Exposure to alcohol advertising was not significantly associated with alcohol positivity or alcohol potency in drinkers or non-drinkers after controlling for a range of confounders. Among the non-drinkers, parent's approval was positively associated with alcohol positivity. Also in the non-drinkers, there was a negative association between alcohol potency and friends' approval, social deviance and parents' approval. Among the drinkers, peer alcohol use, and adult alcohol use were positively associated with alcohol positivity. Also in the drinkers, there was a negative association between social deviance and alcohol potency.

There were limitations to this study, including:

- Non-participation of 8% of the eligible students, and non-inclusion of 3% of the participants in the analysis. There were minor differences between the eligible and analysed populations, resulting in selection bias
- Potential for information bias due to the use of self-report data and lack of information about the validity of the outcome measure
- Concerns about generalisability from this USA based study.

The study used an observational design (level III-2 evidence), resulting in concerns about the effects of confounding. However, the study used a multivariate approach to control potential confounders and included a wide range of appropriate variables. Despite the limitations the study was generally well conducted. The study assessed alcohol outcome expectations rather than alcohol use so it is unclear how the predictor variables identified in this study affect alcohol drinking behaviour. Details of the study are presented in Table 1.

Snyder et al, 2006

This study was set in 24 USA media markets during the period 1999 to 2001. The study aimed to test whether alcohol advertising expenditure and alcohol advertising exposure affected youth alcohol consumption.

A cluster design was used, in conjunction with hierarchical modelling. Specifically, 15 to 26 year olds were selected from a group of media markets which were selected on the basis of geographical proportionality to the number of top 75 media markets in the region. Self-reported data were collected at four time points. Data collected included exposure to alcohol advertising in the previous month and quantity of alcohol consumed in the last month. Industry information was also used to estimate market alcohol advertising expenditure per capita.

Exposure to additional advertising was associated with increased alcohol consumption (rate ratio for each additional advertisement seen 1.01, 95% CI 1.01-1.02). Increased expenditure on alcohol advertising was also associated with increased consumption (rate ratio for each additional dollar spent per capita on alcohol advertising 1.03, 95% CI 1.01-1.05). Similar results were observed when restricting the analyses to

participants under 21 years at baseline. All analyses controlled for gender, age, ethnicity, school status and alcohol sales per capita.

In general, this was a well conducted study but there were significant limitations:

- There were significant sources of selection bias, including a response rate of 27%, refusal rate of 24% and significant attrition through the four data collection points with data on 31% of the baseline participants at the final data collection point. Attrition was more likely to occur among the group classified as “drinkers’ at baseline.
- Use of self report data and industry provided data (although noting the industry data is likely to result in underestimation of the association).
- Observational design (level III-2 evidence) that is susceptible to confounding, and did not control as wide a range of potential confounders as Ellickson et al).

Despite the limitations, the general methodology was sound and the use of hierarchical modelling was appropriate. Details of the study are presented in Table 1.

Table 1: Evidence tables for the consumer studies

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Stacy et al. 2004) USA	Cohort study Level III-2	<p>Study setting.</p> <p>Twenty middle schools in Los Angeles during 2000.</p> <p>Sample at baseline (n=2998) Female 51%</p> <p>Ethnicity: Hispanic 55% Asian 19% Non-Hispanic white 14% African American 2% Pacific Islander 1% Native American 1% Multi-ethnic 5% Unknown 3%</p> <p>Mean age 12.5 years</p>	<p>Study sample</p> <p>Cluster sampled population with 20 schools randomly selected from all public middle schools in Los Angeles County. All seventh grade students were invited to take part in the selected schools.</p> <p>Data collection</p> <p>Self reported questionnaires collecting: exposure information in seventh grade and outcome information in eighth grade. Schools were randomised to receive two different types of questionnaire forms. They were identical except one contained questions on advertisement recall.</p> <p>Advertising exposure:</p> <ol style="list-style-type: none"> 1. Watched TV shows Frequency of watching selected shows and weighted by the show's average monthly alcohol advertising frequency. A similar approach was used for TV sports advertising except a different scale was used due to the increased frequency of alcohol advertising during these programmes. 	<p>All estimates represent the change in odds for one standard deviation unit increase relative to the average exposure. All are based on adjusted models. OR (95% CI)</p> <p>Beer use</p> <p>Watched TV shows: 1.44 (1.27-1.61)</p> <p>Watched TV sports: 1.20 (1.05-1.37)</p> <p>Self reported frequency: 1.21 (1.04-1.41)</p> <p>Cued recall memory test: 1.17 (0.97-1.38)</p> <p>Draw an event memory test: 0.86 (0.75-0.99)</p>	<p>Limitations</p> <ul style="list-style-type: none"> • At baseline <3% of students declined to participate. • Loss to follow-up at one year (measurement of outcome): 25%. • Self-report data used, that is susceptible to misclassification • Observational study that is susceptible to confounding. Multivariate analysis conducted to control for confounding. A wide range of appropriate variables were included in the modelling though some other potential confounders were suggested by the authors • Did not consider all forms of advertising • Results had some inconsistencies across the different exposure measurements. The most valid method of measuring exposure is not clear. • The collection of "memory" data may have been susceptible to recall bias and the collection of proxy data (TV programmes) may have resulted in misclassification of exposure due to its imperfect validity. • Measurement of the outcome measures may also have been misclassified

Table 1: Evidence tables for the consumer studies (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Stacy et al. 2004) <i>continued</i>			<p>2. Self reported alcohol advertisement exposure. Based on 3 questions recalling alcohol exposure related to time spans of 1 week to 6 months.</p> <p>3. Cued recall memory test Two thirds of questionnaires contained this aspect and showed electronically captured scenes for TV commercials.</p> <p>4. Draw an event memory test. Participants were asked to draw the first advertisement that came to mind and the first two alcohol advertisements that came to mind.</p> <p>Outcome measures Current alcohol use. Questions related to consumption in the last 30 days. Prior alcohol use. Included timeframes of six months and lifetime.</p> <p>Data analysis Series of logistic regression models were fitted – including an unadjusted model, a confounder adjusted model and an interaction model.</p>	<p>Wine/liquor use Watched TV shows: 1.34 (1.17-1.52) Watched TV sports: 1.00 (0.88-1.15)</p> <p>Self reported frequency: 1.18 (0.98-1.32) Cued recall memory test: 1.07 (0.91-1.26) Draw an event memory test: 0.92 (0.81-1.03)</p> <p>Three drink episodes Watched TV shows: 1.26 (1.08-1.48) Watched TV sports: 1.07 (0.91-1.26)</p> <p>Self reported frequency: 1.06 (0.89-1.27) Cued recall memory test: 1.17 (0.91-1.44) Draw an event memory test: 0.91 (0.78-1.06)</p>	<ul style="list-style-type: none"> Unclear if the statistical analysis adjusted for the cluster design <p>Comments</p> <ul style="list-style-type: none"> Aimed to examine the impact of televised alcohol commercials in adolescents' alcohol use A strong point of the study was its use of multiple methods of exposure assessment, including both opportunity-based and memory-based measures. Memory-based methods had the advantage of actually knowing there was awareness of the advertising as opposed to opportunity based methods (such as watching TV programmes associated with alcohol advertising) where the advertisement may not have been noticed. Ethnic mix similar to that of LA County Public Schools <p>Reported conclusions (by authors). Although replication is warranted, results showed that exposure was associated with an increased risk of subsequent beer consumption and possibly other consumption variables.</p>

Table 1: Evidence tables for the consumer studies (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Ellickson et al. 2005) USA	Cohort study Level III-2.	<p>Study setting.</p> <p>Forty-one middle schools in South Dakota</p> <p>Study schools were participating in the ALERT plus field trial, which was designed to test the effectiveness of drug prevention programs. Schools were randomly assigned to one of three groups in the ALERT plus trial: control, middle school drug prevention curriculum or middle + high school drug prevention curriculum.</p> <p>ALERT plus aims to prevent students from using drugs and to give them the skills needed to translate motivation to effective resistance behaviour.</p> <p>Sample at baseline (n=3111)</p> <p>Non-drinkers: Female 47% Native American 6% Treatment 57%</p>	<p>Inclusion criteria</p> <p>Enrolled in an ALERT plus or control school</p> <p>Parents had not refused participation in the study.</p> <p>Completed survey at all three data collection points: baseline (grade 7), grade 8 media survey (source of advertising exposure), grade 9 survey (drinking behaviour over past year).</p> <p>Data collection</p> <p>Advertising variables for exposure to television advertising, in-store displays, magazine advertising and concession stand advertising. Also measured social influences, social bonds, problem behaviour, alcohol beliefs, television exposure and demographic data.</p> <p>Exposure to television alcohol advertising: used frequency of viewing televised sports and late night programmes during the preceding seven months as a proxy for exposure levels. Classified into proportion of times viewed.</p>	<p>Baseline (grade 7) non-drinkers 1206/3111 (38.8%).</p> <p>Grade 9: 48% of non-drinkers at grade 7 qualified as drinkers in grade 9 meaning 57% were drinkers in grade 9.</p> <p>Grade 7 non-drinkers</p> <p>Odds ratio (OR) between exposure to alcohol advertising and past year drinking at grade 9:</p> <p>TV: 1.05 Magazines: 1.12 ¹Concession stand: 1.06 ¹In-store: 1.42*</p> <p>Treatment program 0.59* Interaction between store and treatment program: 0.71*</p> <p>*$P < 0.05$</p> <p>Grade 7 drinkers</p> <p>Linear coefficients between exposure to alcohol advertising and past year drinking at grade 9:</p>	<p>Limitations</p> <ul style="list-style-type: none"> • 3111 of 3780 eligible students participated (82%) • Significant differences between eligible and analysed sample across gender, race/ethnicity and grades producing a selection bias, although these differences were included as a control in the multivariate analyses • Self-reported data: exposure and outcome data. Data may have been misclassified due to self-reporting. Data was also collected retrospectively (e.g. alcohol behaviour over the past year) so was susceptible to recall bias. • Misclassification may also have occurred through the imputation method used for missing data. • Measure of alcohol use differed between baseline and follow-up • Exposure to alcohol advertising does not necessarily mean notice was taken of the advertising • Observational study that is susceptible to confounding. Multivariate analysis conducted to control for confounding. A wide range of appropriate variables were included in the modelling.

¹ These results differ from those presented in the original reference. The corrected results were presented in a subsequent corrigenda.

Table 1: Evidence tables for the consumer studies (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Ellickson et al. 2005) <i>continued</i>		Drinkers: Female 54% Native American 6% Treatment 57%	Exposure to magazine advertising. Assessed by using exposure to six magazines using a five point scale. Exposure to concession stands. Shown a photograph of a beer concession stand and were asked how many times they had seen such a place in the past year. A seven point scale was used. In-store displays. Similar approach was used to that for concession stands. Outcome measures Drinking status (baseline): non-drinkers versus drinkers Drinking status at follow up: frequency of alcohol use in the past year: none, one-two times, three – 10 times, 11-20 times, > 20 times.	TV: -0.01 Magazines: 0.10* Concession stand: 0.02 In-store: 0.09* Treatment -0.23* * $P < 0.05$ Both models controlled for treatment program, television habits, other drinking predictors, social context, bonds with family, school and religion, attitudes and behaviour and demographic factors.	Comments <ul style="list-style-type: none"> Aimed to examine the relationship between different forms of alcohol advertising and subsequent drinking among USA adolescents and assess whether exposure to alcohol/drug prevention programs mitigates any such relationship Study design allowed evaluation of participation in the ALERT plus program as a mitigating factor to exposure to alcohol advertising Reported conclusions (by authors). Several forms of alcohol advertising predict adolescent drinking; which sources dominate depends on the child's prior experience with alcohol. Alcohol prevention programs and policies should help children counter alcohol advertising from multiple sources and limit exposure to these sources.

Table 1: Evidence tables for the consumer studies (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Martino et al. 2006) USA	Cohort study Level III-2.	<p>Study setting. Nineteen middle schools in South Dakota</p> <p>Study schools were participating in the ALERT plus field trial, which was designed to test the effectiveness of drug prevention programs. Schools were randomly assigned to one of three groups in the ALERT plus trial: control, middle school drug prevention curriculum or middle + high school drug prevention curriculum.</p> <p>ALERT plus aims to prevent students from using drugs and to give them the skills needed to translate motivation to effective resistance behaviour.</p> <p>Sample (n=1410) Male 51% Average age 13.9 at the grade 8 survey</p> <p>Race/Ethnicity: White 84% Native American 11%</p>	<p>Inclusion criteria 8th grade students Enrolled in a school participating in the ALERT plus trial Parents granted permission Attended a control school during grades 8 and 9. Surveys completed in grades 8 and 9.</p> <p>Data collection In school surveys administered by trained staff at grades 8 and 9.</p> <p>Alcohol outcome expectancies. Adapted the Alcohol expectancy questionnaire-adolescent form. The questionnaire was simplified as it was also completed by younger children. A final set of 27 items were included with approximately equal numbers of positive and negative outcomes.</p> <p>Drinking status at grade 8 – measured with two questions</p> <p>Exposure to alcohol advertising: measured as per Ellickson et al above.</p>	<p>Alcohol positivity at grade 9 (tendency to rate favourable outcomes as more likely to occur when drinking than unfavourable outcomes). -On multivariate analysis there were no significant associations, among drinkers or non-drinkers from the advertising variables or the social bonding variables measured at grade 8. -parent's approval among non-drinkers was positively associated with alcohol positivity ($P<0.05$). - Among the drinkers, frequency of alcohol use, peer alcohol use and adult alcohol use were associated with alcohol positivity (all $P<0.05$).</p> <p>Alcohol potency (tendency to rate all outcomes, regardless of valence, as likely. Reflects the belief that alcohol affects all outcomes, both good and bad).</p>	<p>Limitations</p> <ul style="list-style-type: none"> • 1410 of 1527 eligible students participated (92%) • Compared to the eligible sample, the analysis sample had slightly smaller proportions of non-whites and students with grades of C or below. • 45 participants (3.2% of all participants) were excluded from analyses due to their wide variation from the mean on the CFA expectancy scales (four factor scores were estimated for each person and the group excluded were more than 3 standard deviations from the mean on at least one of these scores) • Observational study that is susceptible to confounding. Multivariate analysis conducted to control for confounding. A wide range of appropriate variables were included in the modelling. • Validity of the outcome measure is unclear • Note outcome measure was alcohol expectancy rather than alcohol use • Self-report data used, that is susceptible to misclassification

Table 1: Evidence tables for the consumer studies (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Martino et al. 2006) <i>continued</i>			<p>Peer and adult influences – measured with four items – using measures of being around people drinking and issues about approval.</p> <p>Social bonding – measure school bonds, family bonds and religiosity bonds.</p> <p>Outcome measures Alcohol outcome expectancy</p> <p>Analysis Used confirmatory factor analysis (CFA) to develop a measurement model of the expectancy scale. Modelled the 9th grade expectancy measure identified from CFA against the range of predictors documented under data collection. Model fitted using maximum likelihood methods. Within school covariance matrix created to reduce the effects of school based clustering. Attrition weights developed to control for biases resulting from attrition between grades 8 and 9. Multiple imputation used for missing data.</p>	<p>On multivariate analysis there were no significant associations, among drinkers or non-drinkers from the advertising variables measured at grade 8</p> <p>Among the non-drinkers, friends' approval, social deviance (all $P < 0.05$) and parents' approval ($P < 0.01$) were all negatively associated with alcohol potency.</p> <p>Among the drinkers, social deviance was negatively associated with alcohol potency ($P < 0.05$).</p> <p>All analyses controlled for age relative to peers, gender, race, type of family (nuclear versus other), total TV viewing and frequency of alcohol use.</p>	<ul style="list-style-type: none"> Exposure to alcohol advertising does not necessarily mean notice was taken of the advertising Did not consider all forms of advertising <p>Comments</p> <p>Aimed to investigate the prospective influence of social influence and social bonding variables on the development of alcohol outcome expectancies (individuals' beliefs about the probable consequences of alcohol use) among adolescents with and without drinking experience</p> <p>Conducted by the same group as Ellickson et al above.</p> <p>CFA approach followed a recommended process</p> <p>Reported conclusions (by authors).</p> <p>These findings suggest that attempts to alter adolescents' alcohol expectancies are likely to fail unless they address the influence of immediate social models on these beliefs.</p>

Table 1: Evidence tables for the consumer studies (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Snyder et al. 2006) USA	Cohort study Level III-2.	<p>Study setting.</p> <p>Households in 24 USA media markets, April 1999 to February 2001.</p> <p>Sample</p> <p>Interviewing occurred in four waves: sample size was 1872, 1173, 787 and 588 across the four waves.</p> <p>Drink in past month (baseline): 60.8% Drinkers under 21 years among those under 21 years 49.3% Male 51.2%</p> <p>Age at baseline: <18 years: 27.0% 18-<21: 25.0% 21-<23: 16.0% 23-26: 32.0%</p> <p>Education at baseline: In high school: 28.0% In college: 31.0% Not in school: 41.0%</p>	<p>Sampling</p> <p>Individuals aged 15-26 years randomly sampled from 24 USA Nielsen media markets. Markets were selected so that each geographic region in the sample was proportional to the number of top 75 media markets in the region. Priority was given to markets with industry data on radio and billboards, otherwise selection was random. Households within markets were systematically sampled from randomly selected households (that had a telephone). Within a household, the youth with the most recent birthday was selected.</p> <p>Data collection</p> <p>Interviewed (computer assisted telephone interviewing) four times over 21 months.</p> <p>Main exposure measures were market alcohol advertising expenditures per capita (purchased industry data on amount spent on alcohol advertisements) self-reported alcohol advertising exposure in the prior month (measured by asking about exposure to television, radio, magazine or billboard alcohol advertising)</p>	<p>All age groups</p> <p>Association between alcohol advertisement exposure and average alcohol consumption (event rate ratio, 95% CI) Each additional advertisement seen: RR 1.01 (1.01-1.02)</p> <p>Association between alcohol advertising spending and average alcohol consumption (event rate ratio, 95% CI) Each additional dollar spent per capita on alcohol advertising: RR 1.03 (1.01-1.05)</p> <p>< 21 years</p> <p>Association between alcohol advertisement exposure and average alcohol consumption in < 21 age group (event rate ratio, 95% CI) Each additional advertisement seen: RR 1.01 (1.00-1.02)</p>	<p>Limitations</p> <ul style="list-style-type: none"> Self-reported data: exposure and outcome data. Data may have been misclassified due to self-reporting. Data was also collected retrospectively (e.g. alcohol behaviour over the past month) so was susceptible to recall bias. However, it was less susceptible to recall bias than Ellickson et al, due to the shorter timeframe of interest (1 month compared with 1 year) Accuracy of the industry data on amount spent on alcohol advertising was unclear – however, is likely to result in underestimation of the effect if any bias exists Observational study that is susceptible to confounding. Multivariate analysis conducted to control for confounding. A wide range of appropriate variables were included in the modelling. Sample selection procedure may have produced a sample that was not representative of the USA population Response rate at baseline was 27% and refusal rate was 24% producing a further selection bias.

Table 1: Evidence tables for the consumer studies (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Snyder et al. 2006) <i>continued</i>			<p>Outcome measures</p> <p>Self reported number of alcoholic drinks consumed in the prior month.</p> <p>Average quantity of consumption and maximum quantity of consumption were also assessed over the same time period. Alcohol use was estimated by multiplying drinking frequency by the mean of the average and maximum consumption (number of glasses).</p> <p>Analysis</p> <p>Data weighted at baseline by age, gender and market to reflect the USA population aged 15 to 26 years. Multilevel modelling used to handle the complex sampling and repeated measures design Three levels of analysis were used: observations, individuals and markets. A poisson sampling model was used with a log-linear function. The analysis was repeated for the subset under 21 years.</p>	<p>Association between alcohol advertising spending and average alcohol consumption in < 21 age group (event rate ratio, 95% CI)</p> <p>Each additional dollar spent per capita on alcohol advertising: RR 1.03 (1.00-1.06)</p> <p>Multilevel model controlled for gender, age, ethnicity and school status, alcohol sales per capita (entered at level 3).</p>	<ul style="list-style-type: none"> • Significant attrition across the four waves, although most was due to loss to follow-up rather than refusal. Drop-outs consumed more alcohol at baseline • Exposure to alcohol advertising does not necessarily mean notice was taken of the advertising • Did not consider all forms of advertising <p>Comments</p> <ul style="list-style-type: none"> • Study aimed to test whether alcohol advertising expenditures and the degree of exposure to alcohol advertisements affect alcohol consumption by youth. • Analysis of the unconditional model showed the largest share of variance in alcohol use was within individuals (81%), reinforcing the importance of focussing on individuals. • The study used a relatively large national sample <p>Reported conclusions (by authors). Alcohol advertising contributes to increased drinking among youth.</p>

Econometrics paper

Saffer et al (2002) produced an econometrics study that aimed to examine the relationship between alcohol advertising bans and alcohol consumption. The study used data collected over a 26 year period from 20 OECD countries. A pooled time series design was used. Two structural equations were created: one related alcohol demand to price of alcohol, income and other variables (e.g. culture and advertising bans) and the second related the legislation of alcohol bans to alcohol consumption, exogenous attitudes and the economic importance of alcohol.

Both partial advertising bans and total advertising bans reduced alcohol consumption at the 10% significance level. Results from the total advertising ban equation implied that increased alcohol consumption would be associated with more total advertising bans.

Econometric papers have recognised limitations. The research designs presented under consumer research represent stronger designs. Limitations of this specific study included:

- Potential sources of misclassification
- Highly susceptible to confounding
- Use of highly aggregated data resulting in an inability to study subgroups of the population
- Reliance on a range of assumptions
- Of necessity, structural equations presented a simplistic picture of all factors contributing to the outcomes of interest
- No sensitivity analyses
- Use of the 10% level of significance rather than the more conventional 5%.

Details about this paper are presented in Table 2.

Table 2: Evidence table for the econometrics study

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Saffer and Dave 2002) Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, UK, USA.	Pooled time series design	Study setting. Used data from 20 countries over 26 years (1970-1995). Sample	Inclusion criteria Data available from OECD countries over the period 1970-1995. Data collection Natural logarithm of per capita annual consumption of pure alcohol (litres) provided by Brewers Association of Canada (BAC). Number of alcohol advertising bans enacted in each country. Alcohol price estimated by dividing private final alcohol expenditures by pure alcohol consumption. Data provided by BAC. Real income estimated by dividing GDP by population. Economic value estimated by considering annual production of beer and wine (and divided by the population). Public attitudes towards intervention used several measures, including number of media from which cigarette advertising is banned, percentage of total health spending paid by the government, percentage of GDP which is spent by the government.	Partial advertising bans Partial alcohol advertising bans reduced alcohol consumption at the 10% level (when controlling for alcohol price, real income and alcohol culture). Results from the partial advertising ban equation imply alcohol consumption does not affect the number of partial bans. Total advertising bans Total alcohol advertising bans reduced alcohol consumption at the 10% level (when controlling for alcohol price, real income and alcohol culture). Results from the total advertising ban equation imply increased alcohol consumption will be associated with more total alcohol advertising bans.	Limitations <ul style="list-style-type: none"> • Data on alcohol consumption provided by industry • Countries that have limits on the times advertising of alcohol is permitted were classified as having no alcohol bans. This is the most appropriate means of dealing with this time of restriction (based on evidence) but may produce a misclassification bias. Most data provided by the same source as alcohol consumption data. • The appropriateness of the measures used for estimating the public attitude measure is unclear. • Observational study susceptible to confounding • Limited documentation of statistical significance testing and made use of significance at the 10% level rather than the usual 5% level • No information is provided on population subgroups of interest. • Relies on the in-built assumptions inherent in the models used • Advertising bans are likely to receive much media attention, which may result in increased consumption • No sensitivity analyses presented.

Table 2: Evidence table for the econometrics study (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(Saffer and Dave 2002) <i>continued</i>			<p>Alcohol culture variable. Used the percentage of all alcohol consumed as wine and beer as a measure – with a low percentage being associated with drinking to achieve intoxication.</p> <p>Analysis</p> <p>Two structural equations used in a time series approach. Equation 1: related alcohol demand to price of alcohol, income and other variables (e.g. culture/ and advertising bans.</p> <p>Equation 2: related the legislation of alcohol bans to alcohol consumption, exogenous attitudes and the economic importance of alcohol.</p>		<p>Comments</p> <ul style="list-style-type: none"> • Aimed to empirically examine the relationship between alcohol advertising bans and alcohol consumption • Two structural equations used to overcome difficulties associated with endogenous links between advertising bans and alcohol consumption (e.g. level of consumption and social ills may be associated with the introduction of new bans). • Methods were employed to reduce the possible effects of serial correlation in this time series analysis <p>Reported conclusions (by authors). Alcohol advertising bans decrease alcohol consumption.</p> <p>Alcohol consumption has a positive effect on the legislation of alcohol bans. An increase of one ban could reduce alcohol consumption by 5-8%. Alcohol price elasticity is estimated at about 0.2. Recent exogenous decreases in alcohol consumption will decrease the probability of enactment of new bans and undermine the continuance of existing bans.</p>

Qualitative study

A New Zealand based, qualitative study was provided (McCreanor et al. 2005). This study aimed to promote debate around the interweaving of marketing and the self-making practices of young people and as a result stimulate public health responses to this complex threat. Data were collected in focus groups from both event-related and affinity group sessions. The latter typically included 3-5 participants over three meetings. Participants were aged 14-18 years. The interviews were audiotaped, transcribed and back checked. The data were thematically coded and analysis was kept “light handed”.

Three themes were identified:

1. Participants actively engaged with alcohol marketing and frequently discussed sophisticated understandings of youth culture which were reflected in the alcohol advertising.
2. Participants demonstrated identification with marketing and brands at social and personal levels.
3. Participants had varied ways of adopting alcohol identities for use in personal and social settings.

There were limitations to the study:

- The sampling strategy was unclear. In particular, it was not clear to what extent diverse views would be identified through the sampling strategy adopted.
- The impact of the researchers on the researched was not clear – there was no description about the research workers conducting the focus groups.
- Focus groups tend to be produce more superficial data than other qualitative methods.
- Transcripts appeared to focus on drinkers – there were no obvious views from non-drinkers.

The study is presented in Table 3.

Table 3: Evidence table of qualitative research

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(McCreanor et al. 2005) New Zealand	Focus groups	Sample Over 250 participants at the time of reporting.	<p>Sample selection</p> <p>Focus group data from event related and ongoing affinity-group sessions since 2003. Event related data collected from groups of friends following youth social events. Affinity group sessions constituted groups of 3-5 friends matched by age, ethnicity and gender. Participants aged 14-18 years. Recruited from networks of the research team.</p> <p>Included both "indigenous Maori and settler Pakeha."</p> <p>Data collection</p> <p>Affinity groups met on three occasions. Used open-ended interviews as a start point. Interviews audiotaped, transcribed and back checked with the audiotape.</p> <p>Analysis</p> <p>Data were thematically coded to highlight the action orientation and meaning making in accounts of identity and marketing. Attempted to keep the analyses "light handed" to avoid rendering interpretations gratuitous and potentially patronising.</p>	<p>Engagement</p> <p>Participants actively engaged with marketing. Frequently discussed sophisticated understandings of youth cultures. This understanding is reflected in their communication about alcohol marketing, ranging from analytic to collaborative interrogation and puzzling.</p> <p>Identification</p> <p>Participants demonstrated identification with marketing and brands at social and personal levels. They understood that they were campaign targets. They valued scenarios from specific advertisements as accurate representations of youth interests and culture.</p>	<p>Limitations</p> <ul style="list-style-type: none"> • Unclear if the sampling strategy resulted in a broad cross section of views. • Focus group size relatively small, which may have impacted on group dynamics. • Lack of transcripts from non-drinkers • No apparent testing of the validity of the results • No information provided about the research workers conducting the focus groups. It was unclear if any steps were taken to increase the reliability of the data collected, such as repeating information collection with another research worker. The relationship between the researcher and the researched is not considered. • Focus groups tend to be more superficial than more in-depth interviewing methods • Details lacking on how the thematic analysis was conducted

Table 3: Evidence table of qualitative research (continued)

Authors Country	Study Design	Sample and Interventions	Methods	Results	Limitations and Conclusions
(McCreanor et al. 2005) <i>continued</i>				<p>Consuming identities</p> <p>Participants had varied ways of adopting alcohol identities for use in personal and social settings. These included the playful use of identities and unwanted thoughts by others.</p>	<p>Comments</p> <ul style="list-style-type: none"> • Aimed to promote debate around the interweaving of marketing and the self-making practices of young people and as a result stimulate public health responses to this complex threat • Qualitative research is an appropriate method to apply in this research area <p>Reported conclusions (by authors).</p> <p>As a strongly embedded and strongly addictive substance, alcohol is no ordinary commodity, and our concern, supported by the data, is that the evident proliferation of the marketing of alcohol identities has been highly successful. We would argue that the complexity and power of the developments we have discussed represent a growing threat particularly to the well-being of our young people, and pose a profound challenge to existing regulatory frameworks and public health strategies.</p>

Review articles

A report was presented by the Foundation for Advertising Research (Foundation for Advertising Research Undated). The report reviews factors that influence youth drinking behaviour, considers the role of marketing and explores some regulatory responses. The review set out to “locate published refereed journal articles that reported the findings of academically rigorous and relevant research in the topic area.” It was restricted to literature published from 2000-2005, although a selection of older, seminal papers were also included where appropriate. Unfortunately, the methodology was poorly described and did not present any of the following details:

- Databases searched
- Selection criteria
- Method of assessing study quality
- Method of extracting data and critically appraising the literature.

These limitations result in difficulty assessing the appropriateness of the studies selected. It is therefore not possible to assess whether significant research was omitted in this review. Therefore, bias in the overall flavour of the report cannot be ruled out. There were also some concerns about interpretation in the second part of this review. In this section, 15 studies were selected for further description. A further four articles and four government reports were also added. Results were presented in the form of tables. The strengths and weaknesses described for each paper were rather subjective and did not describe potential types of bias. The author(s) also considered validity/reliability issues but strangely considered this to be not applicable to some selected papers (particularly literature reviews).

While the report concludes that the literature is still divided as to whether advertising actually influences young people to drink earlier and more frequently a systematic review with a detailed description of the study methods, more detailed results (including critical appraisal of the selected studies) and making use of robust methodology would be required to have confidence in this conclusion. It would therefore not be appropriate to form any conclusions based on this review. In NZHTA’s normal methodology systematic reviews are included in our reviews; however, this study would be excluded based on lack of clarity concerning the review methodology. An evidence table has not been presented for this report given the limitations of the study.

As a narrative review, Hastings et al (2005) has the same limitations as the review by the Foundation for Advertising Research, though some useful background material is presented. The authors divided the relevant research into two categories:

1. Econometric studies. Examines the relationship between overall levels of alcohol consumption (usually in terms of sales) with overall levels of advertising (usually in terms of expenditure).
2. Consumer studies. Examines how people’s drinking knowledge, attitudes and behaviour vary with their exposure to alcohol advertising.

Hastings et al observed a range of limitations associated with econometric studies including some that were controlled by Saffer (2002) in the study described above and others that were not controlled. The major problem that Saffer overcame is the lack of variation in exposure, which is thought to explain the lack of effect on alcohol consumption in a lot of these studies. Hastings also observed that with the use of

aggregated data, there is little information provided on the impact of advertising in subgroups of interest (such as adolescents).

Hastings et al also observed limitations with different consumer study designs. A limitation that has relevance to the consumer studies reviewed in this report related to the important difference between simply being exposed to an advertisement and actually taking notice of it. While this criticism was levelled at other research, it applies equally to the studies included under consumer studies (Ellickson et al. 2005; Martino et al. 2006; Snyder et al. 2006) in this report, in that exposure but not attention was estimated.

Another interesting issue that is apparent in the Hastings et al review related to the lack of consistency in research findings in the studies reviewed. While there are clear reservations about the review methodology, and in particular, doubts about the scope of relevant studies that have been included in this review, this lack of consistency is an issue to bear in mind. For example, they cite the study by Ellickson et al that is included in this report and note that there was no association observed between exposure to TV alcohol advertising and subsequent alcohol consumption whereas in a study by Stacy et al, such an association was observed. There are a wide range of potential reasons for this discrepancy relating to particular design issues used in the two studies.

Despite the discrepancies, Hastings concluded that the consumer studies suggested a link between advertising and young people's drinking. However, given the limitations of this review, it would be important to exercise caution before taking these conclusion at face value. Particular issues include lack of detail on:

- Databases searched
- Selection criteria
- Method of assessing study quality
- Method of extracting data and critically appraising the literature.

Therefore, the robustness of the review cannot be clarified. As with the review by the Foundation for Advertising Research, this study would normally be excluded from appraisal due to the lack of clarity about the review methodology. For this reason, an evidence table is not presented for this review.

The third review was more robust (Cooke et al. 2002). This review aimed to examine the evidence about the effects of alcohol advertising and marketing on the amount and/or pattern of young people's drinking. Databases searched and search terms used were well described. The sources searched were appropriate.

Three main sections were presented: econometric studies, consumer studies and other marketing tools. There was little association found between advertising exposure and alcohol consumption in the econometric studies, although the authors note significant flaws in these studies. The consumer studies clarified the complex nature of associations in this field. They suggested a two way relationship probably exists: advertising encourages targeted drinkers to drink and drinking will encourage attention to advertising by those consumers. The evidence base around other marketing tools was less developed but the authors suggested the need for concern over these other approaches, which include new product development, pricing, distribution, sponsorship and new media campaigns.

There were limitations to the review:

- Study selection criteria, data extraction and critical appraisal methods were not described
- Some industry data were not included due to the high cost involved.

More detail about this review is presented in Table 4.

Table 4: Evidence table of systematic reviews

Authors Country	Study Design	Data sources Search terms	Study selection Data extraction	Results	Limitations and Conclusions
(Cooke et al. 2002)	Systematic review	<p>Data sources</p> <p>Electronic databases</p> <p>PsychINFO, Biological and Medical Sciences, Embase, ISI Social Science Citation Index/Web of Science, Social Sciences Index, Ingenta, IBSS, Emerald, Sociological Abstracts.</p> <p>Organisations with an interest in alcohol</p> <p>Health Promotion Library Scotland, WHO Library Database, Marin Institute for the Prevention of Alcohol and other Drug Problems, Centre for Health Economic, National Institute on Alcohol Abuse and Alcoholism, Eurocare – Advocacy for the prevention of Alcohol Related Harm in Europe, The Centre for Science in the Public Interest, JustDrinks.com, BBC news online, World Advertising Research Centre, Reuters, Datamonitor, Mad.co.uk, The Amsterdam Group, Alcohol companies' own corporate sites</p> <p>Charities and International academics</p>	<p>Inclusion criteria</p> <p>Not documented</p> <p>Data extraction</p> <p>Methods not documented</p> <p>Data analysis</p> <p>Methods nor documented</p>	<p>Econometric studies</p> <p>Most found little or no effect in the relationship between alcohol consumption and overall levels of advertising. However, major flaws were noted and had the limitation of providing no insight into the association among young people.</p> <p>Consumer studies</p> <p>Focussed on the young. Many, including the more recent studies, point to a link between advertising and young people's drinking behaviour. Complex relationships are revealed. Probable that a two way relationship exists: advertising encourages targeted drinkers to drink and drinking will encourage attention to advertising by those consumers.</p>	<p>Limitations</p> <ul style="list-style-type: none"> • Some industry sources could not be used due to the cost of data • No description of selection criteria, and methods of data extraction and appraisal • There may be significant research since this review was published (2002) <p>Comments</p> <ul style="list-style-type: none"> • Examines the evidence about the effects of alcohol advertising and marketing on the amount and/or pattern of young people's drinking • The study examined sources from both developed and developing and transitional societies

Table 4: Evidence table of systematic reviews (continued)

Authors Country	Study Design	Data sources Search terms	Study selection Data extraction	Results	Limitations and Conclusions
(Cooke et al. 2002) <i>continued</i>		Search terms Electronic databases searched using the following terms: alcohol, marketing, product design, drinks industry, price, venue, advertising, promotion, new product development, sponsorship, targeting, young people, adolescents, packaging, communications, internet.		Other marketing tools Limited evidence base but suggested worrying signs related to five tools examined: new product development, pricing, distribution, sponsorship and new media campaigns.	Reported conclusions (by authors). Disentangling the relationship between alcohol marketing and young people's drinking is extremely difficult. Complex and powerful dynamics exist and vested interest clouds the debate. It is also clear that there are many gaps in the literature, and much more research is needed. Nonetheless, there is evidence that advertising is at least reinforcing drinking among the young, and that more direct marketing efforts, such as new product development and promotional pricing schemes, are connected with increased and problematic consumption. Certainly, there is enough evidence to refute the alcohol industry claim that their marketing does no more than encourage brand switching.

Discussion

Nine studies were provided for consideration. These studies covered a range of different designs, including an econometric study, consumer studies, a qualitative study and reviews.

A range of questions are of interest in relation to the influence of alcohol advertising on alcohol intake:

1. Does advertising influence non-drinkers to start drinking?
2. Does advertising influence the level of intake of alcohol amongst drinkers?
3. Does drinking generate positive attitudes to alcohol advertising?
4. What is the relative impact of television advertising when compared with other factors such as peer and parental approval and price?

In the papers provided, one study provided data that were consistent with advertising influencing drinkers to start drinking (Ellickson et al. 2005). The econometrics study also suggested alcohol advertising was consistent with increased consumption, but the nature of this study type does not allow any conclusions on whether this is due to new drinkers or increased consumption among existing drinkers or both (Saffer and Dave 2002). One of the consumer studies also had similar considerations (Snyder et al. 2006). One other consumer study produced inconsistent results in the relationship between exposure to alcohol advertising on TV and subsequent alcohol consumption within the study (due to differences across different measures of exposure). However, the results generally supported a positive association between exposure to alcohol advertising and subsequent alcohol consumption. There were insufficient data presented to determine if this relationship was with new drinkers or increased consumption among existing drinkers or both (Stacy et al. 2004).

There were more data supporting the hypothesis that exposure to alcohol advertising influenced the level of intake amongst drinkers. Similar results applied to existing drinkers as those under non-drinkers above. The qualitative study also provided useful material relating to issues of engagement, identification and consumer identities in relation to alcohol advertising (McCreanor et al. 2005).

There was also some agreement with drinking generating a positive attitude to alcohol advertising. This was evident in the qualitative study (McCreanor et al. 2005) and was also commented on in the systematic review (Cooke et al. 2002).

Finally, there was no direct evidence relating to the role of other non-advertising factors and alcohol intake but one study provided useful material examining the association between such factors and alcohol outcome expectancies. In this study, the results were consistent with peer and adult approval being more important determinants of alcohol outcome expectancies than exposure to alcohol advertising. If a direct relationship exists between alcohol outcome expectancies and alcohol intake, this finding is a useful one.

Despite the above results a number of cautions should be applied. There were limitations to the papers provided and these are outlined throughout this report. It was also apparent from the review articles and one of the consumer studies that this is a field with inconsistent study findings. In relation to robustness, there is considerable

variation in the quality of the papers selected. It is unfortunate that the review papers are problematic. The best of the reviews was published in 2002 so it is likely that useful research has been published since that time. NZHTA are planning a literature search to identify any other relevant research beyond 2002.

References

- Cooke, E., Hastings, G., & Anderson, S. (2002). Desk research to examine the influence of marketing and advertising by the alcohol industry on young people's alcohol consumption. Glasgow: University of Strathclyde Centre for Social Marketing.
- Ellickson, P. L., Collins, R. L., Hambarsoomians, K., & McCaffrey, D. F. (2005). Does alcohol advertising promote adolescent drinking? Results from a longitudinal assessment. [erratum appears in *Addiction*. 2005 Aug;100(8):1201]. *Addiction*, 100, 235-246.
- Foundation for Advertising Research (Undated). Examining the influence of liquor advertising on youth behaviour: a review of the academic literature 2000-2005: The Foundation.
- Hastings, G., Anderson, S., Cooke, E., & Gordon, R. (2005). Alcohol marketing and young people's drinking: a review of the research.[see comment]. *Journal of Public Health Policy*, 26, 296-311.
- Martino, S. C., Collins, R. L., Ellickson, P. L., Schell, T. L., & McCaffrey, D. (2006). Socio-environmental influences on adolescents' alcohol outcome expectancies: A prospective analysis. *Addiction*, 101, 971-983.
- McCreanor, T., Barnes, H. M., Gregory, M., Kaiwai, H., & Borell, S. (2005). Consuming identities: Alcohol marketing and the commodification of youth experience. *Addiction Research and Theory*, 13, 579-590.
- National Health and Medical Research Council (1999). A guide to the development, implementation and evaluation of clinical practice guidelines. Canberra: NHMRC.
- National Health and Medical Research Council (2000). How to use the evidence: assessment and application of scientific evidence. Canberra: NHMRC.
- Saffer, H., & Dave, D. (2002). Alcohol consumption and alcohol advertising bans. Bans on alcohol advertising decrease consumption of alcohol. *Applied Economics*, 34, 1325-1334.
- Snyder, L. B., Milici, F. F., Slater, M., Sun, H., & Strizhakova, Y. (2006). Effects of alcohol advertising exposure on drinking among youth.[see comment]. *Archives of Pediatrics & Adolescent Medicine*, 160, 18-24.
- Stacy, A. W., Zogg, J. B., Unger, J. B., & Dent, C. W. (2004). Exposure to televised alcohol ads and subsequent adolescent alcohol use. *American Journal of Health Behavior*, 28, 498-509.

Appendix 1 NHMRC levels of evidence

Study Quality Assessment

The strength of the evidence presented in the selected studies will be assessed and classified using the dimensions of evidence defined by the National Health and Medical Research Council (National Health and Medical Research Council 2000). The three sub-domains (level, quality and statistical precision) are collectively a measure of the strength of the evidence (see Table 5). These are derived directly from the literature identified as informing a particular intervention. The designations of the levels of evidence are shown in Table 6.

Table 5 Strength of evidence

Strength of evidence	Definition
Level	The study design used, as an indicator of the degree to which bias has been eliminated by design.*
Quality	The methods used by investigators to minimise bias within a study design.
Statistical precision	The <i>p</i> -value or, alternatively, the precision of the estimate of the effect. It reflects the degree of certainty about the existence of a true effect.

*See Table 2

Table 6 Designations of levels of evidence*

Level of evidence	Study design
I	Evidence obtained from a systematic review of all relevant randomised controlled trials
II	Evidence obtained from at least one properly-designed randomised controlled trial
III-1	Evidence obtained from well-designed pseudorandomised controlled trials (alternate allocation or some other method)
III-2	Evidence obtained from comparative studies (including systematic reviews of such studies) with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group
III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group
IV	Evidence obtained from case series, either post-test or pre-test/post-test

*Modified from (National Health and Medical Research Council 1999).