

The Impacts of Liquor Outlets  
in Manukau City  
Report No. 1  
A review of the international academic  
literature and New Zealand media reports

Alcohol Advisory Council of New Zealand

JANUARY 2012



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## ABSTRACT

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There has been significant recent debate over the impacts of liquor outlets on communities in New Zealand. This report reviews two sides to the published debate on the impacts of liquor outlets: the international academic literature and New Zealand media reports. The level of concern about the issue of liquor outlet density is clear from the media review as well as discussions with stakeholders in the community. However, there is a lack of consensus in the academic literature about the nature and extent of any relationship between liquor outlets and outcome variables such as crime statistics – these relationships are likely to be highly context specific. This suggests that further research is needed at a local level in order to investigate whether a relationship exists between liquor outlet density and alcohol-related harms in each location.

**Keywords:** liquor outlets, density, impacts, alcohol, New Zealand

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## LINKS TO OTHER REPORTS

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This is the first report in a series of five reports commissioned by ALAC in partnership with Manukau City. The research was undertaken by researchers from the University of Waikato between 2008 and 2011. The five reports in The Impacts of Liquor Outlets series are:

- Report 1 – A review of the international academic literature and New Zealand media reports (this report)
- Report 2 – Community stakeholder views on the impacts of liquor outlets in Manukau City
- Report 3 – The spatial and other characteristics of liquor outlets in Manukau City
- Report 4 – A spatial econometric analysis of selected impacts of liquor outlets in Manukau City
- Summary report – The impacts of liquor outlets in Manukau City (revised January 2012).

The summary report was initially released in March 2010. That report provided short summaries of the content of the main reports cited above. The summary provided for Report 4 contained a preliminary analysis of the impacts. Since the release of the summary report, the authors have presented the preliminary findings at a number of conferences and received additional peer review and feedback on the methodology. The summary report has been revised and re-released (January 2012) with updated information from Report 4.



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## EXECUTIVE SUMMARY

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There has been significant recent debate over the impacts of liquor outlets on communities in New Zealand. Alcohol-related harm is often linked to the availability of alcohol. Greater availability of alcohol (e.g. through higher density of liquor outlets) is posited to lead to higher consumption of alcohol, which in turn leads to negative social outcomes. Consensus is that this has arisen because of the liberalisation of the sale of alcohol following the Sale of Liquor Act 1989, which allowed the sale of wine in supermarkets and grocery outlets and generated a significant increase in the number of outlets supplying alcohol. There is currently little specific empirical evidence for or against further changes to licensing laws, other than relatively general research related to the availability of alcohol. Indeed, the local community is seeking an evidence base to support liquor licensing changes (McNeill et al., 2012). The community's need for strong empirical evidence underlines the need for research in this area to be undertaken.

This report therefore has two aims: (i) to review the international academic literature on the impacts of liquor outlets and in particular the impacts of liquor outlet density; and (ii) to review the New Zealand media reports related to the impacts of liquor outlets. The academic literature and media reports represent two sides to the published debate on the impacts of liquor outlets.

Overall, the international academic literature provides mixed results for the relationship between liquor outlet density and a range of outcome variables. While some studies have clearly shown negative consequences associated with liquor outlets, others have failed to show any significant effects. The wide range of results and methodologies employed makes it difficult to arrive at general conclusions about the relationship between liquor outlet density and outcome variables. Further, it is likely that these relationships are highly context specific, as well as varying temporally, spatially and by the type of outlet considered.

In media reports, three main themes emerged in relation to liquor outlets. Firstly, the dominant view was that there were too many outlets, at least in the communities under discussion. Secondly, various concerns were reported about the distribution of outlets: that they are clustered in areas of deprivation; that such clustering promotes price competition and longer opening hours, both of which increase problem drinking; and that locating outlets near schools is particularly problematic. Thirdly, media reports suggest a strong desire for local controls over the granting of liquor licences.

The level of concern about the issue of liquor outlet density is clear from the media review, as well as discussions with stakeholders in the community (see McNeill et al., 2012). However, there is a lack of consensus in the academic literature about the nature and extent of any relationship between liquor outlets and outcome variables such as crime statistics – these relationships are likely to be highly context specific. This suggests that further research is needed at a local level in order to investigate whether a relationship exists between liquor outlet density and alcohol-related harms in each location.



# 1 INTRODUCTION

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Alcohol misuse can harm the drinker themselves and people other than the drinker, and has negative consequences for wider society (Devlin et al., 1997; Scarpitt et al., 1997; Gmel and Rehm, 2003). Alcohol has been shown to place a considerable burden on New Zealand society (Connor et al., 2005).

Alcohol-related harm is often linked to the availability of alcohol. Indeed, most studies of the impacts of liquor outlets use 'availability theory', where negative social outcomes are linked directly or indirectly to the availability of alcohol (e.g. see Gruenewald et al., 1993). This theoretical position potentially ignores part of the causal chain, where greater availability of alcohol (i.e. through higher density of liquor outlets) leads to higher consumption of alcohol, which in turn leads to negative social outcomes. Greater density of liquor outlets may lead to higher consumption of alcohol due to decreases in the 'delivered price' of alcohol, which varies by location and socio-economic group. Higher density of outlets increases competition and reduces the monetary price as well as the non-monetary costs (e.g. travel time) associated with purchasing alcohol.

There are other potential explanations for a causal link between alcohol outlet density and negative social outcomes. For instance, concentrations of alcohol outlets may attract antisocial people or heavy drinkers (Gruenewald, 2007). This process of social selection creates an effect of alcohol outlet density on negative social outcomes independent of the level of alcohol consumption.

Considering all potential explanations for the effects of alcohol outlets on social harm, many studies adopt an ecological approach, i.e. they focus on environmental factors (one of which is alcohol outlet density) as an explanation of alcohol-related harm (Gruenewald et al., 2002b). However, Livingston et al. (2007) suggest that even within these ecological factors, the effects of liquor outlets should be separated into two effects:

- i. a proximity effect (which measures how easy it is to obtain alcohol); and
- ii. an amenity effect (which measures how liquor outlets affect the characteristics of the local community).

One potential problem with ecological studies is that they do not adequately separate the effects of liquor outlet density from other effects. For instance, neighbourhoods with high levels of alcohol consumption (and consequent high levels of alcohol-related harm) will naturally attract liquor outlets looking to profit from local demand for alcohol. This will tend to mask the 'true' effect of liquor outlet density on alcohol-related harm, because high levels of alcohol-related harm would be present even without increased liquor outlet density. In other words, ecological studies cannot adequately explain why there may be an observed relationship between liquor outlet density and the outcome variable.

There has been significant recent debate over the impact of liquor outlets on communities in New Zealand. This has arisen in part because of the liberalisation of the sale of alcohol following the Sale of Liquor Act 1989, which allowed the sale of wine in supermarkets and grocery outlets and generated

a significant increase in the number of outlets supplying alcohol (see for example the discussion in Greening, 2006). However, as this literature review demonstrates, there is currently little specific empirical evidence for or against further changes to licensing laws,<sup>1</sup> other than relatively general research related to the availability of alcohol (e.g. see Casswell et al., 1993). Indeed, the local community is seeking an evidence base to support liquor licensing changes (McNeill et al., 2012). The community's need for strong empirical evidence underlines the need for research in this area.

This report has two aims: (i) to review the international academic literature on the impacts of liquor outlets and in particular the impacts of liquor outlet density; and (ii) to review the New Zealand media reports related to the impacts of liquor outlets. This report will provide a key input into the development of a quantitative model of the impacts of liquor outlets on the community in Manukau City, across a range of domains, in order to inform local body planning that minimises alcohol-related harm.

The report is structured as follows:

- Section 2 outlines the method employed for the literature and media reviews;
- Section 3 presents a review of the international academic literature;
- Section 4 presents a review of New Zealand media reports; and
- Section 5 concludes.

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<sup>1</sup> Such as the changes recommended by Hill (2004), which included changing the sale of alcohol to “a discretionary and publicly notified land use activity in those business zones where it is permitted, and a prohibited activity in all residential zones in which this is not already the case”.

## 2 METHOD

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The method employed for the academic literature review initially involved an extensive search of the EBSCO Host database, PubMed database and Google Scholar for international and local peer-reviewed and non-peer-reviewed research in the form of journal articles, book chapters, working papers and monographs. The search terms employed included: (i) 'liquor store', 'liquor shop', 'liquor outlet', 'liquor sales', 'liquor retailer' and 'liquor availability'; and (ii) all the search terms from (i) but with 'alcohol' instead of 'liquor', i.e. 'alcohol store' etc. Following this, additional references were found using a snowball method by consulting the reference list in each previously identified publication. Finally, references were included in the final literature review only if they provided a quantitative evaluation of the impacts of liquor outlet density on some outcome variable, or if they investigated a natural experiment related to the way in which liquor was sold. In all, 145 articles were identified and included in the final literature review. Due to a lack of studies on New Zealand, additional qualitative and anecdotal reports on New Zealand were also included.

The method employed for the New Zealand media review began with an initial search of the Factiva newspaper database to identify articles of interest. Factiva is an appropriate choice of database because it includes all major national and regional New Zealand newspapers. The search terms employed were: (i) 'liquor store', 'liquor shop', 'liquor outlet', 'liquor sales' and 'liquor retailer'; (ii) all the search terms from (i) but with 'alcohol' instead of 'liquor', i.e. 'alcohol store' etc.; and (iii) all the search terms from (i) but with 'booze' instead of 'liquor', i.e. 'booze store' etc.; (iv) 'Manukau AND drinking', 'Manukau AND alcohol', 'Manukau AND booze' and 'Manukau AND liquor'; and (v) all the search terms from (iv) but with 'Manukau' replaced by each of 'Botany', 'Clevedon', 'Howick', 'Mangere', 'Manurewa', 'Otaru', 'Pakuranga', 'Papatoetoe' and 'South Auckland', i.e. 'Botany AND drinking' etc.<sup>2</sup> Several thousand articles were identified, and the research team restricted the number included in the final review by first checking the title and first two lines of each article (as presented on the search results from Factiva) for appropriateness. Each article remaining after this initial filtering process was then downloaded and checked a second time for content before being included in the final analysis. In all, 438 articles were included in the final analysis.

To identify themes within the New Zealand media, articles were then reviewed for themes and discourses using the NVIVO 8 qualitative data analysis software package. This software allows for the identification and storage of rich information to be found in text-based qualitative data. These discourses can be broadly thought of as referring to the effects on individuals, the economic and social effects on communities and the reporting on political and policy responses. Each of these discourses was examined in detail along with the manner in which the media report incidents involving liquor outlets and alcohol. This analysis identified the forms of incident being reported within the media, as well as the style and framework within which they were reported. Common themes and concepts arising in the publications were then collated to provide an overview and general understanding of how the impacts of liquor outlets are represented within the media.

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<sup>2</sup> This search for geographically specific media articles was due to the geographic-specific nature of the overall research programme, 'Research into the impact of liquor outlets in Manukau City'.

### 3 REVIEW OF THE INTERNATIONAL ACADEMIC LITERATURE

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The international academic literature has been reporting on the relationship between alcohol availability, liquor outlets and social outcomes for many decades (see Douglass et al., 1979 for an early example). The literature on the impacts of liquor outlets is contained within the broader literature on the impacts of the availability of alcohol (Livingston et al., 2007), as alcohol availability is integrally related to the density of liquor outlets, as well as the ways in which alcohol is sold. Further, to date there have been very few studies on the impacts of liquor availability and liquor outlet density on communities in New Zealand.

Therefore, a review of the international academic literature on the impacts of liquor outlet density, as well as a consideration of the wider impacts of alcohol availability, is important in order to identify the most appropriate methodology for modelling the impacts of liquor outlet density. Key considerations for model development also include how the 'impacts' of liquor availability and liquor outlet density are defined and measured. This review therefore summarises the literature in terms of: (i) the methodology employed to investigate the association between the impacts and liquor availability or liquor outlet density; (ii) the impacts investigated, and how those impacts were defined and measured; and (iii) the conclusions of the literature in terms of the significance of liquor availability or liquor outlet density on the level or extent of impacts.

Livingston et al. (2007) recently reviewed the theoretical and empirical literature on the impacts of liquor outlets. They grouped the studies reviewed by the impacts that were considered: (i) the impacts on alcohol consumption; (ii) the impacts on violence; and (iii) the impacts on other alcohol-related variables. They also discussed the methodology employed in these studies. This section follows a similar scheme, significantly expanding and updating that earlier review. The New Zealand literature is specifically considered at the end of the section. The literature reviewed, including a note of the methods employed in each study, is further detailed in Appendix I.

#### 3.1 METHODS EMPLOYED IN STUDIES OF THE IMPACTS OF LIQUOR OUTLETS

Several methodologies can be employed to investigate the relationship between liquor outlet density and other variables of interest. Major quantitative methodologies include: (i) cross-sectional analysis; (ii) natural experiments; (iii) time series analysis; and (iv) panel data analysis. Further, studies may or may not also consider the spatial autocorrelation between neighbouring and closely related areas.

Cross-sectional analyses consider the relationship between liquor outlet density and the outcome variable at a single point in time.<sup>3</sup> They can provide a good 'snapshot' of the relationship at that point in time, but are inadequate for determining the impacts of a change in liquor outlet density on the outcome variable. They also cannot be used for inferring causality due to the absence of a

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<sup>3</sup> The 'outcome variable' may be any measure of alcohol-related harm, such as the number or frequency of assaults or violent crimes more generally, and hospital admissions, etc. Appendix I notes the outcome variable used in each study included in this review.

counterfactual.<sup>4</sup> Causality might run in either direction. That is, because alcohol outlets are likely to be located in areas where demand for alcohol is high, whether the outlets cause the demand or the demand causes the location choice of the outlets cannot be demonstrated. Further, biases created by social selection cannot be accounted for except at the aggregate level. For instance, it may be that heavy drinkers will select the place they live based in part on the ready availability of alcohol.

Time series analyses look at changes in liquor outlet density and the outcome variable over time. These studies do not directly identify the relationship between liquor outlet density and the outcome variable, but do evaluate the effects of changes in liquor outlet density on changes in the outcome variable. As such, they are preferable to cross-sectional analyses, as well as more practically applicable than natural experiments. However, due to the absence of a counterfactual, time series analyses suffer in a similar way to cross-sectional studies in terms of identifying causal relationships.

Natural experiments involve a comparison of the level of the outcome variable before and after a significant change in the density of liquor outlets. In order to run a natural experiment, some significant change in liquor outlet density is required (such as might follow a significant law change), and data is required at two points in time: (i) before the change; and (ii) after the change. Natural experiments allow causal inferences to be made, but are relatively uncommon due to the need for a significant change to be evaluated. They may also overestimate the marginal effect of adding or removing a single alcohol outlet, because the effect of a large change in liquor outlet density (as observed in the natural experiment) is likely to be quite different from the effect of adding or removing a single alcohol outlet.

Panel data analyses combine the best features of both cross-sectional analyses and time series analyses. They utilise data that is both across space (cross-sectional) and across time (time series). This allows the relationship between liquor outlet density and the outcome variable, and the marginal effect of a change in liquor outlet density, to be evaluated with a relatively higher level of accuracy. Panel data analysis also provides some control for the omitted variable bias with respect to unobserved cross-sectional time-invariant determinants of the measured impacts of liquor outlets.<sup>5</sup>

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<sup>4</sup> In social science research, the 'counterfactual' refers to a description of a situation (also called a scenario) of what would have been expected to happen if a specific policy intervention or set of events had not taken place. Because social science research is predominantly non-experimental and many factors influence a specific outcome, it is difficult in practice to forecast the effect of a change in one factor while assuming that all other factors remain the same. Economic models can be used to go through such a thought experiment, but can never fully confirm the prediction of the model because the counterfactual is not observed. For instance, say that an increase in assaults is observed along with a growing density of liquor outlets in a given location. In this case, we cannot prove that the growing density of liquor outlets in that location caused the increase in assaults even if in very similar locations that had not seen such an increase in liquor outlets, assaults did not go up. The reason is that there may be some unknown but important way in which our location of interest is different from the others and we never observe in that specific location what would have happened if density had not increased.

<sup>5</sup> Omitted variable bias occurs when explanatory variables are omitted from a model that explains how an outcome variable is influenced by these explanatory variables while at the same time the omitted variables are correlated with the included variables. Consider as an example wine consumption, which may be affected by the way in which the local climate influences beverage intake (which we cannot observe) and by the proximity of vineyards (which we can observe). If the effect of the proximity of vineyards on wine consumption is measured statistically, but the way in which climate influences the location of vineyards is ignored, the effect of the proximity of vineyards on alcohol consumption will be biased (because climate has a separate effect on beverage intake as well). Panel data models exploit the fact that climate is constant over the time span of the analysis, whereas land

However, panel data analyses may also suffer from the absence of a counterfactual, similar to both cross-sectional and time series analyses.

Finally, spatial units that are close geographically often share similar features, which means that there is likely to be spatial auto-correlation (Cliff and Ord, 1973). Studies that account for spatial autocorrelation will obtain estimates of the marginal effects of liquor outlet density on the outcome variable that are more efficient, i.e. estimates that have smaller standard errors.

In the following review, studies described are cross-sectional studies unless otherwise noted. Additional details on each study are summarised in Appendix I.

### **3.2 THE IMPACTS ON ALCOHOL CONSUMPTION**

Studies relating liquor outlet density to alcohol consumption have found contrasting results.<sup>6</sup> In early studies Parker et al. (1978) found that the number of alcohol outlets per capita was significantly positively associated with rates of alcohol consumption and alcoholism in the United States, and Harford et al. (1979) found that the number of on-premise outlets was significantly related to per-capita alcohol consumption. Colon et al. (1982) found a similar association between alcohol availability and consumption using a cross-sectional factor analysis for the United States, as did Rush et al. (1986) using a linear structural relations model for Ontario.

Drinking among tertiary students has been found to be associated with the proximity and density of liquor outlets in cross-sectional studies in the United States (Chaloupka et al., 1996; Weitzman et al., 2003; Brower and Carroll, 2007; Scribner et al., 2008), as has drinking among secondary-school-aged children in Switzerland (Kuntsche and Kuendig, 2005) and California (Treno et al., 2008b). Freisthler et al. (2003) found that sales to pseudo-intoxicated persons were significantly related to the number of other on-licensed premises in close proximity. Besides location, time of availability also has an effect on consumption. For instance, Smith (1986) found that alcohol consumption was closely related to the opening hours of hotels in Western Australia.

There are several studies that have found no association between outlet density and alcohol consumption. For instance, in an early study Parker and Wolz (1979) found that alcohol outlet density (measured by the number of liquor store employees per capita) was not associated with rates of heavy drinking and alcoholism. Pollack et al. (2005) found that alcohol consumption across 82 neighbourhoods in California was not significantly related to alcohol outlet density after controlling for neighbourhood deprivation. Alcohol consumption was highest in economically *advantaged* neighbourhoods, while liquor outlets were generally located in economically disadvantaged areas. This contrasts the conclusions of Bluthenthal et al. (2008), who found that alcohol consumption was closely associated with deprivation in Los Angeles and Louisiana.

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use can change. By looking at how the establishment or closing of vineyards over time influences wine consumption at a location, the effect of unchanged climate cancels out. Such an effect of any unchanging (but relevant) variable at a location is therefore called a fixed effect. Panel data models with fixed effects are therefore very convenient ways of dealing with unobserved things that matter when comparing one location with another, but which don't change over time.

<sup>6</sup> See MacDonald and Whitehead (1983) for a review of early studies.

Green-Mathieu (2006) found no association between proximity to alcohol outlets and alcohol consumption in Connecticut, while Abbey et al. (1990a; 1990b) and Abbey et al. (1993) found that physical availability was not associated with alcohol consumption in Michigan. Truong and Sturm (2007) found that alcohol outlet density was significantly positively associated with problem drinking measures in just 17 out of 240 analyses for California. Miller et al. (2006) found that there was no significant difference between monopoly states (which effectively have lower access to alcohol) and other states in terms of under-age drinking and associated harm. Kuntsche et al. (2008) found that on-licence density (but not off-licence density) was related to volume drinking among youth aged 14-15 years in Switzerland, but that there was no association between outlet density and frequency of youth drinking. However, Scribner et al. (2000) found that alcohol use was significantly positively associated with liquor outlet density at the neighbourhood level (but not at the individual level) in New Orleans. Rossow (2000) found that consumption of moonshine was significantly negatively associated with outlet density in Norway, but consumption of illegally smuggled spirits was not associated with outlet density.

Natural experiment studies have also found mixed results. Liberalisation of alcohol sales laws, resulting in a significant increase in the number of liquor outlets, has been associated with increased alcohol consumption in the United States (Wagenaar and Holder, 1995) and Quebec, Canada (Trolldal, 2005a). In contrast, West (1997) found little effect on alcohol consumption of liberalisation in Alberta, Canada. Similarly, extended trading hours for licensed premises in Fremantle during the America's Cup in 1986 resulted in no significant change in alcohol consumption among young men (McLaughlin and Harrison-Stewart, 1992). Fitzgerald and Mulford (1993) found no significant change in consumption, and Mulford and Fitzgerald (1988) found no significant change in heavy drinking or problem drinking, in a natural experiment in Iowa immediately following liberalisation. However, when the data were reanalysed to include an additional four years of data following the policy change, a significant positive relationship with problem and heavy drinking was found (Fitzgerald and Mulford, 1992), although there was still no significant change in consumption (Mulford et al., 1992). Similar mixed results have been reported for Nordic countries, with increase in alcohol availability related to significant increases in consumption in Finland (Mäkelä et al., 2002), Iceland (Olafsdottir and Leifman, 2002; Mäkelä et al., 2002) and Sweden (Mäkelä et al., 2002; Norström and Skog, 2003; 2005), but little effect on alcohol consumption in Norway (Mäkelä et al., 2002).

In a time series analysis for the United Kingdom, Godfrey (1988) found that new liquor licences stimulated demand for beer, but not for wine or spirits. Gruenewald et al. (1993) conducted a panel data analysis across 38 United States states and found that outlet density was significantly related to sales, independent of price; however, this result was unable to be replicated at the neighbourhood level in California by Gruenewald et al. (2000). Trolldal (2005b) examined alcohol sales across four provinces of Canada and found that, controlling for price, physical availability was significant in only two out of 20 analyses. However, in a time series analysis for Quebec, introduction of wine sales into grocery stores in 1978 had a significant effect on alcohol sales (Trolldal, 2005c). Finally, in a recent panel data analysis using data from the large National Survey on Drug Use and Health in the United States, Nelson (2008) found that alcohol outlet density was not significantly related to binge-drinking after controlling for race, poverty and unemployment.

### 3.3 THE IMPACTS ON VIOLENT AND OTHER CRIME

Many cross-sectional studies have concentrated on the impacts of liquor availability or liquor outlet density on violence, whether murders, assaults, domestic violence or violent crime more generally. The results have again been inconsistent. Roncek and Maier (1991) found significant associations between tavern and cocktail lounge densities and a range of crimes including murder, rape, robbery, aggravated assault, burglary, grand theft and auto theft in Cleveland, as had Roncek and Bell (1981) earlier for bar density. Ireland and Thommeny (1993) found that most incidents of a number of crimes in Sydney occurred in close proximity to liquor outlets. Speer et al. (1998) concluded for Newark that retail alcohol outlets strongly predict violent crime, while Britt et al. (2005) found similar results for Minneapolis. Scribner et al. (1995) found similar results for assaultive violence in Los Angeles, as did Reid et al. (2003) for Kansas City and Gorman et al. (1998b) for New Jersey. Nielsen and Martinez (2003) also found similar results for non-lethal violence in Miami. Livingston (2008b) found a significant positive relationship between outlet density and night-time assaults for Melbourne, as well as evidence that the relationships were non-linear. In a spatial time series analysis of Los Angeles, Yu et al. (2008a) found a significant positive relationship between outlet density and assault rates, while Chikritzhs et al. (2007) found that assault rates were positively associated with higher outlet density, regardless of whether outlet density was measured in terms of a count of outlets, the number of outlets per unit of land area, or the volume of wholesale alcohol purchases.

In contrast, Escobedo and Ortiz (2002) found no association between alcohol outlet density and homicide in New Mexico, as did Jones-Webb et al. (2008) for ten United States cities, while Lester (1995) found no significant relationship between alcohol availability and state-level rates of homicide for the United States. Gorman et al. (1998a) found no significant relationship between outlet density and rates of domestic violence in New Jersey. Markowitz and Grossman (1998) found a positive relationship between the number of alcohol outlets and severe violence towards children in the United States, but after controlling for other factors such as family history of violence, this relationship became insignificant (Markowitz and Grossman, 2000). Treno et al. (2008a) found contrasting results between bar density and different subjective measures of violence: a significant positive relationship with alcohol aggression, a significant negative relationship with aggressive norms, but no relationship with hostility.

Natural experiments have also found contrasting results. In a natural experiment in Perth, Chikritzhs and Stockwell (2002) found that later closing hours for hotels were significantly associated with an increase in assaults, while Yu et al. (2008b) found that a decrease in alcohol outlets following the civil unrest in Los Angeles in 1992 was associated with a decrease in assault rates. In contrast, in Sweden following the introduction of Saturday opening in some areas, Norström and Skog (2005) found no association with assault rates across several measures, while Rossow (2002) found a significant decrease in violent crime during an alcohol supply strike in Norway, but no change in drunk and disorderly behaviour.

Gyimah-Brempong and Racine (2006) found in a cross-sectional non-parametric study in Detroit that, in addition to significant impacts on violent crime, alcohol outlet density had significant positive relationships with crime more generally, as did Gyimah-Brempong (2001; 2006) using instrumental

variables and other parametric approaches. However, in a natural experiment study in Alberta, Canada soon after the liberalisation of alcohol sales laws, little impacts on crime were noted (West, 1997). Stevenson (1996) found patterns of relationship between different crimes and different alcohol outlet types in New South Wales, but Parker (1995) showed that the ratio of liquor licences held by on-licensed premises had little effect on homicide rates in the United States.

The evidence from the above studies is inconclusive. Further, findings *within* some individual studies are contradictory. For instance, Stevenson et al. (1999b) found significant positive effects of alcohol sales on assault rates in New South Wales, but while alcohol outlet density was significant and positive in Sydney it was not significant in country New South Wales. Gruenewald et al. (2006) found that hospital discharges for assault in California were significantly related to the density of off-licence outlets but not the density of bars, and that bars might actually moderate the local population effects of assaults. This is almost the exact opposite result to an earlier study in California by Lipton and Gruenewald (2002). Scribner et al. (1999) found that homicide rates in New Orleans were positively associated with the density of off-licence outlets, but not on-licence outlets, and Costanza et al. (2001) found similar results for rates of robbery and aggravated assault in Baton Rouge. McKinney et al. (2009) found that intimate partner violence was significantly associated with on-licence outlet density but not off-licence outlet density, and Roman et al. (2008) found that aggravated assault was positively associated with on-licence but not off-licence density, and that domestic violence was positively associated with off-licence density but negatively associated with on-licence density. In a natural experiment in Brazil, Duailibi et al. (2007) found a significant decrease in homicides following a limiting of the opening hours of bars, but also found no change in assaults against women.

Effects may be different under different spatial comparisons. For instance, Zhu et al. (2004) found that violent crime was related to liquor outlet density in both the target suburb and in surrounding suburbs in Austin and San Antonio. In contrast, in a cross-sectional study Gorman et al. (2001) found that levels of violent crime were related to alcohol outlet density in the target area, but were not related to alcohol outlet density in neighbouring areas. Waller et al. (2007) reported the results of two different ways of dealing with spatially heterogeneous effects using data from Houston, and found that spatially the results differed significantly.<sup>7</sup>

The results of research into liquor outlet density and impacts among minority groups are striking, a potentially important finding given the close association between liquor outlet density and racial and socio-economic patterns such as observed by LaVeist and Wallace (2000) and Romley et al. (2007). Alaniz et al. (1996, cited in Alaniz, 1998) and Alaniz et al. (1998) showed that the violent crime arrest rates among Latino youth in northern California were significantly positively related to the density of liquor outlets. Nielsen et al. (2005) found that race-specific rates of aggravated assault and robbery were significantly related to outlet density for Latinos in Miami, but not for blacks.

Finally, despite the association of liquor outlets with crime, other factors may be more significant, or the relationship might be more dependent on other factors. For instance, Gorman et al. (2005) found that even though alcohol outlet density was significantly related to violent crime in Houston, drug

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<sup>7</sup> Specifically they employed geographically weighted regression and spatially varying coefficient models. For further explanation, see Waller et al. (2007).

crime density explained most of the violent crime, as did Zhu et al. (2006) also for Houston. Stevenson et al. (1999a) found that alcohol outlet density had an insignificant effect on malicious damage and offensive behaviour in New South Wales, after controlling for total alcohol sales. This is potentially important since it highlights the volume of alcohol sales as an important confounder in the relationship between liquor outlet density and outcome variables – a large number of stores selling a small volume of alcohol is likely to create less alcohol-related harm than a large number of stores selling a large volume of alcohol, while a small number of stores selling a large volume of alcohol may or may not create more harm.<sup>8</sup>

Time series and panel data analyses have had less mixed results, although significant variation within studies persists. Norström (2000) found a significant relationship between outlet density and violent crimes investigated in Norway between 1965 and 1990. Using panel data, Gruenewald and Remer (2006) showed that hospital discharges for assault in California were significantly related to the density of off-licence outlets. Livingston (2008a) found that the number of outlet licences was significantly related to night-time assaults in Melbourne, but that there was significant variation in the relationship depending on the outlet type and the nature of the suburb. For example, general or hotel licences were significantly related to assaults in central suburbs and advantaged suburban areas, while on-licence premises were significantly related to assaults in inner urban, advantaged and disadvantaged suburban areas.

### **3.4 THE IMPACTS ON DRINK-DRIVING AND MOTOR VEHICLE ACCIDENTS**

The relationship between alcohol outlet density and drink-driving and/or motor vehicle accidents has been examined in several studies, again with mixed findings. In early studies, Colon (1982) found that frequency of outlets was significantly positively related to state-level single-motor-vehicle fatalities in the United States, and Stitt and Giacomassi (1992) found that outlet density was significantly positively associated with rates of DUI (driving under the influence) arrests at the state level. Treno et al. (2003) found that outlet density was associated with both drinking and driving and riding with drinking drivers among youth in California, and Treno et al. (2007) found that bar and off-licence density was associated with traffic injuries and alcohol-involved traffic crashes in California. Escobedo and Ortiz (2002) found similar results for New Mexico, as did van Oers and Garretsen (1993) for Rotterdam in the Netherlands, and Jewell and Brown (1995) for Texas. Further, Brown et al. (1996) found that Texas counties with prohibition had significantly fewer fatal alcohol-related motor vehicle accidents than counties without prohibition, as did Winn and Giacomassi (1993) for Kentucky. However, in comparisons at the state level, Colon (1983) found that 'dry' states had significantly more alcohol-related fatal motor vehicle accidents (per 10 million driving miles) than 'wet' states.

Again there are contrasting results within individual studies. For instance, Rabow and Watts (1982) found that felony drunk-driving arrests were significantly associated with outlet density in California, but that misdemeanour drunk-driving arrests were not significantly associated with outlet density, while Watts and Rabow (1983) found that drink-driving arrests were significantly associated with on-licence outlet density, but not off-licence density in California. Scribner et al. (1994) found that

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<sup>8</sup> For instance, Chikritzhs et al. (2007) used volumes of wholesale alcohol purchases as an indicator variable to overcome this problem.

alcohol-related crashes resulting in injury were significantly associated with density of restaurants, liquor stores and mini-markets with liquor licences, but not bars. They also found that alcohol-related crashes resulting in property damage were significantly associated with density of restaurants and bars, but not other outlet types. Gruenewald et al. (2002a) found that drinking and driving was positively associated with restaurant density, but negatively associated with off-licence density, and had no association with bar density. McCarthy (2003) found that alcohol-related crashes were significantly positively associated with on-licence density, but significantly negatively associated with off-licence density. Millar and Gruenewald (1997) found a significant association in California between alcohol outlet density and single-vehicle night-time crashes, but no relationship with self-reported drinking and driving. Similarly, Gruenewald et al. (1996) found no association between alcohol outlet density and drink-driving in California, and a significant relationship between single-vehicle night-time crashes and restaurant density, but not bar density. In a panel data analysis for the United States, Gruenewald and Ponicki (1995) found that single-vehicle fatalities were positively related to outlet density between 4am and 8am, but negatively related to outlet density between 8pm and midnight.

In natural experiment studies, significant increases in traffic accidents have been found following the introduction of Sunday alcohol sales in Brisbane (Smith, 1988b), Victoria (Smith, 1990) and New South Wales (Smith, 1987). Smith (1988a) found a similar increase in traffic accidents following later trading hours in Tasmania, while Blose and Holder (1987) found a significant increase in alcohol-related crashes following the introduction of liquor-by-the-drink in North Carolina. Norström and Skog (2005) found a weak association between drink-driving and opening of outlets on Saturday in Sweden, while following the close of drive-up liquor windows in New Mexico, alcohol-related crashes did not significantly change (Lapham et al., 2004). Similar results were found for Ontario by Vingilis et al. (2005), and in Norway by Rossow (2002). Smith (1989) found that increases in alcohol availability in Western Australia were actually associated with a reduction in male driver and motorcyclist mortality. However, another natural experiment in New Mexico (following lifting of the ban on Sunday packaged alcohol sales) showed a significant effect of alcohol availability on alcohol-related crashes (McMillan et al., 2007).

LaScala et al. (2000; 2001) found significant relationships between bar density and alcohol-related pedestrian injury collisions in San Francisco and in the state of California respectively, but no significant relationship for off-licence density. Further, Meliker et al. (2004) found that there was no significant association between alcohol outlets and alcohol-related motor vehicle crashes in southeastern Michigan, as did Stevenson et al. (1998) in a case-control study in Georgia, and Kelleher et al. (1996) for fatal crashes among young males in Arkansas. Trollidal (2005a) investigated a natural experiment based on the privatisation of liquor sales in Alberta, Canada, and found no association between alcohol sales and fatal motor vehicle crashes. However, a natural experiment in Perth, Western Australia, based on later trading hours for hotels, found a significant increase in motor vehicle accidents (Chikritzhs and Stockwell, 2006).

### 3.5 THE IMPACTS ON OTHER OUTCOME VARIABLES

The relationship between liquor outlet density and a number of other outcome variables has been investigated, including child abuse and neglect, drunkenness and disorder, social cohesion, health costs and hospitalisations, public health problems, and other social problems.

Freisthler (2004) found that greater density of bars was significantly positively associated with substantiated reports of child abuse and neglect in California, but density of off-licence outlets and restaurants was not. Using similar data again in California, Freisthler et al. (2004) then found that physical abuse was significantly related to density of off-licence outlets but not other outlet types, and child neglect was significantly related to density of bars, but not other outlet types. Similarly, Freisthler et al. (2005) found that child maltreatment was significantly positively associated with density of bars, but not other outlet types in one northern California city. In a panel data analysis of Sacramento, California, Freisthler and Weiss (2008) found a significant relationship between outlet density and Child Protection Services (CPS) referrals, while in another panel data analysis of data from California, Freisthler et al. (2007) found a significant positive relationship between off-licence density and CPS referrals, substantiations and foster care entries, and a significant negative relationship with restaurant density, with no significant relationship with bar density.

Donnelly et al. (2006) found a significant relationship between alcohol outlet density and reported neighbourhood problems with drunkenness and property damage in New South Wales. Similar results in terms of 'lowered quality of neighbourhood life' were found by Wechsler et al. (2002) for areas surrounding colleges in the United States. Stitt and Giacomassi (1992) found significant associations between outlet density and rates of drunkenness and disorderly conduct in the United States, but no relationship between outlet density and rates of vagrancy. Roman et al. (2008) found no association between outlet density and disorderly conduct in the District of Columbia, and Rabow and Watts (1982) found no association between outlet density and public drunkenness arrests in California. Scribner et al. (2007) found a significant negative relationship between alcohol outlet density and civic engagement or social capital (measured by voting rates) in a natural experiment in Los Angeles, but Duncan et al. (2002) found no significant association between outlet density and social cohesion for an unidentified city in the Pacific Northwest.

Several studies have found that alcohol outlet density can also increase health costs and hospitalisations. For instance, Brown and Jewell (1996) reported a significant relationship between cirrhosis deaths and alcohol outlet density in Texas, as did Colon (1981) and Colon et al. (1982) using factor analysis on state-level data for the United States, and Smith (1989) in a natural experiment in Western Australia. Treno et al. (2001) found a significant positive effect of liquor outlet density on self-reported injury rates in California. Rush et al. (1986) found a significant relationship between retail availability of alcohol and alcohol-related morbidity but not alcohol-related mortality in Ontario. Tatlow et al. (2000) found that outlet density was significantly positively associated with alcohol-related hospitalisations in San Diego, as did Ramstedt (2002) in a natural experiment in Sweden, although the Swedish results were significant only for some age groups (mainly youth). Wood and Gruenewald (2006) found that serious injury rates were significantly lower in native Alaskan villages with prohibition when compared with those without, which was similar to the earlier findings of Berman et

al. (2000) and Landen et al. (1997), while Chiu et al. (1997) found that alcohol-related outpatient hospital visits declined significantly following a ban on alcohol sales and importation in Barrow, Alaska.

Alcohol outlet density may also be related to public health and social problems indirectly related to alcohol consumption. For instance, in a natural experiment in Los Angeles, Cohen et al. (2006) found that alcohol outlet density was significantly related to gonorrhoea rates, as did Scribner et al. (1998) in a cross-sectional study in New Orleans. Northridge et al. (1986) found in a natural experiment in Scotland that liberalisation of liquor licensing was associated with an increase in the frequency of alcohol taken in association with overdoses, but did not affect the severity of overdoses. However, Escobedo and Ortiz (2002) found no association with suicide rates or drug-related deaths in New Mexico, and Lester (1995) found no association between alcohol availability and state-level suicide rates for the United States.

Finally, there is certainly a role for public intervention to mitigate the impacts of alcohol outlet density. Holder et al. (2000) reported the results of a community-based intervention trial in three communities in California and South Carolina between 1992 and 1996. Among other things, the intervention included new licensing regulations that reduced alcohol outlet density (described in detail in Reynolds et al., 1997). The intervention showed significant decreases in alcohol consumption, drink-driving, night-time and alcohol-related motor vehicle accidents, and assault injuries in the intervention communities, when compared with control communities. This shows that interventions, in terms of reducing alcohol outlet density, can be effective in reducing alcohol-related harm.

### **3.6 THE NEW ZEALAND LITERATURE**

As noted above, the New Zealand literature on the impacts of liquor outlets is limited, but growing recently. Mathieson (2005) used geographically weighted regression to examine the link between alcohol outlet density and a number of outcome variables in Auckland. He found that the relationship with single-vehicle night-time crashes varied significantly between different District Health Board (DHB) areas: while restaurant density was significant and positive in Waitemata DHB and overall, it was negative and significant in Auckland and insignificant in Counties-Manukau; while pub density was significant and positive in Counties-Manukau, it was significant and negative in Auckland and overall and insignificant in Waitemata; and while off-licence density was significant and positive in Auckland and overall, it was significant and negative in Counties-Manukau and insignificant in Waitemata. This study also presented data on serious night-time injuries and night-time assaults in public places, but did not statistically test for any association with alcohol outlet density.

Hay et al. (2007) used geographically weighted regression to investigate the association between distance to nearest bar and social deprivation at the meshblock level. They found generally that social deprivation was associated with a shorter distance to the nearest bar, although this relationship broke down in certain disadvantaged rural areas where large travelling distances to the nearest bar were combined with high social deprivation.

Kypri et al. (2008) studied the effect of alcohol outlet density on drinking patterns and alcohol-related harm among tertiary students at six university campuses. They found a significant positive

relationship between outlet density and drinks per typical drinking day, alcohol problems scale, and second-hand effects. No significant differences in the effects were noted between Maori and New Zealand Europeans, but the effects were larger for off-licence outlets. Huckle et al. (2008) examined the effects of alcohol outlet density on the drinking patterns of Aucklanders aged 12-17 years. They found a significant positive effect of outlet density on how much was consumed on a typical drinking occasion, but no significant effect on either the frequency of drinking or the frequency of intoxication. Pearce et al. (2008) linked higher numbers of alcohol outlets per 10,000 population to more socially deprived areas. However, the same was true of less 'harmful' retail outlets such as convenience stores and supermarkets.

In a natural experiment study, Wagenaar and Langley (1995) considered the effect of the liberalisation of wine sales in 1989 on wine consumption in New Zealand, and found that there has been a significant increase in wine sales following liberalisation. In another natural experiment study, Everitt and Jones (2002) evaluated the effect of the reduction in the minimum drinking age from 20 to 18 on the number of youths aged 16 or 17 admitted to Auckland Hospital Emergency Department. They found a significant increase in the number of intoxicated youths, indicating that an increase in alcohol availability increased alcohol consumption and negative impacts in this age group.

### **3.7 SUMMARY**

Overall, the academic literature provides mixed results for a relationship between liquor outlet density and a range of outcome variables. Many of the relationships appear to be context-specific. That is, the relationship between liquor outlet density depends on the characteristics of outlets or the type of outlet density considered, such as off-licence density or on-licence density (see also Stockwell et al., 1992, and the discussion by Graham, 2006), the type of outcome variable considered, and the nature of the location in terms of its socio-economic and other characteristics (see for example Livingston, 2008a). The relationships between liquor outlet density and outcome variables may also vary over time, although there are currently no long-term longitudinal studies to verify this.

The methodology employed by these studies is as widely varied as the results. Many studies employed cross-sectional quantitative techniques, some including hierarchical or multi-level modelling, and more recent studies also accounted for spatial autocorrelation. However, in cross-sectional or time series studies causality cannot be inferred. Where statistical correlations are detected between alcohol outlet density and the outcome variables, these may actually be due to an association of both with other factors such as socio-economic status, or the causation may run both ways (that is, because alcohol outlets are likely to be located in areas where demand for alcohol is high, whether the outlets cause the demand or the demand causes the location choice of the outlets cannot be demonstrated). Despite this, cross-sectional studies remain the most common due to the ready availability of suitable data for this type of analysis.

More robust natural experiment and pseudo-experimental studies and recent panel investigations have typically found that liquor outlet density has significant negative effects, while often still being specific to the type of outlet. However, as noted by Gruenewald (2008), there is a need for further panel studies in order to confirm the significance and generalisability of their results.

It should also be noted that there are a number of important confounding variables identified in the research; variables that may mediate or affect the relationship between liquor outlet density and outcome variables. The volume of alcohol sales is one important confounding variable, as is socio-economic status of the community. The intensity of alcohol advertising, and programmes or policies implemented to mitigate alcohol-related harms may be other confounding variables. These confounding variables should be allowed for in the analysis of the relationship between liquor outlet density and outcome variables.

Overall, the international academic literature provides a wide range of possible methodologies that can be employed in order to investigate the relationship of liquor outlet density to outcome variables, and the extent and nature of impacts remain open empirical questions. The most robust methodologies involve either:

- i. using natural or pseudo-experimental data, such as would be available following a significant policy change. This allows the actual effect of a change in the number of alcohol outlets in a given location to be evaluated. However, it is likely to overestimate the marginal effect of adding or removing a single alcohol outlet, and is in most instances impractical to implement; or
- ii. estimating spatial panel models. That is, models that utilise data that is both across space (cross-sectional) and across time (time series). This allows the marginal effects of adding or removing a single alcohol outlet to be evaluated relatively accurately. However, even panel data analysis may suffer from not being an experimental (randomised trial) methodology. Even when a liquor outlet is established or disestablished at a particular location, the counterfactual (what would have happened at that specific location if the event had not occurred) is never observed.

## 4 REVIEW OF NEW ZEALAND MEDIA REPORTS

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While the literature reviewed in the previous section provides inconsistent results as to the impact of liquor outlet density, it is commonly believed that outlets have negative impacts on the local communities in which they are located. Several studies such as Gunther and Schmitt (2004) and Slater and Rasinski (2005) have suggested that media reporting may have a significant impact on perceptions and attitudes. This section provides an understanding of how the media frame and present information regarding the impacts of outlets.

### 4.1 LINKING ALCOHOL AND HARMS

Overwhelmingly, liquor and liquor outlets are portrayed in media stories in a negative fashion. One reflection of this is that the overwhelming majority of stories refer to ‘harms’ of one kind or another. Here, we have used ‘harm’ to refer to stories about violence and other crime, traffic accidents, driving under the influence of alcohol, binge-drinking, youth drinking, gangs and alcohol dependency. Although stories of such harms dominate in our media sample, it should be noted that the link between the harm cited and alcohol is often implied rather than subjected to careful analysis.

For example, a story in *The Dominion Post* of 13 May 2002 (‘Wild west gunman fires at boy racers’) covers an incident in which a man fired “eight to ten shots” at a crowd of boy racers gathered at an Auckland service station in the early hours of the morning. Readers are told that the shooting happened the same night as “a bloody fist fight” and another incident in which a hammer had been thrown through a windscreen. Other than the fact that they occurred on the same night, there is no suggestion that the incidents are linked in any way. Nevertheless, a link is implied by a reported comment from an unnamed police source to the effect that the night was “something like the Wild West.” Neither is there any suggestion that the gunman, those involved in the fist fight or the person throwing the hammer through a windscreen had been drinking. Yet that impression is created by a reference to the previous year’s local body elections.

*Auckland Mayor John Banks promised during last year’s local body elections to rid the central city of boy racers. He said his targets were “young men filled to the gills with booze, struggling out of clubs and urinating in doorways and on cars” (Ibid).*

In a similar manner, a story carried by the Australian Broadcasting Corporation on 14 August 2008 links the killing of a 14-year-old boy during a birthday party in South Auckland (‘NZ teen’s murder the latest in spree of violence’) with four other violent deaths earlier in the year. Nothing in the story explicitly links alcohol to any of these deaths. Instead, the link is suggested by the comment of another politician. George Hawkins, a local Member of Parliament, is quoted reflecting on the problems.

*“Some of the incidents involve alcohol, drugs, there are a number, while a lot of people are running around trying to find solutions and organise talkfests I don’t think anyone actually understands the problem – it’s complex,” he said (Ibid).*

Sometimes, an assumed link between alcohol and harm is subjected to some critical enquiry. For example, the *Bay of Plenty Times* of 30 June 2008 carried a story headlined ‘Too many booze outlets in Tauranga’. The opening paragraph states:

*Tauranga's number of liquor outlets per head of population is almost double that of Manukau City, where Prime Minister Helen Clark said accessibility to alcohol was a key driver of crime.*

The story goes on to quote an addictions worker and a senior police officer on the subject of alcohol and crime.

*"The issue requires being addressed on several areas rather than just one, but any initiative is great," Mr Caldwell said. "I don't think Tauranga has got anything to be proud of in terms of our [alcohol-related] crime statistics. We've had some ghastly events in the past couple of years related to drugs and alcohol; we can't pat ourselves on the back..."*

*Western Bay of Plenty police area commander Inspector Mike Clement agreed alcohol availability contributed to crime in Tauranga. "I think the accessibility of alcohol has something to do with everything that follows from that, from disorder to the top end of violent offending."*

However, unlike the earlier stories described above, this one introduces a note of caution about drawing conclusions.

*Mr Clement could not say whether there was a correlation between the number of liquor outlets and crime.*

Nevertheless, given the headline, 'Too many booze outlets in Tauranga', the overwhelming impression is that the number of outlets is contributing to high levels of crime.

A further caution about the way media stories link alcohol and harms concerns the distinction between alcohol as an incidental factor and alcohol as a causative factor. That is, even if those who have perpetrated a harm, or who have experienced a harm, have been drinking, it does not follow that the consumption of alcohol has caused the harm. There is at least the possibility that the harm would have occurred anyway, had the perpetrator or victim not been drinking. For example, according to a story about a murder trial ('Youth gang member says killing in retaliation', 9 October 2006) the victim "reportedly had an alcohol problem". He was killed after his assailant noticed him "stumbling" home from watching a rugby match. Even accepting that the victim's stumbling reflected drunkenness, further reading of the story reveals that it was the prosecutor's contention that the victim was killed in the course of gang retaliation. Even if he had been sober, it is unlikely that that unarmed victim could have successfully defended himself from his knife-wielding assailant.

One common type of story well illustrates the way alcohol may be incidental to the harm described. These are stories of robberies of alcohol outlets. While sometimes alcohol was the specific target of the offenders, more often it seems that they were after money. They could just as easily have targeted a dairy, a video store or any other commercial premises that could be assumed to be holding significant amounts of cash. An example of this is a story in the *Waikato Times* of 22 September 2008 ('Liquor store hit for second time in spate of robberies'), describing a "well organised" robbery in which a sales assistant was threatened by offenders, one of whom was wielding a knife. The offenders made off, on foot, with money and tobacco. There was no suggestion that they had been drinking. Nor was there any suggestion that they were after alcohol, which is, after all, quite heavy to carry.

However, alcohol is sometimes more central to offences involving liquor outlets. The most notable example of this was the much-reported incident in which liquor store owner Virender Singh used a hockey stick to fight off a group of drunken youths who apparently tried to enter his store (e.g. see 'Four in hospital after attack on liquor store', 1 October 2008). Mr Singh was subsequently charged with assault, generating a large amount of media interest, as shopkeepers debated what they could or should be allowed to do to defend themselves.

## 4.2 ALCOHOL, VIOLENCE AND OTHER CRIME

While the above discussion suggests that stories about alcohol-related harm should be read and interpreted through a critical lens, it is clear that alcohol is implicated in various incidents of violence and other sorts of crime.

A common theme here was the role of alcohol in domestic violence. Extreme instances of this involved homicide. For example, Keleti Seau was convicted of murdering his wife in a sustained stabbing attack "after drinking heavily during the day" ('Jurors cry as they find man guilty of Boxing Day murder of wife', 28 February 2008). However, alcohol has been portrayed as implicated in a much wider range of domestic violence incidents. Referring to empirical research, the Christchurch longitudinal study, a feature writer noted:

*Alcohol and drugs are a consistent factor in many studies of child abuse. Drug and alcohol problems affected 40 per cent of the families of children born in Christchurch in mid-1977 where the children later said they had been punished "too severely, harshly or abusively", compared with 16 per cent of families where the children were seldom or never physically punished. ('Warriors still', 22 July 2006).*

As common were stories concerning street violence. For example, an extended story on violence in a Sunday paper began:

*When our reporters and photographers took to the streets with police in Wellington, Christchurch, Napier and Manukau last Saturday night, they saw the seedy underbelly of violent New Zealand – drunken street brawls, assaults and even two brides-to-be in an early-morning punch up ('Fight night', 2 December 2007)*

and followed that with an extensive list of incidents, most of which seemed to have alcohol implicated in them. Unsurprisingly, such stories were sometimes accompanied by expressions of concern about public safety and order.

As mentioned above, alcohol was sometimes implicated in robberies. The most oft-reported robbery in our sample was that which resulted in the death of Auckland liquor store owner Navtej Singh. In the mind of one detective, alcohol was the target here. Inspector Jim Gallagher was reported as saying of the offenders, "These four people have killed an innocent man for a few bottles of booze" ('Police confident shopkeeper's killers will be hunted down', 11 June 2008).

Much less frequently reported were sexual offences involving alcohol. One story about the rape trial of a sports star began:

*The Tea Ropati sex assault case has revealed a seedy underbelly to Auckland's nightlife. Excessive drinking and sleazy behaviour can end in disastrous consequences ('Dicing with drink,' 2 February 2008).*

A final group of crime stories related to drink-driving and accidents believed to be associated with alcohol. In a typical story, headlined 'Drink-drive blitz nets 220 drivers, provides fines bonanza' (31 August 2008), the reader is provided with this example:

*One 19-year-old driver who was three times over the legal limit when stopped by police managed to get his keys back off a sober driver, continued drinking and was stopped later the same night at another checkpoint, where he was found to be almost four times over the limit for his age.*

Stories about deaths associated with alcohol-impaired driving were often accompanied by calls for policy changes. For example, a story that began with "A series of drink-related crashes have [sic] claimed yet more lives and has led to calls for a lower alcohol limit" ('Booze link to deaths', 25 November 2007) included statistics on drink-driving convictions and comment from a police officer and a spokesperson for Students Against Driving Drunk.

### **4.3 ALCOHOL AND OTHER HARMS**

A smaller number of stories related to harms other than crime. Most prominent among these were stories about the impact of alcohol on children and adolescents. For example, *The New Zealand Herald* carried a story about three teenage girls who ran up a drinks bill of \$562 at a "top Auckland restaurant" ('Teenagers' big night out just something to do', 14 October 2003). Out-of-control parties following a school ball also featured (e.g. 'Police ban gang-hosted parties for New Zealand school girls', 16 August 2003).

Often, stories about youth drinking examined the price of alcohol. As the *Taranaki Daily News* noted, "For less than five dollars, children can get more than enough cheap liquor to do them serious harm" ('Pocket money', 28 September 2002). Similar stories drew attention to marketing aimed specifically at young people. Ready-to-drink products were frequently mentioned in this regard (e.g. 'MP condemns liquor outlet's advertising', 26 September 2002). Other stories referred to concerns that some liquor outlets were selling to under-age purchasers. Here, police 'sting' operations were commonly featured (e.g. 'Liquor shops fail teen sting', 8 December 2007). Competition between outlets was sometimes believed to be a factor driving under-age sales.

Addiction was a frequently mentioned alcohol-related harm. Outlets were linked to addiction through the provision of low-cost, easily accessible alcohol as a result of the number of outlets and competition between them. Addiction was also linked to other issues such as under-age prostitution or high-risk behaviour in this profession, as well as crime and abuse. For example, in a story following the shooting of a street sex worker, one story reported:

*Six nights ago a girl was shot in the head here in an outbreak of the territorial battles that simmer day and night. Cop cars patrol, hidden cameras roll for faraway control rooms. And in their twilight world of half truths, lies and uncertain gender, fuelled by booze, drugs and cash, the prostitutes don't seem to care ('The mean streets of Hunters Corner', 9 April 2005).*

#### 4.4 THE DRINKING CULTURE

Media stories often referred to the role of alcohol in New Zealand culture in general, as well as its role in particular subcultures. A common feature of such stories was references to a culture of binge-drinking. For example:

*The news that discount retailer The Warehouse is considering beer and wine sales sparked a public outcry yesterday, from consumer groups worried that it will expose more young New Zealanders to the binge-drinking culture. ('Warehouse liquor plans ring alarm bells', 27 September 2005).*

Similarly, in the previously mentioned story about the number of alcohol outlets in Tauranga, a drug and alcohol worker was quoted as saying that there were too many outlets "in light of what we're currently grappling with – just the whole binge-drinking culture that is out of control" ('Too many booze outlets in Tauranga', 30 June 2008). That New Zealand has a binge-drinking culture was often taken as axiomatic. For example, a story on cut-price alcohol reported Gerard Vaughan, the Chief Executive of ALAC, as saying that "it was well-known New Zealand had a binge-drinking culture. 'New Zealanders tend to drink until it's all gone and price is linked with that'" ('Cut-price alcohol in binge spotlight,' 9 May 2008), a view echoed in the same story by Bruce Robertson of the Hospitality Association of New Zealand:

*... people often bought large quantities of alcohol at cheap prices from off-licensed providers such as supermarkets and drank it to 'get smashed'. Frequently they then went to the pubs, bars and clubs in intoxicated states and caused problems for staff and other patrons (Ibid).*

A national binge-drinking culture was thus often invoked in discussions of liquor licensing. For example, a *Waikato Times* editorial writer reflected on the proliferation of bars and outlets since the amendment to the Sale of Liquor Act in 1990:

*Supporters of those changes argued that New Zealand was adopting a European style cafe culture in bars, and more responsible attitudes would emerge from the legislation. A decade on, New Zealanders do enjoy liberal licensing laws... but the downside has been the intolerable rise in violent crime associated with binge drinking ('The legacy of liquor laws', 18 June 2008).*

Such sentiments were common as various commentators contended that liberalisation had been a mistake. Instead of New Zealanders adopting more sophisticated patterns of drinking, the easier access to alcohol, including an increased number of outlets, had compounded the problems inherent in the national binge-drinking culture.

A slightly different analysis was apparent in other stories that referred not to a national drinking culture but to problematic patterns of consumption in certain subcultural groups. For example, some sports were reported as perpetuating a binge-drinking culture, with alcohol being a regular part of post-game socialising (e.g. 'Alcohol plan targets clubs', 15 July 2006). More common were references to binge-drinking being a feature of youth culture. For example, Hamilton retailers were reported as saying "Cheap deals and New Zealand's underage binge-drinking culture are bigger problems than current liquor laws or an over-supply of booze shops" ('Booze approach challenged', 18 June 2008). Similarly, a story about New Year's Eve celebrations in Wanaka in 2006 reported that youths had

fought with police and firefighters, hurled bottles, smashed a car and set it alight. Most of those arrested were between 15 and 20 and all were described by police as “drunk”. A 16-year-old girl, who police described as “paralytic”, was detained in the cells overnight to detoxify.

*“It is a concern that alcohol plays such a big part in young people’s lives,” said (Police Sergeant Aaron) Nicholson. “Our Kiwi booze culture is very harmful to our young people and community.”* (‘Police slam booze culture’, 2 January 2006).

Youth gangs were another subcultural group in which alcohol was reported as playing an important part. This was evident in stories about an incident in 2008 in which three people were injured trying to break up a fight between young people outside a South Auckland liquor store (‘The daughter of a South Auckland dairy owner injured during a youth fight no longer feels safe in Otara’, 2 October 2008). Two years earlier, the then Mayor of Manukau, Sir Barry Curtis, had been reported as advocating liquor bans as a way of combating violence among youth gang members (‘Manukau Mayor calls for community clamp down on street gangs’, 22 August 2006). Alcohol was frequently mentioned in various stories about youth gangs, including stories about serious assaults and murders. For example, during 2005 there was a series of attacks in Otara that culminated in the stabbing of Iulio Naea Kilepoa. A police officer investigating the murder was reported as saying that “the attacks were separate incidents backgrounded by ‘a short history of bad blood between two groups’ fuelled by heavy drinking” (‘Otara victim beaten before murder’, 1 November 2005).

Some stories about cultural factors explicitly linked problem drinking with specific ethnic groups. Again, stories about South Auckland were prominent here. For example, in one of the stories referred to above, Sir Barry Curtis was quite explicit in his contention that the problem of alcohol-fuelled violence “primarily concerned young Maori and Pacific Islanders” (‘Manukau Mayor calls for community clamp down on street gangs’, 22 August 2006). More often, the role of ethnicity was implied rather than explicitly stated. One way this was done was through invoking the image of a warrior culture, as in the novel cum movie ‘Once Were Warriors’. A good example of this is the story carried by *The New Zealand Herald*, headlined ‘Warriors still’ (22 July 2006). This story opens with an explicit reference to the novel:

*Booze governed Jake “Da Muss” Heke in Once Were Warriors, the novel Alan Duff wrote in 1990 about Pine Block (Ford Block) where he grew up in Two Lakes (Rotorua). Heke drank at the pub, then invited his mates back to his house for drunken parties which often ended in violence.*

Much of this story focuses on Ford Block and its ‘Once Were Warriors reputation’. The impetus for the story appears to be four recent homicides, which are referred to near the beginning. Although there is no mention of ethnicity, three of the four victims have identifiably Māori names. Similarly, in discussing the situation in Ford Block, the link between alcohol-fuelled violence and Māori identity is implied rather than stated explicitly. In part, this is done by reporting comments from residents with Māori-sounding names and by citing population statistics. According to the story:

*Maori make up 33 per cent of the (Rotorua) population, more than in any other city bigger than Gisborne. In Fordlands, 71 per cent are Maori, 27 per cent European, 17 per cent Pacific and 2 per cent Asian – obviously quite a few are a mixture of at least two of these.*

This extract illustrates an interesting feature of stories in which ethnicity or culture is mentioned. Pākehā (or European) identity tends to be cited only when demographic statistics are being reported. While individuals from minority groups are frequently identified by their ethnicity, rarely is that the case for Pakeha (or European). On the whole, the dominant group does not carry an ethnic or cultural label. This becomes clear when one considers stories describing a national drinking culture. Not once is such a culture “marked” (Black, 1997) as being predominantly Pakeha. Instead, it is described using terms such as “a New Zealand culture”, “people’s drinking habits”, “society” and “Kiwi booze culture”. As various commentators have noted, leaving the dominant cultural group unmarked serves to problematise Māori, Pacific and other minority groups in ways not applied to Pakeha (e.g. Nairn and McCreanor, 1991).

#### **4.5 REPORTS ON COMMERCIAL ISSUES AND LICENSING**

Policies that resulted in commercial changes in licensing laws, competition and pricing were all represented in the media discourse. There was, however, very little discussion in the media about alcohol advertising or marketing. Many articles discussed how changes in policy that had allowed supermarkets and dairies to sell beer and wine had increased competition in the alcohol market, resulting in both greater access to alcohol and lower prices. Several media reports suggested that the proliferation of small outlets such as dairies had provided an abundance of access to alcohol and low prices, taking advantage of vulnerable populations (‘Booze rules change mooted’, 14 August 2008; ‘South awash with cheap liquor stores’, 21 June 2008). Meanwhile, other articles criticised the supermarkets for their role in allowing easy access to alcohol, particularly with long opening hours and selling alcohol as a ‘loss leader’ to gain market share (e.g. ‘Liquor licence bid meets opposition’, 27 March 2008). In general, it appears that the media regard increased competition through the proliferation and density of alcohol outlets as a negative situation. *The Nelson Mail* provided a concise summary of the media argument:

*It is an attractive argument that ready access to alcohol normalises it to the point where the impressionable young, the weak-willed and downright irresponsible are too easily lured by it. Inevitably, the more widely it is sold, the greater the price competition among retailers and the greater the potential exposure of the ugly effects* (‘Fighting the blight’, 18 June 2008).

Licensing was also often discussed in the media. It appears that the media in general present a standpoint that people are in favour of alcohol licence reform, particularly regarding types of store, opening hours and density of stores, a point we return to below.

The issue of granting off-licences often appeared in the media when there was significant public objection. This included times when outlets appeared in residential areas, as discussed in a story headlined ‘Residential liquor plan falls foul of neighbours’ (3 July 2008). In this case, an application for an off-licence in a residential home encountered significant public opposition, as did a supermarket chain’s application. Another story reported residents as “queuing up against a Christchurch supermarket’s bid for the first full supermarket liquor licence in the country” (‘Liquor licence bid meets opposition’, 27 March 2008). Opening hours for bars and outlets were also represented in the media as being generally unwanted by residents, while proprietors pushed for longer hours.

## 4.6 COMMUNITY CONCERNS

As the above examples suggest, many of the stories reported concerns about the proliferation of liquor licences and/or the harms associated with them. In some cases, as we noted earlier, a critical reading of the story reveals that the link between alcohol and the harm described is tenuous; in some instances, the presence or consumption of alcohol is incidental to the problem being discussed. But while we think it is useful to read stories with a critical eye, it remains undeniable that alcohol is seriously implicated in a wide range of significant social problems and that this is causing a lot of concern in the community. In this final section, we turn our attention to media depictions of public concern and to examples of how communities are reacting to the problems associated with alcohol.

Unsurprisingly, the things about which people were reported as being concerned quite closely mirrored the sorts of alcohol-related harm we have discussed earlier in this section. Crime and disorder featured frequently. For example, in a story about South Auckland it was reported that:

*Manukau City councillor Daniel Newman has been a vocal opponent of what he calls the “suburbanisation of alcohol” in Manurewa. He’s outraged at the proliferation of liquor licences in Manukau – from 105 in 1990 to 502 now.*

*“You can’t have an increase like that, generally in suburban neighbourhoods, without (social cost),” he said. “They attract graffiti, problems associated with group assembly, drunk and disorderly behaviour, petty crime, family violence. People see opportunities to sell cut-price liquor to people who shouldn’t be consuming it” (‘It’s a rough area, eh’, 15 June 2008).*

Concerns often focused on the behaviour of young people. For example:

*Waikanae Beach residents fear another liquor store opening in their seaside village will increase youth binge drinking.*

*A public notice in a local newspaper last week alerted residents to Complete Catering’s application to open a “boutique specialist bottlestore” from 9am to 11pm seven days a week in Ono St, sparking strong opposition in the community.*

*Resident Tony Taylor said it was madness to allow another licensed premises when there were already six at the beach, including an off-licence. “In view of the other tragedies in bottle stores around the country, it is socially irresponsible. The less chance we give idiots and hoons to express themselves at others’ expense, the better.”*

*He wants an independent community social impact report on the issue. (‘New Waikanae liquor store ‘irresponsible’’, 8 July 2008)*

People’s fears for their personal safety featured in many of the stories. The victims of robberies and/or people associated with them, such as family members and co-workers, were often interviewed by journalists and their fears reported in the media. For example, Newstalk ZB reported on 6 October 2008 that:

*The wife of an Auckland dairy owner who was stabbed on Friday is warning all dairy owners to be on alert.*

*Shashikant Prema was attacked in the couple’s dairy and Lotto shop in the west Auckland suburb of New Windsor. He is in a stable condition in Auckland Hospital with wounds to his back and neck.*

*Damyanti Prema says small shop owners must always be assessing their personal safety* ('Wife of west Auckland dairy owner stabbed on Friday, warns all dairy owners to assess their personal safety and be on alert', 6 October 2008).

Such concerns sometimes lead to debates about self-defence. The dairy owner referred to above was subsequently reported as being concerned that he may have been charged should he have tried to defend himself, citing the case of a liquor store owner who had been charged three days earlier after intervening in a brawl involving "apparently drunken youths" ('Stabbed dairy owner's dilemma', 6 October 2008). Just a day earlier, the *Sunday Star-Times* reported that "Frightened shopkeepers have turned to a gun store for advice about guns, pepper spray and even a bulletproof vest" ('Uneasy shopkeepers ready to arm themselves', 5 October 2008).

Unsurprisingly, concerns about personal safety often spread well beyond the people personally involved in alcohol-related violence. A graphic illustration of this was the march up Auckland's Ti Rakau Drive on 5 July 2008, which, according to one report, attracted more than 10,000 participants ('Asian anti-crime vigilante group draws 10,000 marchers in Auckland protest rally', 5 July 2008). Of course the concerns being expressed here were broader than alcohol-related violence, but clearly alcohol was implicated in at least some of the events precipitating the march.

Another set of concerns revolved around young people's ready access to alcohol and the impact of drinking on them. For example, the Deputy Mayor of Porirua, Litea Ah Hoi, featured in a story about the number of liquor outlets in the city:

*There are 31 off-licence premises serving Porirua's 50,000 residents, including supermarkets and at least 20 smaller superettes. Some sell RTDs – which target young drinkers – so cheaply that binge drinking has become the norm for those on either side of the legal drinking age of 18, Ms Ah Hoi said.*

*"What they normally do is find a dark spot around the area, which includes our schools, and drink until they become six-foot tall and bullet-proof.*

*"Then they will go out and showcase a lot of their anti- social behaviour by mugging people, robbing our houses and shops, and just terrorising our streets. It is appalling." ("Easy access proves a heady cocktail", 18 June 2008).*

Such concerns led to calls for retailers convicted of selling alcohol to minors to lose their liquor licences (ibid), calls for reducing the number of outlets (e.g. 'Alcohol: Mixed reception for new liquor-sales legislation', 8 August 2008) and calls for liquor bans (e.g. 'Gangs spark call for Flaxmere liquor ban', 12 October 2006).

Concerns about young people – and children – were behind another set of stories. These stories reported opposition to the siting of liquor outlets near schools. In this context, vandalism, broken glass, disorderly behaviour, violence and exposure to liquor advertising were mentioned as hazards to children that were thought to be associated with liquor outlets. A typical story covered plans to open a store opposite Cannons Creek School.

*Cannons Creek principal Ruth O'Neill said the area had been plagued by youths drinking in school grounds at night, drunks entering the school during the day, and alcohol-fuelled vandalism at the school costing more than \$30,000 in one year.*

*"We would expect there would be an increase in intoxicated people in the area and by the school. That's not something that we want our children to be exposed to. The dairy sells beer and wine but there's no hard liquor."*

*There were already several liquor stores nearby, she said ('Backlash at plans for liquor store near school', 26 September 2008).*

According to this story, a petition opposing the store attracted almost 700 signatures in the space of two weeks. Seven hundred signatures in Cannons Creek suggest a high level of opposition to this particular outlet. So did another 700-signature petition mentioned in the media. This earlier petition was recalled in two stories covering the 2008 murder of liquor store owner Navtej Singh: four years earlier, 700 people had signed a petition against a licence being granted to the Manurewa shop owned by Mr Singh ('Scumbags the real problem', 22 June 2008; 'There may well be a problem with the number of liquor outlets in this country', 29 June 2008).

While there are many such stories about opposition to the granting of licences, it is generally not possible to gauge the extent of concern about the number and distribution of outlets. One exception is a *Waikato Times* story reporting the results of a professionally run survey the paper commissioned in Hamilton. The survey was conducted in August 2008 when Parliament was considering the Sale and Supply of Liquor and Liquor Enforcement Bill. It asked, "Do you support or oppose Government plans to limit or reduce the number of liquor outlets in the suburbs?". Of the 833 voting-age respondents questioned, 42% said that they supported the plans and 32% that they strongly supported the plans. Just 10% opposed the plans ('Cut back the booze', 4 September 2008). Earlier that year, *The Dominion Post* interviewed a much smaller number of people in a vox pop piece. Asked "Should the Government slash the number of liquor outlets in Porirua to help curb associated violent behaviour?", most interviewees thought that there were either enough or too many outlets ('Easy access proves a heady cocktail', 18 June 2008).

*The Dominion Post's* vox pop piece is one of the few stories in our database in which the views of the public have been sought directly. More often, the media seek comment from professionals of various sorts. Two groups of people dominate here: police officers and politicians. This is not surprising. Police officers often deal with alcohol-related accidents, violence and disorder and journalists often seek them out for comment. For example, this story about liquor outlets in Tauranga:

*Western Bay of Plenty police area commander Inspector Mike Clement agreed alcohol availability contributed to crime in Tauranga. "I think the accessibility of alcohol has something to do with everything that follows from that, from disorder to the top end of violent offending."*

*"We know absolutely that alcohol is a major contributor to all of crime and a number of social issues" ('Too many booze outlets in Tauranga', 30 June 2008).*

Politicians, especially local government politicians, were also frequently featured voicing concerns about liquor outlets. Again, this is unsurprising: local councillors are often sought out in relation to neighbourhood-level concerns of all kinds, and alcohol-related issues are often on council agendas.

Typically, councillors were reported as favouring local control over licensing decisions. For example, Manukau City Councillor Dick Quax was interviewed in a story about violence in Otara. He was reported as saying that:

*There were also too many liquor outlets with extended opening hours. "Nobody needs a liquor outlet on the corner of every street and that's almost what's occurring," he said. "People need to have a greater say as to whether liquor can be sold. We really want to ensure that Otara remains a safe place for people to go about their lawful business, to enjoy the area, to go there and shop and just make sure it's safe for the community" ('Maori wardens may retreat from Otara streets because of violence', 15 December 2006).*

Less frequently, central government politicians were reported as being involved in debate about alcohol outlets. This was particularly the case when specific legislative proposals were being debated, such as the Sale and Supply of Liquor and Liquor Enforcement Bill.

Although less frequently than police officers and politicians, social and health workers of various kinds were also featured in media stories about liquor outlets. For example, a story in *The Marlborough Express* stated:

*Blenheim Drug Arm chairman Roy Ramsey said the practice of using alcohol as a loss leader, where it is sold at low or below cost prices to attract customers, was "abhorrent", as the cheap prices encouraged binge drinking and meant supermarket food shoppers were subsidising losses from beer and wine sales ('Cut price alcohol in binge spotlight', 9 May 2008).*

Māori wardens, social workers and drug and alcohol counsellors were reported expressing similar views.

Finally, our analysis of community concerns would not be complete without mentioning a small number of stories in which views counter to the majority featured. That is, while the overwhelming weight of opinion was that there were too many outlets – or at least too many outlets in certain areas – this was not unanimous. Unsurprisingly, the counter view most frequently came from retailers who sold liquor. For example, *The Nelson Mail* reported that local shop owners felt that they were being "unfairly targeted" by the Sale and Supply of Liquor and Liquor Enforcement Bill.

*Brook St Store owner Martin Meads said the proposal would not make "one cent of difference" to alcohol-related violence, and he hoped it would not be passed into law in his lifetime.*

*He said grocery store owners knew the customers within their communities, knew who was underage, and who not to sell to because they were buying alcohol for others.*

*"We're community-orientated. We keep an eye on that sort of thing" ('Dairies reject planned liquor sales ban', 8 August 2008).*

A small number of commentators argued that a focus on outlets was misplaced. An opinion piece in *The New Zealand Herald*, following the murder of Navtej Singh, put it this way:

*Yes, the murder took place in Mr Singh's liquor outlet. But the liquor outlet is not the problem. The real problem is the murdering, amoral scumbags who can shoot a defenceless man and leave, laughing.*

*You can close every bottle store in town and we'll still have these craven, murdering lowlife among us. Shut the bottle stores and they'll kill dairy owners. Or service station proprietors. Or taxi drivers. Or anyone who looks at them sideways on the street ('There may well be a problem with the number of liquor outlets in this country', 29 June 2008).*

#### **4.7 SUMMARY**

The media reports included in this analysis presented a strongly negative view of alcohol. Many of the reports implicated consumption of excessive amounts of alcohol in a wide range of harms, including disorderly behaviour, traffic accidents, family violence, child abuse and other forms of violence and crime. Less frequently, adverse health impacts were mentioned. Certain widely reported murders have probably contributed to greater media coverage of alcohol-related issues. As we have suggested, sometimes the link between alcohol and the harm under discussion is somewhat tenuous, but even allowing for the possibility that alcohol may be wrongly implicated in some cases, the overall picture is a deeply concerning one.

Binge-drinking, particularly among young people, was a frequent focus of concern. Frequently mentioned in this regard was the ready availability of relatively cheap alcohol, especially ready-to-drink spirits, along with lax observance of age restrictions. Along with young people, gangs and Māori and Pacific people came under close attention. The image of 'Once Were Warriors' was often invoked in stories portraying the problems as primarily associated with certain subcultural groups. On the other hand, a smaller number of stories pointed to a national drinking culture that affects a much wider range of people.

From stories focused on the narrower issues of liquor outlets, three main themes emerged. Firstly, the dominant view was that there were too many outlets, at least in the communities under discussion. Secondly, various concerns were reported about the distribution of outlets: that they are clustered in areas of deprivation; that such clustering promotes price competition and longer opening hours, both of which increase problem drinking; and that locating outlets near schools is particularly problematic. Thirdly, media reports suggest a strong desire for local controls over the granting of liquor licences.

Petitions and protests gave expression to some of these concerns. These are unreliable indicators of how widely held the views expressed are, but the one systematic survey reported in our collection of stories indicated that a large majority of people support the general idea of controlling the number of liquor outlets in suburban areas.

## 5 CONCLUSION

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This report reviews the international academic literature on the impacts of liquor outlets and in particular the impacts of liquor outlet density, and reviews the New Zealand media reports related to the impacts of liquor outlets. The academic literature and media reports represent two sides to the published debate on the impacts of liquor outlets.

Overall, the international academic literature provides mixed results for the relationship between liquor outlet density and a range of outcome variables. While some studies have clearly shown negative consequences associated with liquor outlets, others have failed to show any significant effects. The wide range of results and methodologies employed makes it difficult to arrive at general conclusions about the relationship between liquor outlet density and outcome variables. Further, it is likely that these relationships are highly context specific, as well as varying temporally, spatially and by the type of outlet considered.

However, although there is a lack of a consensus on the relationship between liquor outlet density and alcohol-related harms in the academic literature, New Zealand media reports surrounding alcohol and alcohol outlets have presented a generally negative, causative relationship where alcohol availability is described broadly as a precursor to a range of harms. Three main themes emerged in relation to liquor outlets. Firstly, the dominant view was that there were too many outlets, at least in the communities under discussion. Secondly, various concerns were reported about the distribution of outlets: that they are clustered in areas of deprivation; that such clustering promotes price competition and longer opening hours, both of which increase problem drinking; and that locating outlets near schools is particularly problematic. Thirdly, media reports suggest a strong desire for local controls over the granting of liquor licences.

The level of concern about the issue of liquor outlet density is clear from the media review as well as discussions with stakeholders in the community (see McNeill et al., 2012). However, there is a lack of consensus in the academic literature about the nature and extent of any relationship between liquor outlets and outcome variables such as crime statistics – these relationships are likely to be highly context specific. This suggests that further research is needed at a local level in order to investigate whether a relationship exists between liquor outlet density and alcohol-related harms in each location.

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## Appendix I: Summary of published and unpublished studies on the impacts of liquor outlets and liquor outlet density

Research Paper	Method	Spatial?	Location	Outcome Variable/s	Results
Abbey et al. (1990a; 1990b)	Cross-sectional	No	Detroit, Mi., USA	Consumption	Insig
Abbey et al. (1993)	Cross-sectional	No	Michigan, USA	Alcohol consumption	Insig
Alaniz et al. (1996)	Cross-sectional	Yes	Northern California, USA	Violent crime arrest rate among Latino youth	Sig +ve
Alaniz et al. (1998)	Cross-sectional	Yes	Northern California, USA	Violent crime arrest rate among Latino youth	Sig +ve
Berman et al. (2000)	Cross-sectional	No	Native villages in Alaska, USA	Serious injury rates	Sig +ve
Blose & Holder (1987)	Natural experiment	No	North Carolina, USA	Alcohol-related crashes, and single-vehicle night-time crashes involving male drivers	Sig +ve for alcohol-related crashes and SVNM for those aged 21+ only
Britt et al. (2005)	Cross-sectional	Yes	Minneapolis, Mn., USA	Criminal violence (homicide, rape, robbery, aggravated assault, burglary, motor vehicle theft, and arson)	Sig +ve
Brower & Carroll (2007)	GIS mapping	No	Madison, Wi., USA	Crime	Crime followed patterns that suggested association with outlet density
Brown & Jewell (1996)	Cross-sectional	No	Texas, USA	Cirrhosis death rates	Sig +ve
Brown et al. (1996)	Cross-sectional	No	Texas, USA	Fatal alcohol-related motor vehicle crashes	Sig +ve
Chaloupka & Wechsler (1996)	Cross-sectional	No	USA	Binge-drinking among college students	Sig +ve for outlets near campus, insig for bars on campus
Chikritzhs & Stockwell (2002)	Natural experiment	No	Perth, WA, Australia	Assaults associated with hotels	Sig +ve
Chikritzhs & Stockwell (2006)	Natural experiment	No	Perth, WA, Australia	Road crashes involving impaired drivers	Sig +ve
Chikritzhs et al. (2007)	Cross-sectional	Yes	Western Australia, Australia	Assaults (on licensed premises, on private premises, and in total)	Sig +ve
Chiu et al. (1997)	Natural experiment	No	Barrow, Alaska, USA	Outpatient alcohol-related hospital visits	Sig +ve

Cohen et al. (2006)	Natural experiment	Yes	Los Angeles, Ca., USA	Annual gonorrhoea rate	Sig +ve
Colon (1981)	Cross-sectional	No	USA	Cirrhosis death rates	Sig +ve
Colon et al. (1982)	Cross-sectional	No	USA	Consumption, and cirrhosis death rates	Sig +ve
Colon (1982)	Cross-sectional	No	USA	Single-vehicle fatalities	Sig +ve
Colon (1983)	Cross-sectional	No	USA	Fatal alcohol-related motor vehicle crashes	Sig -ve
Conway (2002)	Natural experiment	No	Piha Beach, New Zealand	Alcohol-related disorder and injuries, fire service call-outs to vehicle incidents, and the overall crime rate	Sig +ve, but not quantitatively tested
Costanza et al. (2001)	Cross-sectional	Yes	Baton Rouge, La., USA	Arrest rates for robbery and aggravated assault	Sig +ve for package only (off-licence) outlets, insig for taverns
Donnelly et al. (2006)	Cross-sectional	No	New South Wales, Australia	Reported neighbourhood problems with drunkenness and property damage	Sig +ve
Duailibi et al. (2007)	Natural experiment	No	Diadema, Brazil	Homicides, and assaults against women	Sig +ve for homicide, insig +ve for assaults against women
Duncan et al. (2002)	Cross-sectional	No	1 city in Pacific Northwest, USA	Social cohesion scale	Insig
Escobedo & Ortiz (2002)	Cross-sectional	No	New Mexico, USA	Suicide, homicide, drink-driving arrests, drug-related deaths, alcohol-related deaths and crashes	Sig +ve for suicide, alcohol-related crashes and alcohol-related crash fatalities, otherwise insig
Fitzgerald & Mulford (1992)	Natural experiment	No	Iowa, USA	Heavy and problem drinking	Insig 1 year after liberalisation , but sig +ve 4 years after liberalisation
Fitzgerald & Mulford (1993)	Natural experiment	No	Iowa, USA	Alcohol consumption	Insig
Freisthler & Weiss (2008)	Panel	Yes	California, USA	Referrals to Child Protection Services	Sig +ve
Freisthler (2004)	Cross-sectional	Yes	California, USA	Substantiated reports of child abuse and neglect	Bars sig +ve, Off-licences and restaurants insig
Freisthler et al. (2003)	Cross-sectional	No	Sacramento, Ca., USA	Sales to pseudo intoxicated persons	Sig +ve for close on-licence outlets, insig for close off-licence outlets
Freisthler et al. (2004)	Cross-sectional	Yes	California, USA	Substantiated reports of child abuse and neglect	Bars sig +ve for neglect, off-licences sig +ve for abuse
Freisthler et al.	Cross-sectional	Yes	California, USA	Child maltreatment	Sig +ve for bars, insig for

(2005)					restaurants and off-licence
Freisthler et al. (2007)	Panel	Yes	California, USA	Child Protection Services referrals, substantiations, and foster care entries	Sig +ve for off-licence, sig -ve for restaurants
Godfrey (1988)	Time series	No	UK	Demand for beer, wine, spirits	Sig +ve for beer, insig for wine and spirits
Gorman et al. (1998a)	Cross-sectional	No	New Jersey, USA	Domestic violence rates	Insig
Gorman et al. (1998b)	Cross-sectional	No	New Jersey, USA	Assault rates	Sig +ve
Gorman et al. (2001)	Cross-sectional	Yes	Camden, NJ, USA	Violent crime (criminal homicide, forcible rape, aggravated assault and robbery)	Sig +ve
Gorman et al. (2005)	Cross-sectional	Yes	Houston, Tx., USA	Violent crime (murder, rape, robbery and aggravated assault)	Sig +ve
Roman et al. (2008)	Cross-sectional	Yes	D.C., USA	Aggravated assault, disorderly conduct, and domestic violence	Assault sig +ve with on-licence, but insig with off-licence; disorder sig +ve with both; domestic violence sig +ve with off-licence but sig -ve with on-licence
Green-Mathieu (2006)	Cross-sectional	No	Connecticut, USA	Alcohol consumption	Insig
Gruenewald & Ponicki (1995)	Panel	No	USA	Single-vehicle fatalities	Sig +ve 4am-8am, but sig -ve 8pm-4am
Gruenewald & Remer (2006)	Panel	Yes	California, USA	Hospital discharge rates for violent assaults	Sig +ve
Gruenewald et al. (1993)	Panel	No	USA	Sales of wine and spirits	Sig +ve
Gruenewald et al. (1996)	Cross-sectional	Yes	California, USA	Drinking and driving, and single-vehicle night-time crashes	Sig +ve for crashes with restaurants but insig with bars, drink-driving insig
Gruenewald et al. (2000)	Panel	?	California, USA	Alcohol sales	Insig
Gruenewald et al. (2002a)	Cross-sectional	No	California, USA	3 measures of drinking and driving	Sig +ve for restaurants, insig for bars, sig -ve for off-licence
Gruenewald et al. (2006)	Cross-sectional	Yes	California, USA	Hospital discharge rates for violent assaults	Sig +ve for off-licence, but insig -ve for bars

Gyimah-Brempong & Racine (2006)	Cross-sectional	No	Detroit, Mi., USA	FBI Crime Index; violent crime index (homicide, rape, robbery, aggravated assault), economic crime index (burglary, larceny, motor vehicle theft), and homicide	Sig +ve for all crime indices
Gyimah-Brempong (2001)	Cross-sectional	No	Detroit, Mi., USA	FBI Crime Index	Sig +ve
Gyimah-Brempong (2006)	Cross-sectional	No	Detroit, Mi., USA	FBI Crime Index; violent crime index (homicide, rape, robbery, aggravated assault), economic crime index (burglary, larceny, motor vehicle theft), and homicide	Sig +ve for all crime indices
Harford et al. (1979)	Cross-sectional	No	USA	Per capita consumption	Sig +ve
Hay et al. (2007)	Cross-sectional	Yes	New Zealand	Social deprivation	Sig +ve, except in certain rural areas
Huckle et al. (2008)	Cross-sectional	Yes	Auckland, New Zealand	Alcohol consumption among young people (aged 12-17)	Sig +ve for quantity, insig for frequency of drinking or frequency of drunkenness
Ireland & Tommeny (1993)	Cross-sectional	No	Sydney, NSW, Australia	Incidents of crime reported to police	Not quantitatively tested
Jewell & Brown (1995)	Cross-sectional	No	Texas, USA	Fatal accident rate, injury accident rate, non-injury accident rate	Sig +ve
Jones-Webb et al. (2008)	Cross-sectional	Yes	10 U.S. cities	Homicides	Insig
Kelleher et al. (1996)	Cross-sectional	No	Arkansas, USA	Young (15-24) male fatal motor vehicle crashes	Insig
Kuntsche & Kuendig (2005)	Cross-sectional	No	Switzerland	Youth drinking	Sig +ve
Kuntsche et al. (2008)	Cross-sectional	No	Switzerland	Volume drinking and frequency of drinking among children (aged 14-15)	Volume drinking sig +ve for on-licence but not off-licence; frequency insig for both
Kypri et al. (2008)	Cross-sectional	No	New Zealand	Alcohol consumption by tertiary students, alcohol problems scale, and second-hand effects	Sig +ve for all indicators
Landen et al. (1997)	Cross-sectional	No	Remote villages in Alaska, USA	Injury mortality rate and alcohol-related injury mortality rate	Sig +ve
Lapham et al.	Natural	Yes	New Mexico, USA	Alcohol-related crashes	Insig

(2004)	experiment				
LaScala et al. (2000)	Cross-sectional	Yes	San Francisco, Ca., USA	Pedestrian injury collisions	Sig +ve for bars, but insig for off-licence and restaurants
LaScala et al. (2001)	Cross-sectional	Yes	California, USA	Pedestrian injury collisions (alcohol-related and non-alcohol related)	Sig +ve for bars, but insig for off-licence
Lester (1995)	Cross-sectional	No	USA	State-level homicide rates and suicide rates	Insig
Lipton & Gruenewald (2002)	Cross-sectional	Yes	California, USA	Hospital discharge rates for violent assaults	Sig +ve for bars, but insig for off-licence
Livingston (2008a)	Panel	Yes	Melbourne, Vic., Australia	Night-time assaults (Friday/Saturday nights)	Sig +ve but varied by licence type and suburb type
Livingston (2008b)	Cross-sectional	Yes	Melbourne, Vic., Australia	Night-time assaults (Friday/Saturday nights)	Sig +ve
Mäkelä et al. (2002)	Natural experiment	No	Nordic countries	Alcohol consumption	Sig +ve for Finland, Iceland, Sweden, insig for Norway
Markowitz & Grossman (1998)	Cross-sectional	No	USA	Violence towards children	Sig +ve for severe violence, insig for overall violence and number of acts of overall violence
Markowitz & Grossman (2000)	Cross-sectional	No	USA	Severe violence towards children	Insig
Mathieson (2005)	Cross-sectional	No	Auckland, New Zealand	Night-time accidents	Overall sig +ve for restaurant and off-licence density and sig -ve for bar density, but varies by DHB area
McCarthy (2003)	Panel	No	California, USA	Alcohol-related crashes	Sig -ve for off-licence, sig +ve for on-licence
McKinney et al. (2009)	Cross-sectional	No	USA	Intimate partner violence	Sig +ve for on-licence, insig for off-licence
McLaughlin & Harrison-Stewart (1992)	Natural experiment	No	Fremantle, WA, Australia	Alcohol consumption among young (18-28) males	Insig
McMillan et al. (2007)	Natural experiment	Yes	New Mexico, USA	Alcohol-related crashes	Sig +ve but variations by county
Meliker et al. (2004)	Cross-sectional	No	Washtenaw County, Mi., USA	Alcohol-related motor vehicle crashes	Insig
Millar &	Cross-sectional	Yes	California, USA	Drinking and driving, and single-vehicle	Sig +ve for crashes, insig for

Gruenewald (1997)				night-time crashes	drinking and driving
Miller et al. (2006)	Cross-sectional	No	USA	Under-21 drinking, binge-drinking, alcohol-impaired driving deaths.	Insig
Mulford & Fitzgerald (1988)	Natural experiment	No	Iowa, USA	Wine consumption, heavy drinker and problem drinker rates	Insig
Mulford et al. (1992)	Natural experiment	No	Iowa, USA	Alcohol consumption	Insig
Nielsen & Martinez (2003)	Cross-sectional	Yes	Miami, FL., USA	Non-lethal violence (aggravated assault and robbery)	Sig +ve
Nielsen et al. (2005)	Cross-sectional	Yes	Miami, FL., USA	Race-specific robberies and aggravated assaults	Sig +ve for Latinos but insig for blacks
Nelson (2008)	Panel	No	USA	Binge-drinking	Sig +ve, but became insig after controlling for poverty, race, unemployment
Norstrom & Skog (2003)	Natural experiment	No	Sweden	Alcohol sales, drinking and driving, and assaults	Sig +ve for sales, sig +ve for drinking and driving, insig for assaults
Norstrom & Skog (2005)	Natural experiment	No	Sweden	Alcohol sales, drinking and driving, and assaults	Sig +ve for sales, sig +ve for drinking and driving, insig for assaults
Norstrom (2000)	Time series	No	Norway	Violent crimes investigated and convictions	Sig +ve for investigations, insig +ve for convictions
Northridge et al. (1986)	Natural experiment	No	West Fife, Scotland	Hospital admissions for self-poisoning (overdoses)	Sig +ve
Olafsdottir & Leifman (2002)	Natural experiment	No	Iceland	Alcohol consumption	Sig +ve
Parker & Wolz (1979)	Cross-sectional	No	USA	Heavy drinking and alcoholism rates	Insig
Parker (1995)	Cross-sectional	No	USA	Homicide (robbery homicide, felony other homicide, family intimate homicide, family other homicide, primary non-intimate homicide)	Sig +ve only for family other homicide, insig for all others
Parker et al. (1978)	Cross-sectional	No	USA	Alcohol consumption and alcoholism rates	Sig +ve
Pearce et al. (2008)	Cross-sectional	No	New Zealand	Deprivation	More alcohol outlets in more deprived areas
Pollack et al. (2005)	Cross-sectional	No	California, USA	Alcohol consumption	Insig +ve

Rabow & Watts (1982)	Cross-sectional	No	California, USA	Public drunkenness arrests, misdemeanour and felony drunk-driving arrests, and cirrhosis rates	Sig +ve for felony drunk-driving, on-licence sig +ve for cirrhosis (but off-licence insig), insig for misdemeanor drunk-driving and public drunkenness
Ramstedt (2002)	Natural experiment	No	Sweden	Alcohol-related hospitalisations	Sig +ve
Reid et al. (2003)	Cross-sectional	No	Kansas City, Mo., USA	Assault rates	Sig +ve
Roncek & Bell (1981)	Cross-sectional	No	Cleveland, Oh., USA	Crime rates (murder, rape, assault, robbery, burglary, grand theft and auto theft)	Sig +ve
Roncek & Maier (1991)	Cross-sectional	No	Cleveland, Oh., USA	Crime rates (murder, rape, robbery, aggravated assault, burglary, grand theft and auto theft)	Sig +ve
Rossow (2000)	Time series	No	Norway	Demand for illegal spirits	Sig -ve for moonshine, insig for smuggled spirits
Rossow (2002)	Natural experiment	No	Norway	Drink-driving, drunk and disorderly behaviour, violent crime	Sig +ve for violent crime, insig for others
Rush et al. (1986)	LISREL (Cross-sectional)	No	Ontario, Canada	Alcohol-related morbidity and alcohol-related mortality	Sig +ve for morbidity, insig for mortality
Scribner et al. (1994)	Cross-sectional	No	Los Angeles, Ca., USA	Alcohol-related motor vehicle crashes (causing injury or property damage)	Injury-related crashes sig +ve for restaurants, liquor stores and mini-markets but not bars; property damage crashes sig +ve for restaurants and bars, but not others
Scribner et al. (1995)	Cross-sectional	No	Los Angeles, Ca., USA	Assaultive violence	Sig +ve
Scribner et al. (1998)	Cross-sectional	No	New Orleans, La., USA	Gonorrhoea rate	Sig +ve
Scribner et al. (1999)	Cross-sectional	No	New Orleans, La., USA	Homicide	Sig +ve for off-licence, but insig +ve for on-licence
Scribner et al. (2000)	Cross-sectional	No	New Orleans, La., USA	Alcohol consumption	Sig +ve at neighbourhood level, insig at individual level
Scribner et al. (2007)	Natural experiment	Yes	Los Angeles, Ca., USA	Civic engagement (voting rates)	Sig -ve

Scribner et al. (2008)	Cross-sectional	No	USA	Alcohol consumption among college students	Sig +ve
Smith (1986)	Cross-sectional	No	Perth, WA, Australia	Alcohol consumption	Sig +ve
Smith (1987)	Natural experiment	No	New South Wales, Australia	Traffic accidents	Sig +ve for 6pm-11:59pm Sundays
Smith (1988a)	Natural experiment	No	Tasmania, Australia	Traffic accidents	Sig +ve
Smith (1988b)	Natural experiment	No	Brisbane, Queensland, Australia	Traffic accidents	Sig +ve
Smith (1989)	Time series	No	Western Australia, Australia	Liver cirrhosis, male driver and motorcyclist mortality	Sig +ve for liver cirrhosis, sig -ve for male driver and motorcyclist mortality
Smith (1990)	Natural experiment	No	Victoria, Australia	Traffic accidents	Sig +ve
Speer et al. (1998)	Cross-sectional	No	Newark, NJ, USA	Violent crime (criminal homicide, forcible rape, aggravated assault and robbery)	Sig +ve
Stevenson (1996)	Cross-sectional	No	NSW, Australia	Crime rates (assault, offensive behaviour and malicious damage)	Assault sig +ve with hotels only, offensive behaviour sig +ve with off-licence, clubs and hotels, malicious damage sig +ve with off-licence, hotels and restaurants
Stevenson et al. (1998)	Case-control study	No	Gwinnett County, Ga., USA	Motor vehicle crashes	Insig
Stevenson et al. (1999a)	Cross-sectional	Yes	NSW, Australia	Malicious damage and offensive behaviour	Insig after controlling for alcohol sales
Stevenson et al. (1999b)	Cross-sectional	Yes	NSW, Australia	Assault rates	Sig +ve for Sydney; insig -ve for country NSW
Stitt & Giacomassi (1992)	Cross-sectional	No	USA	DUI, drunkenness, liquor law violations, disorderly conduct and vagrancy	Sig +ve for DUI, drunkenness, disorderly conduct, liquor law violations (in 1983 but not 1982), insig for vagrancy
Tatlow et al. (2000)	Cross-sectional	No	San Diego, Ca., USA	Alcohol-related hospitalisations	Sig +ve
Treno et al. (2001)	Cross-sectional	Yes	California, USA	Self-reported injuries	Sig +ve
Treno et al. (2003)	Cross-sectional	No	California, USA	Drinking and driving, and riding with a	Sig +ve

				drinking driver	
Treno et al. (2008b)	Cross-sectional	No	California, USA	Youth (aged 14-16) access to alcohol	Sig +ve
Treno et al. (2008a)	Cross-sectional	Yes	California, USA	Violence (hostility index, aggressive norms index, alcohol aggression index)	Bar density sig -ve for aggressive norms, sig +ve for alcohol aggression, insig for hostility
Treno et al. (2007)	Panel	Yes	California, USA	Hospitalised traffic injuries, and alcohol-involved traffic crashes	Sig +ve for bars and off-licence, insig for restaurants
Trolldal (2005a)	Natural experiment	No	Alberta, Canada	Fatal traffic crashes	Insig
Trolldal (2005b)	Time series	No	Canada	Alcohol sales	Sig +ve in 2 out of 20 analyses
Trolldal (2005c)	Time series	No	Quebec, Canada	Alcohol sales	Sig +ve for 1978 change, not for 1983/84 changes
Truong & Sturm (2007)	Cross-sectional	No	California, USA	Problem drinking among adults (excess alcohol consumption, heavy episodic drinking, drinking and driving, with drinking-driver)	Sig +ve in 17 out of 240 analyses
van Oers & Garretsen (1993)	Cross-sectional	No	Rotterdam, Netherlands	Number of alcohol users and traffic injuries	Sig +ve
Vingilis et al. (2005)	Natural experiment	No	Ontario, Canada	Traffic fatalities (total and alcohol related)	Insig
Wagenaar & Holder (1995)	Natural experiment	No	USA	Wine consumption	Sig +ve
Wagenaar & Langley (1995)	Natural experiment	No	New Zealand	Wine consumption	Sig +ve
Waller et al. (2008)	Panel	Yes	Houston, Tx., USA	Violent crime (murder, rape, robbery and aggravated assault)	Sig +ve with different effects spatially
Watts & Rabow (1983)	Cross-sectional	No	California, USA	Alcohol-related arrests (drunk-driving and public drunkenness) and cirrhosis rates	Alcohol-related arrests sig +ve for on-premise outlets; cirrhosis rates sig +ve for all except beer-only on-premise
Wechsler et al. (2002)	Cross-sectional	No	USA	Second-hand effects (litter, noise, vandalism, drunkenness, fighting, etc.)	Sig +ve
Weitzman et al. (2003)	Cross-sectional	No	USA	Heavy drinking, frequent drinking and problem drinking among college students	Sig +ve
West (1997)	Natural	No	Alberta, Canada	Crime, liquor and traffic offences	No change, but not

	experiment				quantitatively tested
Winn & Giacomassi (1993)	Cross-sectional	No	Kentucky, USA	Fatal alcohol-related motor vehicle crashes	Sig +ve
Wood & Gruenewald (2006)	Cross-sectional	No	Native villages in Alaska, USA	Serious injury rates	Sig +ve
Yu et al. (2008a)	Time series	Yes	Los Angeles, Ca., USA	Assault rates	Sig +ve
Yu et al. (2008b)	Natural experiment	Yes	Los Angeles, Ca., USA	Assault rates	Sig +ve
Zhu et al. (2004)	Cross-sectional	Yes	Austin and San Antonio, Tx., USA	Violent crime (murder, rape and robbery)	Sig +ve
Zhu et al. (2006)	Cross-sectional	No	Houston, Tx., USA	Violent crime (murder, rape, robbery and aggravated assault)	Sig +ve