

BACKGROUND PAPER

**of Supporting Evidence
to the
South Island District Health Boards'**

POSITION STATEMENT on ALCOHOL

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Executive summary

- This background paper provides supporting evidence to the accompanying Position Statement. It outlines the current legislation and regulations relating to alcohol in New Zealand, followed by the effects of alcohol on personal health, the social and economic harms related to alcohol, and approaches to reduce alcohol-related harm.
- The quantity of alcohol available for consumption, the number and variety of locations where alcohol is sold in both on- and off-licensed premises, and the relatively cheap price mean that alcohol is widely available in New Zealand. Additionally, there are almost no restrictions on the hours of the day or days of the year on which alcohol may be sold.
- The main piece of legislation controlling alcohol in New Zealand is the Sale of Liquor Act (1989) and its subsequent amendments. The Act regulates the conditions under which alcohol may be bought and sold and the minimum purchase age. It also sets out penalties for breaching those conditions.
- Advertising of alcohol is controlled by the Broadcasting Act (1993), and restrictions on driving after drinking alcohol are dealt with in the Land Transport Act (1998) and its amendments. The Resource Management Act (1991) and the Local Government Act (2001) also have provisions that allow local government bodies to determine where alcohol is bought and sold in their district.
- The Alcohol Law Reform Bill currently before Parliament aims to reduce the access to alcohol by limiting the range of outlets that may sell alcohol, controlling the density of alcohol outlets, reducing the alcohol content of some drinks and tightening up on marketing. The Bill also proposes raising the purchase age for off licensed premises and higher penalties for some liquor-related offences .
- Most New Zealanders drink at least some alcohol, and many drink more than the recommended amount. Recent surveys that have examined the drinking habits of New Zealanders have found that young people (including underage drinkers) are particularly likely to drink excessively. The surveys also established that there was a general tolerance of drunkenness among those surveyed.
- The effects of alcohol on health are well documented. Alcohol impairs cognitive and motor function, decreases inhibitions and so increases risk-taking behaviour, accidents and other injuries. Exposure to alcohol in the critical developmental period before birth and again during adolescence is particularly damaging, potentially causing life-long behavioural and cognitive consequences.
- Certain individuals and families are particularly susceptible to problems with alcohol. While genetic components are known to be responsible, at least in part, their interaction with easy access to alcohol and low social constraints are also likely to play a part, along with factors such as stress, adverse life experiences and gender roles.
- Major categories of disease are causally linked to heavy alcohol drinking including neuropsychiatric, gastrointestinal, and cardiovascular conditions and a range of cancers. Alcohol is a contributing or exacerbating factor for a wide range of other conditions such as depression, diabetes, sleep disorders,

infectious diseases and inflammatory conditions, and injuries from burns, falls and fractures.

- Although light to moderate drinking has been associated with a decreased risk of coronary disease in healthy older adults, heavy drinking as well as occasional binge drinking at any age has the opposite effect. Moreover, alcohol is contraindicated for many other conditions, including other cardiovascular diseases.
- Intoxication with alcohol is the main cause of alcohol-related harm in New Zealand society, leading to risk-taking behaviour, road traffic and other accidents, injuries from falls and drowning, assaults, self-inflicted injury, and acute alcohol poisoning.
- There are social costs from the use and abuse of alcohol, to drinkers themselves, to others they come into contact with, and to the whole of New Zealand society. Costs range from avoidable morbidity and mortality, hospital presentations, aggression and violence, and crime, to harmful effects on family relationships, friendships and social life, schooling, study and employment opportunities, and financial problems.
- Alcohol-related harm is not evenly distributed in the New Zealand population. New Zealanders with low socioeconomic status suffer disproportionately compared to those who are better off. Similarly, the burden of alcohol-related harm varies by ethnicity and is higher for the Māori and Pacific populations.
- Children whose caregivers abuse alcohol are more likely to suffer from abuse and neglect, and to be exposed to family violence. They also have an increased risk of injury from vehicle and other accidents and non-accidental injury. Additionally, increased exposure to alcohol at an early age makes it more likely that children will have alcohol problems themselves later on.
- Alcohol-related harm has a significant economic impact including the cost of injuries, adverse effects on work and study productivity, vandalism, and loss of trade because of public safety concerns.
- Approaches that combine reducing the availability of alcohol and modifying the drinking environment along with restrictions on advertising and sponsorship and increased enforcement of drink-driving counter-measures have been shown to be successful in reducing alcohol-related harm. Community-wide approaches to discourage heavy drinking and encourage alcohol-free events and entertainment also have a positive influence.
- The Position Paper on Alcohol for which this background paper provides the supporting evidence is a proposed joint statement by the five South Island District Health Boards, indicating their concern about the extent of alcohol-related harm in New Zealand and the need for action to reduce it.

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Section One: Introduction and overview of alcohol in New Zealand

This background paper has been developed to provide supporting evidence to the accompanying Position Statement on Alcohol. It is set out in four sections: Section One describes how alcohol is used in New Zealand and gives an overview of existing and proposed legislation. Section Two covers the personal health effects of alcohol in terms of its effect on the brain and its contribution to a range of diseases. Section Three outlines the social and economic harms caused by alcohol. Section Four presents the approaches that have been shown to be effective in reducing alcohol-related harm.

The paper was written collaboratively by staff from Community & Public Health and Public Health South. It was internally peer reviewed and then circulated for feedback to a wide range of people in the South Island DHB networks and beyond.

Searches of the international databases Medline and Science Citation Index were conducted in October 2011 to gather evidence for the effects of alcohol on all aspects of health and disease, and the social harm created by alcohol.

A wide ranging search of other electronic information was undertaken to identify information on the status of alcohol in New Zealand and to locate international and New Zealand examples of measures taken or suggested to reduce alcohol related harm. Major sources included:

- Policy and position statements from New Zealand District Health Boards
- The Canterbury District Health Board submission to the Law Commission review of all aspects of the law on the sale and supply of liquor
- Publications from the Ministry of Health, Statistics New Zealand, Ministry of Transport, the New Zealand Police, and the Ministry of Social Development.
- The report of Law Commission *Alcohol in Our Lives: Curbing the Harm* (Law Commission 2010)
- University research groups, particularly the University of Otago Injury Prevention Research Unit
- The Alcoholic Liquor Advisory Council
- Alcohol Health Watch.
- Considerable use was also made of the two editions of the work by Babor et al (2003 & 2010) in the publication *Alcohol: No Ordinary Commodity. Research and Public Policy*.

References to other relevant sources that were cited in the works investigated were also followed up for further information.

Alcoholic beverages contain the substance ethanol (pure alcohol), which is produced when yeast ferments carbohydrates or sugars in food (ALAC 2011). Alcoholic beverages usually contain between 2.5% and 55% alcohol, ranging from light beer to

brandy, rum and whisky. The latest alcoholic products available are ready-to-drink beverages (RTDs), also known as alcopops. These have been available in New Zealand since 1995, and usually range in alcohol content from 4 to 7%. In New Zealand, beverages need to contain at least 1.15% alcohol to be defined as liquor (or alcohol). The Sale of Liquor Act (1989) defines liquor as “any fermented, distilled, or spirituous liquor (including spirits, wine, ale, beer, porter, honey mead, stout, cider, and perry) that is found on analysis to contain 1.15% or more alcohol by volume”.

Alcoholic beverages are measured in terms of ‘standard drinks’, defined as 10 grams of pure alcohol. Beverages with the highest pure alcohol content require the least volume to comprise one standard drink. Spirits with 40% alcohol content in a 30ml glass, wine with 13% alcohol content in a 100 ml glass, RTDs with 5% alcohol content in a 275ml bottle, or beer with an alcohol content of 4% in a 330 ml can are all examples of standard drinks.

Availability of alcohol

Alcohol is widely available in New Zealand. Statistics New Zealand figures (2011) show that in 2010, 474 million litres of alcoholic beverage were available for consumption, of which the pure alcohol content was 33 million litres (Statistics New Zealand 2011). This meant that on average, each New Zealander aged 15 years and over had available 9.6 litres of pure alcohol to consume.¹ In the same year the amount of pure alcohol available increased 5.5% from the previous year with the sharpest increase being a 20% increase in the amount of spirits. The amount of wine available also increased by 7.7%. The most widely available alcoholic beverage in 2010 by volume was beer (299 million litres available), followed by wine (103 million litres) and spirits (13 million litres).

New Zealanders surveyed for a Ministry of Health report on alcohol use in 2007/08 (MoH 2009) most commonly consumed wine (62.3% of those aged 16-64 years) and beer (60.6%). A large number also reported drinking spirits, liqueurs or mixed cocktails (46.5%), while a smaller number said they consumed RTDs (22.2%), and fewer still drank sherry, port or vermouth (6.7%) or cider (5.4%).

Currently in New Zealand, anyone who is over the age of 18 may purchase alcohol to drink. Those who are under 18 years of age may drink on licensed premises only if the alcohol has been purchased by a legal parent or guardian, and if they remain in a supervised or unrestricted area of the premises. In order to purchase alcohol, people may need to supply photographic identification as proof of age. In New Zealand there is no minimum drinking age (Wellington City Council undated).

New Zealanders can purchase alcohol from a variety of locations, defined by the type of licences which apply to the sale of alcohol. ‘On-licences’, including bars, restaurants, hotels, and cafes, sell alcohol on the premises for consumption on the premises. ‘Off-licences’ sell alcohol for consumption off the premises and include

¹ Figures on the amount actually consumed were sought during the writing of this paper but do not appear to be readily available.

bottle-stores, supermarkets, and convenience stores and dairies. Club licences enable the operators to sell alcohol for consumption on the premises to members of the club or to their invited guests. Special licences allow alcohol to be sold at special events. (Christchurch City Council 2011).

The number of places to drink in New Zealand has increased since 1989 when the Sale of Liquor Act lifted restrictions on liquor licensing, meaning more and more places have been able to sell alcohol. In 1990, the number of places which held liquor licences was 6295; by 2010 this number was 14, 424 (Law Commission 2010).

The density of alcohol outlets has been found to be associated with alcohol-related harm in both international and national research. A New Zealand study by Connor et al. (2011) noted that “more than 50 research papers have been published since the early 1990s finding associations between the spatial density of alcohol outlets and levels of harm” (p. 841). The same study showed that the number of licensed premises within 1km of home was associated with the level of self-reported harm and that the number of off-licences was associated with binge drinking.

As well as the wide variety and number of locations where alcohol is available, New Zealanders can purchase alcohol at any time and almost all days of the year (ALAC undated). Since 1989, 24 hour liquor licences have become available, meaning that bars, supermarkets and convenience stores may supply alcohol throughout the day and night. Since 1999 (with an amendment to the Sale of Liquor Act), New Zealanders have been able to purchase alcohol on Sundays. In 2004, hours of sale were extended to include Easter Sunday for wineries. On public holidays the sale of alcohol may be restricted, depending on the type of premises. Pubs and off-licences may not sell alcohol on Christmas Day, Good Friday, Easter Sunday or before 1pm on Anzac Day. (ALAC undated)

Alcohol is available at relatively cheap prices in New Zealand. There are no minimum prices for alcohol – price is determined by the industry. The average price of alcohol has increased over the last 10 years, but by comparison, so has the price of milk. The average prices for alcohol in 2010 were as follows: 1 litre whisky \$42.94; 3 litre cask white wine \$21.80; 1 dozen bottles beer \$19.50; and glass of beer (licensed premises) \$4.95 (Gunesekara and Wilson 2010). These prices represent increases of 18.8%, 26.5%, 16.2% and 35.1% respectively over the ten year period since 1999. In comparison, the price of milk has increased by 22.8%. Although the price of alcohol has increased, it has become more affordable, in comparison with average hourly earnings. For example, results of this study compare differences in “the minutes taken to earn sufficient alcohol to reach the legal blood alcohol limit” from 1999 to 2010. In 1999 it would have taken a worker 16.4 minutes to earn enough money to get intoxicated by drinking whisky, while in 2009 it would only have taken 13.2 minutes. Prices of alcohol can be subject to wide variation; the same study found that 3 litres of cask wine could be bought for as little as \$16.99 (Gunesekara and Wilson 2010). A more recent study (Sloane et al. 2011) compared discounted alcohol prices to that of discounted non-alcoholic beverages. The average lowest price per standard drink was: \$0.61 for cask wine; \$1.17 for cider; 0.69 for RTDs; \$0.33 for Coca Cola; \$0.35 for apple juice; \$1.39 for grape juice; and \$0.42 for milk. The difference in price between cask wine and grape juice, both made from the same product, was noted by the authors.

Alcohol prices in New Zealand are subject to excise tax (ie a tax on specific goods sold or produced for sale, paid by the producer or seller to the government). Alcohol is taxed either by its ethanol content within a range or by beverage volume. For example, beverages with an alcohol content of between 9-14% are taxed at 10%. In 2009, tax rates were 10% of the retail price for beer, 15% for wine, and 38% for spirits (Alcohol Healthwatch undated).

Current legislation

New Zealand's current main piece of legislation regarding alcohol is the Sale of Liquor Act (1989). Under this Act, the sale of alcohol is able to be determined by the market, rather than by 'need' (Maclennan 2010, p.48). Alcohol sales are no longer monopolised by a few providers, but are driven by "free-market ideology" (Maclennan 2010, p.48). The Sale of Liquor Act lifted restrictions on hours and places of sale, allowing 24 hour licenses and supermarkets to sell wine. The Act aimed to allow communities greater control of liquor licensing, with most of the responsibility for liquor licensing going to local government. It also introduced the concept of host responsibility, which means, for example, that licensed premises are required to have food and non-alcoholic beverages available to purchase. The Act aimed to "promote moderate drinking and reduce alcohol-related harm through host responsibility" (Maclennan 2010, p.48). The Act had several amendments in 1999 which lowered the purchase age from 20 to 18 years; allowed licensed premises to sell alcohol on Sundays; and enabled supermarkets and grocery stores to sell beer as well as wine.

Effectively, the Sale of Liquor Act made it easier to sell alcohol, by lifting restrictions. Its aims were "... to establish a reasonable system of control over the sale and supply of liquor to the public with the aim of contributing to the reduction of liquor abuse, so far as that can be achieved by legislative means [and] to set out the provisions relating to on-license, off-licenses, club licenses and special licenses; define the powers of the Licensing Authority, District Licensing Agencies; outline offences and enforcement provisions" (National Drug Policy New Zealand 2010). The Sale of Liquor Act introduced District Licensing Authorities (DLAs), in each local area, with powers to grant and renew liquor licenses in their area and stipulate hours of trade (Maclennan 2010, p.60). Each DLA has licensing inspectors who monitor how the licensed premises are run (for example, not selling alcohol to those under the age of 18 or serving alcohol to intoxicated customers).

New Zealand law imposes penalties on those who breach the regulations around the sale of alcohol. Those who try to purchase alcohol before they are legally of age (i.e. under 18 years) can receive a \$200 fine. If they are unsupervised on licensed premises they may incur a \$2000 fine, and if they are apprehended drinking or possessing alcohol in a public place they may be fined \$300. Those who try to use someone else's ID to purchase alcohol may be charged with fraud and receive heavy penalties if convicted (New Zealand Drug Foundation undated).

There are also penalties for those who attempt to supply alcohol to minors (under 18 year-olds). Those who purchase alcohol for supply to under 18 year-olds can receive

a fine of up to \$2000. On licensed premises, managers and staff can be fined heavily (separate fines for each) for selling or supplying alcohol to those who are underage (a fine of up to \$10,000 for the manager, up to \$2000 for a staff member, and a suspended licence for the licensee). For the sale or supply of alcohol to an intoxicated person the licensee may be fined up to \$10,000.

Apart from the Sale of Liquor Act (1989), there are two other pieces of legislation relevant to the way alcohol is supplied and controlled. Under the Resource Management Act (1991), local government bodies have the power to determine the location of new licensed premises, and under the Local Government Act (2001) they have the power to introduce bylaws and enforce them with penalties of up to \$20,000.

Driving

In New Zealand the law sets the limits for the amount of alcohol a person can drink while driving measured by Blood Alcohol Content (BAC). Drivers under 20 years of age have a zero BAC limit (lowered in 2011 from 0.03 milligrams per 100 millilitres of blood). This means that after even one drink a young person can be charged with drink driving. Fines and demerit points are the penalties for a blood alcohol level of less than 150 micrograms per litre of breath and less than 30 milligrams per 100 millilitres of blood. For higher blood alcohol content, disqualification, demerit points, fines and imprisonment are all available as penalties (New Zealand Transport Agency 2011). Penalties for drivers 20 years and over who attempt to drive with a BAC in excess of the permitted levels include up to three months in prison, and/or a fine of up to \$4500, and loss of licence for six months or more for a first or second offence. Penalties increase for repeat offenders. For those who kill or injure someone while driving under the influence of alcohol, penalties are higher - up to five years' imprisonment and/or a fine of up to \$20,000.

Advertising

Currently legislation around the advertising of alcohol is controlled by the Broadcasting Act (1993), which allows for the self-regulation of alcohol advertising by the alcohol industry. Within the advertising industry itself, the Advertising Standards Authority is responsible for alcohol advertising codes (Maclennan 2010, p.49). Prior to the 1980s no advertising of alcohol at all was allowed through any media. By 1981, off-licenses were allowed to advertise on television and radio. In 1987, alcohol companies were allowed to sponsor sports and advertise corporately. In 1992 advertising of alcohol products was allowed on broadcast media between 9pm-6am on television and anytime on radio (Maclennan 2010, p.49).

Alcohol Reform Bill

In 2008 the Government commissioned the Law Commission to review legislation around alcohol in New Zealand. After an extensive review, the Law Commission

produced the report, “Alcohol in our Lives, Curbing the Harm” (Law Commission 2010). The Government responded to this with the Alcohol Law Reform Bill.

The Alcohol Law Reform Bill was first introduced in November 2010. It has had two readings so far and is currently (as at November 2011) before Parliament. It has received more than 5000 submissions. The then Minister of Justice, Simon Power, stated that the Bill called for a “safe and responsible drinking culture” and aimed to “reduce excessive drinking, improve the operation of the alcohol licensing system (including community input on licensing), support the responsible sale, supply and safe consumption of alcohol...and make licenses harder to get and easier to lose”.²

The Alcohol Reform Bill responds to the Law Commission report by picking up “126 of the 153 recommendations in the Law Commission report” (Nick Smith, Second Reading, Parliament 2011). According to the Minister of Justice, for the “first time in 20 years Parliament aims to restrict, rather than relax, our liquor laws” (Simon Power, Second Reading, 2011).

The Bill aims to reduce the accessibility of alcohol by limiting the maximum national trading hours: 8am-4am for on-licenses, clubs and special licenses; 7am-11pm for off-licenses. It also targets off-licenses, including convenience stores and dairies, which would no longer be able to sell alcohol. Supermarkets would only be able to display alcohol in one non-prominent area. The Bill would instigate a split purchase age: the off-license purchase age would increase to 20, while on-licenses would stay at 18. The Bill would also make the supply of alcohol to minors without parental or guardian consent an offence, and would put greater emphasis on host responsibility. It aims to give communities greater control about the use of alcohol in their own area, giving them the responsibility to make decisions about the location of alcohol outlets in their area, along with controlling the density of alcohol outlets and opening hours. It would aim to limit the alcohol content of RTDs to 5%, and by law “particularly dangerous alcohol products would be able to be banned.” The new law would also create tighter limits on alcohol marketing. There would be a higher penalty for breaching the liquor ban and an investigation of minimum prices. While these measures go some way towards implementing the recommendations of the Law Commission report, they have not been considered strong enough by many. Kypri et al (2011), for example, described them as “tinkering” rather than reform.

NZ drinking pattern

Most New Zealanders drink at least some alcohol. Eight in ten of the New Zealanders aged between 16-64 (85.2%) who were surveyed in the 2007/08 New Zealand Alcohol and Drug Use Survey had had an alcoholic drink in the past year (MoH 2009). In the same survey, nearly two-thirds (61%) drank alcohol at least once a week. A smaller proportion (7%) drank alcohol daily – equating to 152, 900 adults in the New Zealand population. Men were more likely than women to drink more often, with 6.3% of men drinking daily compared to 4.3% of women (MoH 2009).

² See http://www.parliament.nz/en-NZ/PB/Legislation/Bills/8/2/7/00DBHOH_BILL10439_1-Alcohol-Reform-Bill.htm for documents and media releases relating to this Bill and from which the statements in this and the following two paragraphs are taken.

In New Zealand, the current legal purchase age for alcohol is 18 years, however, surveys show that many New Zealanders start drinking at a younger age. In 2007/08, for those surveyed aged between 16-64, the median age for first trying alcohol was 16 years. Almost one third of New Zealanders (31.9%) had first tried alcohol at age 14 or younger (MoH 2009).

Many New Zealanders also drink more than the recommended amount per drinking occasion (more than 6 standard drinks for males and more than 4 standard drinks for females). In 2007/08, nearly two-thirds (61.6%) of drinkers exceeded the recommended amount at least once during the year. This is most common for young drinkers: for those in the 18-24 year age-group, 80% had consumed more than the recommended amount at least once in the last year (MoH 2009). Almost half of those surveyed (44.3%) had first consumed a large amount of alcohol when they were aged between 15 and 17 years; 13.9% had consumed a large amount of alcohol at least once when aged 14 years or younger. Maori and Pacific groups were also more likely to drink large amounts: 76.6% of Maori and 76.5% of Pacific drinkers had exceeded the recommended amount at least once in the last year. Almost one in ten (9.4%) New Zealanders who drank more than the recommended amount did so one or two times a week in the past year. In addition, 3.2% consumed a large amount three or more times a week. The majority of New Zealanders surveyed (76.7%) had consumed a large amount of alcohol at least once during their lifetime (MoH 2009).

Another nationally representative survey that sampled 628 young people aged between 12 and 17 years and 659 adults aged 18 years and over found that New Zealanders tolerate drunkenness (ALAC 2005). A quarter (27%) of those surveyed agreed that “It’s OK to get drunk as long as it’s not every day”. One third of people (34%) disagreed that “It’s never OK to get drunk” while less than half of people (47%) agreed with this statement. Nearly one in ten drinkers (9%) “drink to get drunk”. Drunkenness was more prevalent amongst young people. Nearly half (47%) of those between 12 and 17 years agreed that “It’s OK to get drunk as long as it’s not every day”. Within the same age group, 14% said they “drink to get drunk”. The survey had a margin of error of $\pm 4.3\%$ for the youth sample and $\pm 5.5\%$ for the adult sample (both at the 95% confidence level) and results were weighted in terms of ethnicity, age and gender.³

Section Two: The effects of alcohol on health

The hazardous and harmful use of alcohol contributes to death, disease and injury to the drinker and to others through the dangerous actions of intoxicated people, or the impact of drinking on foetal and child development. The most recent World Health Organisation report on alcohol (2011), categorised it as the world’s third largest risk factor for disease and disability, a causal factor in 60 types of disease and injuries and a component cause in 200 others. The WHO report noted that almost 4% of all deaths worldwide can be attributed to alcohol, more than the deaths caused by HIV/AIDS, violence or tuberculosis. New Zealand researchers have suggested that ethanol shares

³ The methodology of this study is described

the same characteristics as other substances that are classified as drugs of high risk to public health and it should be scheduled accordingly (Sellman et al 2009). This section provides an overview of the health effects of alcohol drawn from international journal literature, including recent meta-analyses.

Alcohol and the brain

Alcohol acts on specific targets in the brain and triggers a variety of neurotransmitter systems that lead to acute behavioural effects (Field et al. 2010). Alcohol impairs cognitive and psychomotor function, affects mood, and causes feelings of intoxication, and impairments in memory, attention and planning. It decreases inhibitions and so increases sexual risk taking, aggressive behaviour and risk of motor vehicle accidents and other injuries.

The prefrontal cortex, the hippocampus, the cerebellum, the white matter and glial cells of the brain are particularly susceptible to the effects of alcohol. Alcohol also acts on neurotransmitters, and signalling pathways resulting in neural impairments and cognitive and behavioural dysfunction. Some mechanisms are common to both the developing and the adult brain, while others affect developmental stages before birth and during adolescence.

Mechanisms and signalling pathways that affect reinforcement and reward are involved in the initiation and maintenance of alcohol drinking behaviour. The biological mechanisms that link impulsivity and inhibitory control over alcohol are as yet poorly understood (Field et al. 2010; Lejuez et al. 2010). The impairment of control results in diminished ability to focus on and persist with tasks, a tendency to act on the spur of the moment, poor future planning, inability to delay gratification, and diminished ability to regulate emotion (Lejuez et al. 2010). Additionally, the impairment of inhibitory control is associated with increased alcohol seeking behaviour.

Genetic and environmental influences on drinking behaviour

The linkage and association of alcohol dependence with particular chromosomes and genes has been the subject of much research. The US National Institute on Alcohol Abuse and Alcoholism, for example, has been funding the Collaborative Studies on Genetics of Alcoholism (COGA) since 1989. The goal of these studies is to identify the specific genes which underlie the vulnerability of some individuals to having problems with alcohol.⁴ However, while the initiation and maintenance of problem drinking behaviour can be attributed at least in part to genetic mechanisms, environmental factors are also important, and the two interact in a complex way (Campbell & Oei 2010; Young-Wolff et al. 2011). Twin and adoption studies where genetic and environmental factors can be controlled have established that there is a variance in interfamilial alcohol problems; certain children do not develop alcohol use disorders in spite of having a family history of them, while others with no family history may do so (Campbell & Oei 2010). A wide range of environmental factors

⁴ See <http://pubs.niaaa.nih.gov/publications/arh26-3/214-218.htm>

that may interact with a genetic predisposition have been investigated. Social learning cognitions that form expectancies and memories around alcohol in childhood are believed to play a critical part by some researchers (Oei & Morawska 2004), while other studies have looked at factors such as gender roles, stress, adverse life experiences, wider societal influence, and the age of drinking onset (Harden et al. 2008; Pitkanen et al. 2008; Winstanley et al. 2008; Latendresse et al. 2010). Low social constraints and easy access to alcohol are believed to be particularly influential at younger ages (Kendler et al. 2011).

Effect of alcohol on foetal development

The developing brain is particularly vulnerable to alcohol. Alcohol affects the developing central nervous system, leading to a range of physical, learning, and behavioural deficits including growth deficiencies, cranio-facial abnormalities, and intellectual disabilities (Alfonso-Loeches & Guerri 2011). Heavy pre-natal exposure to alcohol has been associated with deficits in memory, language, attention, learning, visuo-spatial abilities, fine and gross motor skills, and social and adaptive functioning. Exposed children are more likely to be rated as hyperactive, disruptive, impulsive or delinquent than non-exposed children and have difficulties with social mixing and aggression, anxiety disorders, and suicidal ideation throughout their lives (Hellemans et al. 2010).

MRI studies in children affected by prenatal alcohol exposure have found structural alterations to the shape, volume and surface area of the overall brain and particular brain regions, as well as reduced white matter and increased grey matter densities in corresponding areas (Guerri et al. 2009). The specific brain structures affected are strongly influenced by the timing of alcohol exposure, with the most damaging period being early in pregnancy and up until week 20. Binge drinking appears to have a more damaging effect than chronic exposure to lower levels of alcohol (Alfonso-Loeches & Guerri 2011). The genetic make up of the mother and foetus also has an influence. If either or both have the aldehyde dehydrogenase enzyme, which provides more efficient alcohol metabolism at higher blood concentration levels, there is some measure of protection (McCarver et al. 1997).

Effect of alcohol on adolescents

The adolescent brain is still maturing, undergoing important structural and functional changes particularly in the pre-frontal cortex (Witt 2010). It is particularly vulnerable to alcohol toxicity, alcohol and substance use problems and psychiatric disorders. The area most affected by alcohol is that associated with cognitive flexibility, self-regulation, inhibitory control, and judgement of risk and reward. These brain circuits develop relatively late in adolescence and may explain the tendency of adolescents to impulsiveness and to disregard the consequences of their behaviour, both of which also increase the risk of substance abuse. Heavy drinking at this age can have a negative impact on brain structure and functions that cause short and long term cognitive and behavioural consequences (Maldonado-Devincci et al. 2010; Alfonso Loeches & Guerri 2011; Witt 2010). MRI studies of adolescents with alcohol use disorders have established that they had smaller brain volumes in the prefrontal cortex

compared with control subjects (De Bellis et al. 2005). There also appear to be gender differences in how vulnerable the different areas of the adolescent brain are to alcohol, with females being more at risk than males, although the mechanisms whereby this occurs are not yet fully understood (Caldwell et al. 2005; Guerri & Pascual 2010; Alfonso Loeches & Guerri 2011) .

Adolescent binge drinking is associated with cognitive deficits, poor academic achievement, and attention and memory disorders. Adolescent drinkers are susceptible to the immediate consequences of alcohol use, including blackouts, hangovers, and alcohol poisoning and are at elevated risk of neurodegeneration (particularly in regions of the brain responsible for learning and memory), impairments in functional brain activity, and neurocognitive deficits. Drinking in early adolescence may modify brain maturation processes in certain areas that result in a worsened ability in problem solving, verbal and non-verbal retrieval, visuo-spatial skills, and working memory. Heavy episodic or binge drinking impairs study habits and erodes the development of transitional skills to adulthood (Ziegler et al. 2005).

Another important long-lasting consequence of alcohol use during adolescence is the higher risk of developing alcohol abuse and dependence in adulthood. Adolescents who begin to use alcohol before the age of fifteen are four times more likely to develop alcohol dependence at some stage of their lives compared with those who start at the age of twenty or later (De Wit et al. 2000). It is not clear whether starting to drink at an early age has a causative relationship with alcoholism or whether it suggests a predisposition because of personality characteristics, genetic background, and environmental factors (Alfonso Loeches & Guerri 2011; Kendler et al. 2011).

Alcohol and older people

While there is evidence for some benefits of moderate consumption of alcohol in healthy adults, there is considerable risk associated with even moderate intake in older people. Alcohol in older age has a wide range of negative associations (Heuberger 2009). Physiological changes with ageing mean that older people have poorer balance, are frailer and more at risk of falls. They are more likely to be taking prescribed or over-the-counter medications that interact with alcohol, or to have existing diseases which contraindicate drinking alcohol. Older people often have poor appetites and alcohol displaces important nutrients which would help to maintain health. In conjunction with ageing and poor diet, alcohol has also been associated with dental and oral disorders such as impaired salivary flow, periodontitis, and poor chewing function, which further deplete nutritional status. Older people are at greater risk for gastrointestinal disease and cancer, and are more likely to suffer from bereavement, to be depressed, or socially isolated, all of which may precipitate heavy drinking. Moreover, “excessive intake” in an older person may be equivalent to an amount that would be considered moderate in someone younger. However, wide differences in individual medical status and life history modify the extent that these factors apply to any particular individual.

Longitudinal studies have suggested that light to moderate alcohol consumption may have a protective effect against age-related pre-dementia, Alzheimer's disease or

vascular origin dementia, though findings from research have been inconsistent (Panza et al. 2009). On the other hand, there is no evidence to show that light drinking is a risk factor for these conditions, but neither is there any evidence of a specific beneficial level.

Alcohol and disease

The ethanol in alcoholic drinks is oxidised in the liver to acetaldehyde, and further detoxified to acetate. Variants in genetic make up result in differences in the ability of individuals to process acetaldehyde, leading to a varied genetic susceptibility to alcohol exposure. Major categories of disease are causally linked to alcohol, particularly heavy drinking. These diseases include neuropsychiatric, gastrointestinal, and cardiovascular conditions, a range of cancers, foetal alcohol syndrome and pre-birth complications (WHO 2011). Alcohol is also a contributory cause to a wide range of other conditions including major depression, anxiety, diabetes, sleep disorders, infectious diseases such as pneumonia and tuberculosis, and injuries from burns, falls, and fractures (Carrao et al. 2004). Among conditions which are exacerbated by alcohol are inflammatory conditions such as psoriasis (Farkas & Kemeny 2010) and there is a relationship between heavy drinking and epileptic seizures (Samokhvalov et al. 2010). Alcohol, especially beer, increases the risk of gout (Singh et al. 2011) and contributes to the risk of obesity as it is a passive form of energy consumption adding to the energy consumed as food (Yeomans 2010). Chronic heavy drinking can also irreversibly compromise bone quality and increase the risk of osteoporosis in later life (Sampson 2002).

The harmful use of alcohol is a particularly important risk factor for men. The World Health Organisation (2011) classes alcohol as the leading risk factor for death in males ages 15–59, mainly due to injuries, violence and cardiovascular diseases. Globally, 6.2% of all male deaths are attributable to alcohol, compared to 1.1% of female deaths. Men also have far greater rates of total disease burden attributed to alcohol than women – 7.4% for men compared to 1.4% for women. Men outnumber women four to one in weekly episodes of heavy drinking and have much lower rates of abstinence. Lower socioeconomic status and educational levels are also associated with a greater risk of alcohol-related death, disease and injury – and are social determinants that are greater for men (WHO 2011).

Cancers

Alcohol consumption is strongly associated with cancers of the head and neck, (the oral cavity, pharynx, larynx, and oesophagus) as well as the respiratory and digestive tract. Daily consumption of around 50g of alcohol increases the risk for these cancers by two to three times, compared with the risk in non-drinkers. Acetaldehyde produced from alcohol by microbes in the normal gastrointestinal tract or salivary glands is a local and topical carcinogen that affects the human gut (Salaspuro 2003; Chen et al. 2009; Oze et al. 2011; Ogden 2005). The relationship is dose dependent, so that damage increases with heavier drinking. There is uncertainty about the existence of a threshold (a number of drinks per day) below which alcohol may not

cause any damage but it is likely that any threshold varies depending on ethnicity, gender, age, and the existence of other conditions. Some ethnic groups, for example Japanese, have a genetic inability to detoxify acetaldehyde (aldehyde dehydrogenase deficiency). These populations have a greatly increased risk of alcohol-related GI tract cancers compared to populations where most people have a fully active enzyme (Baan et al. 2007; Salaspuro 2003).

Alcohol and tobacco have a synergistic effect greater than either of them alone so that heavy smokers and drinkers have a greatly increased risk of upper aero-digestive tract cancers. Acetaldehyde is also present in high concentrations in cigarette smoke, hence the increased exposure to acetaldehyde from both smoking and drinking (Ansary-Moghaddam et al. 2009; Altieri et al. 2005; Ogden 2005). It has been suggested that this exponentially greater effect may be due to the direct contact of solvent action on the tissues of the body, that enhances the effects of tobacco (Altieri et al. 2005).

There is good evidence from several systematic reviews that heavy alcohol intake moderately increases the risk of breast cancer (Weir et al. 2007; Baan et al. 2007; Collaborative Group on Hormonal Factors in Breast Cancer 2002). One systematic review (Carrao et al. 2004) observed a 7.1% increase in the risk of breast cancer for each additional 10g per day intake of alcohol compared to non-drinkers. The estimated risk ratio at 25g alcohol per day was 1.25, at 50g/day was 1.55 and at 100g per day was 2.41.

Similar results have been reported from the pooled analysis of studies of the effect of alcohol on colorectal cancer, with evidence of an increased relative risk of about 1.4 for colorectal cancer with regular consumption of 50g alcohol per day compared to non-drinkers (Baan et al. 2007).

Diseases of the liver and pancreas

Liver cirrhosis is characterised by the replacement of normal tissue with fibrous tissue and the loss of functional liver cells. It leads to permanent scarring of the liver that blocks blood flow and prevents normal metabolic and regulatory processes. The causal impact of heavy drinking on liver disease and on cirrhosis in particular has been known for several hundred years, and has been confirmed by recent studies (Corrao et al. 1999; Corrao et al. 2004). A meta-analysis by Rehm et al. (2010) that further investigated the dose-response relationship found that more than two drinks a day for women and more than three drinks a day for men were significantly associated with higher risk, and the risk increased with increasing volumes of alcohol consumed. This meta-analysis also suggested that for people with any signs of liver disease (even when not related to alcohol), only abstinence from alcohol could be considered safe. Moreover, there were likely to be interactions between alcohol and drugs that are used to treat liver problems (Rehm et al. 2010, p. 442).

There is a link between alcohol consumption and pancreatitis – both in its acute and chronic forms. Alcohol has numerous deleterious effects on the pancreas including direct toxicity to pancreatic cells as well as changes of production and flow of pancreatic juice which result in mechanical obstruction of pancreatic ducts, fibrosis,

and toxicity to other organ systems from the by-products of ethanol metabolism. A meta-analysis (Irving et al. 2009) of studies that had addressed the relationship between alcohol and pancreatitis found that there was evidence supporting a threshold effect (at four drinks daily) and an exponential dose-response relationship above that threshold between average volume of alcohol consumed and the risk of pancreatitis.

Cardiovascular disease

There is a complex relationship between cardiovascular disease and drinking of alcohol. Moderate consumption (one drink/15g alcohol per day for women or two drinks/30g alcohol for men) has been associated with a decreased risk for coronary heart disease in observational studies of diverse populations (Rimm et al. 1999). Brien et al. (2011) confirmed this protective effect based on a meta-analysis of interventional studies⁵ that measured circulating blood levels of biomarkers linked to the risk of coronary heart disease. They concluded that there was "...compelling indirect evidence in support of a causal protective effect of alcohol" (p. 13).

This protective effect on coronary disease is often referred to as the "J-shaped curve" whereby moderate consumption of alcohol in healthy people is beneficial but excessive or binge drinking is quite the opposite (Costanzo et al. 2010). However, even occasional excessive consumption appears to wipe out any protective effect on the heart even if overall consumption is generally moderate or light (Roerecke & Rehm 2010). In contrast, alcohol consumption has detrimental effects on other cardiovascular diseases regardless of drinking pattern (WHO 2011). It is associated with sudden cardiac death, although the effect is complex and the mechanisms are not completely understood. For people with cardiomyopathy or arrhythmias, avoiding alcohol altogether is the most favourable option for reducing risk (George & Figueredo 2010). Alcohol also increases blood pressure, and increases morbidity and mortality from stroke independently from smoking (WHO 2011). Binge drinking is a significant risk factor for stroke especially in people with hypertension (Hillbom et al. 2011). Alcohol is also not recommended for young people, pregnant women, those at risk of alcoholism, or anyone whose activity calls for concentration, skill or coordination (Roerecke & Rehm 2010).

Depression

A meta-analysis of the associations between alcohol use disorder and major depression (Boden & Fergusson 2011) found that the presence of either disorder doubled the risk of the other. The association could not be accounted for fully by common factors that influence both conditions and the disorders appeared to be linked in a causal manner, with the most plausible association being that alcohol use disorder increases the risk of major depression, rather than vice versa. Potential mechanisms include neurophysical and metabolic changes linked to exposure to alcohol but further research is needed to clarify the exact nature of the linkage. Alcohol is also

⁵ The studies included in this meta-analysis administered controlled amounts of alcohol to participants and measured the effect on various biomarkers (for example circulating blood levels of HDL cholesterol, fibrinogen etc), compared to a period of no use of alcohol.

associated with suicidality in both adolescents and adults (O'Connell & Lawlor 2005; Galaif et al. 2007).

Infectious diseases

A recent meta-analysis (Samokhvalov et al. 2010) showed a strong and consistent relationship between alcohol and the risk of community acquired pneumonia. A relative risk of 8.22(95% CI 4.85-13.95) was found after adjusting for age, sex, smoking and other confounding factors such as comorbidities. Additionally, there was a clear dose-response relationship with increasing consumption giving a greater risk. Mechanisms involved include detrimental immunological effects of alcohol, and diminished oropharyngeal tone resulting in increased risk of aspiration and suppression of coughing. Heavy drinking also predisposes people to liver damage, nutritional deficiency, and poor personal hygiene which may result in immunity being further impaired. The same factors are likely to be involved in the elevated risk of tuberculosis in heavy drinkers (Lonroth et al. 2008).

Type 2 diabetes

A dual relationship exists between alcohol consumption and type 2 diabetes. Light to moderate drinking may be beneficial while heavy drinking is detrimental. A recent meta-analysis (Baliunas et al. 2009) found that there was a U shaped relationship between average alcohol consumption and risk of diabetes in both men and women, although the biological mechanism for this is not clear. However, the risk of alcohol consumption on other diseases and health outcomes at even moderate levels may outweigh any positive benefits of alcohol consumption for diabetes.

Section Three: Alcohol-related harm

Alcohol use causes approximately 4% of deaths worldwide and 4.5% of the global burden of disease. This is not only because of the deleterious effect of alcohol on the drinker's health but because of the social problems caused by alcohol to the drinker and others. This places alcohol beside tobacco as a leading preventable cause of death and disability (World Health Organisation, 2011; Babor et al., 2010).

Intoxication is the main cause of alcohol-related harm in New Zealand society 'because it can lead to risk-taking behaviour, accidents and injuries, violence, and acute alcohol poisoning' (World Health Organisation, 2007). Binge drinking sessions in particular are associated with acute health consequences including: road traffic injuries, falls, drowning, poisoning, assault, self-inflicted injury, and foetal alcohol spectrum disorder (Kypri et al. 2003). This section of the background paper addresses the wide range of alcohol-related harm experienced in New Zealand, including mortality, hospital presentations, crime, and social and economic costs. The ways that

alcohol-related harm negatively impacts on children, Māori and people with low socioeconomic status are also explored.

Mortality

Research by Connor et al. (2004) estimated that 3.9% of all deaths in New Zealand in 2000 were attributable to alcohol consumption (approximately 1040 deaths). This study calculated that some deaths from coronary disease would have been prevented by light to moderate drinking of alcohol. However, these were almost entirely among older people, while those attributed to alcohol occurred before middle age with injury being a major contributor. The authors estimated that 17,200 years of life were lost but only 5,300 years of life gained, a net loss of almost 12,000 years of life due to alcohol in one year in New Zealand (Connor et al 2004, p.3). The study also noted that alcohol-related mortality is experienced unequally throughout the population, with men having four to five times the rate of alcohol attributable years of life lost compared to women. Māori men and women were also found to have higher mortality and rates of years of life lost than non-Māori of the same age (Connor et al. 2004).

Hospital presentations

Research on presentations to an Auckland Emergency Department indicated that 35% of injury-based emergency department presentations were alcohol-related (Humphrey et al. 2003). The New Zealand Alcohol and Drug Use Survey found that 4.7% of adults (aged 16-64 years) had experienced an injury in the past year due to their alcohol use. Men (7.2%) were found to be significantly more likely than women (5.1%) to have experienced an injury in the past year due to their alcohol use (Ministry of Health, 2009).

Data collected from Dunedin Hospital Emergency Department for the period 1 November 2010 to 29 October 2011, identified 892 patients who were seen with alcohol-related presentations. This is considered an underestimate and does not include the victims of others' drinking. Of these 892 cases, 65% (582) were seen on a Friday, Saturday or Sunday. Over half the cases, 55% (492), were seen between 9pm and 6am, a time when staffing and other hospital resources are at their lowest. The length of stay in the Emergency Department was over four hours for 62% (560) of these presentations. The average length of stay for uncomplicated intoxicated patients was 4.5 hours with an average cost to the tax payer of \$1000.

Alcohol-related presentations to Emergency Departments throughout New Zealand impact negatively upon staff. A recent study of Wellington Regional Hospital Emergency Department found that a large proportion of *all* Emergency Department staff regularly experienced aggressive and abusive behaviour from intoxicated patients. A large proportion of Emergency Department nurses and ambulance staff also reported experiencing physical assault from intoxicated patients (Gunasekara, et al. 2011). Intoxicated patients presenting to Emergency Departments were reported to negatively impact the quality of care for other patients, for example other patients

frequently reported feeling threatened, which could contribute to the stress of their conditions (Gunasekara et al., 2011).

An investigation of the wholly alcohol-attributable hospital admissions for the period 1986 to 2006 indicates the majority of these admissions were for mental and behavioural disorders due to alcohol use. Admissions for mental and behavioural disorders were highest in the 35 to 44 year age group, but occurred in relatively large numbers for all age groups. The largest relative and absolute increase in wholly alcohol-attributable hospital admissions was in the 15 to 19 years age group, which increased by 126% over this period. This is arguably a result of the lowering of the purchase age of alcohol in 1999 (Law Commission 2010).

Traffic crashes

It is well established that alcohol consumption degrades driving performance and negatively impacts driving behaviour. Numerous studies also illustrate that the risk of being involved in a vehicle accident increases as a driver's blood alcohol level increases (Ministry of Transport, 2010). Driver consumption of alcohol causes significant harm in New Zealand through death, injury, and the associated social costs (Ministry of Transport, 2010).

In 2009 driver alcohol and or drug use was a contributing factor in 113 fatal traffic crashes, 420 serious injury crashes and 1,107 minor injury crashes. These crashes resulted in 138 deaths, 576 serious injuries and 1,743 minor injuries. The total social cost of crashes involving alcohol or drugs was about \$890 million; that is nearly a quarter of the social cost associated with all injury crashes. (Ministry of Transport, 2010).

Twenty seven percent of drivers in all fatal crashes between 2007 and 2009 were reported as having consumed alcohol. Alcohol and drugs were a contributing factor in almost 21% of all serious injury crashes and 13% of minor injury crashes in New Zealand between 2007 and 2009 (Ministry of Transport, 2010).

The harm associated with alcohol-related traffic crashes is often experienced by those other than the alcohol impaired driver, for instance 40% of alcohol-related traffic crash injury is experienced by those other than the alcohol impaired driver (Connor & Casswell, 2009).

For every 100 alcohol or drug-impaired drivers or riders killed in road crashes, 56 of their passengers and 26 sober road users die with them (Ministry of Transport, 2010).

Crime

Alcohol intoxication is associated with violence and aggression:

... a causal link between alcohol intoxication and aggression has been supported by epidemiological and experimental research, as well as by research indicating specific biological mechanisms linking alcohol to aggressive behaviour. Experimental studies suggest a causal relationship between alcohol and aggression... although this

relationship is clearly moderated by gender and personality as well as by situational and cultural factors (Babor et al., 2010, p.46).

New Zealand Police's 2009 *National Alcohol Assessment* clearly demonstrates the significant contribution of alcohol to crime in New Zealand. Of all recorded offences in the year 2007/08:

- At least 31% of offences were committed where the offender had consumed alcohol prior to committing the offence
- At least one third of violence offences occurred where the offender had consumed alcohol prior to committing the offence

The number of alleged offenders identified as having consumed alcohol prior to offending increased from 27% in 2005/06 to 32% in 2007/08 (New Zealand Police, 2009).

Alcohol consumption has been identified as a factor in homicides in New Zealand. Either a suspect or victim was found to have been under the influence of alcohol in 49.5% of the 489 homicides recorded between 1999 and 2008 (New Zealand Police, 2009). A Ministry of Social Development investigation of 141 family violence-related homicides found that alcohol and or drug abuse was a factor in approximately two thirds of the couple-related homicides, and was common as both a factor in perpetrator's backgrounds and as a factor at the time of the event (Ministry of Social Development, 2009).

Alcohol and or drug abuse also featured strongly in child homicides, causing researchers to conclude that:

...children are at highest risk of death from maltreatment in their first year of life and when they live with young unemployed parents or caregivers who abuse alcohol and drugs (Ministry of Social Development, 2009).

District Court Judges have also commented on the impact of alcohol use and abuse on the justice system, estimating that up to 80% of defendants coming before the criminal courts have alcohol or other drug use abuse or dependency issues, and that alcohol is the drug of choice in three-quarters of these cases (Law Commission, 2009).

Social costs

New Zealanders experience a range of social harms due to their own, or other people's alcohol use and abuse. The New Zealand 2007/08 Alcohol and Drug Use Survey found that one in eight adults⁶ (12.2%) had experienced harmful effects from their own drinking in the past year. These included harmful effects on friendships or social life, home life, work/study/employment opportunities, financial position, and legal problems or difficulty learning (Ministry of Health, 2009). These harms were not distributed evenly throughout the population. Men (9.8%) were more likely than women (6.1%) to be affected, and men living in the highest deprivation area

⁶ Included adults aged 16-64 (Ministry of Health, 2009).

(NZDep2006 quintile 5) (12.9%) being more likely than men living in the least deprived area (NZDep2006 quintile 1) (5.3%) to report that they had experienced harmful effects on friendships and social life due to their own drinking (Ministry of Health, 2009).

New Zealanders with lower socioeconomic status bear a disproportionate burden of alcohol-related harm. People living in more socioeconomically deprived neighbourhoods are generally more likely than people living in less deprived areas to have experienced :

- harmful effects in the last year due to their own alcohol use
- harmful effects on their home life in the past year due to someone else's alcohol use
- assault (physical and/or sexual) in the past 12 months due to someone else's use of alcohol or drugs (Ministry of Health, 2009).

Research also shows that many New Zealanders experience harm caused by someone else's drinking. In the 2007/8 New Zealand Alcohol and Drug Use Survey one in six adults (18.1%) had experienced harmful effects on their friendships/social life, home life or financial position due to someone else's drinking. Significantly more women (22.8%) than men (17.0%) had experienced such harm from someone else's drinking (Ministry of Health, 2009).

Recent New Zealand research (Casswell et al., 2011a) found a significant association between a person's exposure to a heavy drinker and reduced personal wellbeing and poorer health status. Over 28% of the study sample reported having one or more heavy drinkers in their lives. This research indicates that a large proportion of New Zealanders report harm from the drinking of others. This includes a wide range of harms, such as being physically hurt, emotionally hurt and neglected, and lower work productivity. A large proportion reported at least one adverse event that was attributed to the drinking of a stranger (Casswell et al., 2011b). An Australian national study that surveyed a randomly selected sample of 2,649 adults (Laslett et al) found that 70% of them reported experiencing nuisance, fear, or abuse from strangers' drinking and 30% reported negative effects from someone close to them, whether family, friends, or co-workers.

Heavy drinking makes a significant contribution to workplace absenteeism, impaired work performance, lack of productivity, and low morale both when consumed within or outside of normal work hours (Bacharach et al 2010; Spicer et al 2003; Frone 2006; Bery et al 2007). A study of 2,805 employed adults in the United States, for example, found that 15% reported consuming alcohol before work, during the work day, working under the influence, or working with a hangover (Frone 2006). Data from an Australian national survey showed that high risk drinking occurred at least occasionally in 44% of workers (Bery et al 2007). Other studies have found drinking, hangovers, and a workplace culture that condones high alcohol use are significant contributors to arguments with supervisors and co-workers, falling asleep on the job, harassment of female employees, and medical problems and injuries (Ames et al 1997; Bacharach et al 2007; Bery et al 2007).

Children and young people

There are numerous concerns about the impact of alcohol on children and young people's wellbeing. Aside from the effects of alcohol on foetal development already discussed above, children may suffer from:

- increased susceptibility to child abuse and neglect if caregivers have an alcohol problem
- increased likelihood of exposure to family violence
- increased risk of injury from other persons under the influence of alcohol, ie. vehicle accidents, accidental and non-accidental injury, and
- increased risk of early exposure to alcohol themselves (Law Commission, 2010, Girling et al., 2006).

Children are particularly vulnerable to harms caused by others' drinking. Research about people with a heavy drinker in their lives found that 17% of respondents with children under 18 years old indicated their children had been negatively affected by someone else's drinking in the last 12 months. This included being verbally abused and witnessing violence (Casswell et al., 2011b).

As earlier stated, caregivers with alcohol problems featured strongly in a review of child homicides in New Zealand (Ministry of Social Development, 2009). Another review, looking at the deaths of children between 2005 to 2007⁷ found that alcohol was a significant contributing factor in a range of child deaths. Alcohol was found to be involved in 31% of the 158 deaths of children due to vehicle crash injuries.⁸ Alcohol was also involved in 19.1% of the 199 child deaths due to drowning, assault, poisoning, suffocation or falls (Child and Youth Mortality Review Committee, 2009). Infants and younger children (under 15 years of age) had significantly fewer deaths involving alcohol (2.2% of 92 deaths) compared to young people (15 to 24 years of age) (32.1% of 265 deaths) (Child and Youth Mortality Review Committee, 2009).

Alcohol contributes to child deaths differently, depending on age. For infants and young children, alcohol impacts the quality of care giving, contributes to family violence and leads to under-supervision of vulnerable infants and children. In contrast there is a dramatic increase in death rates from injury for those 15 years and older, which is largely related to adolescent risk-taking behaviour which alcohol consumption contributes to (Child and Youth Mortality Review Committee, 2009).

Early exposure to alcohol (consumption on multiple occasions before 15 years of age) is linked to a range of poor adult outcomes, including substance dependence, criminal conviction, herpes infections and failure to achieve educational qualifications (Law Commission, 2010, p.89).

The negative impact of alcohol on adolescents was also identified by the New Zealand Alcohol and Drug Use Survey, which found that a quarter (23.0%) of people

⁷ This review focussed on motor vehicle deaths during 2007 and deaths other than motor vehicle (specifically drowning, assault, suffocation, poisoning and falls) from 2005 to 2007 (Child and Youth Mortality Review Committee, 2009).

⁸ This included 16 as drivers, 17 as passengers and 14 as pedestrians (Child and Youth Mortality Review Committee, 2009).

aged 16 to 17 years had experienced harmful effects on their friendships or social life in the past year due to someone else's drinking, and one in five (18.8%) had experienced injuries in the past year due to their own alcohol use (Ministry of Health, 2009).

Foetal exposure to alcohol during gestation can cause Foetal Alcohol Syndrome (FAS) or Foetal Alcohol Spectrum Disorder (FASD), which in turn, are associated with a range of adverse life experiences, including disrupted schooling experiences, trouble with the law, confinement (in jail, prison, or a psychiatric or alcohol/drug inpatient settings), inappropriate sexual behaviours, and drug and alcohol problems (Streissguth, et al., 2004).

Māori

Evidence clearly demonstrates that Māori suffer disproportionately from a wide range of alcohol-related harms compared to non-Māori. This is shown by:

- Māori being more likely to die from alcohol-related causes (Māori have 4.2 times the alcohol related mortality of non-Māori and double the rate of years of life lost due to alcohol) (Connor et al., 2005)
- Māori men being significantly more likely to experience harmful effects on financial position, work, study or employment, experience injuries or having legal problems due to alcohol use (Ministry of Health, 2009)
- Māori women being twice as likely to experience harmful effects on home life, social life or financial position, experience injuries or legal problems due to alcohol use (Ministry of Health, 2009)
- Māori women being four times more likely than non-Māori women to have been assaulted by someone who had consumed alcohol (Ministry of Health, 2009)
- Māori being more likely to be apprehended by police for an offence that involved alcohol (New Zealand Police, 2009).

Economic costs and benefits

Alcohol-related harm in New Zealand has a significant economic cost, including the cost of injury, adverse effects on businesses and employment issues. Harmful alcohol use in 2005/06 alone cost New Zealand an estimated \$4,794 million of diverted resources and lost welfare. Injuries from harmful alcohol use in 2005/06 cost an estimated \$1.592 billion in New Zealand (Slack et al., 2009).

Businesses have reported various day-to-day adverse effects of alcohol including vandalism, environmental hazards that need to be cleaned up (eg. urine, vomit, broken glass) and loss of trade due to public safety concerns (Law Commission, 2010).

Alcohol has a negative impact on work and study productivity, with the Alcohol and Drug Use Survey finding that:

- 3.2% of adults reported harmful effects to their work, study or employment opportunities as a result of alcohol use in the last year

- An estimated 5.6% of respondents reported having one day off school or work in the last 12 months as a result of alcohol use
- Nearly one in ten adults worked while feeling under the influence of alcohol (Ministry of Health, 2009).

Alcohol does have a number of economic benefits to society in terms of creating employment and export earnings. According to the National Business Review (Swann 2009), in 2009 the wine industry alone was worth \$1.5 billion to New Zealand's gross domestic product, and was the 11th largest export, representing 2.2% of total goods exported. The same article noted that the wine industry provided 16,568 full time jobs and contributed to tourism, with over 200,000 visitors annually to vineyards and related events. These tourists also on average stayed longer and spent more than other tourists. The export of spirits and liqueurs has also increased in recent years, with a contribution of \$52.6 million to the economy in the year 2010-2011 (National Business Review 2011).

Section Four: Reducing alcohol-related harm

As outlined in the previous sections, there is strong evidence that New Zealanders' lives are affected by alcohol in numerous ways ranging from preventable mortality, and morbidity, to the effects of violence and lost productivity. It has been argued that this harm has resulted from an increasingly liberalised environment for the sale of alcohol, and societal attitudes which encourage excessive drinking. This section looks at measures that have been shown to be effective in reducing alcohol-related harm. Much of it draws on the work by Babor et al (2010) *Alcohol: no ordinary commodity* which documents the reasons why effective alcohol policies need to take account of the physical, social and economic environments in which people live rather than merely concentrating on the health effects alone.

Increasing taxation

Increasing alcohol taxes has been shown to be highly effective in reducing alcohol consumption and therefore alcohol related harm. Moreover it is not expensive to implement. Evidence shows that when prices go up, alcohol consumption goes down (Babor et al 2010; Ministry of Justice 2007).

Currently, New Zealand's excise tax rate is lower than other nations. The tax on beer in New Zealand for example (10%), is much lower than that in Australia (24%) (Casswell and Maxwell 2005). New Zealand also has an excise tax policy that groups alcoholic beverages into 'bands' – for instance, alcoholic beverages with an alcohol content between 9-14 % are taxed at the rate of 10% (Alcohol Healthwatch undated). This means that manufacturers have an incentive to create higher-alcohol content drinks in order to get the best tax advantage. Instead, the excise tax could be based directly on the level of ethanol in the product.

Alcohol prices are subject to the economic theory of supply and demand. That is, when there is an increased supply and high demand for alcohol, or when there is a constant supply but decreased demand, prices go down. Thus, “deliberate changes in

prices will affect the supply and demand relationship” (Babor et al. 2010, p.110). Therefore a strategy for government is to increase excise taxes on alcohol (and increase revenue), leading to increased alcohol prices which in turn leads to decreased alcohol consumption. Other factors affecting alcohol prices (apart from excise tax) include differences in price between on-premise and off-premise outlets and the geographical distance and transport needed to access supplies of alcohol.

There has been a worldwide trend towards reduced alcohol prices since 1950. One reason for this is that excise taxes are set at a fixed amount, and are not adjusted for inflation. Unless legislation sets a new tax level, in line with inflation, excise taxes on alcohol do not reflect the value of the local currency.

Alcohol price changes may particularly affect youth and heavy drinkers. Studies have shown that young people drink less when beer prices go up (Coate and Grossman 1988). Babor et al. (2010, p. 121) draw attention to a number of studies that have shown higher beer taxes have significantly reduced both the frequency of youth drinking and the probability of heavy drinking, with heavy drinkers being more affected by price increases than occasional drinkers (Laixuthai and Chaloupka 1993). These studies also noted a reduction in violence in association with higher alcohol prices. Higher prices may also result in changes in health outcomes. In the U.S. between 1960 and 1975, when liquor taxes (and prices) went up, cirrhosis mortality went down (Cook 1981).

Reducing the purchase age

Changes to the minimum purchase age have been shown to substantially affect youth drinking. For example, in the 1970s and 1980s in the United States, the minimum alcohol purchase age fluctuated greatly. One study showed that when the minimum purchase age was increased to 21 it led to reduced alcohol use among young Americans and a decrease in traffic crashes (O’Malley and Wagenaar 1991). Other studies in the U.S. have shown that the effectiveness of limiting supply to youth is dependent upon enforcement – otherwise young people are still able to access alcohol (Wagenaar and Wolfson 1994).

Reducing availability

Reducing the physical availability of alcohol is a strategy that is effective yet relatively inexpensive to implement. The cost of restricting alcohol availability is low relative to the health consequences of drinking. The main methods of reducing the availability of alcohol are through restricting hours and days of sales, and controlling the number, location, and type of retail premises. Regulations can be imposed such as government ownership of alcohol outlets, outlet location and limiting ‘bunching’ (e.g. minimum distance between outlets), limiting the number of outlets, restricting hours and days of sale, and restricting the density of retail outlets (Babor et al. 2010). Studies have shown that changing the hours and days of sale has “significant impacts on the volume of alcohol consumed and the rates of alcohol- related problems”

(Babor et al. 2010, p.136). Restricting sales of alcohol from off-licence premises is most likely to affect those who do not keep a supply of alcohol.

Another factor influencing the availability of alcohol is the location and density of liquor outlets. Governments can impose laws limiting the location of alcohol outlets, and these can be enforced at local and national level. For example, zoning laws may impose restrictions on the location of outlets near schools and churches. Density of outlets can be regulated by declaring a minimum distance between them, or by limiting the number of outlets in an area, or both. The ‘bunching’ of bars and restaurants, is considered to give rise to alcohol-related problems. Traffic crashes in particular are more likely to occur in high-density alcohol outlet areas. Changing the number of outlets in an area can therefore influence consumption of alcohol and alcohol-related problems (Babor et al. 2010, p.131).

Further restrictions can be put in place concerning how alcohol is sold at on-premise and off-premise locations. There is likely to be more control over sales from on-premises than off-premises. With on-premise sales there is room to influence a variety of factors around the sale of alcohol including specifying drink sizes, non-discounted drink promotions, and responsible and trained service.

Government ownership of alcohol outlets has been shown to reduce the number of outlets, limit the hours of sale, and remove the profit motive. There is evidence that off-premise monopoly systems limit alcohol consumption and alcohol-related problems; and conversely, that the elimination of government off-premise monopolies can increase alcohol consumption. For example, Swedish alcohol consumption increased when beer became available in grocery stores between 1965 and 1977.

It is possible to further restrict the physical availability of alcohol through regulating who may sell alcohol. Those who sell alcohol are required to hold a license to do so. It is common to check the credentials of those who seek licenses, for example, excluding those with a criminal history. The Law Commission report recommended tightening up regulations on who may obtain a liquor licence – they must be a “suitable person” and declared that there were “serious problems” with laws relating to off-licences, particularly the number of small liquor outlets (p.14). The report recommended prohibiting service stations and takeaway food stores from selling alcohol and that spirits and RTDs should only be available from specialist alcohol outlets (Law Commission Report Summary, p.14).

Modifying the drinking context

Efforts to reduce alcohol harm can be focused on the environments where alcohol is bought and consumed. It has been shown that aspects of the bar environment such as serving practices that promote intoxication, aggressive bar staff and the inability to manage problem behaviour make alcohol-related problems worse (Babor et al. 2010, p.149). Approaches to modifying the drinking context include responsible beverage service training and in-house policies for licensed premises, enhanced enforcement of sanctions for breaching the regulations relating to the sales of alcohol, the legal liability of servers, managers and owners of licensed premises, voluntary codes of practice, interventions for managing aggression and other problem behaviour,

reducing environmental precipitants of aggression, and community mobilization approaches (Babor et al. 2010, p.149-162). Limiting the strength of alcoholic beverages; and promotion of alcohol-free activities are also likely to have an influence.

Restricting marketing, promotion and sponsorship

Advertising of alcohol has increased in many countries over recent decades, and studies have shown it to have detrimental effects. Increasingly, countries have left the regulation of alcohol promotion to the self-regulation of the industry. Research shows that alcohol advertising can have a detrimental effect on young people, exposing them early to the messages that alcohol is attractive, glamorous and fun. If these messages permeate the environment at a young age they may set drinking patterns in later life. Effectively, alcohol advertising leads to greater consumption of alcohol (Babor et al. 2010, p.188-189). A further effect of alcohol advertising is to colour how people perceive the drinking habits of others, thus normalising drinking behaviour. Since the early 1990s, sponsorship of sports and cultural events has become common, particularly those that appeal to young people. These events combine marketing messages on products, giveaways, and grounds signage and associate them with good times and with drinking the sponsors product. McCreanor et al (2008), draw attention to the Export Gold campaign in 2004 that used as its slogan “The best weekend you’ll never remember” in a competition aimed at young people, describing it as “...the synergistic, cumulative effects of environmental exposure of young people to alcohol marketing [which] creates and maintains expectations and norms for practices of drinking to intoxication.” (p. 944)

Legislation may attempt to partially restrict alcohol advertising, for example by banning the advertising of spirits, or restricting hours of advertising to particular times on television. Research into the effect of such legislation has been inconclusive to date, largely because of methodological difficulties and limited experience internationally of countries that have implemented comprehensive restrictions. Babor et al (2010), however, concluded that the “...most probable scenario, based on the theoretical and empirical evidence available, is the extensive restriction of marketing would have an impact” (p. 188).

Drink-driving counter-measures

Alcohol greatly impairs how well a person can drive. As levels of alcohol in the blood go up, driving performance declines. Research has shown that judgement and reaction times are impaired at a BAB of 0.05% and substantially diminished at 0.10% (Davis et al 2003 cited in Babor et al 2010, p. 166). Impairment risk goes up exponentially with increasing amounts of alcohol: at a BAC of 0.08% the relative risk of any crash involvement is 2.7 and at a BAC of 0.15% the relative risk is 22.1 (Babor et al 2010, p. 166). Various measures can be instigated to counter this, one of which is to set maximum Blood Alcohol Concentration (BAC) levels (see Section One). Enforcement includes random breath-testing to check these levels, and penalties for those who exceed the drink-driving BAC limits. Further restrictions may also be

placed on younger or inexperienced drivers, for example, reducing the legal BAC level to 0 for drivers under 20, as has just been done in New Zealand in 2011.

Acting to reduce alcohol-related harm

There is increasing concern about the misuse of alcohol in New Zealand society and the need to take action to reduce the harm it causes.

In their report on curbing the harm from alcohol, the Law Commission Report (2009) proposed an ‘Alcohol Harm Reduction Act’ which would:

... encourage responsible attitudes to the promotion, sale, supply and consumption of alcohol; contribute to the minimisation of crime, disorder and other social harms; delay the onset of young people drinking alcohol; protect and improve public health; promote public safety and reduce public nuisance; and reduce the impact of the harmful use of alcohol on the Police and public health resources.

In order to reduce alcohol-related harm, the Commission recommended:

...restricting the times alcohol can be sold; restricting the places alcohol can be sold; preventing a growing proliferation of alcohol outlets; increasing the purchase age for alcohol; expanding the grounds upon which a liquor licence can be declined; providing for more local input into liquor licensing decisions; reorganising and upgrading the efforts of local authorities in relation to alcohol decisions; providing for local alcohol policies to be decided by councils; financing liquor licensing, monitoring and compliance through licence fees, not a combination of fees and ratepayer contributions; tightening the law about off-licences; and improving regulation of special licences” (Law Commission Report Summary, p.13).

The South Island District Health Boards are gravely concerned about the effect that misuse of alcohol has, either directly or indirectly, on the health and wellbeing of all New Zealanders and particularly the disproportionate effect that it has on the most vulnerable members of society. In their role as leaders responsible for promoting and protecting the health of their constituents the Boards are publishing a joint Position Statement which indicates that concern and sets out a number of recommendations for actions that can and should be taken to address the harm created by alcohol.

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