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# Alcohol consumption and harm in two Western Australian regional centres

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**Abstract:** The application of national or state alcohol harm-prevention programs at a regional level can be inappropriate. The involvement of local communities is critical if harm-prevention responses are to be sensitive to local needs. Unfortunately, individuals and agencies usually have little idea of the impact of alcohol at the local level. Alcohol consumption and harm data have been gathered for Geraldton and Bunbury, two regional centres of comparable size in Western Australia. The indices of harm presented include the nature and cost of hospital morbidity attributable to alcohol, and drink-driving charges. In Geraldton, the impact of alcohol tends to be acute and affects young adults, particularly young males. In Bunbury, the consequences of alcohol use tend to be more chronic in nature and affect older adults. These findings have been used to inform local harm-prevention responses, but more than that, this study is a practical example of how available data can be aggregated at a community level to illustrate local alcohol use and harm. This method can be replicated in any community that wants to understand better the effects of alcohol in its own local context. (*Aust J Public Health* 1995; 19: 41-5)

The Ottawa Charter for Health Promotion states that 'People cannot achieve their fullest health potential unless they are able to take control of those things which determine their health'.<sup>1</sup> Tether and Robinson have reinforced this perspective in the context of alcohol harm.<sup>2</sup> They have argued that many communities are unwilling to be passive recipients of national programs and that central government often does not have the answers to local problems. They have further suggested that the prevention of alcohol problems is everybody's business and that local prevention resources must be part of the response.<sup>2</sup>

Unfortunately, individuals and agencies in a community do not have a good appreciation of the overall effects of alcohol at the local level. Midford, Daly and Holmes found that communities can be motivated to deal with their own alcohol-related problems, but be ineffective in their efforts because there are little available local data to delineate the problems objectively and to give them salience in relevant decision-making forums.<sup>3</sup> These authors found that local alcohol-harm statistics were an important catalyst in achieving restrictions on alcohol availability in the Western Australian town of Halls Creek. The data provided a comprehensive picture of the impact of alcohol on the community. This helped the local population to appreciate the scale and pervasiveness of the harm and enabled the community to represent the situation to relevant government agencies in a way that could not be ignored.

Wittman indicates that three kinds of information about alcohol problems are important in planning for prevention: official information, which is the formal record of alcohol use and related problems;

operational information, which identifies alcohol problems from an agency perspective; and experiential information, which identifies the attitudes and concerns of community groups about alcohol.<sup>4</sup> Blending these three types of information is critical to creating a meaningful local picture. However, official information is frequently of little immediate value at a local level because it is aggregated too broadly, typically at a state or national level. Wittman has made the point that official information is often not compelling at a local level unless it can be related to how the community perceives and experiences alcohol problems.<sup>5</sup> Even operational information, which has greater local relevance, may never be broadly accessible to the local community to assist in intersectoral planning and decision making about alcohol harm.

Community consultation indicates that experiential information is readily available at the local level but does not, on its own, facilitate a good understanding of alcohol-related harm.<sup>6</sup> This study combines what Wittman would describe as official and operational information, for two comparable regional centres in Western Australia, Geraldton and Bunbury.<sup>4</sup>

There were three goals for this study: to compile objective data on alcohol consumption and related harm as a means of assisting community understanding of local alcohol problems; to apply Holman et al.'s methodology of alcohol aetiological fractions to a small data base to determine if the results would be useful for prevention planning; to develop a model that could be replicated in similar regional communities to assist in prevention planning.<sup>7,8</sup>

This study is part of a larger project involving a 'community mobilisation' approach to local alcohol problems. This long-term project, 'Community mobilisation for the prevention of alcohol-related injury' (COMPARI), was commenced at the beginning of 1992, with its main purpose being to reduce

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alcohol-related injuries in the Geraldton community through a combination of individual behaviour change and environmental change.<sup>6</sup> Bunbury is the control location for this intervention and has been included in this study on that basis. The data reported here have already been made available locally, to inform prevention planning.

### Geraldton and Bunbury

Geraldton and Bunbury are small Western Australian coastal cities with populations of comparable size (about 25 000 residents).<sup>9</sup> However, the character of each city is unique. Geraldton, located 400 kilometres north of Perth, in the drier, hotter midwest region of the state, relies heavily on fishing, mining and agriculture for its prosperity. Bunbury is located 200 kilometres to the south of Perth in a cooler temperate area commonly termed the South West. The city has a more diverse economic base, which includes mining and mineral processing, agriculture, tourism and manufacturing.

The demographic profiles of the two cities are also different. Geraldton's population is skewed towards the young adult age group whereas Bunbury's largest 10-year age group is 35- to 44-year-olds and it has far more people in the 65-and-over age group than Geraldton (see Figure 1). The older age group in Bunbury also contains over 30 per cent more females than males, whereas this aged female bias is not so evident in the Geraldton population. Geraldton has slightly more men than women overall.

### Indices of alcohol consumption and harm

Alcohol consumption rates are presented by beverage type and as a total. The indices of harm include hospital morbidity data for alcohol-related conditions, particularly accidents and injuries, the cost of hospital bed-days attributable to alcohol and the rate of drink-driving charges with associated blood-alcohol levels. All data pertain to the Geraldton (6530) and Bunbury (6230) postcode regions.

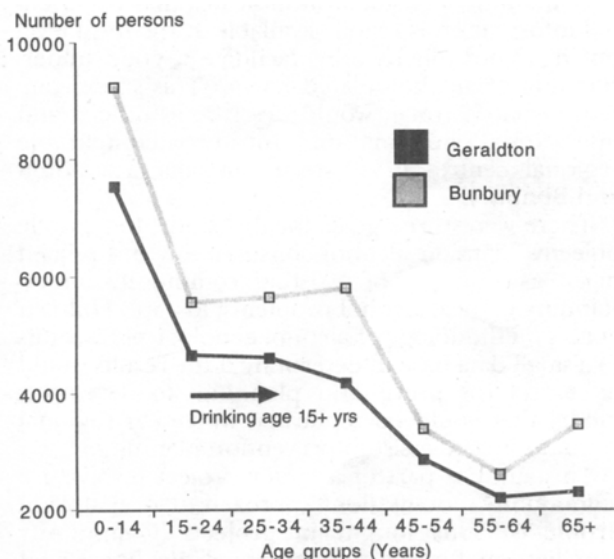


Figure 1: Population profiles, 1991: Geraldton and Bunbury postcode areas. Source: Australian Bureau of Statistics 1991 census.

### The method of alcohol aetiological fractions

Hospital mortality and morbidity data for Geraldton and Bunbury during the calendar year 1990 were made available by the Health Department of Western Australia. The mortality data have not, however, been reported in this paper, because the numbers involved are small and difficult to interpret in any meaningful way. This may be a limitation of aggregating specialised data at a local level.

Modern causation theory regarding the adverse effects of alcohol was applied to the morbidity data. In terms of contemporary epidemiological theory, a cause is any event or state of nature which initiates or permits, alone or in conjunction with other causes, a sequence of events resulting in an effect.<sup>10</sup> A sufficient cause is one which inevitably produces the effect; however, most causes are components of a cluster of causes which together, but not alone, produce a condition. These are known as component causes. Thus, for certain illnesses, such as alcoholic liver cirrhosis, alcohol alone is sufficient to cause the condition. For other illnesses, such as pharyngeal cancer, alcohol is just one of a number of component causes.

The causal relationship between adverse health effects and alcohol use is expressed in terms of a probability measure known as the aetiological fraction. The general population alcohol aetiological fractions are based on pooled estimates of relative risk for specific conditions combined with measures of prevalence of alcohol use. Relative risk indicates the likelihood of contracting a particular condition, based on exposure to some external factor, such as alcohol.<sup>10</sup>

The aetiological fraction method was developed by Holman et al.<sup>7</sup> It has been used by the Commonwealth Department of Community Services and Health to quantify deaths in Australia caused by specific drugs.<sup>8</sup> Aetiological fractions were also acknowledged as a most important source of data by Collins and Lapsley in their research monograph on

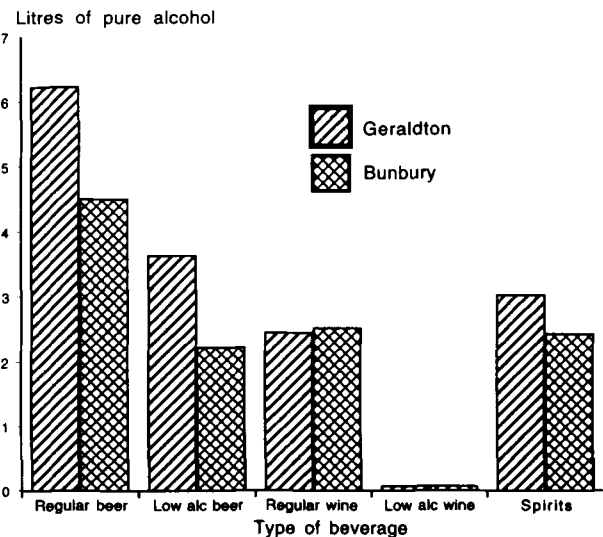


Figure 2: Alcoholic beverage consumption rates, 1990-91, in Geraldton and Bunbury. Source: Western Australia liquor licensing, 1990-91, and Australian Bureau of Statistics 1991 census. Alcohol conversion percentage: regular beer 4.8%, low-alcohol beer 3.5%, regular wine 11.9%, low-alcohol wine 6%, spirits 38.5%.

the economic cost of drug abuse in Australia.<sup>11</sup> These reports deal with national-level data and their applicability at a regional level must be considered minimal. This study has therefore applied this method on a much smaller scale, to inform community-based prevention planning.

**Alcohol consumption**

The rate of alcohol consumption in Geraldton and Bunbury during the 1990-91 financial year is presented by beverage type in Figure 2. The data, made available by the Western Australian Liquor Licensing Division, show that the most popular beverage in both communities was normal strength beer.

Geraldton drinkers consumed considerably more normal and light beer and slightly more spirits than Bunbury drinkers. Bunbury drinkers consumed slightly more normal strength wine than Geraldton drinkers. The total alcohol consumption rates are presented in Table 1. Both towns were above the national annual average of 10.1 litres of pure alcohol per person of drinking age.<sup>12</sup>

**Hospital morbidity**

Hospital bed-days and costs attributable to alcohol, broken down by sex and three major categories of illness, are presented in Figure 3.

The bed-day cost used was the average cost per bed-day (adjusted for non-inpatients) for Western Australian nonmetropolitan public general hospitals with more than 50 beds (\$305).<sup>13</sup> In each community the number of bed-days attributable to alcohol was comparable, although Geraldton had more bed-days due to male accidents and injuries, whereas Bunbury had more bed-days due to female accidents and injuries and male cancers. The bed-day cost attributable to alcohol in each community was almost \$400 000 annually. This is probably a conservative estimate of bed-day costs because costing is based on the relatively low rate that applies to country hospitals, whereas some patients would have been admitted to more expensive metropolitan teaching hospitals. This figure is also an underestimate of all direct health costs attributable to alcohol in each community because it takes no account of other services such as ambulance transport and treatment from general practitioners for alcohol-related accidents and injuries.

Injury-related morbidity can be viewed as an indicator of acute alcohol-related harm, whereas cancer and other diseases are indicators of chronic harm. If

Table 1: Comparison of drinking-age population and alcohol consumption, 1990-91, in Geraldton and Bunbury

	Geraldton	Bunbury
Population of drinking age (15+ years) <sup>a</sup>	20 793	26 522
Total consumption of pure alcohol (L) <sup>b</sup>	32 0347.43	31 0988.35
Average annual consumption per person aged 15+ years (L)	15.41	11.73

**Notes:**

- (a) Source of population data: Australian Bureau of Statistics 1991 census
- (b) Source of alcohol consumption data: WA Liquor Licensing Division, 1990-91.

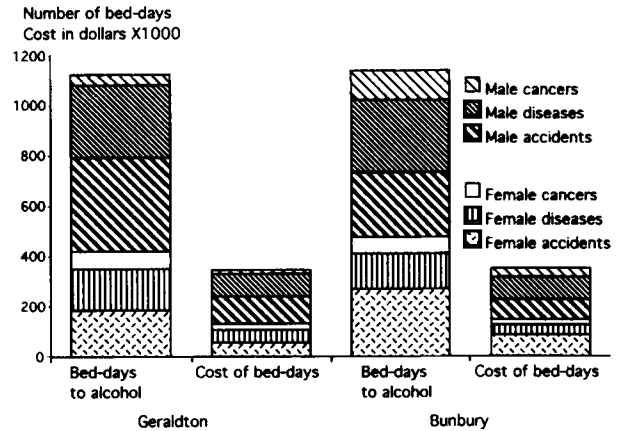


Figure 3: Hospital bed-days and costs (\$'000) attributable to alcohol, 1990, in Geraldton and Bunbury. Hospital bed-day cost (\$305) is the 1989-90 state average for nonmetropolitan hospitals with more than 50 beds. Source: Health Department of Western Australia, 1993, and Gillett and Solon.<sup>13</sup>

this is considered in conjunction with the higher number of male bed-days in Geraldton due to the accident and injury alcohol fraction (Figure 3), the higher per capita consumption in Geraldton (Figure 2 and Table 1) and consumption surveys, which consistently indicate that Australian males drink greater quantities of alcohol in a more harmful manner than their female counterparts, there is a cogent argument for comparing the rate of male accident and injury hospital admissions attributable to alcohol in each city to get an indication of relative harm.<sup>14-16</sup> This comparison is presented in Figure 4.

In Geraldton, there was a higher rate of male accident and injury admissions attributable to alcohol for almost all age categories. Poisson regression analysis revealed that the difference between the two cities was significant (log likelihood  $\chi^2 = 3.91$ ,  $P = 0.048$ ). The estimated relative risk (adjusted for age) of a male being admitted to hospital in Geraldton for an accident or injury attributable to alcohol was

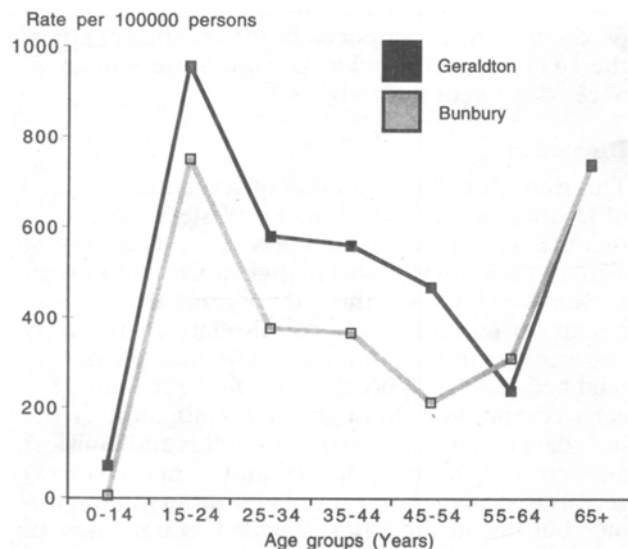


Figure 4: Rate of male accident and injury hospital admissions attributable to alcohol in Geraldton and Bunbury, 1990. Source: Health Department of Western Australia, 1993.

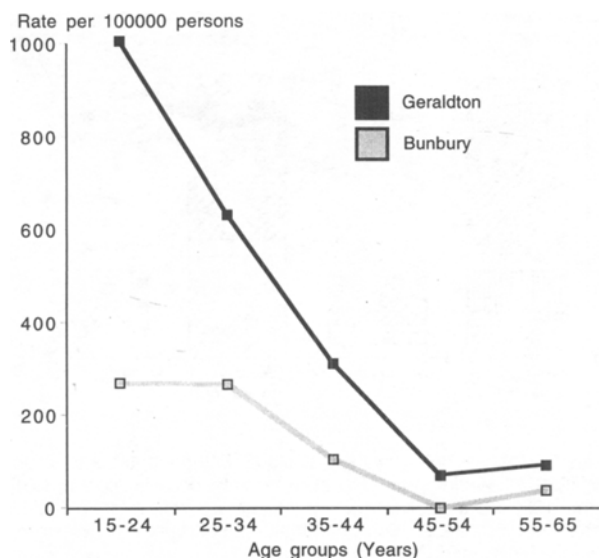


Figure 5: Drink-driving rates, 1991, in Geraldton and Bunbury. Eight cases from Geraldton were not included because age was unknown.

1.417 times that in Bunbury (95 per cent confidence interval (CI) 1.003 to 2.002). There was no significant age-by-city interaction.

#### Drink-driving charges

The rate of drink-driving charges (based on exceeding 0.08 per cent blood alcohol level) for each community is shown in Figure 5. Poisson regression analysis revealed that the difference between the two cities was significant ( $\log$  likelihood  $\chi^2 = 38.23$ ,  $P < 0.0001$ ). The estimated relative risk (adjusted for age) of being charged with drink-driving in Geraldton was 3.108 times of that in Bunbury (CI 2.123 to 4.55). The charge rate in Geraldton exceeded that in Bunbury in every age category, and while this difference appeared greatest in the younger categories there was no significant age-by-city interaction. The average blood alcohol level (BAL) of drink-drivers was also significantly higher ( $P < 0.05$ ) in Geraldton (0.165 per cent) than in Bunbury (0.146 per cent). Once again, this type of harm was predominantly experienced by males: 90 per cent of the 103 drivers charged in Geraldton were male, as were 83 per cent in Bunbury.

#### Discussion

This study describes a number of available indicators of alcohol use and harm in two Western Australian regional centres of comparable size. The rate of alcohol consumption was higher in Geraldton than in Bunbury. However, this did not translate into consistent differences in alcohol-related morbidity between the two communities. The number of hospital bed-days attributable to alcohol was similar for each community, although an examination of the bed-days due to acute harm (accidents and injuries) and chronic harm (cancers and other diseases) reveals that Geraldton exceeded Bunbury in the former but not in the latter. Detailed examination of rates of admissions to hospital because of accidents and injuries attributable to alcohol reinforces this impression of greater acute harm occurring in

Geraldton, particularly within the male population.

Most of the characteristics in the morbidity data can be explained by the particular age profiles of the two communities studied. Bunbury has an older population and tends to experience more chronic alcohol harm. Geraldton has a younger population and tends to experience more acute harm from alcohol. This impression is reinforced by data in a study by Swensen into deaths caused by alcohol in Western Australia.<sup>17</sup>

He calculated the number and causes of deaths due to alcohol for the period 1981–1990 in each Western Australian Statistical Division. Deaths from external causes, such as road accidents, as opposed to deaths caused by illness and disease, indicate acute rather than chronic alcohol harm. In the statistical division containing Geraldton, 45 per cent of deaths due to alcohol were from external causes, compared with 35 per cent in the statistical division containing Bunbury.

Some forms of alcohol-related harm take years, if not decades, to manifest. In Geraldton, there may be a migration factor at work which encourages younger people to work and drink in that community but get sick and die elsewhere.

The one indicator used in this study that does present a striking picture of the greater immediate harm associated with higher per capita alcohol consumption is drink-driving. It seems fairly clear that Geraldton has a considerably higher rate of drinking and driving than Bunbury, although it is possible that this is a consequence of different policing practices. However, two indirect indicators tend to support the position that the drink-driving charges are an accurate reflection of the level of drinking and driving that occurs in each community. In Geraldton, the ratio of charges to accompanying accidents is 103 to 11. In Bunbury, the ratio is 37 to 3. The ratio of charge to accident is very similar in each centre. Accidents associated with drink-driving are less susceptible to influence by policing levels and practices than drink-driving charges. This consistent drink-driving-to-accident ratio provides support for the view that more drink-driving occurs in Geraldton. Even if the number of accidents associated with drink-driving charges is taken as an acute harm indicator on its own, there is cause for concern.

A study by Stockwell, Maisey and Smith also provides evidence of similar police enforcement of random breath testing in these two regional centres.<sup>18</sup> These authors found that in the two years following the introduction of random breath testing in October 1988 there were 11.92 drink-driving charges per 1000 drivers in the Geraldton Police Region compared to 8.45 charges per 1000 drivers in the Bunbury Police Region. These figures were achieved by testing 47 per cent of 64 485 drivers stopped in the Geraldton region and 53 per cent of 66 624 drivers stopped in the Bunbury region.<sup>18,19</sup>

While these data pertain to larger areas and to a period prior to the year examined in this study (1991), they again indicate a higher level of drink-driving in the Geraldton area, although not of the same magnitude as reported in this study. More importantly, the data indicate that police practice

with regard to the numbers of drivers stopped and percentage tested is comparable across locations.

If there is an underlying theme to the nature of harm caused by alcohol in these two communities it is that the effect in Geraldton tends to be acute and experienced more by young adults, particularly young males, whereas in Bunbury, the effects tend to be more chronic in nature and experienced by aged adults. This is obviously a broad generalisation, but even at this level of interpretation there are implications for locally tailored harm-prevention responses.

In Western Australia, the small town of Halls Creek was the first community to be successful in petitioning the Liquor Licensing Commission to impose special local restrictions on liquor availability.<sup>5</sup> That community used a broad array of local consumption and harm data to support their case. Close examination of the data presented in this study, particularly if coupled with systematic evaluation of what Wittman calls experiential information, allows the formulation of a detailed and shared local knowledge base on alcohol consumption and related harm which can be used to motivate and inform local prevention responses.<sup>4</sup>

### Conclusion

This study has developed a method for analysing alcohol consumption and related harm in regional communities in Western Australia. These data have been used in the planning of community interventions, so that local people can make informed decisions about their priorities. There are, however, some problems with this approach that need to be acknowledged. The data sets are generally small and not necessarily amenable to quantitative analysis in the same way as larger populations. It may be difficult, therefore, to discern meaningful local characteristics and trends with a 'snapshot' of one year's data. Where possible, a minimum three-year period should be analysed so that quantitative methods can be better applied. In this way features of the data are likely to be more salient and more meaningful information can be used by the community to assist with local planning.

The process reported in this study is amenable to refinement, and future studies should consider increasing the number of relevant data sets analysed and the sophistication of analysis. There would be considerable merit in collating all relevant state or national data in a manner that allows aggregation at a variety of levels, identification and quantification of interrelationships, and ready presentation and dissemination of results. This would not only benefit local planning and community involvement, but could inform broader policy development and possibly even provide the basis for modelling the consequences of various interventions.

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