EVALUATION OF THE PUBLIC HEALTH AND SAFETY IMPACT OF EXTENDED TRADING PERMITS FOR PERTH HOTELS AND NIGHTCLUBS

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CONTENTS PAGE

EXECUTIVE SUMMARY AND RECOMMENDATIONS

Overview

• A total of 75 hotels, taverns and nightclubs in Perth were granted the opportunity to trade for longer hours between 1989 and 1996. Data provided by the WA Office of Racing, Gaming and Liquor and by the WA Police Service regarding sales and problems associated with individual premises made possible an evaluation of the impact of late trading on alcohol related harm.
• Significant changes in problem levels were found: premises with later trading had significant increases in assaults and premises trading normally had a significant reduction in the number of times they were cited as the last place of drinking by a convicted drink driver with a blood alcohol level above 0.08ml/mg.
• The times at which assaults, road crashes and drink driving offences associated with late trading venues occurred were shifted further into the early hours of the morning.
• It is recommended either that extended trading is discontinued or that greater precautions are taken to protect public health and safety as well as to recoup the extra costs of providing emergency and police services at a time when they are more costly.

Introduction

• This report provides a discussion of (i) the national and international experience with extended trading hours and their impact on alcohol-related problems (ii) a brief overview of research on Australian public opinion regarding permitted hours of trading (iii) the first report on the impact of Extended Trading Permits (ETPs) in Western Australia on levels of alcohol purchases, assaults in and around licensed premises, drink-driving offences and road crashes involving persons who last drank on licensed premises. In this 'natural experiment' it was possible to compare outcomes for otherwise similar premises with and without ETPs in a relatively controlled fashion.
• The hours of trading permitted for different types of premises licensed to sell alcoholic drinks is an issue in which many groups in society have an interest. A balance has to be struck between consumer demand for ready access, the retail alcohol industry's legitimate interest in maximising its profitability and the various public health, safety, order and nuisance issues associated with the consumption of alcoholic drinks at different times and places.
• Trading hours are a critical lever available to government for the regulation of alcohol's physical availability in different settings. Policy decisions on this issue may have an impact on the health and welfare of many people. As a consequence, it is recommended that any review of late trading pays careful attention to the documented impacts of variations in trading hours both in other parts of Australia and overseas.

Experiences elsewhere

• The international research literature provides stronger evidence for the effectiveness of controls on the price of alcoholic drinks and the legal drinking age than for small variations in trading hours. There is some recent Australian evidence from Darwin, however, that extended trading hours for city night-clubs resulted in a substantial increase in complaints made to the police between 10 p.m. and 7 a.m.

Public opinion

• When public and stakeholder opinion on the trading hours of hotels has been sought, this has indicated strong support for midnight closing. These studies have been conducted at times and places where midnight closing for hotels was the norm.

Extended Trading Permits (ETPs) for hotels and nightclubs in the Perth metropolitan area

• A total of 75 premises in the Perth metropolitan area were granted some form of ETP during the study period, 6 of which were nightclubs. Inclusion of the remaining hotels and taverns in any analysis was determined by whether there was at least 6 months of 'harm' data both before and after the granting of an ETP.
• ETPs have been granted to some but not all applicants by the Director of Liquor Licensing since 1989. The great majority have been granted since mid-1993. Most permit an additional hour or two of trading at peak times such as the early hours of Friday, Saturday and Sunday. Premises with a known poor record for compliance with liquor laws are not intended to receive an ETP though information regarding serving practices in premises is not collected routinely by the licensing authority. The net result is a valuable natural experiment allowing for comparisons of problems before and after the granting of ETPs as well as with control establishments that either did not apply for or did not receive an ETP.
• Numbers of drink-driving offenders identified as having drunk last at particular premises were examined for trends before and after the granting of ETPs to hotels and nightclubs in the Perth metropolitan area from 1990 to 1996. Analysis was also made of numbers of assaults identified as occurring on or in the vicinity of particular licensed premises before and after the granting of ETPs from 1991 to 1995. Comprehensive data on wholesale purchases by individual premises was also examined to determine whether the granting of an ETP appeared to increase profitability.

Impact of ETPs on levels of physical and sexual assault around licensed premises

• Analyses were conducted on data from the hotels and taverns for which there was at least one physical or sexual assault located in or around the venue at some time during the study period and, if an ETP had been granted, at least six months of assault data available for analysis both before and after the granting of the ETP. Across the entire metropolitan area between mid-1991 and mid-1995 there were over 2300 assaults that were linked to licensed premises. Employing the categories used by the police, 72% occurred within the premises, 16% on the street directly outside, 4% in the carpark and 8% could be classified by the researchers as occurring on or in the direct vicinity of a licensed premise on the basis of a narrative account of the incident. Within the period that assault data were available, 37 premises were granted an ETP, but only 23 of these venues had at least six months of before and after data. Three further premises were dropped either because there were no continuous data available (n=1) or no assaults were reported to the police either before or after the granting of an ETP (n=2). The remaining 20 premises were matched with non-ETP premises on levels of sales and of assaults prior to the ETP. Of all the officially recorded assault cases in metropolitain Perth associated with licensed premises, less than one per cent (0.98) were recorded by police as involving drugs. The majority of incidents

occurred on weekends, with a total of 72% falling on Fridays, Saturdays and Sundays. The majority of complainants were males (78%).

• Assaults occurring in and around these licensed premises increased significantly after they were granted ETPs. A comparison of hotels/taverns with and without ETPs in Perth entertainment districts showed that the monthly rate of assaults more than doubled between 1991/2 and 1994/5 for the selected ETP premises but remained static for the matched non-ETP premises. The times at which assaults occurred also shifted after ETPs were granted; they became more frequent in the early hours of the morning corresponding to the later closing times. The four night-clubs showed similar trends but were too few to be assessed statistically. The overall rate of assaults at nightclubs was five times that of hotels and taverns.

• Average alcohol purchases for ETP premises were more than 85 % greater than their non-ETP counterparts. When the occurrence of violent assault is adjusted by taking into account the change in alcohol purchases by each premise - the significant increase in assaults is no longer evident. This strongly suggests a link between increased levels of alcohol sales and increased levels of violence.

Impact of ETPs on levels of drink-driving offences after drinking on licensed premises

• Analyses were conducted on hotels and taverns which were identified at least once as the last place of drinking of a drink-driver and, if an ETP had been granted, at least six months of drink-driving data were available for analysis both before and after the granting of the ETP. A total of 61 hotel/tavern premises obtained ETPs during the RBT/Accident study period, ie. between mid 1990 and mid 1996. However, nine of these premises did not have at least six months of data following the introduction of an ETP, continuous data was not available for two premises and only one failed to be cited as the last place of drinking by a drink driver during the six year period. This reduced the total number of premises available for analysis to 49.

• The number of persons failing a road-side Random Breath Test (RBT) after last drinking at a particular hotel or tavern, and who subsequently registered a blood alcohol level in excess of 0.08mg/ml, decreased significantly after the start of an ETP. In addition, the times at which drink-drivers were identified shifted markedly into the early hours of the morning once extended trading was in place despite lower levels of enforcement after midnight. The importance of level of enforcement was also indicated by the fact that significantly fewer drink-drivers were identified by mobile traffic patrols (as opposed to RBT checkpoints) after midnight once an ETP was granted. It appears, therefore, that drink-drivers leaving premises in the early hours of the morning were more likely to escape police detection by the mobile patrols.

• Future analyses will examine matched comparisons of ETP and non-ETP premises in relation to changes in numbers of citations as the last place of drinking by drink driving offenders.

Impact of ETPs on levels of road crashes after drinking on licensed premises

• Analyses were conducted on 44 hotels and taverns which were identified at least once as the last place of drinking of a drink-driver involved in a road crash, if an ETP had been granted, at least six months of drink-driving data were available for analysis both before and after the granting of the ETP. These road crashes are those to which were attended by the police because

of their severity. Six premises were excluded from the full last place of drinking data set for these analyses on the basis of not being cited at any time by a drink driver.
• The number of road crashes following drinking on the selected licensed premise with extended trade did increase but not to a significant degree. While before and after ETP rates of road crashes were similar for hotels/taverns, there was an upward trend for night-clubs. There were too few night-club premises with ETPs to determine any statistical significance.
• A further analysis employed 37 matched pairs of ETP and non-ETP premises. Matching was performed so as to ensure comparisons were made between pairs of premises which had similar levels of sales and of citations from drink drivers involved in road crashes prior to one of the pair receiving an ETP. Seven ETP premises could not be matched. This analysis demonstrated that road crashes increased by only 4% in ETP premises and decreased by 31% in non-ETP premises after ETPs were granted, a significant difference.
• Wholesale purchases of alcohol increased by 27% for ETP premises and by 22% for non-ETP premises, a non-significant difference.

Overview of the impact of the ETP system in Perth on alcohol-related harm

• The introduction of Extended Trading Permits in metropolitan Perth had a definite effect upon the timing of alcohol-related incidents of harm for many premises. For the main harm indicators, road crashes and violent assaults, there was a consistent and obvious shift in the timing of incidents to increase after midnight. Of additional concern, was the indication that routine police traffic patrols were failing to detect as many drink-drivers from particular premises after midnight once an ETP was granted. Emergency services in general are less well resourced after midnight and are more expensive to operate. Extended trading clearly puts extra pressure upon these already over-stretched services. This is consistent with earlier Australian studies regarding the impact of changes in trading hours in different States.
• There is also evidence for a direct negative effect on levels of violent assault and road crashes. Premises operating with ETPs had significantly more violent assaults in or around their vicinity and also significantly greater alcohol purchases. After ETPs were granted, road crashes and whole alcohol purchases also increased, neither effect being significant. By contrast, non-ETP premises were significantly less likely to be cited as the last place of drinking by drink driving offenders in the After ETP period.
• It is difficult to sustain the argument that there was simply an overall shift in the location of assaults as opposed to there being an overall increase as a consequence of ETPs being granted as there was no significant decline in monthly rates of assault for non-ETP hotels/taverns during the study period.
• In relation to road crashes it would appear that the overall trend for alcohol related crashes towards the end of the study period was downwards, perhaps reflecting some positive impact from the lowered permitted blood alcohol level for drivers in June 1993 to 0.05 and the introduction of 'Booze Buses' in July 1995. For patrons of ETP premises, however, this benefit may have been counteracted perhaps as a consequence of greater alcohol consumption and less effective deterrence of drink driving after midnight.
• In relation to the impact of ETPs on alcohol purchases, the pattern of results suggests that there was a small extra increase in these following the granting of an ETP. The study period was one in which alcohol purchases increased substantially for both ETP and non-ETP establishments in keeping with economic growth following the recession of 1991. When comparing inner premises

with and without ETPs matched both by suburb and prior sales level, all within the central Perth metropolitan area, non-ETP premises had significantly less alcohol purchases than ETPs. Presumably their neighbours with ETPs were taking business away.

• It would seem likely that extended trading hours result in a small increase in the community's consumption of alcohol as well as in associated increases in alcohol-related violence and serious road crashes. This finding regarding violent incidents is consistent with the results of an evaluation of extended trading for Darwin nightclubs.

CONCLUSIONS

- The universal Australian experience with extended trading hours has been a corresponding shift in the timing of serious alcohol related probelms. In this instance trading post-midnight increases the proportions of road crashes and assaults occuring at a time when emergency and police services are most expensive and are already over-stretched.
- There is strong evidence from recent experiences in Perth and Darwin that extended trading in late night venues results in an increase in levels of assault offences.
- There is also suggestive evidence that the granting of ETPs has limited the effectiveness of strategies such as the 0.05 blood alcohol level and the introduction of Booze Buses in Western Australia.
- Public opinion surveys, indicate that the majority of opinion is in favour of midnight closing for hotels and taverns, at least where this is already the norm.

One policy response to these findings would be to discontinue the ETP system. Alternatively, if it is determined that ETPs should continue, then public health and safety concerns might be addressed as follows:

1. All forms of public transport could be made more available after midnight in order to make it easier for drinkers to not drive during the early hours of the morning.
2. Licensees with extended trading could be required to provide private transport services for their patrons.
3. Levels of violence and drink driving in and around licensed premises are closely monitored by licensing, police and health authorities.
4. Where levels of violence, road crashes and/or drink-driving associated with a particular ETP licensed premises increase, the ETP should be revoked.
5. There could be an additional harm reduction levy applied to those premises permitted to have late trading in order to compensate the community for the additional costs in deterring drink-driving as well as responding to increases in crime, particularly violent crime, and drink-driving road crashes, after midnight.

In summary, extended trading creates a significant change in the late night environment of metropolitan Perth and in patterns of both alcohol consumption and alcohol related harm. By doing so it must necessarily force emergency, police and transport services who deal with the consequences of this harm to adapt to that changing environment. If they cannot adapt, the efforts of police, public health, government and community groups aimed at reducing or at least controlling alcohol-related problems will be less effective. Unfortunately, adaptation has its price. It is not unreasonable, therefore, to suggest that those who benefit most from such changes should contribute to the costs of minimising problems for the rest of the community.

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1.0 INTRODUCTION

A central and highly controversial issue in the formulation of modern liquor licensing laws is whether controls on the availability of alcohol are an effective means of minimising alcohol problems. Liquor laws have been used in a number of ways to influence the physical availability of alcohol including restrictions on: permitted hours of sale, personnel who may be a licensee, numbers and types of outlets, persons to whom alcohol may be sold, types and strengths of alcoholic beverages sold, the physical characteristics of premises and the range of other services or products which are to be provided. Liquor laws may also be used to alter the 'economic availability' (i.e. price) of alcohol through the levying of liquor taxes. A brief overview will be provided here of the issues and the evidence in relation to the impact of variations in trading hours on levels of alcohol related harm. It will then present the first findings from a review of a fairly unique natural experiment in late night trading that has occurred in Western Australia since 1989.

Cogent arguments and convincing evidence can be, and have been, marshalled to support a variety of positions on this issue. For example, it has been suggested by some authorities that extended trading hours for licensed premises would reduce alcohol related violence[1] and by other authorities that they increase other alcohol problems[2]. Some commentators have suggested that the research evidence in this area has tended to have been interpreted selectively to support the predetermined positions of various interest groups[3].

The availability issue strikes right to the heart of a number of key issues and interests:

- the desire of the majority of adult Australians to enjoy access to their favourite recreational drug;
- the concern of the alcohol manufacturing industry to have as few restrictions as possible placed on their market;
- the concern of retailers to trade at the hours that suit them and with a minimum of competition;
- the right of residents to the peaceful enjoyment of their neighbourhood;
- the concern of public health, safety and welfare groups , as well as the community at large, to minimise alcohol problems;
- the opportunity for governments to collect taxes on a non-essential commodity**.**

These rival interests and pressure groups have each held sway in different parts of the world at various points in time resulting in a continuum of alcohol availability ranging from outright prohibition to unfettered access. Examples of curious compromises between various interest groups can also be found. For example, Mississippi was the last US state to repeal Prohibition in 1966 but up until that time it was estimated that there were more retail liquor traders in

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1 MARSH, P. & KIBBY, K.F. (1992) *Drinking and public disorder*. Oxford, Alden Press.

2 SMITH, I. (1989b) *Effectiveness of legislative and fiscal restrictions in reducing alcohol related crime and traffic accidents*, (ed.) J. Vernon, Alcohol and Crime: Conference Proceedings, Australian Institute of Criminology, Canberra, 223-240.

3 HOLDER, H.D. (1993) Changes in access to and availability of alcohol in the United States : research and policy implications. *Addiction* , 88, Supplement, 67-74.

Mississippi than in the two adjacent 'wet' states of Tennessee and Arkansas[4] The pretence of official prohibition appeared to suit everyone - the government even managed to collect taxes on the sale of 'illicit' liquor. It was said that the 'drys' had their prohibition, the 'wets' had their alcohol and the government had their taxes. Until 1990, Iceland permitted the sale of wine and spirits but prohibited that of beer[5].

In Australia, the relative dominance of any one viewpoint or special interest group at different times has resulted in periods of both relaxation and tightening of controls on alcohol availability. The middle of the last century marked a time when laws were relatively lax while the 1920s, at the height of the world-wide Temperance Movement, heralded an era of greater restraint with some states narrowly avoiding outright prohibition[6,7]. Since World War II there has been a progressive relaxing of these laws in step with greater acceptance of alcohol and more participation in drinking by various social groups.

In more recent times, quite opposite views on this question have been adopted by Australian governments resulting in radically different approaches to liquor legislation. The Victorian 1987 Liquor Control Act ushered in an era of de-regulation of licensing arrangements including a reduction in the number of licensed premises and their hours of opening in that State. It was based on the advice of the Nieuwenhuysen Report[8] that controls on availability were clumsy, antiquated, ineffectual and discriminated against the majority of people who consumed alcohol in a harm-free fashion. In stark contrast, the Northern Territory government recently embarked on an equally radical reform of alcohol policy in a precisely opposite direction. On the advice of a committee established by the Chief Minister to look into the 'use and misuse of alcohol' a number of controls on availability were proposed including a gradual reduction in the number of licensed premises and a levy on drinks with an alcohol content in excess of 3% by volume[9].

There is no single answer to so general a question as 'what is the relationship between alcohol availability and alcohol harm'. Rather, both the concepts of 'availability' and of 'harm' are multi-faceted and it is more useful to seek out specific relationships between types of availability and types of alcohol harm while also paying attention to social, cultural and economic conditions prevailing in particular communities. There are some clear and unequivocal conclusions which can be drawn from the relevant literature and which any genuine attempt to devise liquor laws with a view to reducing alcohol problems should take note of.

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4 HOLDER, H.D. & CHERPITEL, C.J.S. (in press) The end of US prohibition : A case study in Mississippi. In: OSTERBERG, E. & GIESBRECHT, N. (Eds.) *The Impact of Major Changes in Alcohol Availability and Consumption on Alcohol-Related Casualties and Social Problems*. Helsinki, Finland: The Social Research Institute of Alcohol Studies.

5 GUOMONDSDOTTIR, A. (1990) *The impact of beer on Icelandic youth.* Paper presented at 16th Annual Alcohol Epidemiology Symposium, Kettil Brunn Society meeting, Budapest, Hungary, June 3-8,1990.

6' THE ADAMS REPORT': ADAMS, P.R., CLARKE, R. & AHERN, J.J. (1969) *Report of the Committee of Inquiry into the Licensing Act 1911*. Davies, A.B., Perth: Government Printer.

7 BOOTS, K. (1993) An odious and loathsome sin. *Substance*, 4, 6-9.

8 NIEUWENHUYSEN, J. (1986) *Review of the Victorian Liquor Control Act 1968*, Report, Melbourne: Government Printer.

9 D'ABBS, P. (1993) The macho hard living, hard drinking Territorian is dead. *CentreLines,* 13, 3-5

1.1 THE "AVAILABILITY THEORY"

The notion that the degree of availability of alcohol in a society might effect the extent of its use and resultant problems has frequently been elevated to the status of a 'grand theory'. The most famous example of this tendency is the 'Ledermann Model' of alcohol consumption which basically asserts that there is a mathematically quantifiable relationship in all societies between the level of per capita consumption and the number of excessive drinkers in a population[10]. Subsequent theorists have demonstrated that there is no such precisely quantifiable relationship[11,12] - a conclusion that is frequently cited as grounds for a general rebuttal of the 'availability theory'. In fact, there has been no society studied in which changes in the overall per capita consumption of alcohol are not positively correlated with corresponding changes in the proportion of excessive drinkers - the relative size of these changes varies, however, across time and place[13].

There are many possible ways in which alcohol availability, consumption and harm can be related and the partial failure of the Ledermann Model is not of great relevance to any of them. To paraphrase Single[15], there are three separate but linked propositions contained within the 'Availability Theory':

1. The greater the availability of alcohol in a society the higher the average consumption of its population;
2. The higher the average consumption of a population then the greater number there will be of excessive drinkers;
3. The greater the number of excessive drinkers in a population the greater the extent of adverse health and social problems stemming from alcohol use.

While most reviewers agree that the evidence supporting the second and third propositions is compelling[14,15] the first one has stimulated considerable controversy and debate.

The relevant research literature in this area cannot be sorted neatly into the above three categories. Some studies effectively straddle all three of the above propositions by examining evidence for direct linkages between changes in availability and levels of problems. Others straddle the last two propositions by examining relationships between changes in per capita consumption of a population and levels of problems. If one adds to this the varied nature of

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10 LEDERMANN, S. (1956) *Alcohol, alcoholism, alcoholisation,* Vol 1. Connees scientifiques de caractere physiologique, economique et social. Institute National d'Etudes Demographique, Travaus et Documents, Cah No 29, Paris, Presses Universitaires de France.

11 DUFFY, J.C. & COHEN. G.R. (1978) Total alcohol consumption and excessive drinking. *British Journal of Addiction*, 73, 259-264.

12 SKOG, O-J. (1985) *The distribution of alcohol consumption. Part III: Evidence of a collective drinking culture.* Oslo: National Institute for Alcohol Research.

13 DAVIES, P. & WALSH, D. (1983) *Alcohol problems and alcohol control in Europe.* Beckenham, Kent: Croom Helm.

14 CASSWELL, S. (1991) *Background paper for Inter-Regional Meeting on alcohol related problems,* Tokyo, Japan, 2-8 April 1991. Alcohol & Public Health Research Unit, University of Auckland, New Zealand.

15 SINGLE, E.W. (1988) The availability theory of alcohol related problems. In: CHAUDRON, C.D. & WILKINSON, D.A. (Eds.) Theories on Alcoholism. Toronto : *Addiction Research Foundation* (pp. 325-351).

alcohol problems, differing measures of drinking behaviour and of availability it perhaps is no wonder that this debate has given rise to so much controversy and that research has been quoted to support almost any position.

1.2 RESEARCH EVIDENCE ON THE AVAILABILITY THEORY

Eleven major reviews of the international research literature concerning alcohol availability, consumption and harm were identified, though there are doubtless several others. Characteristically, they all discuss the same set of studies and come to similar conclusions. Of these reviews, one originates from Australia[16], one from New Zealand[14], one from the UK[17], one from Scandinavia[18], two from Canada[19,15], three from the USA[20,21,3] and the most recent[22] is authored by scientists from many countries. A further review was commissioned by the World Health Organisation and makes reference to a number of studies and data sets from third world countries which are not discussed to by other reviewers[23].

These common conclusions have been summarised elsewhere[24] and are listed briefly below, with special attention to the data on late night trading.

1. Levels of consumption predict levels of problems

Changes in a nation's per capita alcohol consumption have been linked closely to numbers of deaths from liver cirrhosis and also to a variety of other alcohol problem indicators including violent deaths[25,26] and rates of drunkenness arrests[27]. However, recent analyses of data from Canada, Finland, France, Netherlands, Switzerland and the United States for the years 1962 to

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16 SMITH, D.I. (1988a) Effectiveness of restrictions on availability as a means of preventing alcohol related problems. *Contemporary Drug Problems*, 627-684.

17 PEACOCK, C. (1992) International policies on alcohol impaired driving : a review. *International Journal of the Addictions,* 27, 2, 187-208.

18 OSTERBERG, E. (1992) Effects of alcohol control measures on alcohol consumption. I*nternational Journal of the Addictions,* 27, 2, 209-225.

19 ELIANY, M. & RUSH, B. (1992) *How effective are alcohol and other drug prevention and treatment programs? A review of evaluation studies*. Ottawa: Minister of Supply & Services Canada.

20 MOSKOWITZ, J.M. (1989) The primary prevention of alcohol problems : a critical review of the research literature. *Journal of Studies on Alcohol*, 50, 1, 54-88.

21 GRUENEWALD, P.J. (1993) Alcohol problems and the control of availability : Theoretical and empirical issues. In: HILTON, M.E. & BLOSS, G. (Eds.) *Economics and Prevention of Alcohol-Related Problems*. NIAAA Research Monograph # 25. Bethesda, Maryland: US Government Printing Office.

22EDWARDS, G. et al (1995) *Alcohol Policy and the Public Good*. Oxford University Press: Oxford.

23 FARRELL, S. (1985) *Review of national policy measures to prevent alcohol related problems*. Geneva: World Health Organisation.

24STOCKWELL, T. (ED) An examination of the appropriateness and efficacy of liquor licensing laws across Asutralia. Australian Government Publishing Service, Canberra, 1995

25 BRUUN, M., EDWARDS, G., LUMIO, K., SKOG, O-J., SULKUNEN, P. & OSTERBERG, E. (1975) Alcohol control policies in public health perspective. *The Finnish Foundation for Alcohol Studies*, Vol 25, Forssa, Aurasen Kirjapalo.

26 SKOG, O-J. (1986) Trends in alcohol consumption and violent deaths. *British Journal of Addiction* 81, 365-379.

27 PLANT, M. (1987) *Drugs in perspective*. London: Hodder and Stoughton.

1988 show that per capita consumption is only moderately associated with numbers of deaths from causes other than from liver cirrhosis[28]. Much stronger links between alcohol consumption and harm are suggested by evidence from self-report surveys in which the probability of experiencing personal alcohol problems increases in a linear, or even exponential manner, with increases in average weekly consumption[20].

2. Dramatic changes in availability influence levels of problems

A number of 'natural experiments' involving substantial and/or sudden changes in some form of availability have been studied. Such opportunities arise either through the sudden relaxing or tightening of control through legislative means, or accidentally by virtue of strikes by key groups of personnel in the alcohol production and supply network. These changes in availability are almost invariably accompanied by consonant changes in both consumption levels and alcohol problem indicators.

Farrell[34] provides an overview of other such natural experiments from New Zealand, Poland, France, Canada and the USA. Dramatic reductions in overall consumption, especially that of heavy drinkers and alcoholics, of public drunkenness, domestic violence, deaths from liver cirrhosis and violent crime are all well documented. Large reductions in alcohol availability were usually only partially compensated for by increased use of home produced or imported alcohol. Skog[29] (1993) analysed Danish data on suicide rates during a period when the price of alcohol in that country 'increased dramatically' and found that these and per capita consumption both declined significantly.

3. 'Global availability' is associated with consumption and harm

A few studies have attempted to develop global measures of overall alcohol availability incorporating several dimensions of availability such as price, hours of opening, drinking age and so on. Davies and Walsh[13] applied this approach to epidemiological and consumption data from 16 European countries over several years. While they identified some exceptions where lax controls were associated with low rates of use and harm, a strong overall relationship emerged between these variables.

Another such study applied a global measure of availability to data from each of the States in the US[30]. Strong positive correlations were found between overall availability of alcohol and rates of death from liver cirrhosis and suicide but a negative correlation was found with rates of death from homicide.

[28] GIESBRECHT, N. & DICK, R. (1993) Societal norms and risk-taking behaviour : inter-cultural comparisons of casualties and alcohol consumption. *Addiction,* 88, 7, 867-876.
[29] SKOG, O-J. (1993) The tail of the alcohol consumption distribution, *Addiction*, 88, 601-610.
[30] LESTER, D. (1993) Restricting the availability of alcohol and rates of personal violence (suicide and homicide). *Drug and Alcohol Dependence,* 31, 215-217.

4. Prices effect levels of consumption and problems

Liquor licensing systems have the capability of influencing the economic availability of alcohol through liquor taxes. They are not, of course, the only form of taxation on alcoholic drinks as there are also federal sales and excise taxes. Taxation has a powerful influence on the price of alcoholic drinks as government charges make up for a large proportion of the purchase price of drinks. It is widely accepted that alcohol behaves like other commodities and that levels of its use will rise and fall inversely with alterations in its real price[31]. None of the reviewers or economic sources we have obtained suggested otherwise.

5. Increased outlet density stimulates increased consumption and problems

It is very difficult to establish causal relationships between changes in the density of licensed premises, alcohol consumption and harm although associations between these variables are widely reported. Controls on numbers of licensed premises are a common feature of many licensing systems[33].

Studies suggest that at the very least the possibility that limits over outlet density might be an effective means of controlling alcohol problems needs taken seriously and that further research into its effectiveness needs to be conducted. Future research needs to learn from the methods developed by Gruenewald and colleagues at the Prevention Research Centre in California so as to raise the level of scientific rigour in this area.

6. Raising the legal drinking age reduces some alcohol problems for young people

There is a clear consensus in the research literature and in reviews of this that alterations in the legal drinking age have direct consequences for drinking behaviour and rates of problems for young people. This body of knowledge was influential in the decision of many US states to raise their minimum drinking age to 20 or 21 during the 1980's following experiences with earlier periods of relaxation[32]. There is also very good data on this issue in relation to the changes that have taken place within various Australian states in recent years[2,33]. There can be little doubt that raising the drinking age is a powerful prevention measure in relation to the experience of violence and other problems related to intoxication by young people. There is also little doubt that younger people are especially at risk for such problems[23].

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31 LLOYD, P.J. (1985) The economics of regulation of alcohol distribution and consumption in Victoria.. The *Australian Economic Review*, 1st Quarter, 16-29.

32 WAGENAAR, A.C. (1933) Research affects public policy : the case of the legal drinking age in the United States. *Addiction,* 88, Supplement, 75-81.

33 SMITH, D.I. & BURVILL, P.W. (1986) Effect on traffic safety of lowering the drinking age in three Australian states. *Journal of Drug Issues*, 16, 2, 183-198.

7. The relationship between small variations in the hours of trading and overall levels of alcohol problems remains unproven

Most reviewers have classified this issue as 'unproven'[34,14]. While traffic accidents and assaults have been shown to be closely associated with hours of trading with a peak appearing after closing time[35,36], actual changes in hours of trading have not always resulted in a significant corresponding change in problem rates or in consumption levels.

Again, much of the Australian data has been analysed and reported by Ian Smith, of the Western Australian Drug and Alcohol Authority. Mostly his analyses clearly show that small alterations in trading hours shift the pattern of road traffic accidents so that a peak occurs shortly after the new closing time. In some instances they show a significant increase in accidents in comparison with a control state on the day when extended trading hours occur[37]. What they do not show, however, is an overall increase in total numbers of accidents across all times. This means that it is impossible to rule out the explanation that peoples' drinking and driving habits have simply shifted or been redistributed across the whole week.

Much research in this area, as with that concerned with outlet densities, has failed to take into account a number of variables. The absence of a dramatic increase in alcohol problems in Scotland following a substantial deregulation of trading hours in 1976 was highly influential in persuading the Clayson Committee[38] to recommend similar deregulation in England and Wales. During the period after the deregulation, Scotland experience a particularly severe recession which was greater in severity than that of its neighbours. The Scottish experience was also persuasive in the deliberations of the Nieuwenhausen Committee[8] which helped bring about an even greater deregulation in hours of trading for Victoria in 1987. A recent evaluation of this experience with deregulation also failed to take account of prevailing economic conditions[39].

A detailed study of the impact of extended trading hours in the city of Fremantle during the 1987 Americas Cup failed to demonstrate any significant changes in rates of alcohol problems or consumption levels for local residents, though it did suffer from some inherent weaknesses in design[40]. Due to the enormous influx of visitors to the area it was not, of course, possible to examine overall rates of drink driving and assault offences in any meaningful way. In fact, it

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34 NIEUWENHUYSEN, J. (1988) Liquor control policy and alcohol availability-consumption relationships : reflections on the Victorian debate, *Australian Drug and Alcohol Review* 7, 3, 263-272.

35 RONCEK, D.W. & MAIER, P.A. (1991) Bars, blocks and crimes re-visited : linking the theory of routine activities to the empiricism of 'hot spots'. *Criminology*, 29, 725-753.

36 LANG, E., STOCKWELL, T. & LO, S.K. (1990) *Drinking locations of drink-driving offenders in the Perth metropolitan area.* Technical Report prepared for the Western Australian Police Department. National Centre for Research into the Prevention of Drug Abuse, Perth, Western Australia.

37 SMITH, D.I. (1988b) Effect on traffic accidents of introducing Sunday alcohol sales in Brisbane, Australia. *International Journal of the Addictions*, 23, 10, 1091-1099.

38 CLAYSON, C. (1984) *Licensing Law and Health : The Scottish Experience*. Action on Alcohol Abuse Policy Forum: Licensing Law and Health, 4 December, London.

39 DISTILLED SPIRITS COUNCIL OF AUSTRALIA INC. (July 1992) Position Paper : Alcohol Availability.

40 McLAUGHLIN, K.L. & HARRISON-STEWART, A.J. (1992) The effect of a temporary period of relaxed licensing laws on the alcohol consumption of young male drinkers. *International Journal of the Addictions*, 27, 4, 409-423.

appeared that the local residents made very little use of the extended hours - maybe they went away! The only exception here was that those residents who reported the heaviest typical levels of consumption were more likely to take advantage of the opportunity to drink in hotels after midnight. This finding parallels that of another of Ian Smith's in which it was determined that persons who frequented hotels and taverns in Perth with only morning opening tended to have rates of problem drinking[41].

A more recent variation in trading hours was established for a trial period and its impact closely monitored. The late trading hours of night-clubs were relaxed in Darwin and an evaluation was conducted by the Menzies School of Public Health[42]. The key findings included the demonstration of a marked increase in late night crime and drunkenness from the date of the introduction of extended hours (from 4am to 6am). This increase applied to the whole of the time that night-clubs were opened and so could not be easily explained in terms of a shift in problems from one time to another. It is still possible that other factors were responsible for this increase in crime other than just the change in trading hours. It was also shown that the risk of violence created by the night-club scene was related in part to high levels of intoxication among patrons combined with poor public transport to remove them efficiently from public places. One of the arguments in favour of extended hours was the need to offer sophisticated entertainment for tourists. In fact, it was shown that night-clubs were frequented almost solely by local youth and that much of the entertainment (and associated behaviour) was far from sophisticated!

On balance it would appear on the basis of present research evidence that there is only limited and mixed evidence in favour of controlling alcohol problems through the means of adjustments in the hours of on-sale premises. Controlled studies are required before Nieuwenhausen's conclusion can be refuted that in modern societies in which alcohol is already highly available further minor increases in trading hours are unlikely to have profound effects on levels of consumption[8]. However, given the evidence cited above in relation to price and outlet density particular caution needs to be exercised in relation to extensions to hotel trading hours beyond midnight, especially in metropolitan areas. The net result of such a move will be to increase the number of outlets at a high risk time both for violence and traffic accidents.

This brief overview also identifies the need for better controlled research on this issue. We believe that the following case study of the Extended Trading Permit system for some hotels and night-clubs in Western is an advance on most previous studies. The design allows (by good fortune) for the control of a number of possibly confounding factors that otherwise limit the conclusions that can be drawn on the basis of simple before and after comparisons.

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41 SMITH, D.I. (1986) Comparison of patrons of hotels with early opening and standard hours. *International Journal of the Addictions*, 21, 155-163.

42 D'ABBS, P., FORNER, J.F. & THOMSEN, P. (1994) Darwin Nightclubs: *A review of trading hours and related issues*. Menzies School of Public Health, Darwin, Australia.

1.3 PUBLIC OPINION ON TRADING HOURS

Public support for alcohol control policies is a relevant consideration for policy-makers. Without a degree of popular support policies are likely to be at least partly undermined[43]. The viability of alcohol policies is also strongly influenced by their acceptability to a number of key-stakeholders such as various sectors of the alcohol industry, police and regulatory bodies. For example, in Britain recommendations for the adoption of controls to address alcohol-related problems proved so contentious to the Conservative government of the day that they were suppressed[44]. Policies advocating an increase in the price of alcohol, identified by researchers as an effective way of reducing consumption, are frequently opposed by survey respondents[45], and by the liquor industry[46].

Until recently little attention has been paid to public opinion by prevention researchers[47], but now there is increasing evidence of widespread public support for a number of prevention policies, including many which directly concern liquor licensing laws.

Key informant interviews (including magistrates, police, industry spokespersons and workers) in a number states including New South Wales were canvassed on a number of prevention policy issues as part of a national review of Australian liquor licensing laws[24]. On balance this would indicate a strong preference for the status quo to be retained. There were contrary views as to whether either reducing or extending hours would increase or decrease violence, and there were those who thought it would make little difference as trading hours were not seen as a factor in violence. Results of opinion research were also summarised. Strong support was found across most categories of respondent for existing trading hours to remain. Only 30% of respondents in a recent WA study supported a decrease in licensing hours[48], and a NSW study found little support for increasing hours[44]. The latter study was conducted before the current extension of trading hours for hotels beyond midnight was consented to by parliament - in other words the great majority of NSW respondents (over 70%) were opposed to the relaxation of trading introduced by their government.

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43 ROOM, R. (1984) Alcohol control and public health. *Annual Review of Public Health* , 5, 293-317.

44 EDITORIAL. (1982) Public interest. *British Journal of Addiction*, 77 (1), 1-2.

45 FLAHERTY, B., HOMEL, P. & HALL, W. (1991) Public attitudes to health control policies. *Australian Journal of Public Health*, 14, 301-306.

46 SAUNDERS, B. (1989) Alcohol and other drugs : the prevention paradoxes. *Community Health Studies*, 13, 150-15.

47 HILTON, M.E. & KASKUTAS, L. (1991) Public support for warning labels on alcoholic beverage containers. *British Journal of Addiction*, 86, 1323-33.

48 HAWKS, D. et al (1993) Public support for the prevention of alcohol related problems. *Drug and Alcohol Review*, 12, 243-250.

2.0 THE WESTERN AUSTRALIAN SYSTEM OF EXTENDED TRADING PERMITS: A UNIQUE 'NATURAL EXPERIMENT'

The remainder of this paper will present and discuss the first results of an evaluation of the impact of Extended Trading Permits (ETPs) on selected alcohol-related offences and the profitability of licensed venues.

The Liquor Act of WA (1988) specifies the permitted hours of trading for different categories of premises but allows that application can be made to the Director of Liquor Licensing for an Extended Trading Permit (ETP). Not all applications are granted however and approval of an ETP may be selective.

Essentially, this investigation is concerned with three types of licensed premises: hotels, taverns and night-clubs (cabaret licenses). Hotel and tavern licenses both allow the licensee to sell alcohol on the premises and for consumption off the premises, usually via a "bottle shop". The major difference between these two types of licenses is that hotels are obliged to offer accommodation on the premises. Normal trading hours for a hotel or tavern are between 6 a.m. and 12 midnight from Monday to Saturday and 12 midday to 9 p.m. on Sundays. Due to the very similar nature of these licences, for the remainder of this report, hotels and taverns have been grouped together and treated as if they were the same type of license.

Night-clubs, however, have very different trading hours. A night-club may trade from 6 p.m. to 6 a.m. the following morning from Monday to Saturday and from 8 p.m. to 12 midnight on Sundays.

When a hotel/tavern premise is granted an ETP it may take several different forms, as a result there is a great deal of trading time variability among these premises. The vast majority of extensions, however, allow one extra hour of late trading on Fridays and Saturdays, thus extending closing times to 1 a.m. Interestingly, extended trading hours for Sundays appear to be more rigid in that the majority are limited to one or one and a half hours after the normal closing time of 9 p.m., thus allowing a premise to trade until 10 or 10.30 p.m. However, some premises have been approved extended trade until midnight on a Sunday.

Of all the premises granted ETPs within the July 1990 to June 1996 study period, which have at least six months of available data, the vast majority had been granted one hour of extended trade on any combination of either Friday, Saturday or Sunday nights (n=41, 82%). Nine of these premises were only granted Sunday extensions while a further nine also had Thursday extensions. A very small proportion of all premises have been granted extensions allowing trade for an extra two hours past midnight (n=4, 8%), all but one of these premises also require the provision of food. Five premises were granted early opening trading extensions (10%) without any increased closing times. However, it was not uncommon for a premise to be granted early trading in addition to late trading extensions. Since late trading was of particular interest to this investigation where both early and late trading extensions were granted at different times, the late trading extension was used as the ETP start date.

As described earlier, cabaret licenses allow night-clubs to trade from 6 p.m. to 6 a.m. Monday to Saturday and from 8 p.m. to 12 midnight on Sundays. Although few extensions of trade have been granted for night-clubs, they are usually quite different to those seen for hotels/taverns. In most cases, an extension of trade actually occurs earlier than the normal start time and must generally be accompanied by a meal. For example, whereas the normal Sunday night-club start time is 8 p.m., most ETPs will allow trade to start at 7 p.m. It is also possible however, to obtain a one hour extension of trade from 12 midnight to 1am on Sundays. Yet again, other trading extensions may allow the licensee to enlarge the area of trade and thereby increase their patron capacity. Due to the very small number of night-club premises with any form of ETP available for this study, only descriptive statistics will be provided.

Thus, by design, with or without an extended trading permit, these two types of licence have very different lengths of trade and subsequent closing times. As a result of this, they are likely to have very different patterns of associated alcohol-related problems and for this reason, they will be examined separately.

2.1 SPECIFIC HYPOTHESES

From the evidence presented above, several hypotheses regarding the effect of Extended Trading Permits upon alcohol-related harm indicators can be established.

1. a) The level of violence recorded by police as associated with hotel/tavern and night-club premises with ETPs will be greater after the start date of the permit than before the start date.

b) The timing of assault charges recorded by police will shift to coincide with later hotel/tavern and night-club closing times.

c) For hotel/tavern premises, a greater proportion of associated assaults will occur past midnight after an ETP has been granted than the proportion of assaults occurring past midnight before the ETP was granted.

2. a) The level of drink-driving road crashes recorded by police as associated with hotel/tavern and night-club premises with ETPs will be greater after the start date of the permit than before the start date.

b) The timing of drink-driving accident charges recorded by police will shift to coincide with later hotel/tavern and night-club closing times.

c) For hotel/tavern premises, a greater proportion of associated assaults will occur past midnight after an ETP has been granted than the proportion of assaults occurring past midnight before the ETP was granted.

3. a) The level of drink-driving charges recorded by police as associated with hotel/tavern and night-club premises with ETPs will be greater after the start date of the permit than before the start date.

b) The timing of drink-driving charges recorded by police will shift to coincide with later hotel/tavern and night-club closing times.

c) For hotel/tavern premises, a greater proportion of associated drink-driving charges will occur past midnight after an ETP has been granted than the proportion of assaults occurring past midnight before the ETP was granted.

4. The amount of wholesale alcohol purchased from a hotel/tavern granted an ETP will be greater after the start date of the ETP than before the start date.

5. When levels of violence, associated with hotel/taverns granted ETPs, are adjusted for corresponding amounts of wholesale alcohol purchases for each premise, there will be no difference in levels of violence between Before and After ETP periods.

3.0 METHOD

3.1 SAMPLE SIZES AND SELECTION CRITERIA

Throughout Western Australia there are currently, 340 hotel, 268 tavern and 35 hotel restricted liquor licenses. In addition, there are approximately 60 night-clubs.

A total of 75 premises in the Perth metropolitan area were granted some form of ETP between 1989 and 1996, six of which were night-clubs. Of the 69 which were hotels or taverns, 4 were only open to residents, one was not situated on the mainland and these were not considered further. Inclusion of the remaining hotels and taverns in any analysis was determined by whether there was at least 6 months of 'harm' data both before and after the granting of an ETP. As shown below, this resulted in different sample sizes for each analysis depending on the harm variable under consideration.

For any ETP licensed premise the "Before" period was defined as any data available for that harm indicator prior to the start date of the ETP and the "After" period as the months of data following the start date. For all main analyses, at least six months of Before and After data were required for a premise to be eligible for inclusion.

Since the aim of this study was to investigate the effect of Extended Trading upon indicators of alcohol-related harm, we selected those premises which had been granted an ETP and, for some analyses, matched controls who had not. In addition, it was not only necessary for an incident to have been associated with a premise granted an ETP but the premise itself had to meet specific selection criteria. Premises were selected on the following bases:

1. The liquor licence held by the premise noted as either the "last place of drinking" or the location of an Assault was either a hotel, tavern or night-club.

2. The premise was required to have been granted an ETP at some time during the study period:

   a) Between July 1, 1991 and June 30, 1995 for Assaults and,
   b) Between July 1, 1990 and June 30, 1996 for Roadblock Breath Testing Station (RBTs), Routine Police Patrols and Accident cases.

3. For all data sets, a minimum of six months Before and After period data was required.

4. Each licensed premise with an ETP had to be referred to in the harm indicator data sets at least once within the study period to be included for analysis.

5. Continuous data had to be available for each premise throughout the study period.

Sample for analysis of assault data
Within the period for which assault data were available, 37 premises were identified as having an ETP, but only 23 of those venues had at least six months of before and after data. One of the remaining 23 premises one did not trade continuously throughout the 4 years and two others had no assaults reported to the police either before or after the granting of an ETP, they were therefore ineligible for further inclusion. Thus, a sample of 20 premises was retained for analysis, representing 54 per cent of the entire ETP population during the study period and including 87 per cent of premises for which there was six months of continuous data.

Sample for analysis of road crash data
A total of 61 hotel/tavern premises obtained ETPs during the period that breath testing data from road crashes were available, ie. between mid 1990 and mid 1996. However, nine of these premises did not have at least six months of data following the introduction of an ETP, two premises were not trading continuously and six were not cited at all during the six years. This reduced the total number of premises available for analysis to 44. Thus, of all the premises which obtained an ETP between mid 1990 and mid 1996, over 72 per cent were analysed.

Sample for analysis of drink driving data
A total of 61 hotel/tavern premises obtained ETPs during the period that breath-testing data were available, ie. between mid 1990 and mid 1996. However, nine of these premises did not have at least six months of data following the introduction of an ETP, two premises were not trading continuously and one had no incidents recorded at all during the six year period. This reduced the total number of premises available for analysis to 49. Thus, of all the premises which obtained an ETP between mid 1990 and mid 1996, over 80 per cent were analysed.

3.2 MEASURES

The information presented and discussed below was gathered by the Police Service of Western Australian Police and the Liquor Licensing Division of the WA Office of Racing, Gaming and Liquor.

Last Place of Drinking Data

The information supplied in a major section of this report was collected by police from drivers who failed a breath test administered by Traffic Police. For several years, it has been WA police policy to ask all drink-driving offenders...."Where was your last place of drinking?". If the "last place of drinking" was a licensed establishment, then the individual was asked to provide the name of that premise. In addition, the time at which the offender was charged was also recorded. Three sources of breath testing data were available: Roadside breath testing stations (also known as Random Breath Tests), Routine Traffic Police patrols, and Road Crashes. Random Breath Testing stations (RBTs), refer to special blockades set-up along roads and streets which randomly select drivers for breath testing. Individual police patrols refer to single car traffic police who stop and charge drivers whilst carrying out their normal routine. Road accident cases are drivers involved in a crash which the police have attended, who failed the mandatory breath test and subsequently charged with 0.08 or DUI.

A total of six years data extending from the 1st of July 1990 to the end of June 1996 were available for this report. Although data were available for offences ranging throughout the entire state, only those offences noted as associated with a licensed premise within the Perth Statistical Division were examined. A search was then conducted for all charges relating to either hotel, tavern or night-club premises.

The charges for drink-driving offences included having a Blood Alcohol Level (BAL) of 0.05, 0.08, DUI, 0.02, those who refused, those who preferred a blood test and those who were not charged. However, not all of these charges were admissible for analysis for reasons explained below.

In June 1993 the maximum legal blood alcohol level for drivers was reduced from 0.08 to 0.05. For our study, the consequence of this is that charges recorded before the lowering of the legal BAL will not reflect the same likelihood of an individual being charged as after the level was lowered. Essentially, since most ETPs were granted after mid 1993 it may be that any increase in frequency seen for the After period is simply a reflection of the fact that during this time it is also easier for police to charge individuals with drink-driving. Thus, all 0.05 charges associated with eligible ETP premises were omitted from the analyses to ensure that the coincidental timing of the legislative change did not confound the findings.

In addition, there were also several hundred incidents where police recorded the incident as "not charged". In these cases individuals evidential reading at the Breath Testing station was either below 0.08 or was calculated to have been below 0.08 when the individual was driving. WA police conduct a complex calculation which makes assumptions regarding whether BAL is rising or falling and back-calculates what the reading 'should have been' when the person was given the first roadside breath-test.

Assault Data

Once again, the Police Service of WA supplied information regarding violent assaults throughout Western Australia from July 1988 onwards. Whenever a police officer was required to attend the scene of an assault or if an assault was reported to police, the premises at which it occurred and the time of the incident was noted. In the event that an assault occurred inside or in the immediate vicinity of a licensed premise, the name of the venue was recorded.

Four years of consecutive Assault data, from July 1, 1991 to June 30, 1995 were provided. The original data base included the entire state of WA but only those Assaults occurring at locations within the Perth Statistical Division were required for the present study. Once all the metropolitan Assault incidents had been selected, a further search was conducted for all charges relating to either hotel, tavern or night-club premises.

Liquor Licensing Extended Trading Data

The Liquor Licensing Division of the Office of Racing, Gaming and Liquor provided information regarding all premises within WA which had, at some time between 1989 and 1996, been granted an ETP. New trading hours information regarding those premises with ETPs and located within the Perth Statistical Division was extracted from the main data base. Precise information concerning start dates for approved ETPs, type of ETP, terminations, hours and timing of extensions, and the type of liquor license was recorded.

Within the Perth Statistical Division, there are 75 hotel/tavern or night-club premises which have, so far, been granted an Extended Trading Permit. The majority of these extensions were granted after June 1993 with most falling after June 1994.

Liquor Licensing Wholesale Purchase Data

In addition to details concerning approved extended trading, the Liquor Licensing Division also provided information regarding the wholesale alcohol purchases of each licensed premise in WA. This information extended from July 1, 1991 to June 30, 1995, thus coinciding with the police Assault data.

Each licensee completes an annual return (from July 1 to June 30), which identifies the total purchases for "high" alcohol beer (>3.8%/vol.), "low" alcohol beer, "high" alcohol wine and spirits (>6.1%/vol.), and "low" wine and spirits. These returns are the basis upon which annual license fees are charged and are scrupulously checked against records from wholesale suppliers for accuracy. From these records, the total value of wholesale liquor purchases by hotel, tavern and night-club premises were calculated for each tax year.

Western Australian Police Department Enforcement Policy

Since all the alcohol-related harm data presented in this report comes directly from police records it is susceptible to, and reflective of, fluctuations in police enforcement policy which may have occurred during or immediately before the study period. It is therefore important that any major changes in police policy are accounted for when interpreting the results.

As we saw previously, the change from a 0.08 to 0.05 BAL was an obvious major legislative event which required that allowances be made in the data analyses to remove the possibility of confounding. In order that any major police policy changes could also be documented, a panel of key senior police informants were interviewed regarding past and present strategies.

3.3 ANALYSES

As described earlier, most ETP start dates and the majority of data available from police records, do not completely coincide so as to allow equal Before and After periods. Due to the fact that most ETPs were granted after June 1994 and since even the largest study period only extends from July 1990 to July 1996 - many more months of data are available prior to an ETP than after. Because of this, it follows that there is a lack of congruity in the amount of harm-data

available before and after ETP start dates. To overcome this inequality, monthly harm ratios rather than event frequency have been used to determine if differences exist between Before and After periods. Individual selection criteria for each harm indicator can be found in the relevant section.

The analysis of choice for comparing monthly rates of various harm indicators before and after ETP start dates was the Paired t-test. For all harm indicators, the monthly harm ratios were transformed using the square root function in order to obtain a distribution approximating normality. Tables outlining descriptive statistics show initial, true, values before transformation. Where adjustments have been made for wholesale alcohol purchases, Repeated Measures analysis was required.

In order to examine whether major changes in relevant police enforcement policies had occurred during the study period and thereby possibly confounded the study, senior WA police were interviewed by the investigators.

4.0 RESULTS

4.1 ASSAULTS AND EXTENDED TRADING

Hotels and Taverns

Throughout the four years of police recorded assault data available for this investigation, over 2300 cases were identified as having occurred in or around a hotel/tavern or night-club licensed premise in the Perth metropolitan area. Of all the officially recorded assault cases in metropolitan Perth associated with licensed premises, less than one per cent (0.98) were recorded by police as involving drugs. The majority of incidents occurred on weekends, with a total of 72 per cent falling on Fridays, Saturdays and Sundays, Table 4.1.1 below outlines the frequency of assaults as they occur for each day of the week. In addition, the majority of complainants were males (78%).

Table 4.1.1: Daily Assault Percentage

DAY OF WEEK	PERCENTAGE ASSAULTS
Monday	4.5%
Tuesday	4.3%
Wednesday	8.2%
Thursday	11%
Friday	22%
Saturday	26%
Sunday	24%
TOTAL	**100%**

Unfortunately, due to insufficient information, it was not possible to determine the exact name and location of 116 hotel/tavern and 61 night-club related incidents and they were not considered further. However the proportion of metropolitan premises which could not be identified only reached 7.5 per cent. In all, for cases where a licensed premise could be identified, 376 were associated with hotel/tavern or night-club premises with ETPs. Of all the assaults associated with ETP licensed premises a total of 205 were eligible for inclusion.

In order to determine how ETPs granted to hotel/tavern licensed premises may have affected the occurrence of violent assault associate with these premises, Before and After periods were compared. Only those premises with at least six months of data before and after ETP start dates and those premises for which continuous data was available throughout the study period were included. For each Before and After period the total number of assaults was divided by the total number of months of data available to obtain a monthly rate. A paired t-test was then conducted on 20 premises meeting the selection criteria, comparing before and after monthly assault rates. A total of 119 cases, 56 before and 63 after ETP start dates were included.

The mean monthly ratio for occurrence of assaults associated with licensed premises before an ETP was granted was 0.0880 while the assault ratio after the ETP was granted was 0.1995. These two ratios are significantly different. The monthly ratio of assaults associated with hotel/tavern licenses occurring after an ETP was greater than the ratio before the ETP was granted - for the same licensed premise (t = 2.36, 19 d.f., sig 0.029, 2 tailed).

Indeed, from figure 4.1.1 below it is obvious that not only the frequency of assaults is different but also the timing of the assaults reflects the later trading hours.

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Figure 4.1.1: Temporal distribution of assaults associated with hotels/taverns before and after ETP start date

For the After period, there is a steep increase in assaults after 9 p.m. when a peak occurs at 16 per cent. For the next five hours, the proportion of incidents remains above 12 per cent, it is during this time that about 70 per cent of assaults occur. During the next hour, between 2 a.m. and 3 a.m the proportion of assaults drops as steeply as it rose to rest at zero until the afternoon.

For the Before period, there is a peak of 14 per cent between midnight and 1 a.m. Of most interest is the fact that for the Before period, assaults decline dramatically after 1 a.m. whereas for the After period, the same decline occurs one hour later. During the same five hour period where 70 per cent of After period assaults occur there was only 50 per cent in the Before period. Clearly, this temporal shift is indicative of the later trading hours and closing times of licensed premises with ETPs.

Table 4.1.2: Descriptive statistics for violent assaults associated with Hotel/Tavern licensed premises

Variable	Mean	S.D.	Min	Max	N
assaults before ETP	2.80	2.64	0	10	20
assaults after ETP	3.15	3.28	0	11	20
months before	30.97	6.64	16	41	20
months after	17.02	6.64	6.5	32	20
monthly rate before ETP	0.0880	0.0852	0.000	0.3125	20
monthly rate after ETP	0.1995	0.2503	0.000	1.00	20

The broad term "assault" actually covers many sub-categories of different types of charges for violent behaviour. The following table outlines the percentages of the different types of assaults which occurred for the 119 applicable ETP cases and the 63 non-ETP cases.

Table 4.1.3: Frequency of Assault charges for incidents associated with hotel/tavern ETP and non-ETP premises

	ETP Premises		Non-ETP Premises	
	Frequency	Percentage	Frequency	Percentage
Bodily Assault	33	28%	18	28.6%
Common Assault	68	57%	37	58.7%
Wounding	7	6%	0	0%
Sexual Assault	4	3.5%	2	3.2%
Assaulting a Public Officer	3	2.5%	4	6.3%
Serious Threat	3	2.5%	1	1.6%
Annoy/ Intimidate/Going Armed to cause Fear	1	0.5%	1	1.6%
TOTAL	**119**	**100%**	**63**	**100%**

Quite clearly, the largest proportion of assaults for the cases under investigation were bodily/common assaults, however, there was a number of cases where the offender was charged with some form of sexual assault. Table 4.1.4 below represents the proportions of different types

of violent crime for the entire sample of assaults in the metropolitan area associated with hotel/tavern and night-club premises during the study period.

Table 4.1.4: Frequency of Assault charges for all incidents associated with hotel/tavern and night-club premises in the metropolitan area, July 1991 to June 1995.

Type of Assault	Frequency	Percentage
Bodily	767	32.8%
Common	1227	52.5%
Grievous Bodily Harm	76	3.2%
Wounding	88	3.8%
Assaulting a Public Officer	68	2.9%
Sexual Assault	43	1.84%
Murder	1	0.04%
Serious Threat	20	0.85%
Miscellaneous (poisoning, intent to injure, written threat, armed, annoy/ intimidate)	48	2.05%
TOTAL	**2338**	**100%**

Matched Non-ETP versus ETP premises and levels of Assault

Of the 20 hotel/tavern premises used in the above analyses, all were able to be closely matched on the basis of wholesale purchases with non-ETP premises. In order that the most accurately paired matches possible could be formed, several necessary criteria for selection were established. Firstly, the non-ETP premises were required to have either a hotel or a tavern license and be situated in the metropolitan area. Secondly, for consistency, both non-ETP and ETP selected premises, had to have been associated with at least one assault throughout the study period. Thirdly, the total wholesale alcohol purchases for the baseline year (1991/1992) had to be within ten percent of the total for the matched ETP premise (see Fig.4.1.2). Fourthly, the total of "high alcohol content" liquor purchased by non-ETP premises in the baseline year had to be within 5 per cent of their matched ETP premises. In addition, wherever possible, pairs were selected such that Before ETP assault rates in both premises were similar. Neither member of each pair possessed an ETP at baseline and for the ETP premises all start dates occurred within the 1993/1994 tax year. Continuous Assaults and Wholesale Alcohol Purchase data was required for all premises.

In order that the validity of the paired selections relating to the third and fourth criteria be revealed, several preliminary, individual tests were conducted. Firstly, matched pairs t-test revealed that wholesale purchases in both types of premises for 1991/1992 were equivalent. The average wholesale alcohol purchase for non-ETP premises of $686,094 was very similar to the mean seen for ETP premises of $670,403 for the 1991 tax year ($t = -0.96$ sig = 0.348, d.f. = 19, 2 tailed) (see Figure 4.1.2). Secondly, it was revealed that "high alcohol content" liquor purchases in 1991/1992 for non-ETP premises ($575,697) were also extremely close to the purchases made

by their ETP counterparts ($575,369) (t = -0.05 sig. = 0.961 d.f. = 19, 2 tailed). Thirdly, it was clearly demonstrated that in 1991/1992, before any premise had been granted an ETP, both non-ETP (0.068) and ETP (0.088) premises had similar levels of monthly assault rates (t = 0.95, sig. = 0.353, d.f. = 20, 2 tailed)

Table 4.1.5 below outines the frequencies for each of the different types of assault which occurred in and around matched premises with normal trading hours.

Table 4.1.5: Descriptive statistics for ETP and non-ETP premises associated with assaults in 1991/92 and 1994/95

	ETP		NO ETP	
Statistic	**Before**	**After**	**Before**	**After**
monthly assault rate	0.0880(1.05)	0.1995(2.4)	0.0680(0.82)	0.0690(0.83)
SD	0.0852	0.2503	0.059	0.1189
min	0	0	0	0
max	0.3125	1	0.1842	0.3125
N	20	20	20	20

* yearly rate in parentheses

NB: Due to skewed distributions variables transformed by square root for analyses by paired t-test. Significance values are based on transformed variables.

Not surprisingly, premises with ETPs appeared to have more than doubled the level of violence associated with them from 1991/92 to 1994/95. Indeed, further analyses revealed that, for premises with ETPs the mean number of assaults for 1994/95 was far greater than that seen for 1991/92 (t = 2.36, d.f.19., sig 0.029, 2 tailed). Meanwhile however, non-ETP premises remained static over the study period with a mean Before monthly assault rate of 0.0680 and an After rate of 0.0690 (t = 0.05, sig. = 0.964, d.f. = 19, 2 tailed)

In addition to the increased level of assaults seen for ETP premises, there was also a large increase in the level of wholesale alcohol purchases. Comparing 91/92 and 94/95, ETP premises increased mean wholesale alcohol purchases from $670,403 to $881,048 (31%) while the increase for non-ETP premises was far smaller ($686,094 to $815,822: 18.9%). Indeed, when comparing mean percentage changes in purchases over the four years it becomes evident that ETP premises (52%) do in fact increase their liquor purchases far more than non-ETP premises (28%) - by over 85 per cent (t = 2.72, sig. = 0.014, d.f. = 19, 2 tailed). Figure 4.1.3 below indicates 1991 and 1994 tax year liquor purchases for each matched pair.

In summary, it appears that while violence in and around non-ETP premises has remained steady over the four years of the study, those licensed venues which have been granted extend trading have since experienced increased levels of associated physical and sexual assault. At the same

time, the average increase in wholesale alcohol purchases seen for ETP establishments was more than double the increase found for premises with normal trading hours from 1991/92 to 1994/95.

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Figure 4.1.2: Average yearly wholesale liquor purchases for matched pairs in 1991/1992.

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Figure 4.1.3: Average yearly wholesale liquor purchases for matched pairs in 1994/1995.

Assaults And Wholesale Alcohol Purchases

Since there appeared to be an interesting correlation between levels of assaults and wholesale liquor purchases, a closer examination of the relationship was conducted. Before and After levels of wholesale alcohol purchases were identified for all 20 ETP premises associated with assaults.

In order to further clarify how premises granted ETPs affected levels of assault occurring in or around such venues, monthly assault ratios were adjusted for fluctuations in the amount of alcohol purchased by each premise. This is of particular importance since it is quite clear that obtaining an ETP is also associated with significantly greater increases in wholesale alcohol purchases. It should be noted at this stage that since retail sales data were unavailable, a necessary assumption of the following discussion is that wholesale purchases directly reflect retail sales of alcohol.

Repeated measures analysis was applied, where Before and After monthly assault rates were represented as the dependent variables while adjusting for average monthly alcohol purchases as covariates. The results indicated that when assault ratios were adjusted for current alcohol purchases, the effect of introducing extended trading was removed ($F = 2.12$, sig. $= 0.162$).

These findings provide compelling support for the notion that rates of violent assault are directly related to the level of alcohol sales. Intuitively, it appears that longer trading hours lead to greater alcohol sales, the consequence of which is a corresponding increase in assaults. Of course however, there are many other possible factors which could influence the apparent relationship between extended trading, alcohol purchases and violence. Changes in management practice, policing strategy, and changes in the level of reporting of assaults may all influence the alcohol/assaults relationship to some degree. However, as we will see in Section 4.4, given that there has been little change to police policy during the study period we can quite confidently rule out any confounding influence related to changes in reporting strategy or approach to violence. As for the possible influences of management is it is very unlikely, that all twenty premises managed to orchestrate their activities so as to create a spurious relationship between sales and violence. However, it remains to be established, whether the apparent increase in sales seen after introducing extended trading is the result of an influx of new patrons, the original patrons drinking more, or a combination of both.

Comparing Wholesale Liquor Purchases in the Same Region for ETP and Non-ETP Matched Premises

Most conveniently, 17 out the 20 applicable ETP premises noted as associated with Violent Assaults were all situated in the Perth city area and within close proximity to one another, ie. in adjacent suburbs. This facilitated further analysis whereby, within this prescribed area, changes in alcohol purchases over the study period for all non-ETP venues, were compared to changes indicated for the seventeen premises trading with extended hours. In order to be included, continuous data was required for each premise throughout mid 1991 to mid 1995. Thus, within this defined area which, for the sake of brevity, will be referred to as Region X, 17 premises with extended trading and 24 with normal trading hours were compared (N = 41)

Between the 1991 and the 1994 tax years, it appears that, for premises within Region X, venues with an ETP increased their level of wholesale purchases much faster than non-ETP premises. The mean percentage change in liquor purchases for hotels/taverns with an ETP was an increase of 53 per cent ($175,663) whereas the mean change for those without extended trading was more than two and a half times smaller at 19.6 per cent ($50,013) ($t = 2.49$, sig. = 0.017, $df = 39$, 2 tailed). Thus, assuming that wholesale alcohol purchases directly reflect retail sales we can further surmise, with a high degree of certainty, that having an extended trading permit increased alcohol sales - within Region X.

It is remains to be seen however, exactly how extended trading has affected the drinking patterns and preferences of patrons in order that such a large increase in trade may be apparent. For instance, two likely scenarios are; one, that new patrons are entering Region X and selectively choosing to drink at those premises with extended trading and; two, these same 17 venues are attracting a larger slice of the limited drinking population of Region X at the expense of their fellow licensees.

Night-clubs

At present, six cabaret licensed premises have been granted extended trading but only three of those occured within the study period with the necessary 6 month minimum of Before and After data. The type of ETP granted these six premises varies widely. As mentioned previously, generally, night-clubs tend to be granted ETPs which allow earlier trading. However, of the three night-clubs eligible for analysis, the largest contributor of cases actually had an extension of the *area* in which they could sell alcohol, and the second largest was granted an extension from midnight to 1 a.m. on Sundays. These facts must be kept in mind when interpreting harm indicator outcomes.

Due to the small number of ETP licensed night-clubs, it was concluded that analyses would lack the necessary statistical power to produce a significant result at the 0.05 level. Even so, 86 assaults were recorded by police as being associated with these three cabaret licensed premises, at the same time, there were 119 assaults spread over 20 hotel/tavern licenses. This produced comparable assault averages of 5.9 per hotel/tavern and 28.7 per night-club - almost five times greater in night-clubs.

It is also noteworthy, that of the three night-clubs currently granted ETPs, one premise alone is associated with 58 per cent of cases. Figure 4.1.4 below indicates how the timing of assaults differ before and after the ETP was granted.

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Figure 4.1.4: Temporal distribution of assaults associated with night-clubs before and after ETP start date

Quite clearly, we can see that while the peak time for assaults occurs between 12 midnight and 1 a.m. for both Before and After periods, assaults decline more slowly once they have peaked in the post period. Indeed, 15% of assaults continue to occur up to 3 a.m. in the morning for the After period while at the same time the Before period has less than five per cent of cases.

It is also quite interesting to note that each side of midnight for the Before and After periods seem to occur as mirror images of one another. It appears that where the majority of assaults in the Before period occurred between 8 p.m. and midnight, that same majority in the post period occurs after peaking and continues on to 4 a.m.

Table 4.1.6: Descriptive statistics for assaults associated with night-clubs

Variable	Mean	S.D.	Min	Max	N
assaults before ETP	8.67	12.50	0.00	23.0	3
assaults after ETP	20.00	26.15	23.00	50.0	3
months before	28.8	17.61	8.5	39.00	3
months after	19.16	17.61	9.0	39.50	3
monthly rate before ETP	0.235	0.2038	0.000	0.353	3
monthly rate after ETP	0.918	0.6025	0.222	1.266	3

4.2 ALCOHOL RELATED ROAD CRASHES

Road Crash and Road Patrol data (RP) originate from a different data base than that used to examine incidents of violent assault. From the 1990 tax year to the 1995 tax year RP and Road Crash data span six consecutive years and include many more cases than that seen for assaults. Basically, both RP and Accident statistics originate from the same data base. From information provided, distinction could be made between mandatory breath tests at the site of an accident and those incidents where an accident was not involved such as, road side testing stations or routine police patrols.

Although these two types of situations both represent driving and drinking charges they are best treated separately as they clearly represent two distinct groups of alcohol-related problems. For instance, the RP group could be described as a potential source of road crashes, while the Accident category could alternatively be seen as the final product of drinking and driving for those who eluded police detection.

Throughout the six year study period, 7050 road crashes occurred on Western Australian roads where a driver was apprehended for drink-driving. However, metropolitan road crashes associated with licensed premises numbered fewer at 1703. Unfortunately, due to the change from 08 to 05 BAL in 1993, 125 "05" charges were omitted along with a further 281 where "no charge" was entered. Of the remaining 1297 charges (08, 02, DUI, refused to be breath tested or was blood tested) where the driver's last place of drinking was a hotel/tavern or night-club licensed premise, 246 were associated with hotel/tavern premises with ETPs eligible for inclusion and 67 night-clubs.

Hotels and Taverns

Exactly 246 road crashes, attended by traffic officers, and related to drinking at one or more of 44 hotel/tavern ETP premises occurred over the study period. A total of 170 accidents occurred in the Before period and 76 in the After period. Charges included 08, 02, DUI, refused and blood tested. As seen for hotel/tavern associated road side breath tests, the monthly rate of road crashes prior to and after ETP start dates were similar.

In summary, for the sample of 44 premises, the monthly accident rate for the Before period was 0.0769, and that detected for the After period was 0.0721. Paired t-test analysis conducted on transformed values revealed a t-value of -0.40 with a corresponding 2 tailed significance of 0.690, indicating that the two periods had equal rates of road crashes.

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Figure 4.2.1: Temporal distribution of Road Crashes associated with hotels/taverns for Before and After ETP periods

There was a very pronounced shift in the distribution of accidents between the Before period and the After period. After ETP start dates, road crashes appear to peak continuously between midnight and 2 a.m. which is also around the new closing time for many hotels/tavern with ETPs. Prior to ETPs road crashes peaked during an earlier time interval, ie. between 11 p.m. and 1 a.m. Accidents also seem to climb more swiftly from 10 p.m. to 1 a.m. in the After period, whereas the Before period produces a more gentle incline from 8 p.m. onward.

Table 4.2.1: Descriptive Statistics for hotel and tavern premises associated with alcohol related road crashes

Variable	Mean	S.D.	Min	Max	N
Crashes before ETP	3.86	3.52	0	15	44
Crashes after ETP	1.72	2.69	0	13	44
months before	50.5	13	9.0	65.5	44
months after	21.5	13	6.5	63.0	44
monthly rate before ETP	0.0769	0.0740	0	0.3636	44
monthly rate after ETP	0.0721	0.0953	0	0.3714	44

Matched ETP and non-ETP Premises and Road Crashes

As seen previously for assaults, attempts were made to match all of the current 44 ETP premises associated with similar non-ETP premises. Successful matches were found for 37 premises. Each match was formed upon meeting specific criteria, the same procedure in fact, which was employed for assaults. An outline of the success of the matching is described below.

Firstly, for the year 1991/1992 the total wholesale liquor purchases for both ETP ($652,515) and non-ETP ($671,163) premises were very similar with less than 3 per cent difference in purchases ($t = -1.35$, sig. = 0.187, d.f. = 36, 2 tailed). Secondly, the total yearly "high alcohol" liquor purchases for ETP ($545,452) and non-ETP ($547,771) premises were also very similar with less that 0.4 % difference between them. In addition, the two types of establishments had very similar levels of Before period road crashes. The Before period monthly ratio of road crashes associated with non-ETP premises was 0.0731 while the ratio for ETPs was 0.0781, a non-significant difference ($t = 1.02$, sig. = 0.315, d.f. = 36, 2 tailed).

Table 4.2.2: Matched ETP and non-ETP premises associated with road crashes *before* and *after* ETP

	ETP		NO ETP	
Statistic	Before	After	Before	After
monthly crash average	0.0781(0.94)	0.0809(0.97)	0.0731(0.88)	0.0503(0.60)
SD	0.0770	0.0993	0.0726	0.0740
min	0	0	0	0
max	0.364	0.3714	0.2973	0.3913
N	37	37	37	37

NB: Due to skewed distributions variables transformed by square root for analyses by paired t-test. Significance values are based on transformed variables.

Upon closely examining Table 4.2.2 above it is evident that there was very little change from the monthly Before period level of road crashes (0.0781) to the After period (0.0809) for premises with ETPs (t = 1.41, sig. = 0.168, d.f. = 36, 2 tailed). This is consistent with the previous analysis of all 44 ETP premises where there was no statistical difference between Before and After road crash levels. However, in contrast, it appears that a substantial decrease in the level of road crashes has occurred for non-ETP premises over the study period. In fact, the reduction from 0.0731 road crashes per month to 0.0503 road crashes represents a significant 31 per cent decrease(t = 2.61, sig.= 0.013, d.f. = 36, 2 tailed).

Night-clubs

Once again, as seen for assaults, there are a few (4) night-club venues available for statistical analysis of extended trading Before and After periods. As a result, the number of accident cases available is also relatively small (67), with 20 related accidents occurring before and 47 after extended trading start dates.

It is also becoming increasingly apparent however, that one premise in particular seems to have a monopoly with regard to alcohol-related harm. Of the total number of night-club associated road crashes, venue "A" is recorded more than six out of ten times as the "last place of drinking" among premises with ETPs. Notably, this is the same premise which was cited 6.8 times out of ten for road side breath testing records and which contributed 58 per cent of assault cases.

As demonstrated earlier for assaults and night-club licences, the number of premises is too small to have any possibility of revealing a significant result. Although three out of the four night-clubs noted have greater After period accident ratios than before extended trading was permitted, a greater number of premises must first be obtained in order to draw any firm conclusions. Table 4.2.3 below describes the Before and After period monthly ratios for each premise.

Table 4.2.3: Night-club associated Road Crash ratios for Before and After ETP periods

	Monthly Road Crash Ratio	
Premise ID	Before ETP	After ETP
Club A	0.10	0.77
Club B	0.15	0.29
Club C	0.10	0.04
Club D	0.06	0.19

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Figure 4.2.2: Temporal distribution of Road Crashes associated with night-clubs for Before and After ETP periods

It appears that after ETP start dates the timing of night-club associated road crashes has been redistributed so that a greater proportion of accidents now occur after 4 a.m. Notably, at the new extended closing time of 1 a.m. on Sundays, the proportion of all night-club related crashes is approximately 17 per cent, in comparison, the Before period has only 10 per cent of crashes recorded at this time. It is highly probable that this temporal pattern reflects the trading patterns of its two greatest contributors - one with extended trade from 12 midnight to 1 a.m. on Sundays and the other which received an area extension. In the case of the extension of the licensed area, it appears that the ability to facilitate a greater number of patrons has increased the economic viability of trading to the maximum time of 6 a.m.

It is also possible that this apparent extension of road crashes into the late morning is the result of a combination of fatigue and alcohol consumption.

4.3 ROAD TRAFFIC PATROL DRINK-DRIVING CHARGES

Between mid 1990 and mid 1996 there was over 70 000 non-accident drink-driving charges made by Western Australian police. Of those occurring in the metropolitan area, approximately 18 300 charges were related to prior drinking at a hotel/tavern or night-club licensed premise. Unfortunately, 4042 charges were either 05 or recorded as "Not Charged" and were unable to be considered further. However, of the remaining 14 258 charges, 2425 were related to prior drinking at hotels/taverns with an eligible ETP and 807 night-clubs.

Hotels and Taverns

Over the six year period, there were 3150 non-accident cases where a drink-driving charge resulted in the positive identification of a hotel/tavern as the "last place of drinking". In addition, all of these charges were associated with premises which held an ETP and met the selection criteria. All of these premises traded within the metropolitan area. Unfortunately, due to a major

legislative change half way through the study period, many cases had be removed from the analyses.

In June 1993 the maximum legal blood alcohol level for drivers was reduced from 0.08 to 0.05. For our study, the consequence of this is that charges recorded before the lowering of the legal BAL will not reflect the same likelihood of an individual being charged as after the level was lowered. Essentially, since most ETPs were granted after mid 1993 it may be that any increase in frequency seen for the After period is simply a reflection of the fact that during this time it is also easier for police to charge individuals with drink-driving. Thus, all 0.05 (363) charges associated with eligible ETP premises were omitted from the analyses to ensure that the coincidental timing of the legislative change did not confound the findings.

In addition, there were also over three hundred (353) incidents where police recorded the incident as "not charged". In these cases individuals evidential reading at the Breath Testing station was either below 0.08 or was calculated to have been below 0.08 when the individual was driving. WA police conduct a complex calculation which makes assumptions regarding whether BAL is rising or falling and back-calculates what the reading 'should have been' when the person was given the first roadside breath-test.

A further nine cases were lost as there was no means of identifying whether the charge had been made by an Roadblock patrol or a Routine Patrol.

Thus, all charges reported as 08, DUI, 02, those who refused a breath test and those preferring a blood test were included in the following analysis. In sum, 2425 with premises cited as the "last place of drinking" were analysed.

Table 4.3.1: Drink-driving charge categories for Roadblock and Routine Patrol RBTs

	Type of Traffic Patrol	
Type of Charge	Roadblocks	Routine Patrols
08	1033	627
DUI	323	317
Blood Test	15	21
Refused	14	27
02	29	19
TOTAL	**1414**	**1011**

NB: nine cases type of patrol unknown

As described previously, Road Patrols can be divided into two distinct groups, those which are recorded by road side breath testing squads (Roadblocks) and those recorded by routine traffic officers. In crucial ways, these two types of strategies used by the police to detect drink-drivers are very different. For instance, road side testing is usually planned in advance, may target certain known trouble spots at closing times, and thus may be sensitive to trading changes such as extended closing hours. It could be said however, that by comparison, loan car traffic patrols, which decline in frequency past midnight, are less sensitive to fluctuations in trading hours occurring after midnight. Economic constraints are obviously a major factor affecting the numbers of police officers available during the early hours of the morning. If this is so, then it is quite possible that each of the two methods and their ability to detect drink-drivers after 12 midnight could be affected differently by extensions in trading hours.

Thus, due to the unique nature of these two sources of drink-driving charges it was decided that they would be best analysed separately. Table 4.3.2 below describes the breakdown of the number of charges recorded for the two types of breath testing data.

Table 4.3.2: Before and After period charge frequencies for Roadblock and Routine patrols: hotel/tavern related charges

	ETP PERIOD		
TYPE OF PATROL	**BEFORE**	**AFTER**	**TOTAL**
Roadblock	1007	407	1414
Routine Patrol	764	247	1011
TOTAL	**1771**	**654**	**2425**

Road Side Breath Testing (RBTs)

As we will see in Section 4.4, examination of RBT data made by Roadblock squads had been complicated by the advent of "Booze Buses" in mid 1995. Since there was no means of distinguishing which charges were made by "Booze Buses" and which were made by standard RBT Roadblocks, the best means of overcoming the possibility of confounding of the data was to examine the two periods separately. In order to achieve this, charges occurring after the

introduction of the "Booze Buses" were removed in the initial analysis so that all drink-driving charges could only have been made by traditional roadblocks. This had the effect of reducing the number of charges and the sample size of hotels/taverns associated with them as the final year of data was removed. However, in a second analysis, all the cases occurring after mid 1995 were replaced and analysed in conjunction with charges made by standard Roadblocks in order to examine the actual effect that the Booze Buses might have had on the number of charges.

RBT Drink-Driving Charges: Before the Introduction of "Booze Buses".

Roadblock breath testing charges and "last place of drinking" information were analysed using Before and After ETP periods occurring between July 1990 and June 1995. The usual criteria of six months minimum data prior to and after ETP start dates applied. In all, 488 charges were included, 320 occurring before and 168 occurring after ETP start dates. A total of 22 hotel/tavern premises were associated with one or more of the 488 charges.

The mean monthly charge ratio for the Before period was 0.4980 and 0.3872 for the After period, a t-value of -2.49 with 21 degrees of freedom produced a meaningful effect with a 2 tailed significance of 0.021. Thus, the results indicated that significantly more drink-driving charges were recorded by Roadblock breath testing patrols before the introduction of extended trading.

Table 4.3.3: Descriptive statistics for hotel/tavern premises associated with drink-driving charges from Roadblock RBTs *(without Booze Buses)*

Variable	Mean	S.D.	Min	Max	N
Breath tests before ETP	14.54	14.47	0	57	22
Breath tests after ETP	7.63	11.17	0	43	22
months before	39.0	10.45	9	53.5	22
months after	21.0	10.45	7	51	22
monthly rate before ETP	0.4980	0.4927	0	1.54	22
monthly rate after ETP	0.3872	0.5139	0	1.87	22

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Figure 4.3.1: Temporal distribution of drink-driving charges associated with hotels/taverns from Roadblock breath testing *(without Booze Bus charges)*

Both Before and After period temporal patterns appear similar in that they both have two pronounced peaks between 9 p.m. to 10 p.m. and between 12 midnight to 1 a.m. However, there

was a pronounced shift in the timing of charges so that in the After period (17.3%) charges occur far more frequently between 1 a.m. and 2 a.m. than in the Before period (7.6%).

RBT Drink-Driving Charges: The combined effect of traditional Breath Testing Roadblocks and "Booze Buses".

Adding the final year of RBT charges to the data described immediately above allows a larger number of hotel/tavern premises with ETPs and many more drink-driving charges to be examined. A total of 1414 charges, 1007 before and 407 after ETP start dates, were spread over 49 hotel/tavern premises and admissible for analysis.

It appears that the effect produced by adding the final year of data containing RBT charges made by "Booze Buses" to the other five years of data was to reduce the significance of the difference between Before and After periods. Apparently, when the effect of the "Booze Buses" was incorporated into the overall frequency of RBT charges, Before ETP (0.4128) and After ETP (0.3695) monthly ratios were no longer significantly different ($t = -1.12$ sig. $= 0.268$ d.f. $= 48.0$, 2 tailed).

Table 4.3.4: Descriptive statistics for hotel/tavern premises associated with drink-driving charges from all Roadside Breath Testing *(Traditional Roadblock RBTs and Booze Buses)*

Variable	Mean	S.D.	Min	Max	N
Breath tests before ETP	20.55	23.02	0	115	49
Breath tests after ETP	8.30	10.05	0	46	49
months before	50.22	12.86	9.0	65.5	49
months after	21.75	12.86	6.5	63.0	49
monthly rate before ETP	0.4128	0.4656	0	1.98	49
monthly rate after ETP	0.3695	0.3721	0	1.43	49

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Figure 4.3.2: Temporal distribution of drink-driving charges associated with hotels/taverns from Road Side Breath Testing *(Traditional Roadblock RBTs and Booze Buses)*

From Figure 4.3.2 we can see what appears to be a pronounced increase in the number of RBTs recorded past 12 midnight for the After period. It is very interesting to note that during the Before period between 1 a.m. to 2 a.m , the percentage of charges was only 7.7 per cent, but the proportion of charges being made at this time in the After period is more than twice as great (16 per cent). It appears that road side breath testing patrols are somewhat sensitive to changes in trading times. This may be due to a shift in focus on known trouble spots in accordance with new closing hours.

Routine Police Traffic Patrols

The data concerning single car patrols presents a very interesting situation. These types of patrols do not necessarily target premises at certain times nor do they necessarily increase the frequency of patrols after midnight to coincide with trading changes. Essentially, if individual police traffic officers were unable to respond to trading time changes, the majority of offences occurring after 12 midnight might be missed due to the smaller numbers of individual patrols on the roads at that time. This data therefore has a strong potential to produce biased results, insensitive to changes in trading times extending beyond midnight.

These concerns were highlighted when Before and After period charge ratios were compared using Paired t-test analysis. As previously indicated, there was 1011 charges in total with 764 Before period cases and 247 After period cases. It appears that these types of patrols have detected many more drink-driving offenders prior to the introduction of extended trading than

after. The Before period monthly charge ratio of 0.3186 and the After period ratio of 0.2068 are significantly different at the 0.0001 level (t = -4.39, df = 48). Recalling the results of the Roadblock RBT analysis (not including charges made by "Booze Buses"), we also saw a similar result, where Before charge ratios were greater than After ratios (sig. = 0.021). - but apparently to a lesser degree than that found for Routine patrols.

Table 4.3.5: Descriptive statistics for hotel/tavern premises associated with Routine police traffic patrols

Variable	Mean	S.D.	Min	Max	N
Breath tests before ETP	15.59	15.07	2	68	49
Breath tests after ETP	5.04	7.23	0	35	49
months before	50.22	12.86	9	65.5	49
months after	21.75	12.86	6.5	63	49
monthly rate before ETP	0.3186	0.3044	0	1.39	49
monthly rate after ETP	0.2068	0.2352	0	1.04	49

It is suggested however, that these findings are not necessarily an indication of the effect or lack of effect of extended trading but rather, an artefact of policing restrictions. This explanation is again highlighted by the very similar temporal pattern seen for Before and After period drink-driving charges in Figure 4.3.3

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Figure 4.3.3: Temporal distribution of drink-driving charges associated with hotel/taverns from police Road Patrols

Compared to road side patrols we see a far smaller shift in the number of charges made after twelve midnight in the After period. Unlike the major change seen between 1 a.m. and 2 a.m. for road side breath testing only a small change of 3.6 per cent is evident for individual patrols at the same time. In addition, unlike all the other temporal patterns observed thus far, there is very little evidence of a shift in time past midnight for the After period.

As the temporal patterns seen for Assaults, Roadblock and Road Crash breath testing indicate, there is a consistent, pronounced shift for drink-driving charges and offences to coincide with new, after midnight, closing times. Thus, if we choose to interpret these current findings within the context of other indicators we are compelled to conclude that they probably represent an atypical result biased by policing restrictions. Quite simply, those individuals who would otherwise have been charged prior to or at midnight in the Before period for drink-driving are now leaving these same premises later, only to be left undetected because fewer traffic patrols are available for road patrol after midnight. Hence, there is an over representation of offences occurring in the Before period and an under representation of drink-drivers in the After period. To this end, as initially expected, these findings probably say more about policing strategy than the effect of extended trading.

Night-clubs

The data concerning night-clubs and road patrols originates from the same data base as that described above for hotels and taverns. However, due to the fact that far fewer night-clubs have been granted ETPs there are fewer cases available for analysis.

During the study period, a total of 807 drink-driving offences from RPs, ie. (08, 02, DUI, refused), were recorded where the "last place of drinking" was identified as a night-club in possession of an ETP. In total, 4 cabaret licensed premises were noted. Although only four night-club premises may appear to be a very small selection of venues, in actual fact, there were only six cabaret licences operating with ETPs in the entire metropolitan area, throughout the study period. Unfortunately, one of these premises was granted its ETP too late in the study period to meet the selection criteria and the other was never noted as a last place of drinking.

Reflecting back, there were 49 hotel/tavern premises associated with 2425 RBT incidents, remarkably, only 4 cabaret or night-club licenses with ETPs were related to over 800 charges. For hotels/taverns this reflects an average of 49 charges per premise, while the night-club average is more than quadruple that seen for hotels/taverns at 201 per venue. It should also be noted however, that there is a great deal of variation among the four night-clubs regarding the numbers of associated charges. For instance, Club A ranges from 24 Before charges to 526 After charges, while Club B ranges from 18 to 31 respectively. It should also be noted that Club "A" contributes to about 68% of all RBT night-club cases "as the last place of drinking" .

As seen earlier for hotel/tavern licenses and breath tested drink-driving charges, the data can be divided into two categories. For night-club related cases, 520 Road side testing charges and 287 individual traffic patrols were recorded (see Table 4.3.6).

Table 4.3.6: Before and After charge frequencies for two types of breath testing patrols: night-club related charges

	ETP PERIOD		
TYPE OF PATROL	**BEFORE**	**AFTER**	**TOTAL**
Roadblock	94	426	520
Routine Patrol	104	183	287
TOTAL	**198**	**609**	**807**

Due to the highly variable nature of the associated charge rates among premises and the fact that there were only four premises in total, it was expected that parametric testing was unlikely to reveal any significant difference between the two periods for both types of patrols. A truer indication of the difference between Before and After periods would more likely result from the application of a non-parametric test. However, the very small number of premises means that the available data lacks the statistical power to generate a significant result.

Table 4.3.7 below outlines the Before and After period charge ratios for the four premises identified by the two types of breath testing patrols.

Table 4.3.7: Before and After drink-driving charge ratios for two types of police Road Patrols

	Type of Patrol			
	Roadblock RBTs		Routine Traffic Patrols	
Premise ID	Before	After	Before	After
Club A	0.40	6.90	0.80	3.21
Club B	0.97	2.57	0.92	0.71
Club C	0.24	1.09	0.42	0.23
Club D	0.22	1.19	0.14	0.29

Since we were unable to conduct meaningful statistical analyses upon night-club related charge data, it was of some interest to examine the ratios for individual premises in order to glean some indication of trend. Notably, we can see that for Roadblocks all the After charge ratios are greater than the Before ratios, by comparison, only two in four premises noted by Individual Traffic Patrols have greater After ratios. In addition, the alterations between the two periods appears different for each type of patrol. Roadblock breath testing After ratios are always more than four times greater than the corresponding Before ratio, however, Routine traffic patrol changes are much smaller by comparison. Once again, it appears that Road Side Testing is more sensitive to fluctuations in trading times, whereas car patrols do not reflect the same level of detectability of post midnight drink-drivers.

In the light of these findings however, it must be stressed that these are only observations and not statistical truths. Any discussion or explanation of the results is, unfortunately, only speculative. Due to the very small number of night-clubs with extended trading statistical analysis was simply not feasible at this stage.

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Figure 4.3.4: Temporal distribution of drink-driving charges associated with night-clubs from Roadblock RBTs

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Figure 4.3.5: Temporal distribution of drink-driving charges associated with night-clubs from Routine Road Patrols

From examination of Figure 4.3.4 and 4.3.5 above it appears that at certain times, single car patrols may be more sensitive to night-club associated drink-drivers than road side police patrols, or at least as sensitive. Notably, while the Before periods for both road side breath testing stations and car patrols have similar patterns and peaking times, the After periods are much different, with routine patrols peaking strongly between 4 a.m. and 5 a.m. It is likely that the reverse of the hotel/tavern situation is occurring here. While it may be unwarranted for RBTs to be stationed on roadsides during the middle hours of the morning, ie. around 4 a.m., alternatively, routine police traffic patrols are likely to scrutinise any car on the road at this time. Thus, it appears that while routine patrols detect fewer drink-drivers overall, they are more likely to detect and charge those remaining individuals leaving night-clubs during the very late hours of the morning.

4.4 ANALYSIS OF MAJOR CHANGES IN ENFORCEMENT POLICIES 1990-1996

The following is an outline of the timing of WA police policy changes which occurred just before and during the study period and how each may have affected the different data sets used in this analyses.

RBT and Road Crash Data.

- ***November 1988*****:** *The introduction of Random Breath Testing to WA roads.* This refers to Random Breath testing by Roadside Blockades. Since the RBT data set for this study begins in July 1990, at the time of the first data record, Roadside RBTs had therefore already been operational for at least twelve months. The introduction of Roadblocks was also strongly promoted and debated by the media at the time of its inception. Thus, it is reasonable to conclude that Roadblock RBT testing was both well established within the police department and widely acknowledged within the general community before the beginning of the study period.

- ***November 1994:*** *All drivers stopped by a Roadblock RBT must be tested.* In the initial introduction of Roadblock breath testing not all drivers pulled over were actually breath tested. Prior to November 1994, before a driver could be breath tested there had to be sufficient overt evidence that the driver had in fact been drinking, such as alcohol on the breath or the admittance of drinking. The effect that this change may have produced on the current study was examined using six month Before and After periods (due to the introduction of "Booze Buses" in mid 1995, six months was the maximum After period allowable without introducing the possibility of confounding).

The analyses indicated that drink-driving charges made by Routine Patrols, Roadblocks and at Road Crashes where the individual had last been drinking at a licensed premise with an ETP were not immediately affected by the advent breath testing for all drivers by RBT patrols. These findings are presented in Appendix A.

Since it was very unlikely that the change to 100% breath testing of all drivers had any significant impact upon the study periods under investigation, it was not adjusted for in the analyses.

- ***July 1995:*** *Mobile RBT Units introduced*. Colourfully described as "Booze Buses" these patrols can fully process and charge a drink-driver "on the spot" without requiring further processing at the central station or the involvement of a large number of officers. Compared to the traditional Roadblocks these Mobile Units have a heightened flexibility and efficiency. Although these two types of RBTs may constitute two very different types of strategies there is no means of differentiating between the two from the present RBT data set - both are simply recorded as RBTs. This is unfortunate since the introduction of the "Booze Buses" coincides with the final 12 months of the study period. It is quite possible therefore, that the frequency of RBT charges between July 1995 and June 1996 (coinciding with the "after" period for many ETP premises) was influenced by the simultaneous introduction of the Mobile Units.

In order to initially assess how the introduction of "Booze Buses" may have affected the frequency of drink-driving charges associated with ETP licensed premises, six month Before and After periods were compared. Interestingly, the analyses indicated that although there was no change in the frequency of Road Crashes or charges made by Routine Patrols, the number of charges made by Roadblocks (included "Booze Buses") was greatly increased after the introduction of the mobile RBT Units. The findings of the chi square analyses are presented in Appendix B. The implications of these findings and the means employed in order to control for likely confounding of the RBT data is discussed in greater detail in Section 4.3.

- ***April 1996:*** *Mobile RBT Units allowed on Perth freeways.* Of lesser concern to the validity of the study than the actual introduction of "Booze Buses" was the allowance of such patrols on freeways. Occurring late in the RBT study period, this change could only have affected the final few months of data collection. As a general rule police do not expect to experience any immediate effect from newly introduced strategies but usually anticipate at least a delayed effect of six months. In addition, there was at the time, only a few Mobile Units in operation. Given these qualifications, it is highly unlikely that the introduction of freeway "Booze Buses" would have had any meaningful effect upon the validity of the findings for this study.

- ***January 1996:*** *The DELTA Program.* Over the last 12 months or so, the DELTA program has been gradually overhauling the operations of the WA police department. More than a specific change in just one aspect of policing, the DELTA program encompasses a whole range of strategy, overall planning and day to day operational changes with wide spread consequences for more effective policing. Although actual inception began early in 1996, changes were gradual and as yet, the program still remains at the "embryo stage". In addition, senior police estimate that it was unlikely that any effects of the program were visible until at least six months after the initialisation. Thus, although the DELTA program coincides with the final six months of the RBT study period, it is unlikely that any meaningful effects due to changes in policing practices would be present during this time.

Assaults Data

- ***July 1990:*** *Change from 2 daily work shifts to 3 shifts.* Implemented around the same time as the beginning of the RBT/Accident data and twelve months prior to the beginning of the Assaults data, police rosters were reorganised into three main shifts instead of the previous two. Essentially, the three shifts included a day shift between 7 a.m. and 3 p.m., an afternoon shift between 3 p.m. and 11 p.m. and a night shift from 11 p.m to 7 a.m. Senior police explained that in the last seven years shifts have been quite rigidly maintained, with generally only an hour each-way of flexibility. Although exact numbers of officers participating in each shift was not available, all shifts were said to operate with a set number of officers and with little flexibility. Thus, throughout the entire study period there was no major changes to the police rostering system.

- ***April 1996:*** *More stringent reporting of disorder in and around licensed premises in the last 12 months.* In accordance with the DELTA Programme, senior police report that there has been an increased focus upon violence and disorder in and around licensed premises. Officers attending incidents of disorder or violence have been directed to pay greater attention to recording the names of licensed premises where they appear associated with such an incident. Essentially, this would have had the effect of increasing the number of recorded incidents thereby creating an inflated number of incidents relative to previous years and projecting the appearance of increasing violence. Luckily however, the assaults data examined for this report only extends to June 1995, missing the new changes by about ten months. It is therefore extremely unlikely that increased reporting would have been a contributing factor for this study period.

- ***June 1996:*** *Introduction of "Zero Tolerance".* In order to reduce the level of individual police officer discretion, especially in matters concerning disorderly conduct and violence, police have been specifically directed to report even the most minor of incidents. If implemented effectively, the introduction of "Zero Tolerance" may have increased the overall frequency officially recorded assaults. Fortunately however, the Assaults data available for the present investigation only extended to June 1995 and would not have been affected by this change in policy.

5.0 DISCUSSION AND CONCLUSIONS

This report has examined the effects produced by introducing Extended Trading Permits (ETPs) to hotel/tavern and night-club premises in the Perth metropolitan area between 1990 and 1996. Several different types of harm indicators have been investigated, all of which originate from officially reported police statistics. The four categories of harm indicators included Assaults, Road Crashes, RBT drink-driving charges and Routine Patrol drink-driving charges. The effect of ETPs upon the level of wholesale alcohol purchases was also examined.

The current investigation was made possible by a fortuitous combination of circumstances surrounding the ETP system, police policy and the availability of data. Firstly, the Western Australian ETP system is unique in that not all past applications have been necessarily granted, with the timing of those approved spread over the previous six years. Secondly, since 1990, police have been routinely collecting data which indicates the "last place of drinking" for all those individuals charged with drink-driving, whether the charge resulted from a road crash or an RBT. In addition, from 1991 onwards, where a violent assault had been attended by, or reported to police, the name of any associated licensed premise was recorded, ie. where the assault occurred in or around the premise. Thirdly, there were no major changes to police policy or legislation which could not be taken into account or controlled for, when examining the effects of extended trading.

When data collected prior to an ETP and following an ETP were compared within the limits of the study period, it became evident that the effect of the ETPs was different for each of the harm indicators.

Perhaps the most primary and compelling finding of this investigation was that after an ETP had been granted to a hotel/tavern licensed premise, the number of violent assaults associated with that premise dramatically increased. The amount of alcohol purchased by these same premises also increased dramatically. A very strong link between the increase in violence and the increase in alcohol purchases was also found. It was clearly established that when any increase in alcohol purchases occurring after an ETP was adjusted for, there was no longer a significant increase in the number of assaults. Furthermore, the timing of the assaults shifted so as to coincide with the new, later closing times.

The argument that incidents of violence had simply been redistributed among licensed premises, so that as assaults increased in ETP premises they simultaneously decreased in non-ETP premises also seems unlikely to be the case. A comparison of hotels/taverns with and without ETPs in Perth entertainment districts showed that the rate of assaults doubled between 1991/2 and 1994/5 for ETP premises but remained static for non-ETP premises. Furthermore, during the study period, there were no identifiable police policy changes which could have biased the recording of violent incidents in favour of a greater number of After period offences. However, it is possible, though unlikely, that assaults may have been redistributed from night-club premises to hotels and taverns with late trading. Future analyses will investigate this possibility.

One very important point to be noted here is that reported incidents of violence are only the "tip of the iceberg", many more offences remain unreported to police. In addition, while the majority

of cases of "violent assault' examined were of the bodily/physical variety, several cases involved indecent and sexual assault. The effect of longer trading hours also appears to increase the level of violence in and around night-clubs although, due to the small number of premises, statistical analysis was not warranted.

Unlike violent and sexual assaults, there was no apparent increase in road crashes following drinking on a hotel/tavern licensed premise with extended trade. Although at first impression, this appears to be one consolation to a disturbing scenario, we do in fact see a pronounced shift in the timing of these crashes. Quite clearly, ETPs increase the number of drink-driving road crashes between midnight and 2 a.m., whereas previously, there was a steep decline after midnight. Thus, the majority of road crashes associated with extended trading occur at a time when emergency services are most costly and over stretched. The consequences of this shift would be self evident for ambulance and police services, hospital and emergency departments and ultimately, to the community at large.

Of further concern was the finding that while the number of Road Crashes where the driver was last drinking at a normal trading hours premise strongly decreased over the study period, there was no such decline for premises with extended trade. It would appear, that while vigilant police activities were able to positively influence road crashes associated with drinking at normal trading premises, the presence of extended trading hours in other licensed premises was actually undermining their efforts.

Due to the introduction of the fast and efficient "Booze Buses" to the RBT circuit in mid 1995 and the introduction of 0.08 BALs in 1993, the examination of RBT charges required that a few more adjustments be made to the data. When Before and After ETP periods were compared using all charges of 0.08 BAL or over, and not including those charges made by "Booze Buses" a significant decrease in the number of charges made after ETPs was indicated.

Unfortunately however, the fact that fewer drink-drivers last drinking at ETP premises were detected by RBTs does not necessarily indicate a real decrease in the number of such offenders on WA roads. If this were so, we would undoubtedly expect a corresponding drop in the number of drink-driving offences (associated with ETPs) arising from road crashes attended by the police - a fact not revealed in the road crash data. It is also worth noting that since January 1989 police attending the scene of a road crash are required to conduct breath tests on all drivers involved.

Thus, there are two possible explanations for this finding, a) that there was a real decrease in the number of drink-drivers on WA roads who last drank at ETP premises, or b) that police RBT efforts to detect drink-drivers were undermined by ETPs. Given that we have already shed doubt on the likelihood of the first explanation, how then would we expect ETPs to undermine the effectiveness of RBT patrols?

Quite possibly, the later trading hours were allowing intending drink-driving offenders to leave premises well after midnight, at the same time however, police RBT operations were winding down. Thus, whereas prior to extended trading, police were successfully apprehending most offenders before 1 a.m., after extended trading, there were actually less drink-drivers on the roads during this time - they were still in the pubs drinking! Therefore, unless police were able to

continue their Roadblock activities well into the following morning, they would simply have been missing the influx of drink-drivers coming from premises with later closing times. Given the additional costs involved with operating RBTs during the early hours of the morning, whether from overtime or additional shift allowances, it is understandable that fewer patrols would be present during the early hours of the morning.

Adding further weight to the explanation of these findings was the fact that significantly fewer drink-drivers were also identified by Routine Traffic Patrols (as opposed to RBT checkpoints) as coming from premises with extended trading. In addition, the times of charges made by routine patrols before and after ETPs were almost identical, with no apparent increase in the proportion made after midnight. As the temporal pattern seen for all other alcohol-related harm indicators show, there is a pronounced shift for drink-driving charges to coincide with later closing times. Thus, if we choose to interpret these findings in the light of all other indicators, we are compelled to conclude that they reflect the distribution of police resources at different times of the day and night rather than a reduction in drink-driving behaviour. Once again, it appears that drink-drivers leaving premises in the early hours of the morning were more likely to escape police detection.

This explanation of events was also supported by the findings from a further analysis of the RBT data which included charges made by the highly efficient "Booze Buses". Apparently, when the one year of "Booze Bus" charges was included, the previous decrease in the number of charges made at roadside testing stations seen after extended trading was negated. It appears that the arrival of the "Booze Buses" facilitated the apprehension of a greater number of drink-drivers than the traditional Roadblocks.

In the light of these findings, the pressing question arises..."How effective could Routine breath testing, RBTs and "Booze Buses" have been if it were not for the presence of extended trading?" This is an especially pertinent question when we consider that the intention of RBTs and "Booze Buses" is in fact to reduce the number of drink-drivers on WA roads - not to maintain the status quo. Unfortunately, this question is beyond the scope of the current report, but will be addressed in a later paper.

5.1 SUMMARY AND RECOMMENDATIONS

- The universal Australian experience with extended trading hours has been a corresponding shift in the timing of serious alcohol related problems. In this instance trading post-midnight increases the proportions of road crashes and assaults occurring at a time when emergency and police services are most expensive and are already over-stretched.
- There is strong evidence from recent experiences in Perth and Darwin that this results in an increase in levels of assault and offences.
- Public opinion surveys, indicate that the majority of opinion is in favour of midnight closing for hotels and tavern where this is already the norm.

One policy response to these findings might be to discontinue the ETP system. Alternatively, if it is determined that ETPs should continue, then public health and safety concerns might be addressed as follows:

1. Effective public transport be made available after midnight in order to make it easier for drinkers to not drive during the early hours of the morning. The need for a train service and a more efficient taxi service after midnight has been highlighted to the research team by senior police.
2. Licensees with extended trading partly fund additional public transport services or alternatively provide courier services for their patrons.
3. Levels of violence and drink-drivers in and around licensed premises continue to be closely monitored by police.
4. Where levels of violence, road crashes or drink-drivers associated with ETP licensed premises increase, the ETP be revoked.
5. There be an additional harm reduction levy applied to those premises permitted to have late trading in order to compensate the community for the additional costs in deterring drink-driving as well as responding to increases in crime, particularly violent crime, and drink-driving road crashes, after midnight.

In summary, extended trading creates a significant change in late night environment of metropolitan Perth and in patterns of both alcohol consumption and alcohol related harm. By doing so it must necessarily force emergency, police and transport services who deal with the consequences of this harm to adapt to that changing environment. If they cannot adapt, the efforts of police, public health, government and community groups aimed at reducing or at least controlling alcohol-related problems will be thwarted. Unfortunately, adaptation has its price. It is not unreasonable therefore, to suggest that those who benefit most from such changes should also be part of the solution.

APPENDIX A

Table 1: Six month drink-driving charge frequencies before and after introduction of 100% breath testing at Roadblocks

Harm Indicator	Charges Before	Charges After	Chi squ.	Sig
Roadblocks	65	80	1.5517	0.2129
Routine Patrol	48	57	0.7714	0.3798
Road Crashes	18	21	0.2308	0.6310

Apparently, there was no effect of the new 100% breath testing policy during the first six months of the introduction. Although it was expected that this change might produce at least a deterrent effect upon would-be drink-drivers thereby reducing the number of offenders, there is a possible explanations for why this did not prove to be the case.

Assuming that there had been no corresponding increase in the number of officers operating the Roadblocks, testing all drivers would have also reduced the number of drivers which could actually be pulled-over in any limited amount of time (given that it takes longer to breath test each driver than to simply ask whether they had been drinking). Clearly this would mean that since fewer drivers were able to be selected, that the overall number of drink-drivers apprehended would also be reduced.

APPENDIX B

Table 1: Six month drink-driving charge frequencies before and after introduction of "Booze Buses"

Harm Indicator	Charges Before	Charges After	Chi squ.	Sig
Roadblocks	99	176	21.56	0.0000
Routine Patrol	69	49	3.3898	0.0656
Road Crashes	22	28	0.720	0.3961