

The long-term effect of lockouts on alcohol-related emergency department attendances within Ballarat, Australia

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Abstract

Introduction and Aims. Alcohol has consistently been demonstrated to increase levels of aggression and violence, particularly in late night licensed venues. Since August 2003, Ballarat (a regional city of approximately 95 000 inhabitants, in Victoria, Australia) has implemented a 3:00 AM 'lockout' with the goal of reducing alcohol-related harms. This paper is the first long-term analysis of the effect of this type of intervention on emergency department (ED) attendances. The aim of this paper is to examine the effectiveness of a lockout intervention within the city of Ballarat, Victoria on alcohol-related ED presentations. **Design and Methods.** This paper examines alcohol-related injury frequencies pre- to post-lockout intervention in Ballarat, Victoria, from 1999 to 2009, as indicated by ED International Classification of Diseases codes for acute alcohol intoxication and assault. These data are further compared with similar data from Geelong, Victoria, as a control. **Results.** A small reduction in alcohol-related assaults and intoxication rates within Ballarat occurred before and after the introduction of the lockout. However, after this decline these rates steadily increased, surpassing Geelong by 2005. **Discussion and Conclusions.** There is no discernible long-term impact on alcohol-related ED attendances of the lockout intervention in Ballarat. As such, other interventions may be more appropriate to reduce alcohol-related ED attendances. [Miller P, Coomber K, Sønderlund A, McKenzie S. The long-term effect of lockouts on alcohol-related emergency department attendances within Ballarat, Australia. *Drug Alcohol Rev* 2012;31:370–376]

Key words: alcohol, violence, licensed venue, lockout, trading hour.

Introduction

Alcohol has consistently been demonstrated to increase levels of aggression and violence, particularly in late night licensed venues. Importantly, this major public health issue is ultimately preventable. Many interventions have been employed around the world to reduce or prevent alcohol-related harms, although few have proved effective when exposed to scientific scrutiny. One such intervention that has been implemented is a lockout strategy where entry to venues is refused after a designated time (e.g. 2:00 AM). The aim of the current paper is to examine the effectiveness of a lockout intervention within the city of Ballarat, Australia on reducing alcohol-related emergency department (ED) presentations. These data are compared with a nearby control site, Geelong, Australia [1].

Ballarat and Geelong report higher than average rates of alcohol-related harm than the State of Victoria [2],

although this differs depending on the indicator (i.e. hospital admission or alcohol-related traffic accidents) [3]. Widespread community acceptance of alcohol-related antisocial behaviour, and even alcohol-related violence, may be accentuated in regional areas, due to significant sections of the community regarding these behaviours as 'fun' or 'masculine' [3]. Licensed venues are most often identified as the sites where people drink, and also where most harm is experienced [4]. In this context, communities continue to struggle with measures that are effective in reducing alcohol-related harm on the one hand, while still providing opportunities for entertainment and socialisation.

Effective interventions at reducing alcohol-related violence

In Australia, a substantial proportion of the problems associated with alcohol and interpersonal violence arise in and around licensed premises in the night-time

economy (NTE) [5,6]. Strong links exist between alcohol outlet density and violence [7]. There is also a strong inverse relationship between alcohol-related violence and alcohol pricing [8,9] and outlet opening hours [10]. Specifically, longer trading hours leads to higher blood alcohol levels in drivers [11], incidence of road crashes while intoxicated [12], and levels of violence [6].

On a community scale, an effective intervention to reduce general violence is sharing of ED and police data within the wider community in order to develop appropriate policies and other prevention strategies [13]. In regards to alcohol-related violence, voluntary alcohol interventions with licensees, community alcohol accords, police programs and community action projects constitute the main approaches to reducing alcohol-related violence and injury [14]. These initiatives generally have a smaller impact than the more comprehensive policy interventions, but can nonetheless be extremely valuable within a community. The most noteworthy of such interventions include the Alcohol Linking Program [15], the Queensland Safety Action Project [16] and the Swedish Stockholm prevents alcohol and drug problems (STAD) [17], which have all been proven to be relatively successful at reducing risky drinking and alcohol-related harm.

Lockouts

One proposed alternative to reducing trading hours in order to reduce alcohol-related harm is licensed venue 'lockouts' [sometimes called curfews where venues do not allow patrons to enter a premises after a specified time (e.g. 2:00 AM)]. Patrons can, however, continue to consume alcohol after this time [14]. This approach is based on the rationale that much of the alcohol-related violence in the NTE is due to movement of people between venues during early morning hours, despite a substantial body of evidence, which identifies levels of intoxication as the major determinant of alcohol-related violence [18]. Research examining this type of intervention is very limited, and has generated ambiguous results.

Currently, the lockout intervention appears to have been utilised mostly within Australia [14], although there is at least one non-Australian example [19]. Bleetman *et al.* described Operation Blade which was conducted in Glasgow, Scotland, and had the primary aim of reducing knife crime [19]. This intervention included a 'curfew', whereby the Glasgow District Licensing Board altered permitted hours in night clubs from 3:00 AM to 2:00 AM, and admission or readmission of patrons was prohibited after midnight ('curfew'). They found that 'Increased police presence and the introduction of the clubs' curfew had no significant impact on

average daily (emergency department) attendances or on the time of attendance' ([19], p. 155).

One recent study on lockout interventions within the Gold Coast area of Queensland, Australia [20] examined the effectiveness of a 5 week trial 3:00 AM lockout during 2004 using general police data. During the lockout trial period, there were statistically significant reductions in street disturbances (12.3% reduction, $P=0.0005$) and sexual assaults (33.7% reduction, $P=0.004$); however, no significant declines were found for general assaults, property damages or stealing. As such, inconsistencies exist regarding the effectiveness of lockouts. The Queensland lockout was only evaluated over a 5 week trial period and such a short trial duration undoubtedly results in very speculative conclusions.

There is also one evaluation of the Ballarat lockout, using police data for the 12 months prior to the lockout and for 12 months after the lockout [21]. The findings indicated a decrease in reported assaults within licensed premises (47.5%) and public places (33.3%) following the lockout implementation. Further, there was a decrease in overall property damage outside of licensed premises (17.3%); however, property damage to licensed premises increased (25%). While there were decreases in assaults and property damage during the first 12 months of the lockout implementation, this decrease began 6 months prior to the implementation of the lockout. The evaluation period coincided with an increased police presence in the city on Friday and Saturday nights, regular liaison with venue operators, security personnel and increased patrols in both marked and unmarked police vehicles [21]. Thus, it is impossible to determine if the reduction in assaults is due to the lockouts or the increased police action, as also described in the Glasgow trial [19]. In light of these limitations and the lack of evidence regarding such interventions, the present study seeks to use the most sensitive and reliable measure of alcohol-related harm (ED attendance data; [22,23]) to evaluate the long-term effects of lockouts in the Ballarat community.

Methods

The size and trend of the alcohol-related harm and the impact of the lockout within Ballarat will be presented in terms of ED presentations. Comparisons to alcohol-related problems in the Geelong NTE, which has not adopted a lockout policy, will be made.

Context

Ballarat. Ballarat is the third most populous city in Victoria (95 000 people) with a growth rate of 1.5% per annum [24]. It is located 105 kilometres north-west of

Melbourne and 88 kilometres from Geelong. Ballarat has a substantial night-life with 169 licensed premises in 2004 (including 44 general licenses and 68 on-premise licenses), increasing to 180 in 2008 (including 42 general licenses and 67 on-premise licenses) [25]. The lockout strategy was introduced on 1 August and required all late night entertainment venues to refuse entry after 3:00 AM.

Geelong. Geelong is being used as a control site to contrast the effects of the lockout over a long-term period. Geelong is a regional centre of approximately 205 000 people with a growth rate of 1.1% per annum. Located 70 kilometres south-west from Melbourne, Geelong has a substantial night-life with 142 licensed premises in 2004 (31 general licenses; 77 on-premise licenses), increasing to 153 in 2008 (28 general licenses; 80 on-premise licenses) [25]. A general licence permits the supply of alcohol to customers for drinking on the premises, and to take away (e.g. pubs, hotels and nightclubs). Geelong has also implemented a number of community-driven interventions and was one of the first cities in Australia to implement a Liquor Accord in 1991, where police, licensees and council representatives met regularly to discuss and agree on strategies for dealing with alcohol-related problems [26,27]. The Accord [26] has created a general sense of cooperation in Geelong over many issues connected to alcohol-related problems. There is, however, still much debate over the effectiveness of various strategies, and a lockout policy is not currently implemented in Geelong [28].

Data

Case-level data for the study were obtained from the Department of Human Services records for the dates of 1 July 1999 through 31 July 2009. Both alcohol-related assaults and alcohol-abuse cases were included. Alcohol abuse consisted of any International Classification of Diseases-10 F10.0 (acute drunkenness due to alcohol) event in any of the 40 diagnosis codes. Alcohol-related assault included anyone over 14 years old, and any X85 to Y09 (which includes homicides and injuries inflicted by another person with intent to injure or kill, by any means) or Y87.1 (sequelae of assault) codes. There were 3069 cases in Geelong and 1111 cases in Ballarat. Blood alcohol concentration data are not collected by hospital staff.

While police records might provide added insight into the instances of alcohol-related violence which are intercepted and resolved on the street rather than in EDs [22], previous research has repeatedly highlighted the greater sensitivity of ED records in describing alcohol-related harm in the community

[22,23,29]. For instance, assaults recorded by police rely on policing activities and can be dependent on where resources are targeted [30]. Also, many people do not report assaults to police for a variety of reasons. Therefore, it was decided that ED records would provide a more reliable picture of alcohol-related harm over time [22,23].

Analyses

Data were further aggregated to include only those cases which occurred within the 'high alcohol hours' of 8 PM–6 AM Friday to Sunday morning [2]. This resulted in a total of 337 cases for Ballarat and 766 cases for Geelong. Interrupted Time Series Analysis, using SPSS Expert Modeler (SPSS Inc., Chicago, IL, USA), was conducted on the Ballarat data to determine the potential impact of the lockout intervention on ED presentations. The lockout variable was designated as dichotomous 'event' variables (0 = pre-intervention, 1 = post-intervention).

Results

During high-alcohol hours in Ballarat, the most common age group attending the ED with alcohol-related injuries was 15–24, with 47.5% ($n = 160$) of people within this group (Geelong: 41.7%, $n = 320$). Over two-thirds (69.4%, $n = 234$) of ED presentations were male (Geelong: 81.3%, $n = 623$).

Figure 1 presents the percentage of alcohol-related presentations for time of day (by hour) over the weekend period in Ballarat before and after 2003 (when the lockout was implemented). Rates of admission over the weekend, rather than the entire week are used, as high-alcohol hours are the focus of this study; Figure 1 indicates that alcohol admissions peak during high-alcohol hours. The trends of people presenting at Ballarat ED have not substantially changed after the introduction of the lockout in 2003. Figure 1 also shows the rate for time of admission Friday to Sunday for Geelong, and indicates that admissions rates peak between midnight and 6:00 AM.

Figure 2 presents the rates per 10 000 of alcohol-related ED presentations (assault and intoxication) during high-alcohol hours for Geelong and Ballarat per half year. Population statistics were obtained for both Geelong and Ballarat local government areas from the Australian Bureau of Statistics [31,32]. Following a stable period for the first 6 months, there was a decrease in ED attendance rate for the following 6 months before they began to increase again in late 2004 to early 2005, surpassing Geelong by late 2005/early 2006.

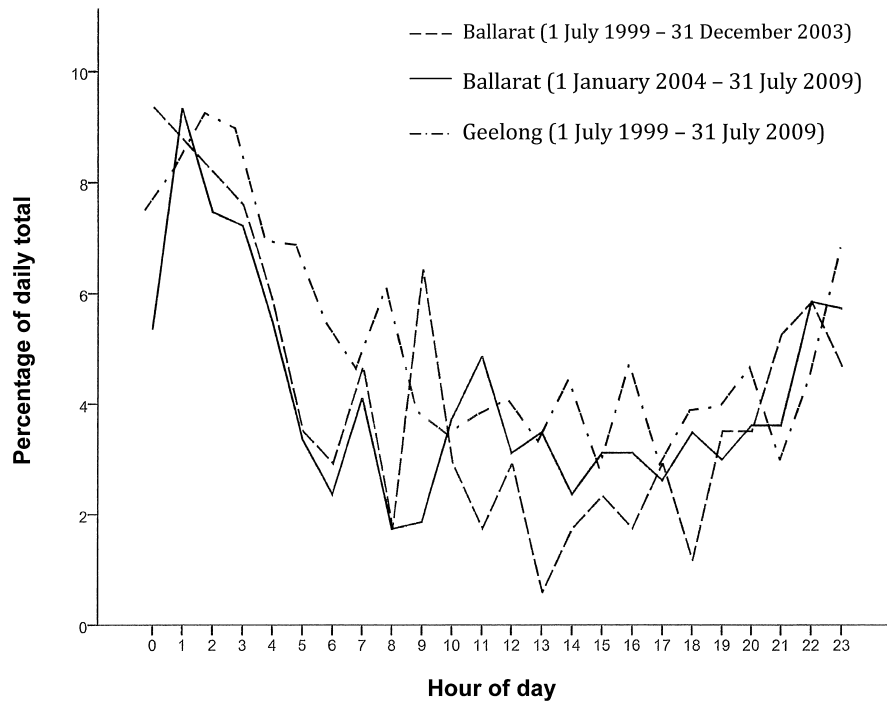


Figure 1. *Percentage of alcohol-related emergency department presentations in Ballarat (pre- and post-lockout implementation) and Geelong by time of admission (Friday–Sunday).*

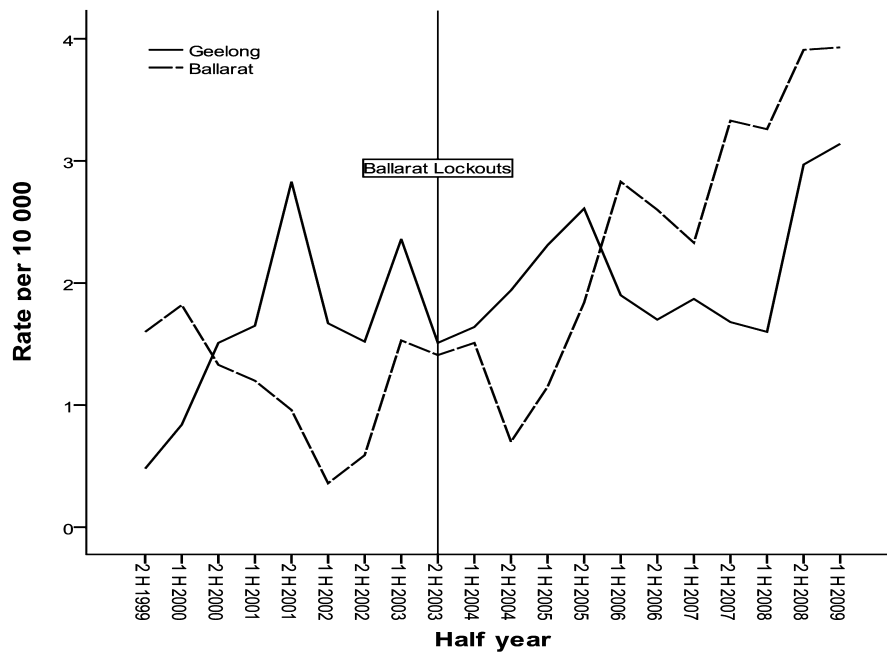


Figure 2. *Rates per 10 000 of alcohol-related emergency department presentations (assault and intoxication) for Ballarat and Geelong local government areas during high alcohol hours per half year.*

Using quarterly time points to obtain a greater number of observations trends in alcohol intoxication and assault were examined using a curve estimation to obtain an R^2 value for 2003 and earlier (pre-lockout)

and post-2003 (post-lockout). For Ballarat during 2003 and earlier there was no significant trend in the data. However, for post-2003 there was a strong positive trend for combined alcohol intoxication and assault

($R^2 = 0.74$, $P < 0.05$). In comparison, in Geelong during 2003 and earlier there was a moderate positive trend ($R^2 = 0.44$, $P < 0.05$). However, this positive trend decreased post-2003 ($R^2 = 0.25$, $P < 0.05$).

Lastly, time series analysis using monthly aggregated data (120 observations) was used to examine the potential impact of the lockdown intervention on the alcohol-related ED presentations per 1000 people in Ballarat. Autocorrelation and partial autocorrelation graphs were examined. In addition, the Durbin–Watson statistic indicated a significant positive autocorrelation ($d = 1.103 < d_{L, 0.05} = 1.634$). Therefore, time series analyses could be applied. The model was specified as an exponential smoothing simple seasonal model, indicating that there was a seasonal trend in the original data. The model fitted the data well (stationary $R^2 = 0.73$), no outliers were detected and the model was correctly specified (Ljung–Box statistic $P = 0.21$). The model showed that the lockdown was not a significant predictor of ED presentation rates within Ballarat.

Discussion

The current study explored the long-term impact of the 3:00 AM lockdown implemented in Ballarat on 1 August 2003 by examining rates of alcohol-related ED presentations. The ED presentation rates within Ballarat were then compared with Geelong, where no lockdown policy is in place. Ballarat ED alcohol-related assault and intoxication presentation rates declined prior to the implementation of the lockdown, followed by a small rise and then a more substantial drop for 6 months post-lockdown. However, after this initial decline, ED presentation rates steadily increased and surpassed that observed in Geelong by the end of 2005.

The previous evaluation of the Ballarat lockdown [21] reported the implementation of the lockdown as a success, whereas the current research suggests that the observed positive effects were short-lived. Further, the reduction in ED presentation rates is not necessarily attributable to the lockdown implementation as police and community attention was also focussed on alcohol-related issues during this time [19]. In particular, policing activity pre- and post-introduction of the lockdown was higher than normal levels and could account for a proportion of the reductions noted. This is very likely to be the case prior to the introduction of the lockdown in Ballarat.

Additionally, in response to the increases in alcohol-related harm, Ballarat has recently changed the lockdown time from 3:00 AM to 2:30 AM (2 April 2010) as well as introducing a ban on service of alcoholic shots after 1:00 AM [33]. Lastly, the increase in alcohol-related harms may be related to the increased number of liquor licenses issued within Ballarat [22]. However, only 14

new liquor licenses overall were issued within Ballarat between 2004 and 2009. In particular, there were two fewer general licences (including pubs, hotels and taverns) and only one new on-premise licence (including nightclubs). Literature indicates that increases in alcohol outlet density, within a local postcode area, increase the levels of binge drinking and alcohol-related injuries and violence [34].

The findings of this study suggest that lockdowns, as a stand-alone intervention, are unlikely to have a sustained effect on ED attendances for either assault or intoxication. This accords with the current available evidence which shows that increased alcohol consumption equals increased harm [18,35], particularly violence [14,36–38]. While lockdowns might reduce the number of people moving between venues, there remains no clear evidence that this reduces violence, particularly at closing time. This also fails to address other related concerns, such as the availability of transport [39], and suggests more comprehensive responses, including intelligence-based policing [15], whole of community mobilisation [40,41] and better trained staff [42,43]. While the findings from the current study demonstrate little effect over the long term from the introduction of a lockdown, there is a lack of comprehensive evaluations of these types of interventions, and much more research is required [44].

Limitations

There are a number of limitations with this study. Firstly, it should be noted that the ED data most likely underestimate the actual frequencies of alcohol-related injury [45,46]. This assumption is based primarily on the reality that injuries sustained as a result of alcohol intoxication do not always require medical attention. Such cases would therefore not be represented in either data-set. Therefore, the current study is based on a small sample size. This small sample size may explain some of the volatility in the data. Another related issue pertains to the fact that ED-data is recorded by medical staff whose main objective is patient assessment and immediate treatment, rather than noting any alcohol-involvement. Despite this, the use of primary injury codes and the ‘high alcohol hours’ formula has been demonstrated to reliably track trends over time [2] and is therefore an appropriate measure for this study.

Secondly, while the data forming the basis for the study help greatly in understanding the long-term effectiveness of a lockdown strategy in relation to alcohol-related ED admissions, there are other information sources which could provide a more complete description of this problem. For example, ambulance data would certainly add to the level of detail available,

although ambulance call-out data for the Ballarat region was not collected in electronic form until late 2008.

Lastly, the current findings are limited by the retrospective, case-control type design. Therefore, conclusions regarding the ineffectiveness of the lockout intervention in Ballarat are preliminary. A randomised control trial would be the most appropriate way to assess the impact of interventions on alcohol-related harms in the community. Future research is needed to investigate the impact lockouts have on the rates of alcohol-related harms.

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