

## Alcohol and injury among attendees at a busy inner city New Zealand emergency department



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### ABSTRACT

**Introduction:** We present a study that provides a contemporary view of alcohol-related injury prevalence amongst patients presenting to a New Zealand (NZ) emergency department (ED).

**Methods:** Adult injury patients presenting to Auckland City Hospital ED within 6 h of injury were invited to participate during three recruitment periods (2015–2016). An interviewer-administered questionnaire obtained information on demographic, injury, general health, and lifestyle factors. Breath alcohol samples were obtained. Descriptive and logistic regression analyses were conducted.

**Results:** 501 patients participated (71% response rate), 21% had consumed alcohol within 6 h of their injury. The majority were male, and overall falls were the most common mechanism of injury among all patients. Alcohol-related injuries most commonly occurred at home, and were significantly more likely to occur during the weekend (Friday–Sunday) and night hours (23:00–06:59). After controlling for the effects of confounding; ‘poor’ general health, engaging in leisure activities at the time of injury, and injuries resulting from assaults were associated with increasing the odds of alcohol-related injury.

**Conclusions:** Acute alcohol use continues to play a considerable role in ED injury presentations in NZ. Continued policy, health promotion, and injury prevention efforts are required to reduce the harms associated with alcohol use.

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### Introduction

Acute alcohol consumption, even in small amounts, has been shown to significantly increase the risk of injury [1] with evidence of a strong dose response relationship. Around 43% of alcohol attributable deaths in NZ are injury-related [2]. The contribution of alcohol to injuries is particularly evident for patients presenting to hospital emergency departments (EDs). Internationally, studies estimate that 10 to 18% of injury presentations are alcohol-related [3]. A study conducted by Humphreys and colleagues in 2000 at Auckland City Hospital found 35% of adult injury presentations had

consumed alcohol in the preceding 6 h, 16% of alcohol-related presentations were motor vehicle-related, and 78% of people injured as a result of intentional injuries had consumed alcohol acutely [4].

The variability in the prevalence of alcohol-related trauma across regions highlighted in previous studies [3,5], reinforces the need for regional emergency department (emergency room) studies that present unique opportunities to identify disparities in alcohol-related injury rates, enhance treatment and prevention decisions for specific patient groups, and to monitor the effectiveness of interventions targeting harmful drinking behaviours [6,7]. The aim of this study was to investigate the prevalence of alcohol-related injuries among patients presenting to the Auckland City Hospital ED. The study is part of the multi-country World Health Organization (WHO) Emergency Room Collaboration Alcohol Analysis Project (ERCAAP) exploring the role of alcohol in injury presentations to EDs [8]. In addition, we were interested in changes in patterns of alcohol

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use among injury presentations by comparing data from the study by Humphreys and colleagues using similar methodology to the present study, conducted in 2000 [4].

## Materials and methods

### Data collection

Eligible participants were adults ( $\geq 16$  years) who sustained an injury in the 6 h prior to arrival at Auckland City Hospital ED. Participants needed to be able to complete the interview in English, and give informed consent. Patients who had sustained non-traumatic injuries (e.g. poisonings, drowning), who were admitted to hospital for greater than 36 h, who had cognitive difficulties, or who were deemed inappropriate or unsafe to interview by the ED staff were excluded from the study. A probability sample of 500 consecutive patients was selected.

Participants were screened by research assistants (RAs) for eligibility, informed about the study aims (written and verbal information provided) and invited to take part in the study. Recruiting took place 24 h a day during three recruitment periods (5–7 December 2015, 16–22 February 2016, and 19–26 April 2016). The ED's electronic admission system and the department's triage staff were used to identify potentially eligible patients. Two RAs were rostered on each shift with an additional RA rostered for busy periods during Friday and Saturday evenings. RAs approached patients once they were medically stabilised. In cases where a patient was too sick or too intoxicated for informed consent to be obtained, ethics approval permitted RAs to collect a breath alcohol sample and then obtain retrospective consent at a later time. If at this point consent was not obtained, the patient and sample were excluded.

Data were collected from participants via an interviewer-administered questionnaire. The WHO/ERCAAP questionnaire [8] was used with some locally relevant questions added by the local study team. The domains of interest included demographic information, injury circumstances, general health, a depression screen, and usual and acute recreational drug and alcohol use. Two measures of alcohol involvement were used: breath alcohol and patient self-report. In some patient's blood alcohol concentrations were also collected by medical staff at their discretion, these were usually only collected for road traffic injuries or other significant trauma mechanisms. The breath alcohol samples were collected using BAC Track S80 Alco-meters calibrated and validated using the manufacturer's specifications.

The survey data were entered by trained staff into an electronic data base developed for the study. The data entry fields included range and logic checks to assist with data completeness and reliability. Characteristics significantly associated with alcohol-related injuries were identified by logistic regression analysis using the statistical software R, through functionality of the mgcv package [9]. Missing data were treated as missing completely at random in the provisional regression analyses, as such, any missing values resulted in that particular case being removed when building the regression model. The flexibility of the regression approach taken enabled the relationship between variables and the response to vary. For example, rather than treating the day of the week as a distinct factor (i.e., weekday or weekend), the temporally varying relationship throughout the week was estimated. As such terms were included in the model which allowed the hour of the day, day of the week, and number of years of education to vary with the probability of a participant having consumed alcohol. Two logistic regression models were fitted and compared, each considered the same variables as discussed above. However, the second variant of the model allows the relationship between the day of week an injury was obtained and the

probability of alcohol consumption to change with sex. The final model selected was fitted using 469 cases. The level of statistical significance was set at  $p < 0.05$ .

Approval for the study to be conducted was obtained from the National Health and Disability Ethics Committee (Ref: 15CEN122) and the Auckland Hospital District Health Board (Ref: 6873).

## Results

### Characteristics of those who were injured

During the recruitment periods, a total of 1599 patients were initially approached of which 891 were ineligible, and 66 were missed (Fig. 1). Of the 642 who were deemed eligible to participate, 501 agreed to take part (78% response rate). The median age of participants overall was 33 years (Inter quartile range [IQR] 24–56) (Table 1). Over 60% of injury presentations were aged 16–34 years. The majority of participants were male (57.5%,  $n = 288$ ), and self-identified as NZ European (44.7%,  $n = 224$ ).

One fifth of patients (21%,  $n = 105$ ) had consumed alcohol within 6 h of their injury (Table 1). The median age of those presenting to ED with injuries was lower in those who had consumed alcohol acutely (29 years, IQR 22–47 cf. 34.5 years, IQR 24–58). Almost one quarter of injured males who presented with injuries to ED had consumed alcohol compared with only 17% of females. Among Māori (indigenous people of NZ) who presented to the ED with an injury, more than one third ( $n = 18/45$ ) had consumed alcohol, compared to around one quarter of NZ Europeans (23.7%,  $n = 53$ ).

### Injury circumstances

The majority of those presenting with injuries sustained in licensed premises (Pub/Bar/Restaurant/Nightclub) had consumed

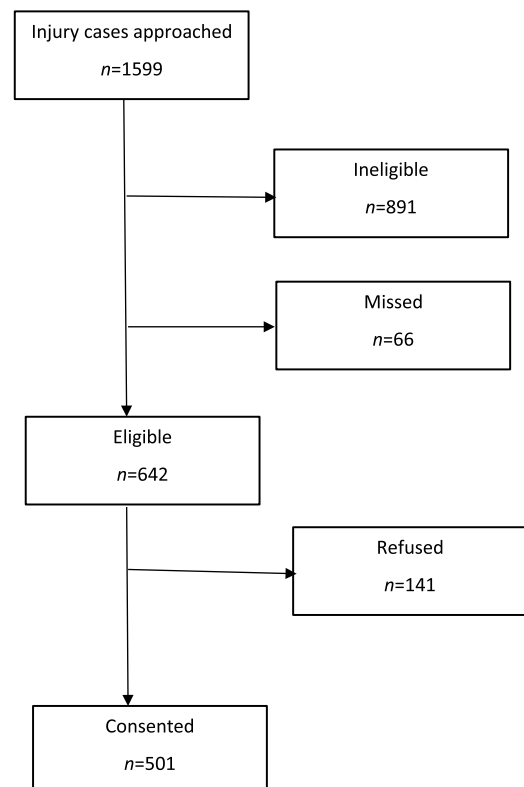


Fig. 1. Recruitment flow diagram for eligible patients.

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