

## 2014/2015 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on **4 July 2014**

### Supervisor Information (First named supervisor will be the contact):

Supervisor's Name(s): Prof Doug Sellman, Assoc Prof Joe Boden, Assoc Prof Simon Adamson, Assoc Prof Chris Frampton

Department: Psychological Medicine

Institution: University of Otago Christchurch

Phone: 03-3640480 0274-344456

E-mail: [doug.sellman@otago.ac.nz](mailto:doug.sellman@otago.ac.nz)

Mailing Address: National Addiction Centre, 3<sup>rd</sup> Floor Terrace House, 4 Oxford Tce, ChCh 8011

### Research Category (Choose one category only – to be used for judging the students' presentations):

**Clinical**

**Laboratory**

**Community X**

### Project Title (20 words MAXIMUM):

Testing the validity of New Zealand's low-risk drinking guidelines

### Project Description:

## Background

Harm from alcohol is usefully divided into acute and chronic harms. Acute harms result from intoxication from alcohol and include injury, aggression and alcohol poisoning. Chronic harms result from the toxic effects of alcohol on the body over time resulting in a myriad of medical conditions [O'Hagan et al 1993; Room et al 2005].

Drinking guidelines are an attempt to specify doses of alcohol below which both acute and chronic harms can be minimized. Doses per week relate to chronic harms, whereas doses per occasion relate to acute harms.

The drinking guidelines of the Alcohol Advisory Council of New Zealand (ALAC) referred to "responsible drinking" [MacEwan 1995] were:

*For women: no more than 14 standard drinks per week and no more than 4 standard drinks on any one occasion; and*

*For men: no more than 21 standard drinks per week, and no more than 6 standard drinks on any one occasion.*

In 2011, these guidelines were reviewed and now referred to as "low risk drinking" [HPA 2011]:

*For women: no more than 10 standard drinks per week and no more than 4 standard drinks on any one occasion;*

*For men: no more than 15 standard drinks per week, and no more than 5 standard drinks on any one occasion; and*

*For both women and men at least two abstinent days per week.*

It is noteworthy that both standard drinks and drinking guidelines vary quite considerably across different countries in the world [Kerr & Stockwell 2012]. The recent work of the HPA here in New Zealand was based in large part on recent reviews of the drinking guidelines in Canada and Australia, where a standard drink of alcohol varies from 13.6g in Canada to 10g in Australia. A standard drink in New Zealand is 10g of alcohol.

The main purpose of this current research proposal is to explore the validity of the per occasion "low-risk" drinking limits described in the current HPA drinking guideline - 4 standard drinks for women and 5 standard drinks for men.

## Methodology

Validity will be explored in two ways: theoretically using mathematical modelling; and empirically through conducting a community survey.

### 1. Mathematical modelling

This will involve the construction of a series of blood alcohol concentration (BAC) tables for both women and men at 4 and 5 standard drinks consumed respectively, for a range of body weights from 45–105kg in women and 60–120kg in men (mean weights of NZ women and men are close to 75kg and 90kg respectively), and range of drinking periods from 1 – 5 hours.

The BAC tables will be constructed using the following formula [Kypri et al 2005; Andersson et al 2009]:

$$EBAC = \frac{0.806 \cdot SD \cdot 1.2}{BW \cdot Wt} - (MR \cdot DP)$$

where 0.806 is a constant for body water in the blood (mean 80.6%), SD is the number of standard drinks containing 10 grams of ethanol, 1.2 is a factor to convert the amount in grams to Swedish standards set by The Swedish National Institute of Public Health, BW is a body water constant (0.58 for men and 0.49 for women), Wt is body weight (kilogram), MR is the metabolism constant (0.017) and DP is the drinking period in hours.

The tables will be examined using the putative level of risk categories below for the range of BACs from 0.00 – 0.10, based on the following descriptions:

- "Binge drinking means drinking so much within about 2 hours that blood alcohol concentration (BAC) levels reach 0.08g/dL" [NIAA 2014].
- "Drivers aged between 20 and 29 years are 50.2 times more likely to have a fatal crash at BAC 0.08 compared to 17.5 times as likely at BAC 0.05". [ALAC 2009]
- "When a BAC of .056 is exceeded, the negative, depressant effects of alcohol take place" [CSHPWB 2008]
- "BAC=0.04. Lower inhibitions and sensation of warmth, some minor impairment of reasoning and memory, lowering of caution" [CSHPWB 2008]
- "In Sweden, which changed its BAC threshold from .05 to .02 in 1990, the results have been dramatic. According to the World Health Organization and European Commission, of road fatalities in Sweden, roughly 16% were alcohol related. In the U.S., 31.7% of traffic fatalities were alcohol related in 2007" [Time 2010].

#### **BAC Putative level of risk**

0.00	No risk
0.02	Very low risk
0.04	Low risk
0.06	Moderate risk
0.08	High risk
0.10	Very high risk

## **2. Community survey**

120 people aged 18 years and above will be randomly selected from the Christchurch Residential White Pages using block randomization for gender and age (< 35 years, 35 and over).

The main questioning of the survey will be a thought experiment in which participants will be invited to imagine drinking 4 or 5 standard drinks (depending on gender) over a 2-3 hour period and then be required to function in a series of six scenarios graded easy, medium, and hard. Two examples for each level of difficulty will be used. Standard drinks will be converted into actual beverage quantities for each participant.

Examples of scenarios might be as follows:

Easy - walking down to the dairy to buy some milk;

Medium - looking after a small child who has just fallen and scraped her knee;

Hard - dealing with an irritable and intoxicated 17-year old who wants to go out to town with his mates at 1am.

Participants will be asked to rate their functioning level on a five-point scale:

Very Well

Well

Neither Well nor Poor

Poor

Very Poor

Participants will also be asked how they consider they would function having consumed no alcohol for each scenario.

The survey will also consist of the demographic and alcohol use questions from the 2010 Health Sponsorship Council's Health and Lifestyles Questionnaire [Devlin 2011], as a check on the representativeness of the sample, as well as to investigate associations between perceived ability to function socially under the influence of alcohol and various levels of drinking.

## References

Alcohol Advisory Council of New Zealand (ALAC). ALAC calls for lower BAC levels, August 2009.

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Kerr WC, Stockwell T. Understanding standard drinks and drinking guidelines. *Drug and Alcohol Review* 2012;31:200-5.

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MacEwan I. Upper limits for responsible drinking. Report of the Working Party on Upper Limits for Responsible Drinking. Wellington: Alcohol Advisory Council of New Zealand, 1995.

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