

Sex-specific analysis of acute alcohol use in suicides and reporting of alcohol as a contributor to suicide deaths in New Zealand 2007–2020: a cross-sectional study of coronial data

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ABSTRACT

AIM: Acute alcohol use (AAU) can increase suicide risk. It is unknown if this effect differs by population sub-group in New Zealand, and what characteristics are associated with alcohol being coded as contributory to death, when AAU is identified. This study aimed to answer: 1) are the characteristics associated with suicide involving AAU different between females and males, and 2) among suicides that involved AAU, what factors are associated with alcohol being coded as a contributory factor?

METHOD: Secondary analysis was conducted of suicide data from 2007–2020, from the National Coronial Information System. Binomial regression models for females and males were used to estimate sex-specific differences in risk of suicide involving AAU. Poisson regression modelling was used to estimate the relative risk of alcohol being coded as contributory where AAU was identified.

RESULTS: Suicide was more likely to involve AAU among Māori females (adjusted risk ratio [ARR] 1.35, 95% confidence interval [CI] 1.08–1.68) and Pacific females (ARR 1.75, 95% CI 1.22–2.51), compared to European females. Compared to males who were employed, all other employment statuses had significantly lower risk of suicide that involved AAU. Those who died by hanging (ARR 0.75, 95% CI 0.62–0.92) or firearms (ARR 0.55, 95% CI 0.38–0.90) were less likely to have alcohol coded as contributory, compared to those who died by poisoning.

CONCLUSION: Targeted public health interventions designed by and for specific demographic groups (particularly Māori and Pacific females) are needed, alongside universal interventions that address social and structural determinants. Data systems and coding must accurately reflect the association between AAU and suicide in New Zealand.

Suicide is a significant public health issue in New Zealand, with 557 suspected suicide deaths recorded in 2022 (giving an age-standardised rate of 10.4 per 100,000 persons).¹ This health and social burden is experienced inequitably by different population groups; suicide rates are higher in males, those who are of Māori ethnicity, and young people (particularly the 20–24 age group).¹ People with alcohol use disorder (AUD) represent another high risk group for suicide, with New Zealand cohort data providing evidence for an association between AUD and suicidal ideation in adulthood.² Alcohol can contribute to suicide as both a distal and proximal risk factor. Acute alcohol use (AAU) is well established as a proximal risk factor for suicidal behaviour.^{3–5} This is due to the direct effects of alcohol on feelings of despair, disinhibition and impaired decision making, and its contribution to other proximal risk factors such as interpersonal

conflict.⁶ AAU is also associated with the use of more lethal suicide means,⁷ thereby increasing the risk of a suicide attempt resulting in death. Previous international studies have found that the prevalence of AAU in suicides ranges from 10–69%, though this is moderated by population demographics including sex, ethnicity, employment status, marital status and age.^{4,7,8}

A recent New Zealand study found that just over one-quarter (26.6%) of suicides in those aged 15 or older involved AAU.⁹ This proportion varied by demographic characteristics including ethnicity and age group, and those of Māori or Pacific ethnicity were of increased risk of suicide involving AAU.⁹ Notably, however, there were no sex differences observed in New Zealand, with males and females having equivalent risk of suicide involving AAU.⁹ This is in contrast to findings from Australia⁸ and the United States of America (USA),¹⁰ which found that male suicide decedents

were significantly more likely to have AAU present. There is a trend in countries similar to New Zealand (including Australia, Canada and the USA) towards increasing suicide rates in females, particularly in those aged 10–24 years,^{11,12} who are Indigenous,^{11,13} and where AAU is identified,¹⁴ which highlights that sex differences may also be impacted by other demographics such as age and ethnicity. However, in New Zealand, it is currently unknown if the characteristics associated with AAU within suicide differ between males and females. This knowledge gap on sub-group specific trends hampers the ability to develop targeted public health suicide prevention interventions for specific age, sex or ethnicity sub-groups.⁷

The World Health Organization highlights that suicides are preventable⁵ and targeting alcohol use at the population level (e.g., through restricting sales or availability) has been shown to be an effective suicide prevention strategy.¹⁵ However, to evaluate prevention efforts, including those designed for specific sub-groups, it is vital that coronial processes and cause of death (mortality) coding consistently identify where alcohol has contributed to suicide deaths. In Australia, it was found that around half (47.6%) of suicides that involved AAU (as determined by individual review of coronial records) also had alcohol recorded as a contributory cause of death, and this was associated with factors including both blood alcohol concentration (BAC) and means of death.¹⁶ Previous New Zealand findings showed that only around one-third (33.6%) of suicides involving AAU had alcohol coded as contributory;⁹ however, it is unknown what factors are associated with this. This knowledge could be used to improve coding protocols and safeguard against any potential inconsistencies.

In this study, we seek to inform and support suicide prevention efforts in New Zealand by both enhancing knowledge of AAU within suicide, and providing data that may be used to improve reporting and coding processes. Specifically, this study aimed to answer the following questions: 1) are the characteristics associated with suicide involving AAU different between females and males, and 2) among suicides that involved AAU, what factors are associated with alcohol being coded as a contributory factor?

Method

This study is a secondary analysis of an existing dataset extracted from the National Coronial

Information System (NCIS), which compiles cases from the Coronial Service of New Zealand, and Australian state and territory coroners' courts.⁹ This project was approved by the University of Otago Human Research Ethics Committee (HD20/102), with a second level of review and approval by NCIS (NZ019).

Case identification and coding

The full methods for the creation of this dataset have been previously reported⁹ and are summarised here. Eligible closed cases were extracted from the NCIS dataset for the full available time period, which was 2007–2020. This included all deaths with a coronial finding of “Intentional self-harm” in those aged 15 or over in New Zealand. Cases were included in the dataset if eligibility criteria were met that allowed for identification of whether alcohol was present at the time of death. It is important to note from the original study that 23.3% of cases were excluded because acute alcohol use could not be ascertained, primarily due to lack of toxicology data.⁹ The following characteristics were extracted and subsequently coded for all eligible cases:

- Age: age in years at death, subsequently grouped into 10-year intervals. Given the heterogeneity of 15–24-year-olds (especially regarding the legal purchasing of alcohol—the age of purchasing alcohol in New Zealand is 18 years), this age group was further split into two 5-year age groups (15–19 years; 20–24 years). Although the 5-year age groups do not align perfectly with the legal alcohol purchasing age, this categorisation enabled comparison with other studies.
- Sex: female, male.
- Employment status: employed, unemployed, student, retired/pensioner, other (including categories of home duties, prisoner, still enquiring, child not at school), unknown.
- Marital status: never married, widowed, divorced/separated, married/de facto, unknown.
- Ethnicity: initial coding was consistent with the 2018 Census ethnic group summaries of European, Māori, Pacific peoples, Asian, Middle Eastern/Latin American/African (MELAA), and other ethnicity;¹⁷ however, due to low numbers, Asian, MELAA and other were subsequently combined into a single group named “other ethnicity”.

- Method of death (based on International Classification of Diseases ICD-10-AM code): poisoning, hanging, drowning, firearm, sharp object, falls, other.

Post-mortem BAC was manually extracted from toxicological and coronial reports, recorded in mg/100mL and then dichotomised as:

- No acute alcohol use: BAC \leq 50 milligrams/100mL of blood
- Acute alcohol use: BAC $>$ 50 milligrams/100mL of blood

To investigate the extent to which a suicide involving AAU is coded as having alcohol as a contributory factor, where BAC was $>$ 50mg/100mL, this variable was further categorised into 51–100, 101–150, 151–200, 201–250 and $>$ 250mg/100mL. Proportions of cases within each of these categories were previously reported.⁹

Whether alcohol was identified in NCIS records as a contributory cause of death was determined by use of ICD-10-AM codes (F10.0, F10.1–10.9, R78.0, T51, X45 or X65) and searching for the word “alcohol” at all levels of the cause of death fields. If any one of these codes was identified, we deemed alcohol had been identified as a contributory cause of death. This was then dichotomised as:

- Alcohol not coded as a contributory cause of death
- Alcohol coded as a contributory cause of death.

Sample population

The total number of eligible cases was 6,072, of which 4,658 (76.7%) met inclusion criteria. A total of 1,238 of included cases (26.6%) involved AAU. The characteristics of this sample have been previously reported,⁹ and the proportions of cases

that involved AAU, and where alcohol was coded as contributory, are shown in Table 1.

Statistical analysis

Statistical analysis was conducted in Stata (StataCorp, Stata Statistical Software: version 16.1 for Windows). To investigate sex-specific differences in risk, binomial regression models for females and males were used to assess the relative risk that different demographic groups had for their suicide to have involved AAU. Univariate models were firstly conducted to examine the effects of individual explanatory variables (unadjusted results). Next, we used a multivariable model adjusting for ethnicity, age group, employment status and marital status. To investigate the extent to which a suicide involving AAU was coded as having alcohol as a contributory factor, Poisson regression was used to assess the relative risk of alcohol being coded as contributory in suicides where AAU was identified. The multivariate model was adjusted for sex, ethnicity, age group, employment status, marital status, method of death and BAC category.

Results

There were 1,211 females in the 4,658 included cases (representing 26.0% of the total). Of these 1,211 females, just over one-quarter ($n=323$, 26.6%) had AAU identified. Of characteristics that predicted the risk of suicide involving AAU, ethnicity was the most significant variable for females (Table 2). Compared with European females, Māori females had a 35% greater risk of their suicide involving AAU, after adjusting for age group, marital status and employment status (adjusted risk ratio [ARR] 1.35, 95% confidence interval [CI] 1.08–1.68). Pacific females also had a 75% increased risk (ARR 1.75, 95% CI 1.22–2.51) compared with European females. Females

Table 1: Proportions of sample for acute alcohol use (AAU) and coding of alcohol as a contributory cause of death.

Alcohol coded as contributory	AAU identified (i.e., BAC $>$ 50mg/100mL)	
	No	Yes
No	3,266 (95.5%)	822 (66.4%)
Yes	154 (4.5%)	416 (33.6%)
Total	3,420	1,238

Table 2: Results of binomial regression modelling for risk of suicide death involving acute alcohol use for females, by case characteristics.

Characteristic		RR	95% CI	P-value	ARR	95% CI	P-value
Ethnicity	European	REF					
	Māori	1.50	1.24–1.83	<0.000	1.35	1.08–1.68	0.008
	Pacific peoples	1.85	1.29–2.65	0.001	1.75	1.22–2.51	0.002
	Other	0.45	0.25–0.82	0.009	0.47	0.26–0.86	0.015
Age group	25–34	REF					
	15–19	0.76	0.55–1.04	0.085	0.85	0.59–1.21	0.359
	20–24	1.01	0.75–1.36	0.971	0.95	0.70–1.27	0.722
	35–44	0.82	0.61–1.10	0.180	0.87	0.64–1.17	0.347
	45–54	0.81	0.61–1.07	0.144	0.87	0.65–1.18	0.374
	55–64	0.56	0.38–0.82	0.003	0.63	0.43–0.94	0.024
	65–74	0.35	0.17–0.71	0.004	0.55	0.22–1.36	0.194
	75+	0.25	0.12–0.59	0.002	0.39	0.12–1.28	0.120
Employment	Employed	REF					
	Unemployed	1.12	0.90–1.39	0.320	1.01	0.81–1.25	0.954
	Student	0.69	0.49–0.99	0.042	0.58	0.38–0.87	0.009
	Retired/pensioner	0.35	0.21–0.59	<0.000	0.61	0.28–1.32	0.205
	Other	0.94	0.67–1.30	0.696	0.93	0.67–1.29	0.666
	Unknown	1.03	0.68–1.57	0.879	0.95	0.63–1.44	0.824
Marital status	Never married	REF					
	Widowed	0.64	0.38–1.06	0.082	1.27	0.74–2.18	0.383
	Divorced/separated	0.75	0.54–1.03	0.079	0.83	0.59–1.17	0.299
	Married/de facto	0.84	0.68–1.04	0.115	0.89	0.71–1.11	0.297
	Unknown	1.28	0.88–1.88	0.195	1.40	0.96–2.04	0.082

Adjusted results are adjusted for age group, ethnicity, marital status and employment status. Values are rounded to 2.d.p (except for p-value, which is rounded to 3.d.p).

Adjusted risk ratio = ARR; confidence interval = CI; risk ratio = RR; reference category = REF.

Table 3: Results of binomial regression modelling for risk of suicide death involving acute alcohol use for males, by case characteristics.

Characteristic		RR	95% CI	P-value	ARR	95% CI	P-value
Ethnicity	European	REF					
	Māori	1.19	1.04–1.35	0.011	1.11	0.96–1.27	0.146
	Pacific peoples	1.27	1.01–1.60	0.043	1.21	0.95–1.52	0.117
	Other	0.62	0.45–0.85	0.003	0.62	0.45–0.85	0.003
Age group	25–34	REF					
	15–19	0.68	0.54–0.87	0.002	0.71	0.54–0.93	0.014
	20–24	1.09	0.91–1.30	0.347	1.08	0.90–1.28	0.413
	35–44	1.04	0.88–1.23	0.623	1.05	0.89–1.24	0.567
	45–54	0.86	0.73–1.03	0.094	0.86	0.72–1.03	0.106
	55–64	0.73	0.59–0.90	0.004	0.74	0.59–0.92	0.007
	65–74	0.46	0.32–0.68	<0.000	0.59	0.37–0.95	0.029
	75+	0.26	0.15–0.43	<0.000	0.31	0.16–0.60	<0.000
Employment	Employed	REF					
	Unemployed	0.77	0.67–0.88	<0.000	0.74	0.65–0.85	<0.000
	Student	0.64	0.49–0.84	0.001	0.76	0.56–1.03	0.072
	Retired/pensioner	0.36	0.27–0.48	<0.000	0.61	0.41–0.92	0.020
	Other	0.40	0.25–0.66	<0.000	0.40	0.24–0.65	<0.000
	Unknown	0.91	0.70–1.19	0.510	0.88	0.67–1.16	0.370
Marital status	Never married	REF					
	Widowed	0.79	0.53–1.19	0.265	1.72	1.16–2.55	0.007
	Divorced/separated	1.08	0.92–1.27	0.325	1.07	0.90–1.27	0.455
	Married/de facto	0.92	0.81–1.04	0.185	0.94	0.81–1.08	0.377
	Unknown	0.98	0.76–1.27	0.876	1.05	0.81–1.36	0.694

Adjusted results are adjusted for age group, ethnicity, marital status and employment status. Values are rounded to 2.d.p (except for p-value, which is rounded to 3.d.p).

Adjusted risk ratio = ARR; confidence interval = CI; risk ratio = RR; reference category = REF.

Table 4: Proportion coded with alcohol as a contributory cause of death by BAC.

BAC category (mg/100mL)	Alcohol not coded as contributory	Alcohol coded as contributory
51–100	234 (81.0%)	55 (19.0%)
101–150	277 (76.3%)	86 (23.7%)
151–200	209 (64.9%)	113 (35.1%)
201–250	68 (38.9%)	107 (61.1%)
>250	34 (38.2%)	55 (61.8%)
Total	822 (66.4%)	416 (33.6%)

of other ethnicities had less than half the risk of their suicide involving AAU (ARR 0.47, 95% CI 0.26–0.86). Being a student was also associated with a decreased risk compared to those females who were employed (ARR 0.58, 95% CI 0.38–0.87).

There were 3,447 males in the 4,658 included cases (representing 74.0% of the total). Of these 3,447 males, just over one-quarter (n=915, 26.5%) had AAU identified. When considering characteristics that predicted the risk of suicide involving AAU, employment status was the most significant variable for males (Table 3). Compared to males who were employed, all other employment statuses (unemployed, student, retired and other) had a significantly reduced risk of suicide involving AAU. Being widowed was associated with increased risk (ARR 1.72, 95% CI 1.16–2.55) compared to males who were never married. Regarding ethnicity, while males of other ethnicities had a reduced risk of suicide involving AAU compared to European males (ARR 0.62, 95% CI 0.45–0.85), there was no significant elevation in risk for Māori or Pacific males. Regarding age group, males aged 15–19, and those aged 55 and over, had reduced risk compared to the 25–34-year-old age group.

Of the 1,238 cases that involved AAU, the proportion that then had alcohol coded as a contributory cause of death increased with increasing BAC (Table 4).

When considering the characteristics that were associated with whether a suicide involving AAU was coded with alcohol as being contributory, the two most significant variables were BAC category and method of death (Table 5). Cases with BAC over 200mg/100mL were three times more likely to have alcohol coded as contributory, compared to cases with BAC 51–100mg/100mL. Those who had died by hanging (ARR 0.75, 95% CI 0.62–0.92)

or firearms (ARR 0.55, 95% CI 0.38–0.90) were less likely to have alcohol coded as contributory compared to those who died by poisoning.

Discussion

We conducted sex-specific analyses to identify characteristics associated with suicide involving AAU separately for females and males. Additionally, we quantified which characteristics were associated with alcohol being coded as contributing to death. In relation to the sex-specific analyses, we found distinct differences between females and males. For females, ethnicity was the most significant characteristic, with increased risk of suicide involving AAU observed for females of Māori and Pacific ethnicity as compared with European ethnicity. No relationship between ethnicity and suicide risk involving AAU was observed in males. Previous New Zealand findings had suggested that Māori and Pacific peoples had an increased risk of suicide involving AAU;⁹ the findings of this study suggest that these ethnic inequities may be due to increased risk in females only.

Population-level data on hazardous drinking in New Zealand also confirm a sex and ethnicity disparity. While males have an increased prevalence of hazardous drinking compared to females overall, the prevalence for non-Māori men is comparable to that of Māori women.¹⁸ An established body of literature highlights the harms associated with coping motivations for alcohol consumption, including increased hazardous drinking.^{19–21} Being of Māori ethnicity is not a risk factor per se. Rather it reflects cumulative risk (both historic and current), including racism, socio-economic disadvantage, trauma, discrimination and cultural disconnection, which may impact Māori women.^{22–24}

Table 5: Results of regression modelling showing the risk (likelihood) of BAC+ suicides having an alcohol code assigned as a contributory or underlying cause of death.

Characteristic		RR	95% CI	P-value	ARR	95% CI	P-value
Sex	Male	REF					
	Female	1.30	1.11–1.53	0.002	1.11	0.94–1.32	0.218
Ethnicity	European	REF					
	Māori	0.81	0.67–0.98	0.034	0.93	0.76–1.13	0.459
	Pacific peoples	0.61	0.39–0.95	0.030	0.73	0.47–1.15	0.173
	Other	0.57	0.32–1.03	0.061	0.70	0.39–1.25	0.233
Age group	25–34	REF					
	15–19	0.85	0.60–1.20	0.347	1.03	0.73–1.47	0.852
	20–24	0.88	0.67–1.17	0.384	0.96	0.73–1.25	0.752
	35–44	1.12	0.89–1.42	0.343	1.16	0.92–1.47	0.216
	45–54	1.10	0.86–1.39	0.458	1.09	0.86–1.39	0.461
	55–64	1.04	0.77–1.40	0.816	1.07	0.78–1.46	0.692
	65–74	1.14	0.70–1.84	0.597	1.10	0.60–2.02	0.762
	75+	1.12	0.61–2.06	0.722	1.35	0.55–3.29	0.516
Employment	Employed	REF					
	Unemployed	1.14	0.95–1.37	0.152	1.08	0.91–1.30	0.371
	Student	0.83	0.56–1.23	0.351	1.03	0.69–1.52	0.888
	Retired/pensioner	1.29	0.93–1.81	0.129	1.46	0.87–2.47	0.154
	Other	1.58	1.16–2.14	0.003	1.30	0.94–1.79	0.113
	Unknown	0.91	0.60–1.38	0.651	0.94	0.63–1.40	0.768
Marital status	Never married	REF					
	Widowed	0.96	0.59–1.57	0.876	0.58	0.32–1.03	0.064
	Divorced/separated	0.91	0.71–1.15	0.422	0.81	0.64–1.04	0.096
	Married/de facto	0.85	0.71–1.02	0.089	0.81	0.67–0.98	0.031
	Unknown	1.09	0.79–1.50	0.618	0.98	0.72–1.34	0.917
Method of death	Poisoning	REF					
	Hanging	0.72	0.60–0.86	<0.000	0.75	0.62–0.92	0.005
	Drowning	1.23	0.75–2.03	0.414	0.98	0.61–1.58	0.938

Table 5 (continued): Results of regression modelling showing the risk (likelihood) of BAC+ suicides having an alcohol code assigned as a contributory or underlying cause of death.

Method of death (continued)	Firearm	0.56	0.38–0.84	0.005	0.55	0.38–0.80	0.002
	Sharp object	0.89	0.44–1.80	0.740	0.93	0.51–1.69	0.802
	Falls	1.09	0.66–1.80	0.726	0.82	0.48–1.38	0.454
	Other	1.07	0.70–1.64	0.752	1.05	0.68–1.62	0.816
BAC category	51–100	REF					
	101–150	1.24	0.92–1.68	0.154	1.32	0.98–1.77	0.070
	151–200	1.84	1.39–2.44	<0.000	1.90	1.44–2.50	<0.000
	201–250	3.21	2.46–4.19	<0.000	3.32	2.55–4.34	<0.000
	>250	3.23	2.43–4.33	<0.000	2.99	2.22–4.01	<0.000

Adjusted results adjusted for sex, ethnicity, age group, employment, marital status, cause of death and BAC category. Values are rounded to 2.d.p (except for p-value, which is rounded to 3.d.p).

Adjusted risk ratio = ARR; confidence interval = CI; risk ratio = RR; reference category = REF.

We hypothesise that females of Māori and Pacific ethnicity may be disproportionately impacted by these risk factors. In turn, this may then influence alcohol motivations, alcohol consumption and suicidal behaviour. This hypothesis suggests the need for research to elucidate this association in greater detail, and for studies to evaluate whether population-level universal alcohol interventions are effective for all population groups.

For males, employment status was a significant variable in the association between AAU and suicide. Males in employment had a higher risk of suicide involving AAU when compared to males in all other employment categories, including unemployment, being retired and being a student. While employment has historically been conceptualised as a protective factor against suicide, there is increasing recognition that the association may be more complex.²⁵ There are numerous ways in which employment can contribute to increased risks of suicide via a number of different potential mechanisms, including exposure to adverse psychosocial conditions at work²⁶ and access to potential suicide means (e.g., firearms, certain medicines).^{27,28} Many of these factors have been more strongly associated with suicide deaths in employed males as compared with females,²⁶ although not consistently so. While this association would benefit from future research to identify potential causal pathways, it nevertheless highlights the value of workplace suicide prevention

programmes for males,²⁹ which should include elements specifically targeted towards the harmful use of alcohol.

Consistent with Australian findings, we found that increased BAC was associated with an increased likelihood of alcohol being coded as contributory to death.¹⁶ We note, however, that there was still a significant proportion of cases with a very high BAC identified in toxicology that did not have alcohol coded as being contributory. While we acknowledge the complexity that mortality coders must address when assigning codes, this finding does have important implications. Our study demonstrates that ICD-10 code results cannot be used to accurately report the contribution of alcohol to suicide in New Zealand. Accurate ascertainment of alcohol involvement in suicide deaths in New Zealand at the present time therefore must rely on case-by-case extraction of toxicology data, which is not feasible for routine reporting nor for ongoing evaluation of the impact of alcohol policy on suicide rates. Coronial data is an important source of knowledge to inform health policy; therefore, both suicide prevention and alcohol-related policy in New Zealand would benefit from a consistent protocol for reporting and coding the presence of AAU within suicides. Even after controlling for BAC, we found that cases where the method of death was hanging or firearms were less likely to have alcohol coded as contributory when AAU was

identified. This exclusion may occur because the cause of death is considered to be more obvious in these cases, or because it is more difficult to assess what, if any, role AAU may have played. However, given that AAU is associated with more lethal means of suicide,^{7,30,31} including both hanging and firearms, it is important that the presence of AAU is recorded in these cases.

The limitations of this study reflect those of the source dataset, particularly that not all relevant variables are consistently available within the NCIS data, e.g., socio-economic status, co-morbid mental disorders, or acute stressors prior to death.⁹ It is also important to note that almost a quarter of cases had to be excluded from the source dataset as the presence or absence of AAU could not be ascertained, and these data, had they been available, could have potentially impacted the findings. Additionally, there are relatively small numbers in some population sub-groups (e.g., females of Pacific ethnicity), resulting in wide confidence intervals, which should be interpreted cautiously for these populations. The findings for these population sub-groups warrant additional research to be able to reach stronger conclusions. However, a strength of this study is that it utilises

a novel dataset for New Zealand, based on extracted toxicological data, which enables a more accurate understanding of the association between AAU and suicide.

Alcohol use is a modifiable risk factor for suicide and interventions targeted at alcohol should be a cornerstone of New Zealand's suicide prevention strategy.^{5,15} While international population-level alcohol interventions have shown efficacy in reducing suicide, the effectiveness of these may be moderated by age, sex and ethnicity.¹⁵ Our study highlights the need for both interventions at a population-level that address determinants of alcohol use, and to also consider public health interventions that are designed by and for specific demographic groups (in particular for Māori and Pacific females), informed by Kaupapa Māori and Indigenous theory. It is also important for research to identify causal pathways and social/structural determinants for alcohol use and suicide that may differ between females and males, and this should include Kaupapa Māori-led research. To support research, monitoring and evaluation, it is vitally important that data systems and coding accurately reflect the association between AAU and suicide in New Zealand.

COMPETING INTERESTS

Nil.

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