



# Drinking frequency and quantity and risk of suicide among men

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## ORIGINAL PAPER

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**Drinking frequency and quantity and risk of suicide among men**

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**Abstract** *Background* Individuals who die from suicide commonly have consumed alcohol immediately beforehand, often in large quantities. However, prospective cohort data on regular alcohol use as a risk factor for suicide are lacking. *Method* As part of the Health Professionals Follow-up Study, 47,654 men free of cancer prospectively reported their drinking habits, including average use, drinking frequency, and typical maximal use on repeated occasions beginning in 1986. Participants were followed for death to 2002. *Results* A total of 136 men died from suicide during follow-up. Quantity of alcohol consumed per drinking day tended to be associated with a greater risk of suicide mortality, with an adjusted hazard ratio among men consuming 30.0 or more grams (more

than two drinks) per drinking day of 2.42 (95% confidence interval, 0.75–7.80; *P*-trend 0.05). Average alcohol consumption, drinking frequency, and binge drinking were not independently associated with risk. The apparent relationship of quantity consumed per drinking day with risk was not substantially changed by adjustment for serious illness or other dietary factors and was most notable for suicide associated with firearm use. *Conclusions* Among men, risk of death from suicide tends to be associated primarily with quantity of alcohol consumed per drinking day, not with drinking frequency or overall alcohol consumption. This finding supports guidelines that limit consumption among men who choose to drink alcohol to two drinks or less per drinking day.

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## Introduction

Alcohol intake has been implicated as an acute risk factor for suicide or suicide attempts in a host of studies. For example, one case-crossover study found that the risk of suicide attempt requiring emergency evaluation was elevated almost ten-fold within six hours of alcohol consumption [1]. Likewise, May and colleagues reported that alcohol was present in 69% of suicide deaths among American Indians and 44% of all suicide deaths in New Mexico [2]. Using nationally representative data, Castle and colleagues found that 30% of white individuals who died from suicide had a history of problem drinking identified by next of kin [3]. Time-series and geographic analyses also support the link between alcohol use and risk of suicide [4, 5].

Although the risk of suicide is unequivocally high among individuals with alcoholism [6, 7], few prospective cohort studies of alcohol use and risk of suicide among non-alcoholic populations exist. Klatzky and Armstrong found that consumers of six or

more drinks per day had a six-fold higher risk of suicide than other members of a Northern California health plan, with no higher risk among lighter drinkers [8]. A nested case-control study in a Southern California retirement community also found a higher suicide risk associated with average intake of more than three drinks per day, but a lower risk among consumers of less than two drinks per day [9]. Neither of these studies had detailed information on drinking frequency and quantity, despite their importance for understanding the link between alcohol use and mortality [10].

To determine the associations of drinking frequency and quantity and heavy episodic drinking with risk of suicide death, we studied over 45,000 participants of the Health Professionals Follow-up Study (HPFS). The HPFS is a prospective cohort study of male health professionals in the United States, for whom 16-year follow-up on mortality, including death related to suicide, is available. We explored several measures of alcohol consumption, including overall average consumption, frequency of intake, quantity of alcohol consumed on drinking days, and episodic or binge drinking.

## Methods

The HPFS is a prospective investigation of 51,529 US male dentists, pharmacists, veterinarians, optometrists, osteopathic physicians, and podiatrists aged 40–75 years who returned a mailed questionnaire regarding diet and medical history in 1986. Follow-up questionnaires were sent biennially to update information on exposures and newly diagnosed illnesses. For this analysis, we excluded men with cancer (other than non-melanoma skin cancer) at baseline ( $n = 1,995$ ), men whose initial questionnaires were missing information on alcohol use or had incomplete or inadequate dietary information ( $n = 1,880$ ), leaving 47,654 men for analysis.

### ■ Assessment of alcohol consumption

Participants reported information on alcohol intake in several ways. We assessed overall average quantity of alcohol consumption with an 131-item semi quantitative food frequency questionnaire. The questionnaire included separate items about beer, white wine, red wine, and liquor. We specified standard portions as a glass, bottle, or can of beer, a 4-ounce glass of wine, and a measure or shot of liquor. Participants were asked how often, on average over the past year, they consumed the specified amount of each beverage. We calculated ethanol intake by multiplying the frequency of consumption of each beverage by the alcohol content of the specified portion size (12.8 g for beer, 11.0 g for wine, and 14.0 g for liquor) and summing across beverages [11]. This process was repeated every four years, with an added item about light beer in 1994. In 1986, 1988, and 1998, men also reported the number of days per week that they typically drank any form of alcohol. The validity of both of these measures has been established by comparison with seven-day dietary records [12, 13]. We calculated usual quantity of alcohol use per drinking day by dividing overall intake by drinking frequency, as previously described [14].

To assess heavy episodic or binge drinking, participants answered the following question in 1988: “In a typical month, what is the largest number of drinks of beer, wine, and/or liquor that you may have in one day?” The six response categories included none,

1–2, 3–5, 6–9, 10–14, and 15+. Participants have also self-reported whether they have had a physician diagnosis of alcohol dependence on biennial questionnaires since 1996.

### ■ Other covariates

We assessed dietary factors using the 131-item food frequency questionnaire, which has been validated with dietary records [12]. In 1988, participants responded to a series of questions regarding social support, including the number of close friends and close relatives they had, the number of friends and relatives they saw at least monthly, how often they attended religious gatherings, and how many hours per week they spent in community or social groups [15]. Height and weight were self-reported and have been validated in this cohort [16]. Leisure-time physical activity was assessed with a series of questions regarding individual activities and has also been validated [17]. Participants reported use of antidepressant and minor tranquilizer (i.e., benzodiazepine) medication every two years, beginning with the 1990 questionnaire; doses were not reported.

### ■ Assessment of suicide death

We confirmed deaths when reported by families, postal officials, or the National Death Index, with a combined follow-up rate in a companion study exceeding 98 percent [18]. Physicians reviewed death certificates and hospital or pathology reports to classify individual causes of death and were unaware of participants' reported alcohol intake. Deaths caused by self-inflicted or external injury were classified according to the underlying causes listed on the death certificate. For this study, we included deaths classified with International Classification of Diseases, 8th Revision (ICD-8) codes E950-E959. We also separately examined suicide death associated with firearm use (E955) and other causes.

### ■ Statistical analysis

We calculated person-years for each participant from the date of return of the 1986 questionnaire to the date of death, or February 2002. Binge drinking and social support were queried only in 1988, and we therefore began follow-up for analyses that included those variables at the return of the 1988 questionnaire. Likewise, follow-up for analyses that incorporated antidepressant use began at the return of the 1990 questionnaire.

We calculated incidence rates by dividing the number of suicides in each category by person-years of follow-up in that category. In multivariate analyses, we simultaneously controlled for age, smoking (never, former, 1–14, 15–24, and 25+ cigarettes/day), body-mass index (in quintiles), geographical region (in four categories), physical activity (in five categories), and marital status (in four categories). We additionally adjusted for dietary factors (in quintiles), profession (in six categories), living situation (in four categories), measures of social support (in five categories each), or incident major illnesses in sensitivity analyses.

Nutrient intakes were updated every four years; other covariates (other than region and profession) were updated every two years. We conducted tests of linear trend across increasing categories of alcohol consumption by treating the midpoints of consumption in categories as a continuous variable. For multivariate analysis, we used Cox regression with time-dependent covariates [19]; there were no violations of the proportional hazards assumption for alcohol consumption.

As in previous work [20], we categorized average alcohol intake as 0, 0.1–9.9, 10.0–29.9, and  $\geq 30.0$  g/day, corresponding to average intake of no alcohol, less than 1 drink per day, 1–2 drinks per day, and more than 2 drinks per day. We assigned four categories of drinking frequency (<1, 1–2, 3–4, and 5–7 drinking days per week), and four categories of quantity per drinking day (0, 0.1–14.9, 15.0–29.9, and  $\geq 30.0$  g per drinking day, corresponding to 0, 1, 2, and >2 drinks per drinking day). To ensure homogeneity of risk among

**Table 1** Characteristics of 47,654 male health professionals according to average alcohol consumption in 1986

Characteristic <sup>a</sup>	Alcohol consumption (g/day)			
	0	0.1–9.9	10.0–29.9	≥30.0
Participants ( <i>n</i> )	11,226	18,458	12,312	5,658
Mean age (years)	54.8	53.7	54.5	55.9
Mean alcohol intake (g/day)	0	4.3	16.3	46.0
Mean number of days per week alcohol is consumed	0	1.4	4.5	6.3
Mean alcohol intake per drinking day (g/day)	0	14.3	30.4	53.3
Ethanol consumed in:				
Beer (g/day)	0	1.3	5.0	16.1
Red wine (g/day)	0	0.5	1.9	3.2
White wine (g/day)	0	1.0	3.2	4.5
Liquor (g/day)	0	1.3	6.0	22.6
Mean body mass index (kg/m <sup>2</sup> )	25.7	25.5	25.4	25.5
Current cigarette smoker (%)	7	8	10	20
Past cigarette smoker (%)	31	40	50	52
Married (%)	92	92	90	88
Live with wife (%)	90	90	88	86
Mean daily intakes:				
Total energy (kcal/day)	1,924	1,931	2,017	2,221
Coffee (cups/day)	1.5	1.9	2.2	2.6
Folate (mcg/day)	486	489	482	442
Dietary fiber (g/day)	22	22	21	17
Omega-3 fats (mg/day)	274	329	325	278

<sup>a</sup> All variables (except for age) were standardized to the age distribution of the study population. Dietary variables (except for total energy and coffee) adjusted for energy intake

men in the highest, open-ended alcohol intake categories, we explored suicide risk within each category when dichotomized. We also explored intake per drinking day as a continuous variable after winsorization [21]. We categorized maximum alcohol intake (for analysis of binge drinking) as 1–2, 3–5, and 6 or more drinks in one day within a typical month.

Our analyses used updated measures of alcohol consumption, in which we prospectively assessed the relative risk of suicide death in four-year increments, based upon alcohol consumption derived from the preceding questionnaire. Thus, we used the 1986 questionnaire to determine the risk of suicide death during the 1986–1990 period, the 1990 questionnaire for 1990–1994, etc.

## Results

### ■ Patient characteristics

Table 1 shows the characteristics of HPFS participants according to their average baseline alcohol consumption. As previously reported [20], alcohol consumption was associated with a greater prevalence of current and former smoking, with greater intake of total calories and coffee, and with lower intake of fiber. Most men were married and lived with their wives. Drinking frequency and quantity consumed per drinking day were positively correlated (Pearson  $r = 0.54$ ;  $P < 0.001$ ).

### ■ Usual drinking frequency and quantity and risk of suicide mortality

A total of 136 men died from suicide during follow-up, an incidence rate of 20/100,000 person-years. As seen in Table 2, there was little association between

overall quantity of alcohol consumed or drinking frequency and risk of suicide death.

Quantity of alcohol consumed per drinking day was positively but not significantly associated with risk, with approximately 22% higher risk among men who consumed 30 or more grams per drinking day (Table 2). With the highest drinking category dichotomized, the corresponding hazard ratios were 1.20 (95% confidence interval, 0.71–2.03) among consumers of 30–44.9 g per drinking day, and 1.24 (95% confidence interval, 0.72–2.15) among consumers of 45.0 or more grams per day.

When we adjusted simultaneously for drinking frequency and quantity consumed per drinking day, a weak trend toward lower risk with greater drinking frequency was seen (Table 2). In contrast, adjustment for drinking frequency magnified the higher risk among men who consumed 30 or more grams per drinking day. The mutually adjusted hazard ratios were 2.40 (95% confidence interval, 0.72–8.02) among consumers of 30–44.9 g per drinking day, and 2.45 (95% confidence interval, 0.73–8.26) among consumers of 45.0 or more grams per day. As expected from the positive correlation of drinking frequency and quantity consumed per drinking day, the confidence intervals in mutually adjusted analyses were wider than when each component was examined separately.

We performed several sensitivity analyses to determine whether our findings were robust. Results from larger models that included profession and living situation, which were not independently associated with risk, were similar to smaller models.

**Table 2** Adjusted hazard ratio for suicide mortality among 47,654 HPFS participants according to usual average alcohol intake

	Average alcohol consumption (g/day)				<i>P</i> -value <sup>a</sup>
	0	0.1–9.9	10.0–29.9	≥30.0	
Cases of suicide death	41	47	26	22	
Person-years of follow-up	173,604	267,411	179,876	74,867	
Adjusted hazard ratio	1.00	0.84	0.68	1.11	0.91
95% confidence interval		0.55–1.29	0.41–1.13	0.64–1.91	
	Drinking frequency (drinking days/week)				
	<1	1–2	3–4	5–7	
Cases of suicide death	47	33	19	37	
Person-years of follow-up	215,969	205,967	99,032	174,790	
Adjusted hazard ratio	1.00	0.79	0.92	0.90	0.84
95% confidence interval		0.50–1.24	0.53–1.60	0.58–1.42	
Further adjusted for quantity consumed per drinking day	1.00	0.45	0.52	0.48	0.87
		0.14–1.41	0.15–1.81	0.14–1.58	
	Alcohol consumption per drinking day (g/drinking day)				
	0	0.1–14.9	15.0–29.9	≥30.0	
Cases of suicide death	49	19	26	42	
Person-years of follow-up	238,620	110,371	177,910	168,857	
Adjusted hazard ratio	1.00	0.83	0.77	1.22	0.39
95% confidence interval		0.48–1.42	0.47–1.25	0.79–1.88	
Further adjusted for drinking frequency	1.00	1.65	1.51	2.42	0.05
		0.50–5.47	0.46–4.96	0.75–7.80	

*P*-values derive from tests of linear trend

Hazard ratios adjusted for age, smoking, body-mass index, geographical region, average daily exertion, and marital status

Additional adjustment for intake of omega-3 fatty acids or eicosapentaenoic acid, which may ameliorate depression [22], did not change our results, nor did adjustment for total caloric intake. Additional adjustment for caffeine intake, which has been associated with a lower risk of suicide among nurses [23], did not influence our results. Our results were also not substantially changed when we further adjusted for incident diagnoses of nonfatal coronary heart disease, cancer, and diabetes, or when we stopped updating alcohol intake after diagnosis of cancer; incident cancer itself was independently associated with two-fold higher risk (hazard ratio 2.12; 95% confidence interval, 1.08–4.16).

We performed additional analyses to determine the effect of additional adjustment for social support or antidepressant use. Among the men who responded to the questions regarding social support in 1988, the adjusted hazard ratio associated with intake of 30 or more grams of alcohol per drinking day was 2.60 (95% confidence interval, 0.79–8.59) both before and after further adjustment for number of close friends, number of close relatives, and frequency of religious attendance. In similar analyses beginning in 1990, the multivariable-adjusted hazard ratio associated with intake of 30 or more grams per day was 1.84 (95% confidence interval, 0.55–6.15). With additional adjustment for antidepressant use, the hazard ratio was 1.88 (95% confidence interval, 0.56–6.30; *P*-trend 0.04), although antidepressant use itself was very strongly associated with risk (hazard ratio 4.69; 95%

confidence interval, 2.59–8.47). Likewise, the risk associated with intake of 30 g or more per drinking day was similar before (hazard ratio 1.80; 95% confidence interval, 0.54–6.01) and after (hazard ratio 1.78; 95% confidence interval, 0.53–5.94) adjustment for benzodiazepine use, which was itself associated with higher risk (hazard ratio 3.00; 95% confidence interval, 1.50–6.02). Only 14% of cases of suicide occurred among men taking antidepressants, limiting our ability to examine interactions of medication use and alcohol, but the crude associations of alcohol intake with suicide appeared to be roughly similar among men who did or did not report antidepressant use.

To examine whether our results were disproportionately influenced by abstainers, we examined risk associated with intake per drinking day as a continuous variable, with and without exclusion of abstainers. The hazard ratio for suicide death per 12.5-g increment in intake per drinking day was 1.15 (95% confidence interval, 0.94–1.39) excluding abstainers and 1.18 (95% confidence interval, 0.99–1.41) when including them.

Of the 136 suicides, 78 were associated with firearm use. The hazard ratio for suicide death related to firearm use among consumers of 30 or more grams per drinking day was 1.54 (95% confidence interval, 0.88–2.68; *P*-trend 0.15) before adjustment for drinking frequency, and 3.89 (95% confidence interval, 0.67–22.60; *P*-trend 0.02) afterward. In contrast, among the 58 suicides that occurred

through other means, the corresponding hazard ratio was 1.50 even after adjustment for drinking frequency (95% confidence interval, 0.30–7.60; *P*-trend 0.71).

### ■ Binge drinking and risk of suicide mortality

There were 87 cases of suicide death during 476,202 person-years of follow-up among men who reported the maximum number of drinks they consumed in one day in a typical month as part of the 1988 questionnaire. Compared with non-drinkers, the risk of suicide mortality was 0.81 (95% confidence interval, 0.47–1.39) among men whose maximal intake was 1–2 drinks per day, 1.08 (95% confidence interval, 0.59–1.96) among men whose maximal intake was 3–5 drinks per day, and 1.20 (95% confidence interval, 0.47–3.03) among men whose maximal intake was six or more drinks per day (*P*-trend 0.69). However, even these estimates were attenuated by further adjustment for usual alcohol consumption; following adjustment, the corresponding relative risks were 0.78 (95% confidence interval, 0.40–1.52), 0.92 (95% confidence interval, 0.41–2.06), and 0.90 (95% confidence interval, 0.29–2.74; *P*-trend 0.84).

Only 815 men reported a physician diagnosis of alcohol dependence on the 1996 questionnaire or afterward. In an exploratory analysis, the hazard ratio for subsequent suicide mortality associated with this diagnosis was 2.31 (95% confidence interval, 0.52–10.30).

## Discussion

Alcohol has a well-established role in suicide mortality. Forensic analysis suggests that as many as half of individuals who die from suicide may have consumed alcohol beforehand, and alcohol may disproportionately play a role in individuals who otherwise do not have known psychiatric illnesses [24]. However, there has been relatively little attention paid to the relationship of regular drinking habits, rather than recent alcohol consumption, to risk of suicide death. In a cohort of 36,689 Finnish adults followed for over 14 years (in whom 169 suicide deaths occurred), consumption of over 120 g of alcohol per week was not significantly associated with risk of suicide death, but it did contribute to the joint effects of heavy use of cigarettes and coffee [25]. Among patients with alcohol dependence enrolled in Project MATCH, frequent light drinking was associated with suicidal ideation, at least among women [26], although other studies suggest no increased risk among light drinkers in the general population [8]. To our knowledge, ours is the first study to explore prospectively the risk associated with a range of drinking patterns.

Our results highlight the importance of assessing drinking patterns when evaluating the role of alcohol use on various causes of morbidity or mortality. Before taking drinking frequency and quantity into account, we found no association between average alcohol consumption and risk of suicide death, but this finding obscured an apparently direct relationship with quantity consumed per drinking day that was sharpest among men who consumed more than two drinks per day. In contrast, we have previously found inverse associations between alcohol consumption and risk of coronary heart disease and diabetes that appeared to be largely determined by drinking frequency [14, 27]. In concert, these results are at least consistent with current national guidelines that dictate limits on drinks per drinking day (to two for adult men and one for nonpregnant adult women) [28]. At the same time, current guidelines do not restrict drinking frequency, a policy that is consistent with our previous findings and the current study. Among non-dependent men, even frequently consumed alcohol does not appear to be associated with suicide if consumed in quantities unlikely to produce inebriation.

Relatively little is known about interventions to reduce suicide mortality related to alcohol use. In a systematic review, Dinh-Zarr and colleagues found few studies of alcohol-related interventions that described effects on suicide mortality [29], although these suggested that brief counseling might prevent injury-related death (relative risk 0.65; 95% confidence interval, 0.21–2.00). The National Public Health Institute of Finland has reported that, among alcohol-dependent individuals who had attempted suicide, only 14% received disulfiram and 9% received psychotherapy after the attempt, arguing that conventional treatment to such individuals could be strengthened considerably [30]. Randomized trials of fluoxetine suggest that it improves depression scores in patients with depression and alcohol use disorders [31], but whether such treatment prevents suicide, particularly in light of suicide concerns related to serotonin-specific reuptake inhibitors [32, 33], is uncertain.

The stronger relationship of quantity of alcohol consumed per drinking day and firearm-related suicide death is consistent with the hypothesis that impulsivity (which is directly affected by alcohol use [34, 35]) exacerbates the association between firearm ownership and risk of suicide. Of note, about two-thirds of suicide deaths among men aged 40 years and older in the United States involve firearm use; the corresponding proportion in this study was similar but slightly lower (57%) [36]. However, the stronger relationship may also reflect less under-reporting of suicide deaths related to firearms.

The HPFS is subject to limitation. As with any observational study, we cannot prove cause-and-effect relationships, and there may be unmeasured aspects

of lifestyle other than alcohol use that are responsible in part for our findings.

We did not have information regarding depression or other psychiatric disorders among these men, which are important risk factors for suicide mortality [3, 37]. We did have information on antidepressant and benzodiazepine use, which did not appear to confound the association of alcohol consumption with risk of suicide death. As a result of this lack of information, we cannot explore the potentially interesting interrelationships of alcohol intake, depressive symptoms, major psychiatric disorders, and risk of suicide in this cohort.

HPFS participants are not necessarily representative of the total U.S. population, although the rates of suicide death among dentists (the most common profession in this study) do not appear to differ greatly from the general population [38]. While participant homogeneity limits the generalizability of our results, it provides a sample of uniform sex, educational attainment, and occupational status. When coupled with the large number of factors assessed by questionnaire, the study design allows us to account for a larger series of variables than most other studies. For example, of the risk factors for suicide among men with a history of alcoholism identified by Murphy and colleagues [39], we included current drinking (by updating alcohol intake during follow-up), social support, serious medical illness, depression (as captured by antidepressant use), employment, and living situation. However, similar studies are needed in women, given the marked sex-related differences in rates of attempted suicide and suicide death [40].

Our definition of suicide death was based on death certificates, as in other cohort studies. Treating practitioners may have misclassified some cases of suicide death, particularly in cases where other causes of death may have been plausible (e.g., among men with known chronic disease) or more socially desirable, although, as noted, cases of suicide death related to firearm use may be less prone to underreporting, and death certificates appear to provide valid information on injury-related causes of death [41]. Without intensive and systematic local investigation into each death, some misclassification may be inevitable. Further cohort studies that examine suicide attempts, rather than completed suicides, may inform this issue further.

By following over 45,000 men for 16 years, we confirmed 136 cases of suicide, similar to other cohort studies of its size [25]. However, the precision of our risk estimates was necessarily limited by the relative rarity of suicide death, and our individual point estimates were not statistically significant even when linear trends were. This was particularly true for analyses that incorporated multiple measures of alcohol intake (e.g., binge drinking and usual intake), because these were correlated with each other. As a result, we cannot define a threshold at which risk may increase with confidence, especially given our inability

to account for inter-individual variability in ethanol pharmacokinetics and dynamics. Likewise, relatively few men reported consumption of 50 or more grams of alcohol daily, limiting our ability to define the detrimental effects of heavy drinking, and we could not stably assess interactions of alcohol intake with antidepressant use and other potentially important exposures.

Although we relied on self-reported alcohol consumption in this study, we have previously validated the measures of quantity and frequency of alcohol consumption in this population, and all assessments of alcohol intake were made prospectively. Nonetheless, we could not fully capture the many dimensions of drinking patterns. For example, we only had information on binge drinking at one time point and had no information on the relative amounts consumed on weekends and weekdays.

We grouped former drinkers and longer-term abstainers deliberately, as the bulk of current evidence suggests that alcohol acts acutely during suicide and hence current use (regardless of past use) should best predict risk. Although there may be higher risk of some chronic diseases among former drinkers [42], and long-term consumption could have important effects on mood and hence on suicide, our results were not substantially changed by restriction to active drinkers, suggesting that our choice of reference category did not bias our findings.

Based upon our findings and these limitations, several areas for future research appear warranted. First, large, prospective cohort studies that use innovative methods to capture multiple dimensions of drinking behavior repeatedly over time, such as the Alcohol Timeline Followback [43], are needed to determine how variability, pattern, and extent of drinking influence risk. Our measures of alcohol intake either had limited ability to assess this (e.g., the semi quantitative food frequency questionnaire, which explicitly integrates quantity and frequency and ignores variability) or were not assessed serially (e.g., maximal intake in the last month). Equally important are specific questions to capture other elements of drinking, such as lifetime alcohol consumption or proportion of alcohol consumed with meals [44, 45]. Second, these studies need to incorporate validated measures of psychiatric illness that are administered repeatedly over time. Third, innovative analytic methods [46] that recognize the complex interplay of alcohol use with psychiatric illness [47] should be employed wherever possible.

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## Conclusion

In conclusion, we found the highest risk of suicide mortality among men with the heaviest consumption per drinking day after adjusting for frequency of intake. Our results suggest that suicide should be added

to the list of detrimental public health consequences of alcohol use that exceeds recommended limits.

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