厚労科研木村班
「アルコール依存症の早期介入から回復支援に至る
切れ目ない支援体制整備のための研究」

飲酒量低減による
アルコール健康障害の改善効果や
医療コストに関するエビデンスの収集

岡山大学大学院医歯薬学総合研究科
公衆衛生学分野

教授　神田秀幸

背景

・飲酒は健康のリスク
・少量飲酒の心血管イベント抑制効果
・近年少量飲酒の効果　否定的な報告あり

目的

飲酒量と健康障害につながる近年のエビデンスを収集し、国民の飲酒の適正化に資する。

方法

2015年以降に報告された飲酒量と健康障害に関する疫学研究の代表的な文献

1.飲酒量と総死亡
2.飲酒量と心血管死亡
3.飲酒量とがん罹患

結果

1.飲酒量と総死亡

論文1：アルコール摂取量と死亡リスクについてのメタ分析

Do "Moderate" Drinkers Have Reduced Mortality Risk?
A Systematic Review and Meta-Analysis of Alcohol
Consumption and All-Cause Mortality

TIM STOCKWELL, PH.D.,[a,d] * JINHUI ZHAO, PH.D.,[a] SAPNA PANWAR, M.S.,[b] AUDRA ROEMER, M.SC.,[a]
TIMOTHY NAIMI, M.D.,[c] & TANYA CHIKRITZHS, PH.D.[b,d]

TABLE 2. Weighted mean relative risk (RR) estimates of all-cause mortality adjusted for between-study variation for different categories of drinkers compared with abstainers (N = 87 studies and 523 risk estimates) with tests of publication bias and heterogeneity, but not adjusted for study characteristics

Drinking categories	n of studies	n of risk estimates	Adjusted M RR [95% CI] vs. abstainers 飲酒者対禁酒者		Heterogeneity I² % [95% CI]	Adjusted M RR [95% CI] vs. occasional drinkers 飲酒者対機会飲酒者	
			RR [95% CI]	t test p		RR [95% CI]	t test p
Abstainer			1.00			1.19 [1.12, 1.27]	<.0001
Former drinker	21	42	1.22 [1.14, 1.31]	<.0001	65.34 [52.01, 74.97]	1.45 [1.33, 1.59]	<.0001
Occasional (<1.30 g/day)	15	32	0.84 [0.79, 0.89]	<.0001	60.50 [41.91, 73.15]	1.00	
Low volume (1.30–<25 g /day)	81	229	0.86 [0.83, 0.90]	<.0001	64.96 [59.71, 69.52]	1.02 [0.95, 1.10]	.5222
Medium volume (25–<45 g/day)	63	105	0.95 [0.91, 1.00]	.0313	79.50 [75.51, 82.84]	1.13 [1.05, 1.22]	<.0010
High volume (45–<65 g/day)	44	61	1.12 [1.07, 1.17]	<.0001	82.02 [77.48, 85.65]	1.33 [1.24, 1.44]	<.0001
Higher volume (≥65 g/day)	33	54	1.29 [1.22, 1.36]	<.0001	83.33 [78.92, 86.81]	1.52 [1.40, 1.66]	<.0001
All drinkers combined	87	523	1.00 [0.85, 1.17]	.9613	84.36 [83.17, 85.47]	1.24 [1.08, 1.42]	.0133

Notes: Significant RRs in **bold**. CI = confidence interval.

時々飲酒者：週1日までの飲酒者で1日平均飲酒量が1.3g未満
低アルコール摂取量：1日平均飲酒量が1.3g～24.9g
中等度飲酒量：25-44.9g
多量飲酒量：45～64.9g
超多量飲酒量：65g以上

TABLE 3. All-cause mortality relative risk (RR) estimates for different categories of drinker compared with abstainers, weighted and adjusted for between-study variation and study-level covariates, with adjustment for abstainer biases and study quality-related characteristics ($N = 523$ estimates from 87 studies)

Drinking categories	Studies	Estimates	RR	[95% CI]	t test p
Adjustment for six selected covariates[a] 6項目調整：飲酒開始年齢、性、白人/非白人、飲酒の調べ方、非飲酒者バイアス、機会飲酒者バイアス					
Former drinker	20	42	**1.26**	[1.17, 1.35]	<.0001
Occasional (<1.30 g/day)	15	32	**0.86**	[0.80, 0.92]	<.0001
Low volume (1.30–<25 g /day)	81	229	**0.89**	[0.84, 0.94]	<.0001
Medium volume (25–<45 g/day)	63	105	0.98	[0.92, 1.04]	.4696
High volume (45–<65 g/day)	44	61	**1.13**	[1.06, 1.20]	<.0001
Higher volume (≥65 g/day)	33	54	**1.32**	[1.23, 1.41]	<.0001
All drinkers combined	87	523	1.04	[0.88, 1.22]	.5625
Further adjusted for all identified covariates[b] 上記項目+調査期間、有病者の包含/除外基準、人種や喫煙の区分					
Former drinker	20	42	**1.38**	[1.24, 1.54]	<.0001
Occasional (<1.30 g/day)	15	32	0.95	[0.85, 1.05]	.2815
Low volume (1.30–<25 g /day)	81	229	0.97	[0.88, 1.07]	.5895
Medium volume (25–<45 g/day)	63	105	1.07	[0.97, 1.18]	.1738
High volume (45–<65 g/day)	44	61	**1.24**	[1.12, 1.37]	<.0001
Higher volume (≥65 g/day)	33	54	**1.44**	[1.30, 1.60]	<.0001
All drinkers combined	87	523	1.15	[0.97, 1.36]	.0852

抑制

抑制消

Notes: **Bold** indicates statistical significance. CI = confidence interval. [a]Further adjusted for median age at intake, sex, Caucasian/non-Caucasian, drinking measure adequacy, former drinker bias, and occasional drinker bias; [b]further adjusted for study follow-up years, inclusion/exclusion of ill subjects, and study levels controls for race and smoking.

Adequacy; 飲酒量を正確に推定できる調べ方をしているか
Former drinkers bias; 非飲酒者に過去飲酒者が混じっている
Occasional drinkers bias; 非飲酒者に時々飲酒者が混じっている

J Stud Alchol Drugs, 77;185-98, 2016.
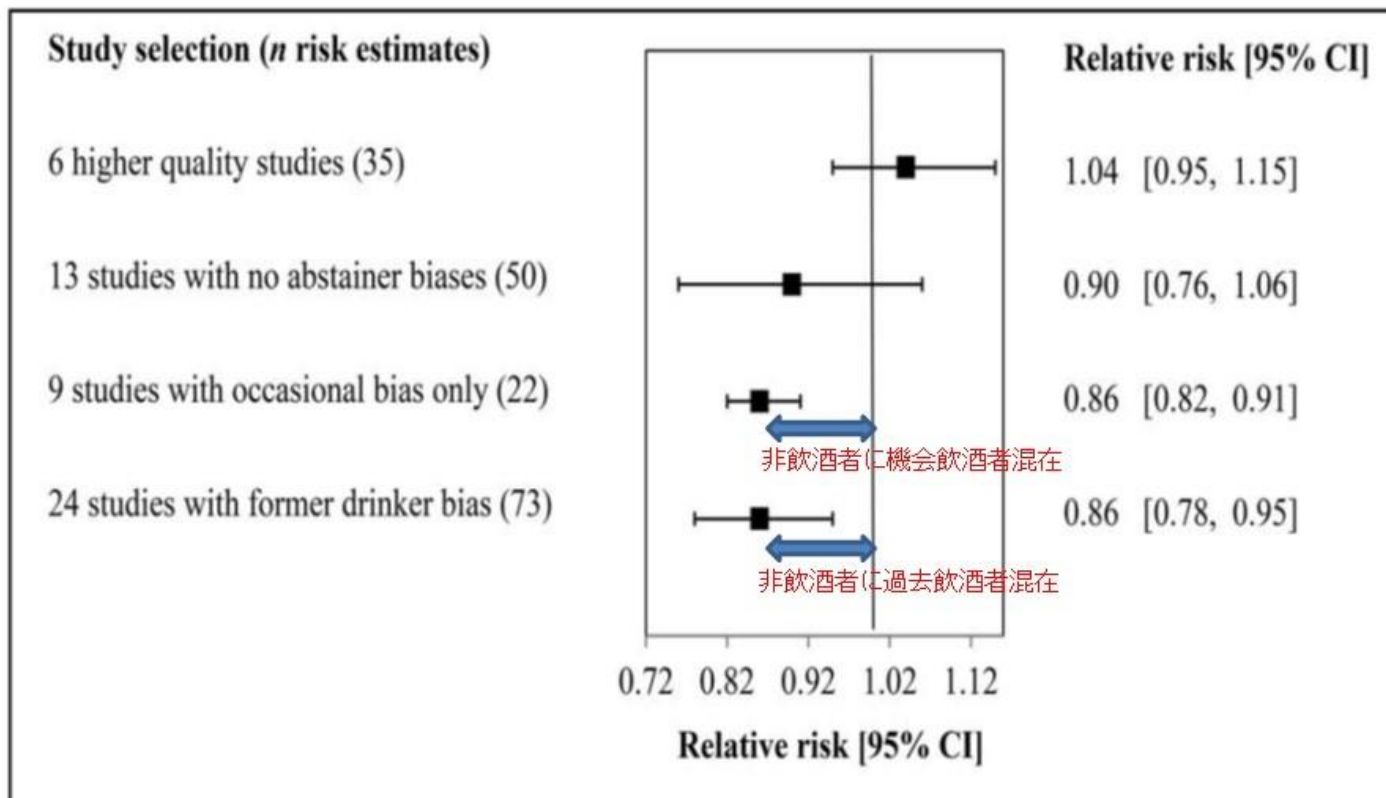
☆飲酒の期間、持病、人種、喫煙の程度で、少量飲酒による死亡抑制効果は否定的

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FIGURE 4. All-cause mortality relative risk for low-volume drinkers versus lifetime abstainers after controlling for design characteristics by study selection in adjusted models. CI = confidence interval.

J Stud Alchol Drugs, 77;185-98, 2016.

☆バイアスを除去した質の高い研究の結果は、低量のアルコール摂取に死亡率を下げることを支持しない

論文2：アルコール摂取量と死亡リスクやDALYsについてのメタ分析

Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016

The Lancet, 392;1015-35, 2018.
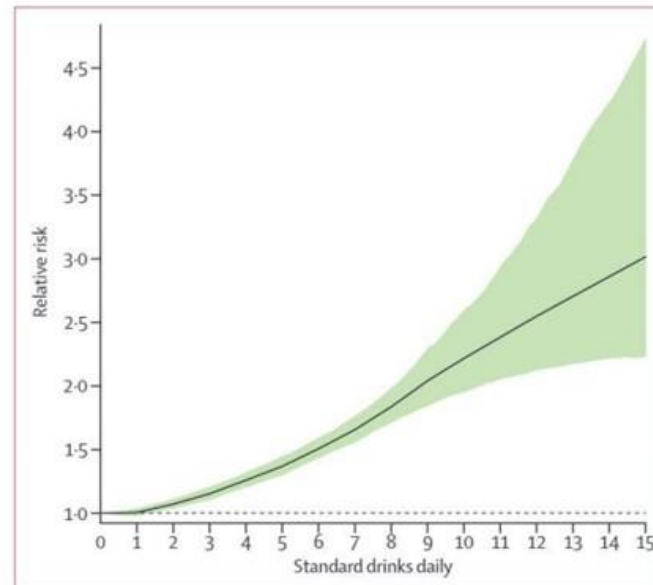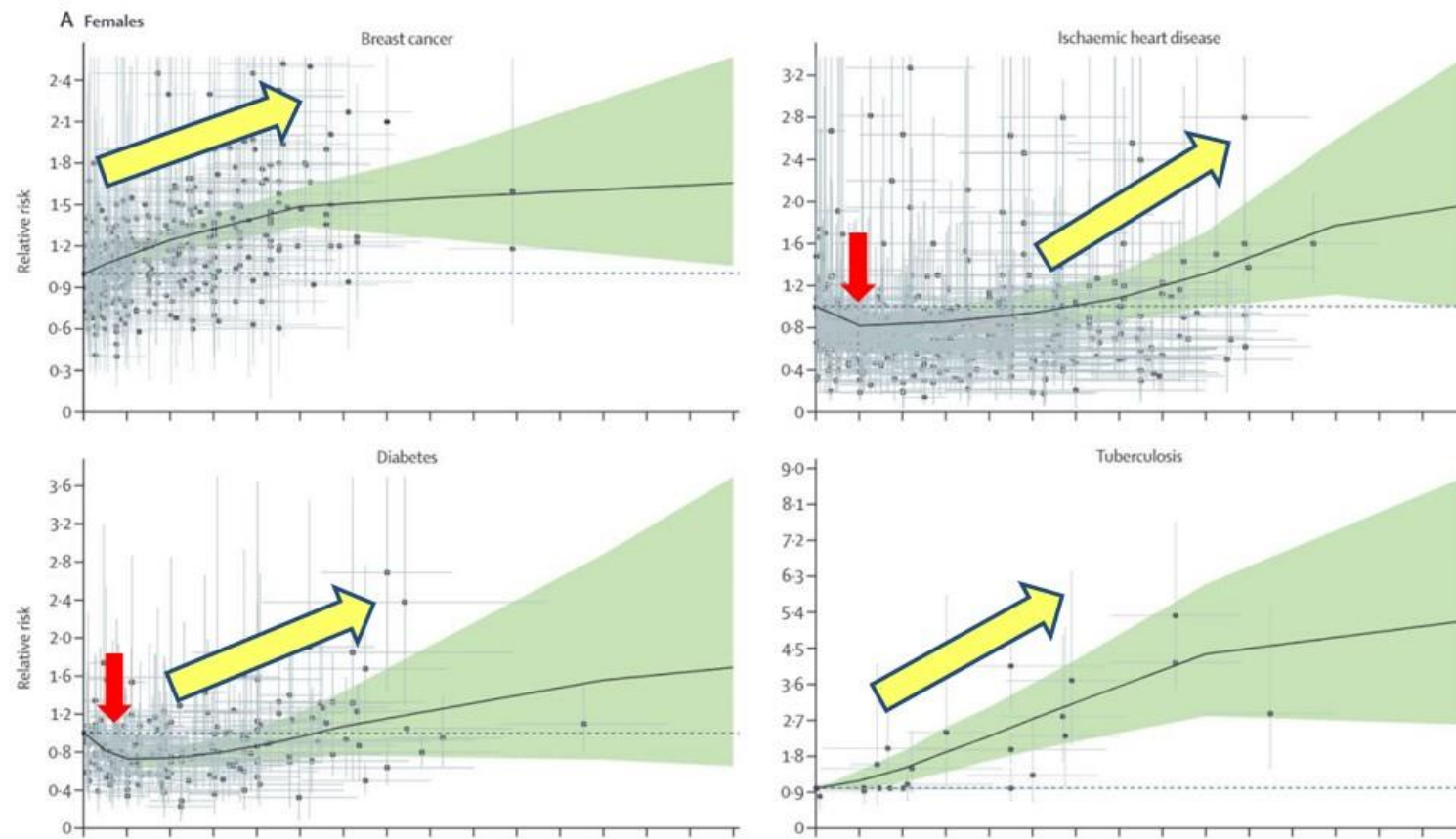
GBD 2016 Alcohol Collaborators*

Figure 5: Weighted relative risk of alcohol for all attributable causes, by standard drinks consumed per day
Age-standardised weights determined by the DALY rate in 2016, for both sexes. The dotted line is a reference line for a relative risk of 1. DALY=disability-adjusted life-year.
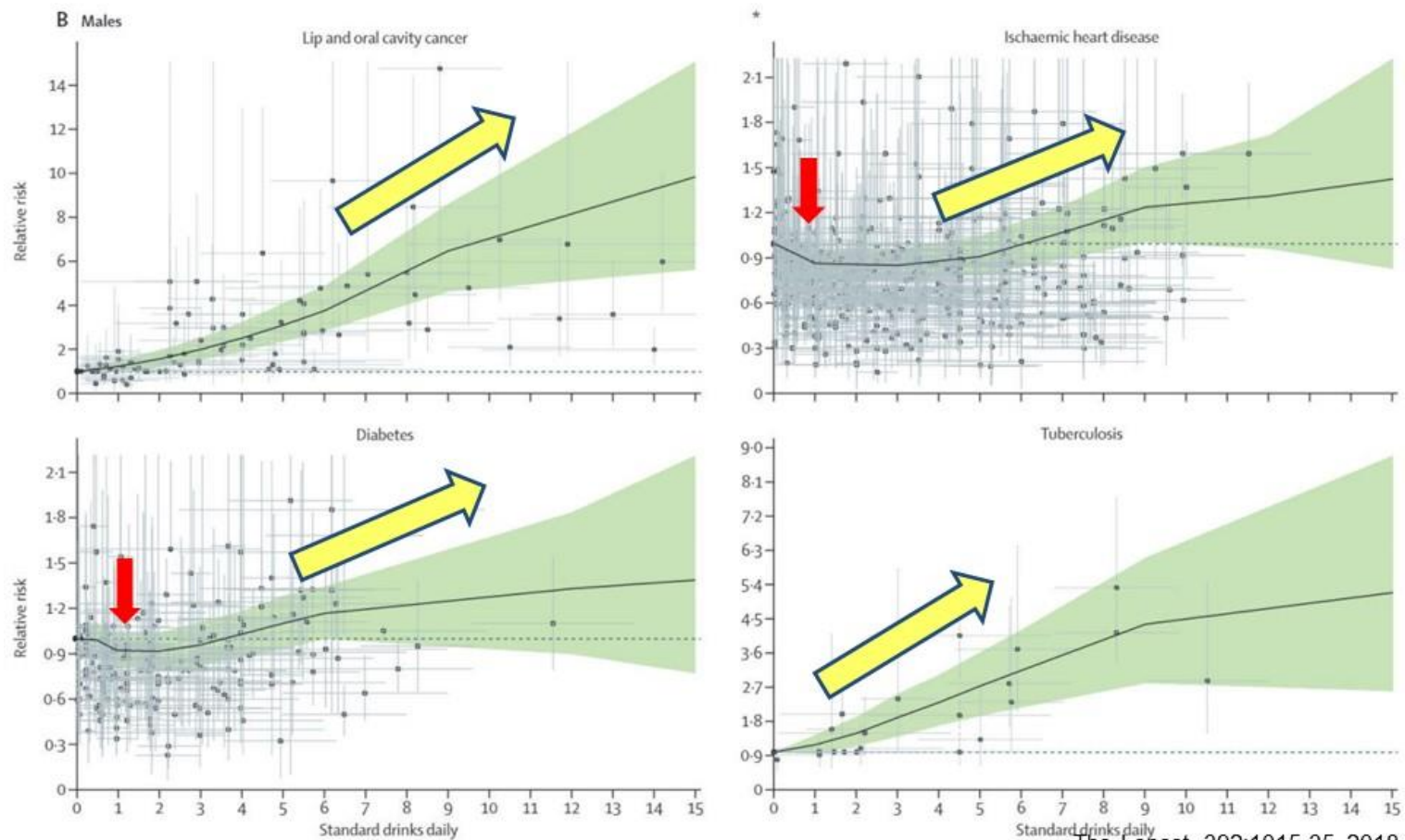
毎日のアルコール摂取量が多いことは 総死亡の相対リスク上昇させる

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女性　飲酒ドリンク数と各疾患の死亡相対リスク

男性　飲酒ドリンク数と各疾患の死亡相対リスク

少量の飲酒は、虚血性心疾患や糖尿病のリスクを下げるものの、
総死亡やがん、結核のリスクを有意に上昇させる

結果

2.飲酒量と循環器疾患死亡

論文3：アルコール摂取量と心血管死亡のメタ分析

Risk thresholds for alcohol consumption: combined analysis of individual-participant data for 599 912 current drinkers in 83 prospective studies
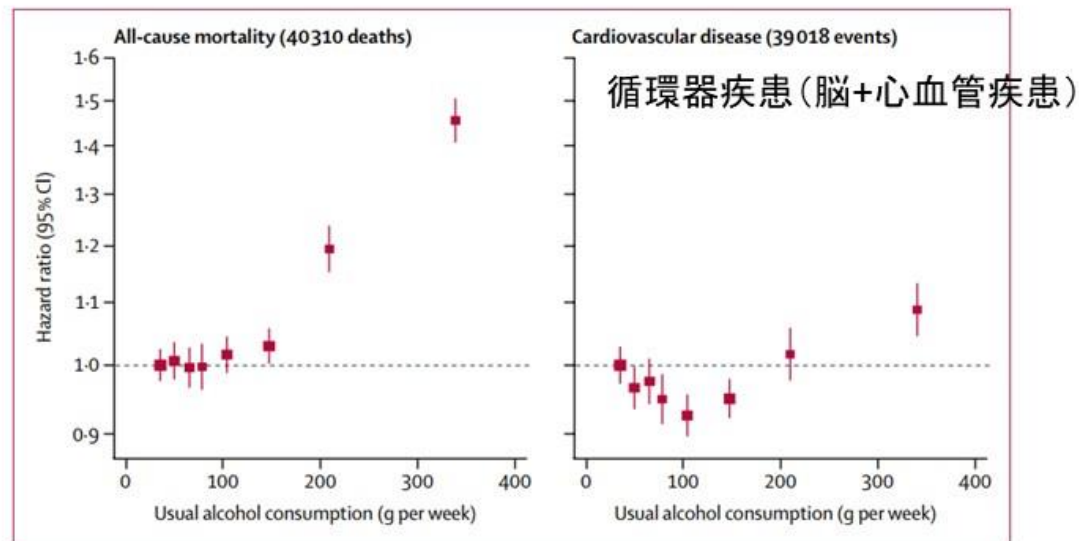
Lancet, 391;1513-23,2018.

Figure 1: Associations of usual alcohol consumption with all-cause mortality and the aggregate of cardiovascular disease in current drinkers

Cardiovascular disease was defined as an aggregate of myocardial infarction, coronary heart disease, and stroke. Hazard ratios are adjusted for age, smoking, and history of diabetes, and stratified by sex and EPIC centre. The reference category is the lowest baseline alcohol consumption category (between 0 and 25 g/week). HRs are plotted against the mean usual alcohol consumption in each category. Sizes of the boxes are proportional to the inverse of the variance of the log-transformed hazard ratios. Vertical lines represent 95% CIs.
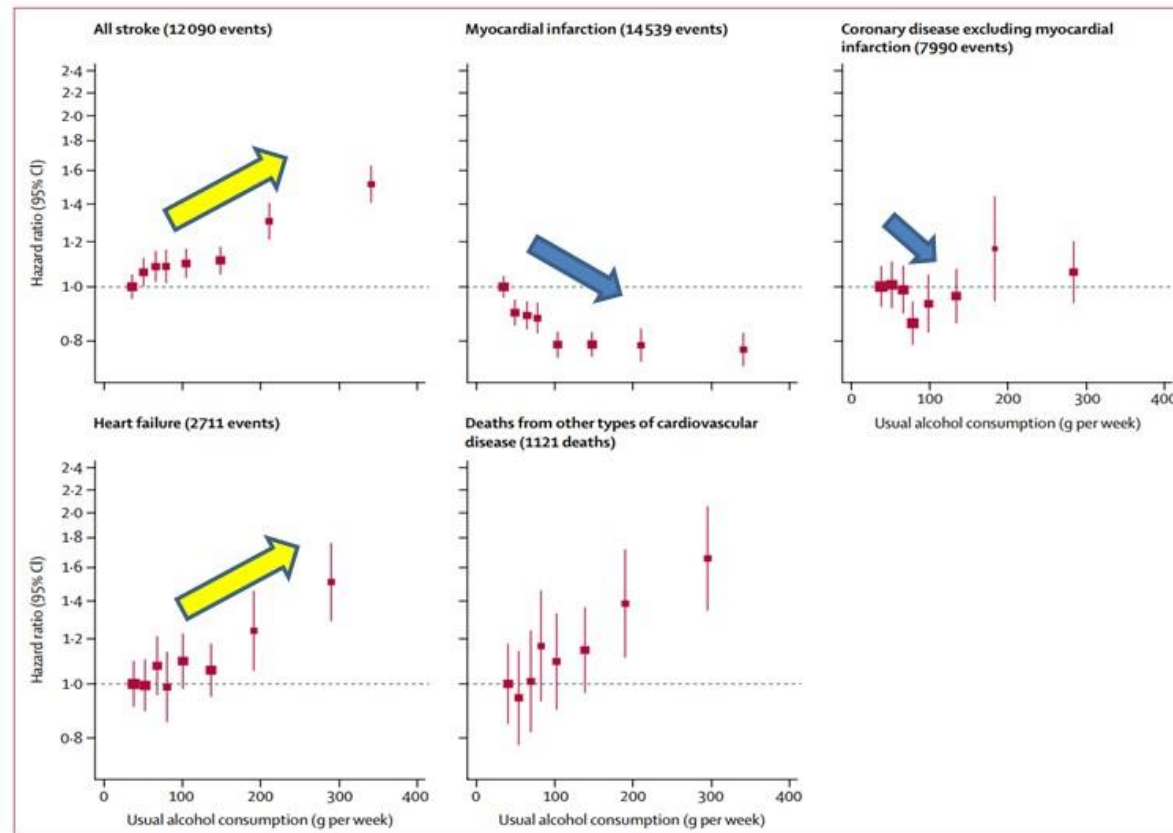
Figure 2: Associations of usual alcohol consumption with cardiovascular subtypes in alcohol drinkers

Hazard ratios are adjusted for age, smoking, and history of diabetes, and stratified by sex and EPIC centre. The reference category is the lowest baseline alcohol consumption category (between 0 and 25g/week). Hazard ratios are plotted against the mean usual alcohol consumption in each category. Studies with fewer than five events of any outcome were excluded from the analysis of that outcome. Sizes of the boxes are proportional to the inverse of the variance of the log-transformed hazard ratios. Vertical lines represent 95% CIs. Deaths from other cardiovascular disease include the following outcomes: cardiac dysrhythmia, hypertensive disease, sudden death, and aortic aneurysm.

Lancet, 391;1513-23,2018.
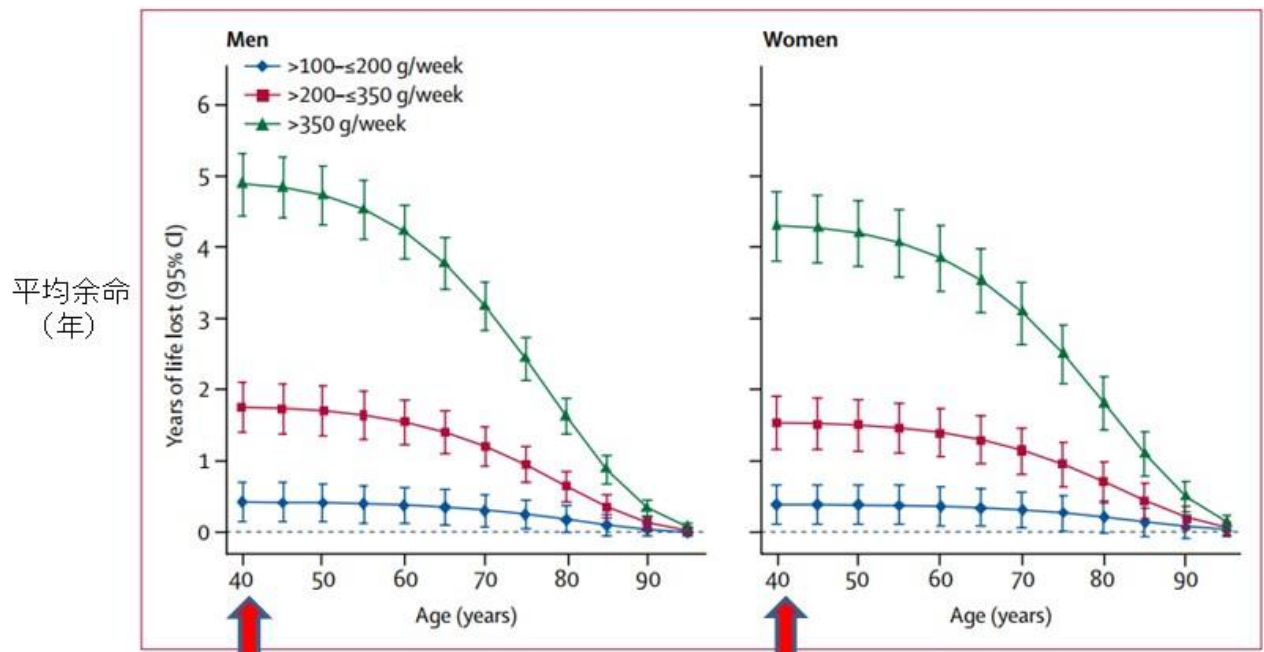
週飲酒量： 脳卒中・心不全に促進的、心筋梗塞・冠血管は抑制的

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平均余命
（年）

Figure 4: Estimated future years of life lost by extent of reported baseline alcohol consumption compared with those who reported consuming >0–≤100 g per week

The estimates of cumulative survival from 40 years of age onwards in the alcohol-drinking groups were calculated by applying hazard ratios (specific to age at risk) for all-cause mortality associated with categorised baseline alcohol consumption to US death rates at the age of 40 years or older. Mean usual levels of alcohol consumption within each baseline alcohol consumption category were 56, 123, 208 and 367 g per week, respectively, for the groups >0–≤100 g per week, >100–≤200 g per week, >200–≤350 g per week, and >350 g per week.

Lancet, 391;1513-23,2018.

【平均余命への影響】週飲酒量が純アルコール換算で0-100gの群を基準に対して
40歳時点での平均余命　男女ともに（赤矢印部）
・純アルコール量が週100-200g　→　6ヵ月の余命短縮
・純アルコール量が週200-350g　→　1-2年の余命短縮
・純アルコール量が週350g以上　→　4-5年の余命短縮

飲酒量は週100g以下へ
（1日15g程度）
余命延伸の飲酒量は無い

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論文4：アルコール摂取量と心血管死亡のメタ分析

Alcohol Consumption and Mortality From Coronary Heart Disease: An Updated Meta-Analysis of Cohort Studies

JINHUI ZHAO, PH.D.,[a,*] TIM STOCKWELL, PH.D.,[a,b,c] AUDRA ROEMER, M.SC.,[a,b] TIMOTHY NAIMI, M.D.,[d] & TANYA CHIKRITZHS, PH.D.[c,e]

TABLE 1. Mean relative risks (RRs) of coronary heart disease mortality attributable to alcohol consumption in all included studies

Drinking categories, Pooled (269 estimates from 45 studies)	N/n[a]	Unadjusted			Partially adjusted[b]			Fully adjusted[c]		
		RR	[95% CI]	t test p	RR	[95% CI]	t test p	RR	[95% CI]	t test p
Abstainer		1.00			1.00			1.00		
Current and former drinker vs. abstainer	45/269	0.94	[0.81, 1.10]	.3848	0.93	[0.79, 1.10]	.3074	0.93	[0.79, 1.09]	.3143
Former drinker vs. abstainer	9/18	1.25	[1.03, 1.51]	.0215	1.25	[1.10, 1.43]	.0010	1.25	[1.03, 1.51]	.0225
All current drinker vs. abstainer	44/251	0.89	[0.79, 1.01]	.0619	0.88	[0.77, 0.99]	.0417	0.88	[0.78, 0.99]	.0402
Abstainer		1.00			1.00			1.00		
Occasional (<1.30 g/day)	6/11	0.98	[0.77, 1.25]	.8776	1.00	[0.88, 1.14]	.9823	1.00	[0.82, 1.20]	.9685
Low volume (1.30–24.99 g/day)	42/129	0.79	[0.74, 0.85]	.0001	0.80	[0.75, 0.85]	.0001	0.80	[0.69, 0.93]	.0049
Medium volume (25–44.99 g/day)	35/51	0.86	[0.76, 0.96]	.0067	0.80	[0.75, 0.86]	.0001	0.80	[0.69, 0.94]	.0064
High volume (45–64.99 g/day)	21/32	0.85	[0.74, 0.98]	.0283	0.86	[0.79, 0.93]	.0002	0.86	[0.73, 1.01]	.0707
Higher volume (≥65 g/day)	19/28	1.00	[0.86, 1.16]	.9685	0.94	[0.84, 1.06]	.3302	0.95	[0.79, 1.13]	.55442

Notes: Estimates significant at the 5% level ($p < .05$) are **bold**. CI = confidence interval. [a]N = Number of studies; n = number of risk estimates. [b]Weighted estimates adjusted for between-study variation. [c]Weighted estimates adjusted for between-study variation, abstainer group biases, mean age, sex of study population, alcohol measure accuracy (i.e., both quantity and frequency of drinking were assessed for at least 1 week), ethnicity (mainly White vs. not), control of heart health at baseline, socioeconomic status, and smoking status in individual studies.
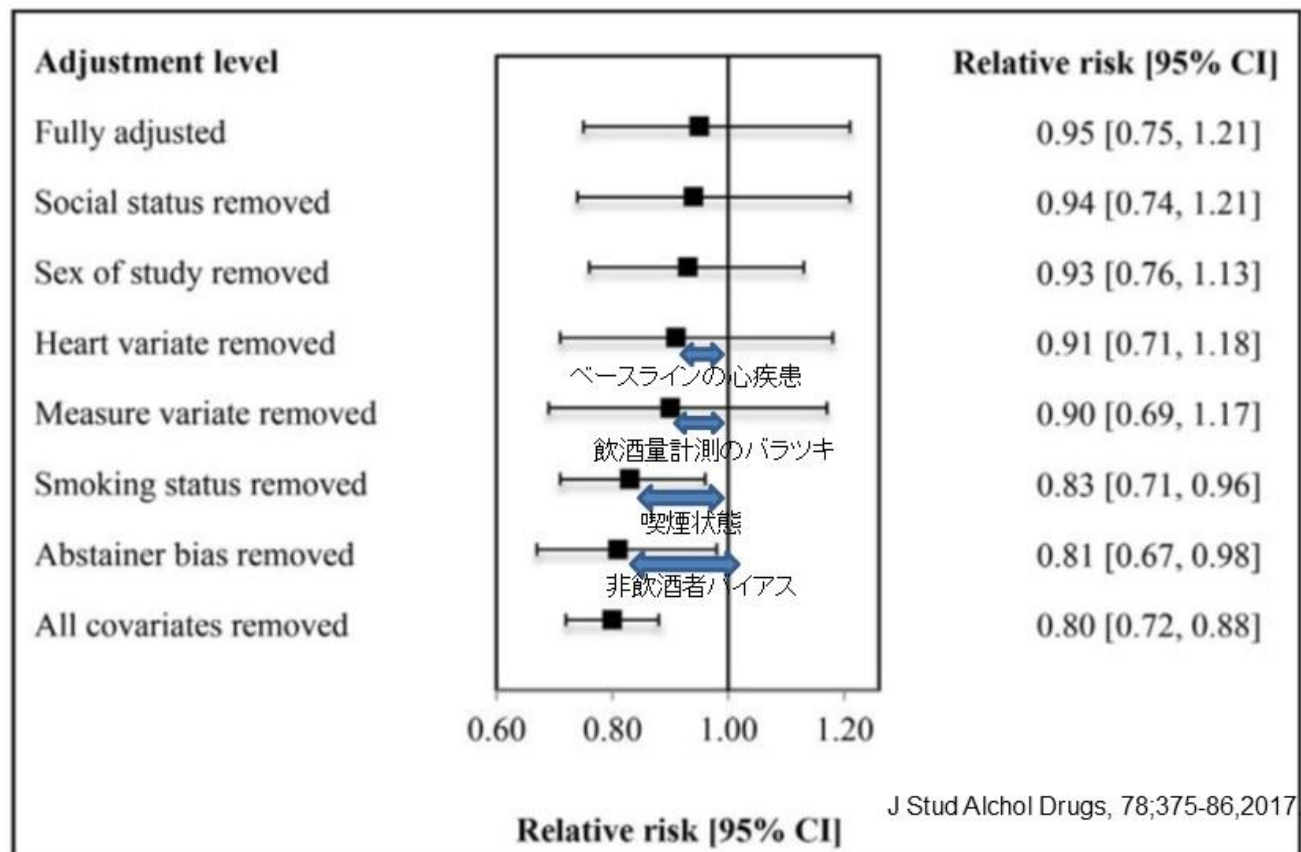
アルコール摂取が比較的多くても心血管疾患に対しては、予防的に働く

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FIGURE 3. Coronary heart disease (CHD) mortality relative risk estimates for low-volume alcohol consumers versus lifetime abstainers with and without influential covariates among population age 55 or younger (*N* = 23 studies, 134 risk estimates). CI = confidence interval.

抑制に与えるインパクト要因：
非飲酒者バイアス、喫煙状態、飲酒量計測の正確さ、ベースラインの心疾患の状況

TABLE 5. Mean relative risks (RRs) of coronary heart disease mortality due to alcohol consumption in higher quality studies

Drinking categories in higher quality studies	N/n[a]	Unadjusted			Partially adjusted[b]			Fully adjusted[c]		
		RR	[95% CI]	t test p	RR	[95% CI]	t test p	RR	[95% CI]	t test p
Abstainer		1.00			1.00			1.00		
Current and former drinker vs. abstainer	5/42	1.04	[0.81, 1.35]	.6650	1.03	[0.81, 1.29]	.7639	1.03	[0.80, 1.33]	.7343
Former drinker vs. abstainer	4/8	1.37	[0.96, 1.95]	.0790	**1.39**	**[1.13, 1.72]**	**.0031**	**1.40**	**[1.06, 1.84]**	**.0186**
All current drinker vs. abstainer	5/34	0.97	[0.74, 1.28]	.7849	0.95	[0.79, 1.15]	.4644	0.96	[0.76, 1.21]	.6064
Occasional (<1.30 g/day)	2/4	1.19	[0.72, 1.96]	.4822	1.15	[0.81, 1.63]	.4367	1.22	[0.81, 1.82]	.3264
Low volume (1.30–24.99 g/day)	4/13	0.81	[0.62, 1.07]	.1413	0.89	[0.75, 1.04]	.1387	0.86	[0.68, 1.09]	.2106
Medium volume (25–44.99 g/day)	5/8	0.83	[0.58, 1.19]	.3013	0.84	[0.67, 1.06]	.1324	0.83	[0.62, 1.12]	.2226
High volume (≥45 g/day)	5/9	1.12	[0.80, 1.56]	.5013	0.96	[0.76, 1.23]	.7570	0.96	[0.69, 1.35]	.8272

Notes: Estimates significant at the 5% level ($p < .05$) are **bold**. CI = confidence interval. [a]N = Number of higher quality studies (adequate alcohol measure, <60 mean age at baseline, control for smoking, no former drinker bias); n = number of risk estimates. [b]Weighted estimates adjusted for between-study variation. [c]Fully adjusted estimates: weighted estimates adjusted for between-study variation, occasional drinker bias, sex of study population, control for heart condition, and social status.

J Stud Alchol Drugs, 78;375-86,2017.

Higher quality studies：
・禁酒者バイアスがない　・喫煙状況調整　・適切な飲酒量の計測
・ベースライン時のコホートの平均年齢が60歳まで
・非飲酒者に含まれる禁酒者や時々飲酒者を分離して解析できている。

質の高い研究のメタ分析によると、飲酒の抑制効果は有意でない。

アジア人での研究結果、白人の55歳までにリクルートされたコホート集団では、飲酒の冠動脈疾患の予防効果が認められない。

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結果

3.飲酒量とがん罹患

論文5：アルコール摂取量とがん罹患（大規模コホート）

Light to moderate intake of alcohol, drinking patterns, and risk of cancer: results from two prospective US cohort studies

Yin Cao,[1] Walter C Willett,[1,2,3] Eric B Rimm,[1,2,3] Meir J Stampfer,[1,2,3] Edward L Giovannucci[1,2,3]

看護師と医療従事者の2つのコホートを結合

飲酒量定義：Light to moderate とは女性1日15g未満、男性30g未満

Women (total cancer)
Relative risk
P for curvature: 0.79

Men (total cancer)
P for curvature: 0.75

統計モデルで調整した変数；人種、身長、BMI,がんの家族歴、健診受診有無、大腸内視鏡検査の経験、喫煙(パックイヤー)、身体活動、アスピリン使用、ビタミン剤使用、総エネルギー摂取量、赤肉・加工肉摂取

Women (alcohol related cancer)
Relative risk
P for curvature: 0.69

Men (alcohol related cancer)
P for curvature: 0.98

感度分析；過去に大量飲酒していたが、その後飲まなくなった人を含む解析と含まない解析の比較

Alcohol consumption (g/day)
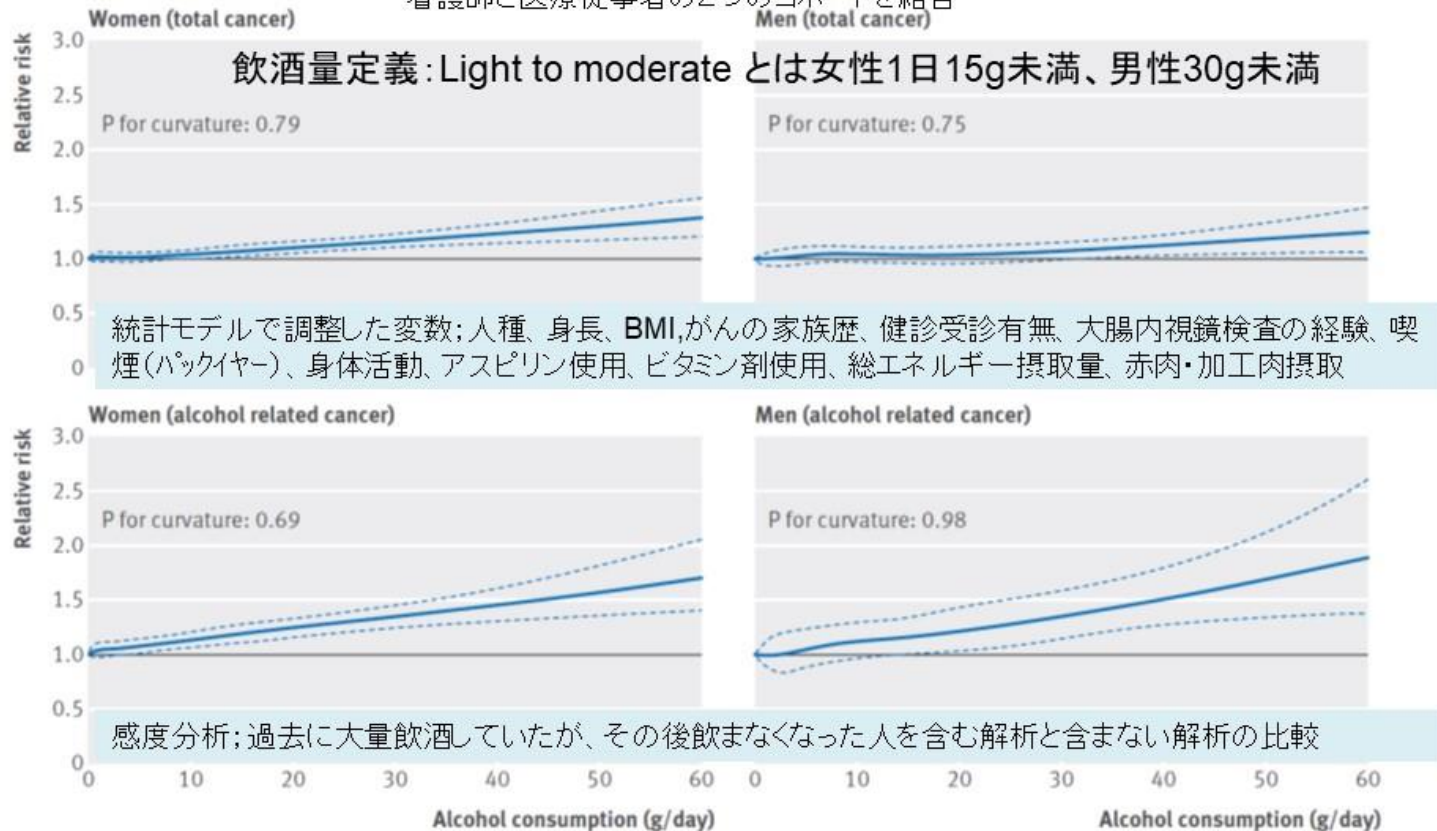
Alcohol consumption (g/day)

Fig 1 | Non-parametric regression curves showing the association between alcohol consumption and risk of cancer (total and alcohol related). Blue lines=relative risk; dotted lines=95% confidence intervals
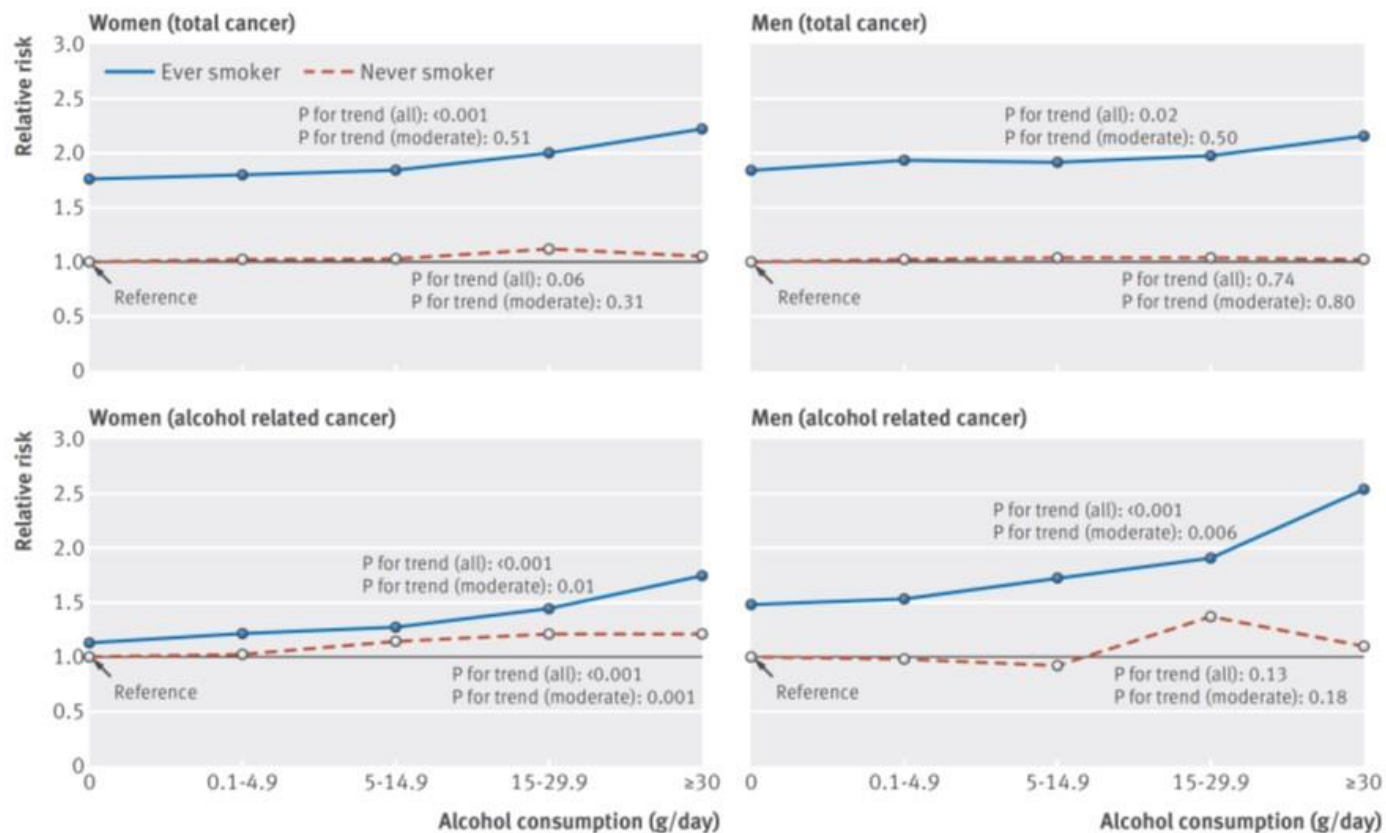
Fig 2 | Risk of total and alcohol related cancer jointly by alcohol consumption and smoking history

アルコール摂取量が、がん罹患のリスクを下げない。"Jカーブ"にならない

男性では、非喫煙・少量飲酒者では有意な増加はない。
女性では、非喫煙・少量飲酒（5-14.9g／日）でも有意な増加あり（特に乳がん）。0.1-4.9gでは認められなかった。

まとめと考察

近年の論文より、

・飲酒は、総死亡やがん罹患のリスクを増加させる

・少量飲酒の抑制効果は疾患限定的（心血管疾患,DM）

少量飲酒による予防的効果よりも、

飲酒量をできるだけ抑えること が
疾患予防の観点から推奨される

今後の展開

1.飲酒による健康障害
　動脈硬化ガイドライン2021に盛り込まれる
　　包括的リスク管理の中に"飲酒"項目 新規追加
　　本結果を含む飲酒のステートメント掲載予定

2.飲酒による健康障害と医療コストに関する文献検討
　分担研究として、次年度以降の取組み