

ALCOHOL DRINKING & CANCER RISK

2022 Alcohol Policy Conference

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For Research on Cancer**

**As required by the Alcohol Policy 19 Conference,
I have signed a disclosure statement and note the
following conflict(s) of interest:**

- No conflicts of interest to disclose

Global Burden of Disease. *Lancet* 392, 2018

- Nearly, 600 individual studies and 700 data sources
- 23 health outcomes
- **“The level of alcohol consumption that minimised harm across health outcomes = 0 (95% CI 0-0.8) drinks daily”.**

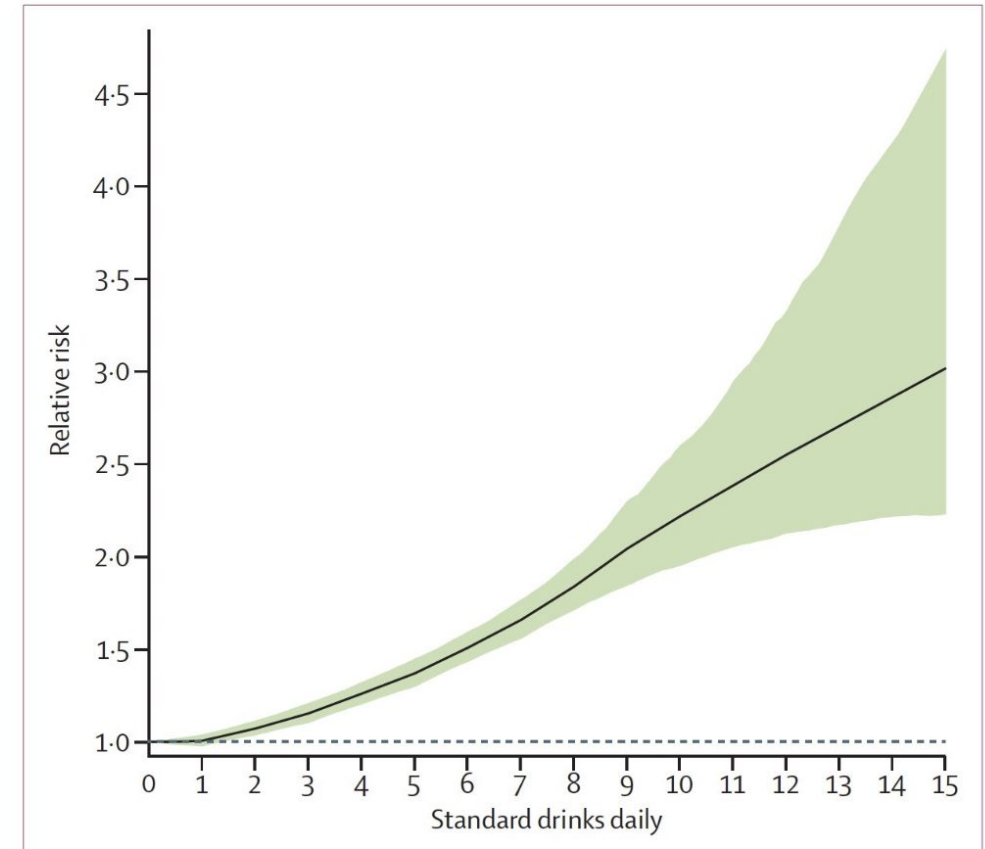


Figure 5: Weighted relative risk of alcohol for all attributable causes, by standard drinks consumed per day
Age-standardised weights determined by the DALY rate in 2016, for both sexes. The dotted line is a reference line for a relative risk of 1. DALY=disability-adjusted life-year.

Early Reports of a Link Between Alcohol Consumption and Cancer

- 80% of patients with cancer of the esophagus and cardiac region of the stomach were alcoholics. (*Lamy, 1910*)
- Among persons employed in the production and distribution of alcoholic beverages there were high mortality rates for cancers of the oral cavity, pharynx, oesophagus and larynx occurred (*Young & Russell, 1926; Clemmesen, 1941; Kennaway & Kennaway, 1947; Versluys, 1949*).
- In religious groups that avoid alcohol intake (e.g., Seventh-day Adventists), lower rates of cancer incidence (and mortality), compared to national rates, at same cancer sites (*Wynder et al., 1959; Lemon et al., 1964*).

Association of cancer sites with tobacco and alcohol consumption and socioeconomic status of patients: interview study from the Third National Cancer Survey.

Williams RR, Horm JW.

- **Personal interviews from 7,518 incidence cases of invasive cancer**
 - Lifetime use of cigarettes, cigars, pipes, other tobacco,
 - Wine, beer, liquor
 - Education and family income
- **Alcohol consumption was associated with cancers of:**
 - Oral cavity
 - Larynx
 - Esophagus
 - Colon rectum
 - Breast
 - Thyroid

International Agency for Research on Cancer



World Health
Organization

World
Cancer
Research
Fund



American
Institute for
Cancer
Research

CUP Continuous
Update
Project

Analysing research on cancer
prevention and survival

Monograph Program

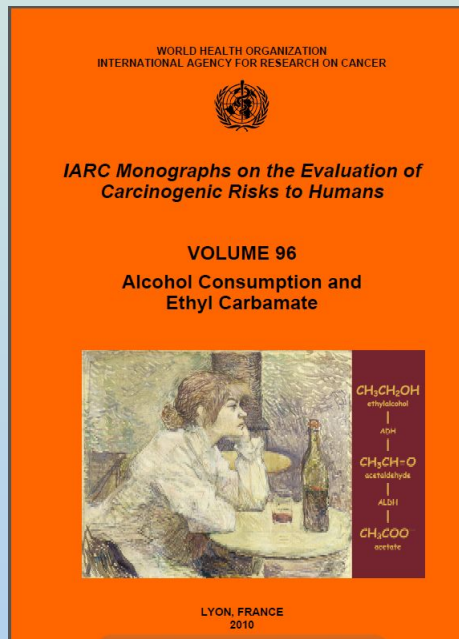
- Convenes a panel of experts to evaluate strength of evidence for carcinogenic risks to humans posed by “environmental” factors (e.g., chemical, physical or biological agents, personal habits).
- Define the exposure, evaluate human, animal and mechanistic studies, and classify the agent.
- Does **NOT** defined dose of exposure.

Table 4. Integration of streams of evidence in reaching overall classifications (the evidence in *bold italic* represents the basis of the overall evaluation)

Stream of evidence			Classification based on strength of evidence
Evidence of cancer in humans ^a	Evidence of cancer in experimental animals	Mechanistic evidence	
<i>Sufficient</i>	Not necessary	Not necessary	Carcinogenic to humans (Group 1)
Limited or Inadequate	<i>Sufficient</i>	<i>Strong (b)(1) (exposed humans)</i>	
<i>Limited</i>	<i>Sufficient</i>	Strong (b)(2–3), Limited, or Inadequate	Probably carcinogenic to humans (Group 2A)
Inadequate	<i>Sufficient</i>	<i>Strong (b)(2) (human cells or tissues)</i>	
<i>Limited</i>	Less than Sufficient	<i>Strong (b)(1–3)</i>	
Limited or Inadequate	Not necessary	<i>Strong (a) (mechanistic class)</i>	
<i>Limited</i>	Less than Sufficient	Limited or Inadequate	Possibly carcinogenic to humans (Group 2B)
Inadequate	<i>Sufficient</i>	Strong (b)(3), Limited, or Inadequate	
Inadequate	Less than Sufficient	<i>Strong b(1–3)</i>	
<i>Limited</i>	<i>Sufficient</i>	<i>Strong (c) (does not operate in humans)^b</i>	
Inadequate	<i>Sufficient</i>	<i>Strong (c) (does not operate in humans)^b</i>	Not classifiable as to its carcinogenicity to humans (Group 3)
All other situations not listed above			

IARC Monographs

Three Evaluations of Alcohol as a Human Carcinogen



1987 Volume 44 (1988)	2007 Volume 96 (2010)	2009 Volume 100E (2012)
<ul style="list-style-type: none"> Alcoholic beverages 	<ul style="list-style-type: none"> Alcoholic beverages Ethanol 	<ul style="list-style-type: none"> Alcoholic beverages Ethanol Acetaldehyde associated with alcoholic beverage consumption

IARC: Sufficient Evidence of Carcinogenicity (Group 1)

Type of cancer	Alcoholic Beverages	Ethanol	Acetaldehyde
No specific cancer type		2010	
Oral Cavity	1988, 2010, 2012	2012	2012
Pharynx	1988, 2010, 2012	2012	2012
Larynx	1988, 2010, 2012	2012	2012
Esophagus (SCC*)	1988, 2010, 2012*	2012	2012
Liver	1988, 2010, 2012		
Colorectum	2010, 2012		
Female breast	2010, 2012		

IARC: Evidence of Lack of Carcinogenicity

Type of cancer	Alcoholic Beverages
Non-Hodgkin lymphoma	2010, 2012
Kidney	2010, 2012



WCRF/AICR Criteria for Grading Evidence

Grade	Definition
Convincing	Evidence strong enough to support a judgement of a convincing causal relationship.
Probable	Evidence strong enough to support a judgement of a probable causal relationship
Limited - suggestive	Evidence suggestive of a direction of effect, but may have methodological flaws, be limited in amount, and is generally consistent
Limited – no conclusion	Evidence might be limited by the number of studies available, inconsistency of direction of effect, poor quality of studies (for example, lack of adjustment for known confounders), or any combination of these.
Substantial effect on risk unlikely	Evidence is strong enough to support a judgement that an exposure is unlikely to have a substantial causal relation to a cancer outcome.

Adapted from <https://www.wcrf.org/wp-content/uploads/2021/02/Alcoholic-Drinks.pdf>
Accessed August 10, 2022

WCRF/AICR: Alcoholic Drinks and Risk of Cancer

ALCOHOLIC DRINKS AND THE RISK OF CANCER					
WCRF/AICR GRADING		DECREASES RISK		INCREASES RISK	
		Exposure	Cancer site	Exposure	Cancer site
STRONG EVIDENCE	Convincing			Alcoholic drinks ¹	Mouth, pharynx and larynx 2018 Oesophagus (<i>squamous cell carcinoma</i>) 2016 Liver 2015 ² Colorectum 2017 ³ Breast (postmenopause) 2017 ⁴
	Probable	Alcoholic drinks	Kidney 2015 ⁵	Alcoholic drinks	Stomach 2016 ² Breast (premenopause) 2017 ⁴
LIMITED EVIDENCE	Limited – suggestive			Alcoholic drinks	Lung 2017 Pancreas 2012 ² Skin (<i>basal cell carcinoma</i> and <i>malignant melanoma</i>) 2017
STRONG EVIDENCE	Substantial effect on risk unlikely	None identified			

<https://www.wcrf.org/wp-content/uploads/2021/02/Alcoholic-Drinks.pdf>
 Accessed August 11, 2022



WCRF/AICR: Alcohol and Breast Cancer

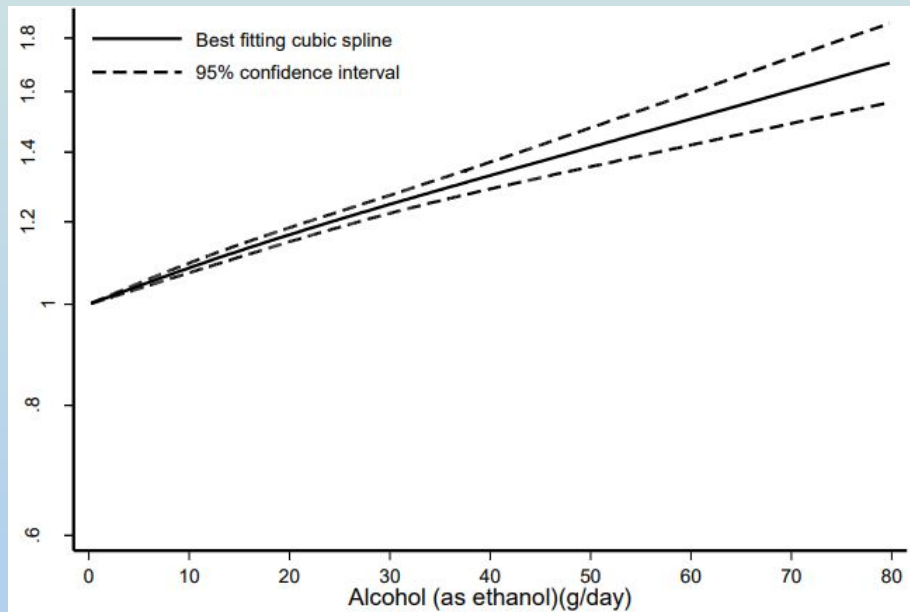


Table 251 Summary of results of the dose-response meta-analysis in the CUP SLR

	Breast cancer (any)	Premenopausal breast cancer	Postmenopausal breast cancer
Increment unit used	10 g/day	10 g/day	10 g/day
Studies identified in the CUP search excluding Pooling Project			
Studies (n)	23	10	22
Cases	98 046	4 227	35 221
RR (95%CI)	1.07 (1.05-1.09)	1.05 (1.02-1.08)	1.09 (1.07-1.12)
Heterogeneity (I^2 , p-value)	74%, <0.001	0%, 0.79	71%, <0.001

<https://www.wcrf.org/wp-content/uploads/2021/02/breast-cancer-slr.pdf>
 Accessed August 11, 2022

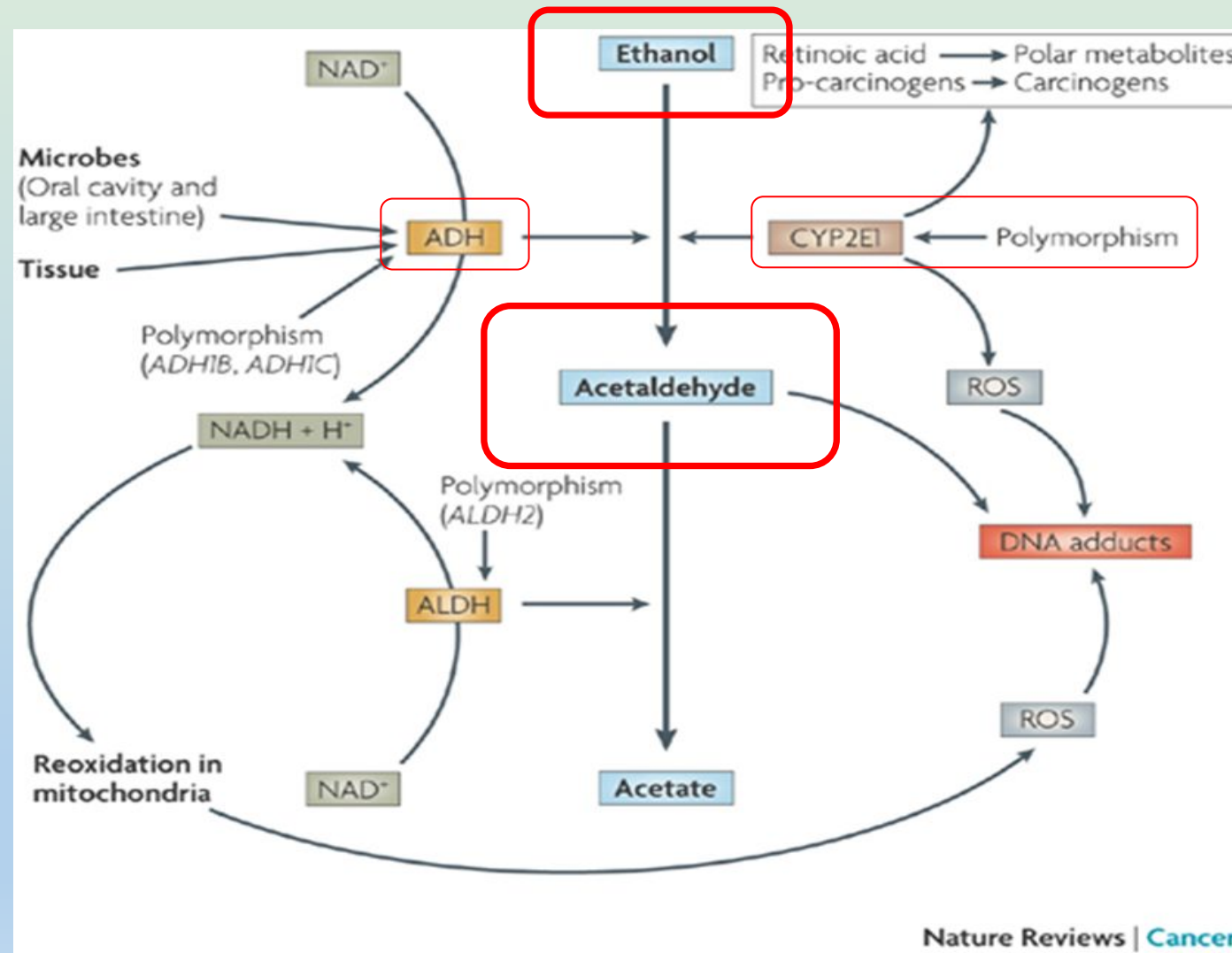
WCRF/AICR: Amount of Alcohol

Strong Evidence that Consuming:

Daily consumption	Direction of risk	Type of Cancer
Any	Increases	Oral cavity, mouth, pharynx, larynx, SCC esophagus, female breast (pre and post)
≥2 (~ 30+ g EtOH/day)	Increases	Colorectal
≥3 (~ 45+ g EtOH/day)	Increases	Stomach, liver
≤2 (~ 30+ g EtOH/day)	Decreases	Kidney

<https://www.wcrf.org/wp-content/uploads/2021/02/Alcoholic-Drinks.pdf>
Accessed August 11, 2022


Alcohol Related Carcinogenesis



Induced at high amounts of consumption

Article

Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States

Farhad Islami MD, PhD , Ann Goding Sauer MSPH, Kimberly D. Miller MPH, Rebecca L. Siegel MPH, Stacey A. Fedewa PhD, MPH, Eric J. Jacobs PhD, Marjorie L. McCullough ScD, RD, Alpa V. Patel PhD, Jiemin Ma PhD, MHS, Isabelle Soerjomataram MD, PhD, MSc, W. Dana Flanders MD, DSc, MPH, MA, Otis W. Brawley MD, MACP, Susan M. Gapstur PhD, MPH, Ahmedin Jemal DVM, PhD



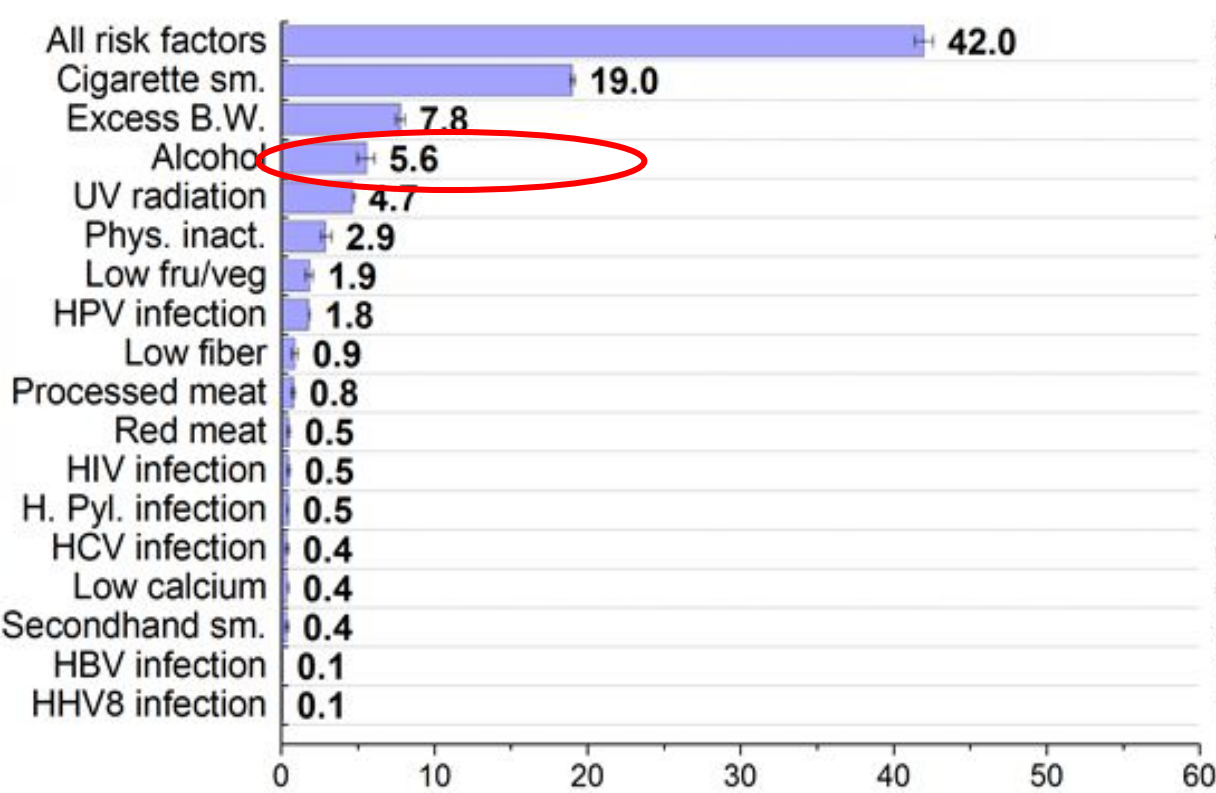
[View issue TOC](#)
Volume 68, Issue 1
January/February 2018
Pages 31-54

- The proportion and number of invasive cancer cases and deaths,
- Overall (excluding nonmelanoma skin cancers) and for 26 cancer types,
- Adults aged 30 years and older in the United States in 2014
- For major, potentially modifiable exposures

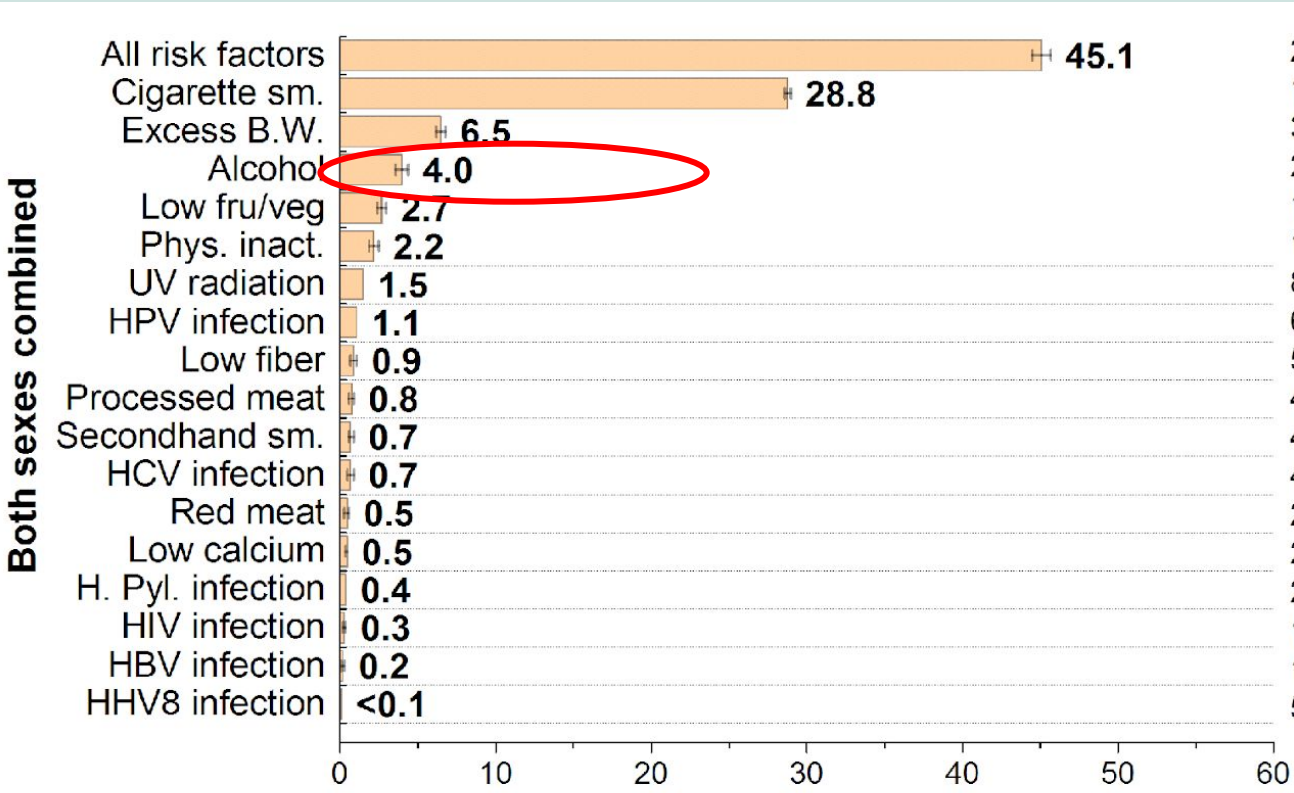
✓ cigarette smoking	✓ secondhand smoke	✓ alcohol intake
✓ excess body weight	✓ physical inactivity	✓ low fruit/vegie intake
✓ dietary fiber	✓ dietary calcium	✓ red & processed meat
✓ ultraviolet radiation	✓ 6 cancer-associated infections	

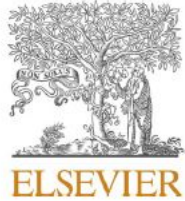
Population Attributable Fraction for all Incident Cancer Cases and Deaths among Adults ≥ 30 years (U.S., 2014)

CANCER CASES

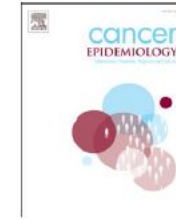


CANCER DEATHS



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Cancer Epidemiology

journal homepage: www.elsevier.com/locate/canep

Proportion of cancer cases and deaths attributable to alcohol consumption by US state, 2013-2016

Ann Goding Sauer^a, Stacey A. Fedewa^a, Priti Bandi^a, Adair K. Minihan^a, Michal Stoklosa^{a,b}, Jeffrey Drope^{a,b}, Susan M. Gapstur^c, Ahmedin Jemal^a, Farhad Islami^{a,*}

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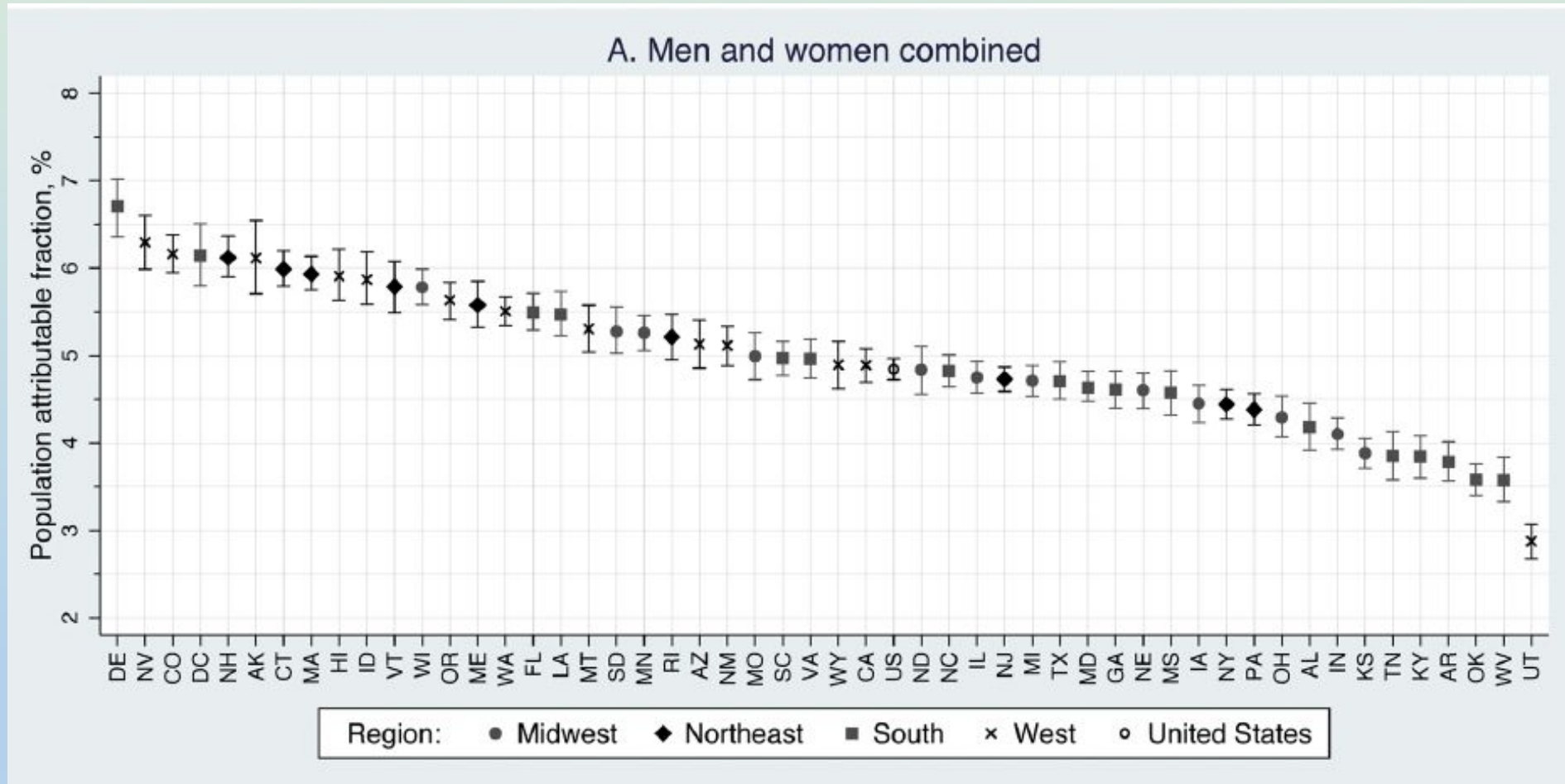
^c Behavioral and Epidemiology Research Group, American Cancer Society, Atlanta, GA, United States

Average Annual Total Cancer Cases and Deaths due to Alcohol Consumption (U.S., 2013-2016)

Cases* N (%)	Deaths* (N%)
75,199 (4.8%)	18,947 (3.2%)

* Combined men and women aged ≥ 30 yrs. Excludes non-melanoma skin cancer.

Percent of Total Cancer* **Cases** Attributed to Alcohol Consumption by State (U.S., 2013-2016)



* Combined men and women aged ≥ 30 yrs. Excludes non-melanoma skin cancer.

Number (%) of Cancer Cases and Deaths Attributable to Alcohol Consumption by Cancer Type (entire 2013-2016 time period)

	Cases* N (%)	Deaths* N (%)
Oral cavity & pharynx	91,017 (49.8%)	18,462 (48.6%)
Larynx	14,899 (30.1%)	4,429 (29.3%)
Female breast	115,794 (12.1%)	18,572 (11.3%)
Colorectum	62,766 (11.1%)	22,105 (10.7%)
Liver	11,124 (10.5)	7,688 (10.1%)
Esophagus	5,146 (7.7%)	4,529 (7.5%)

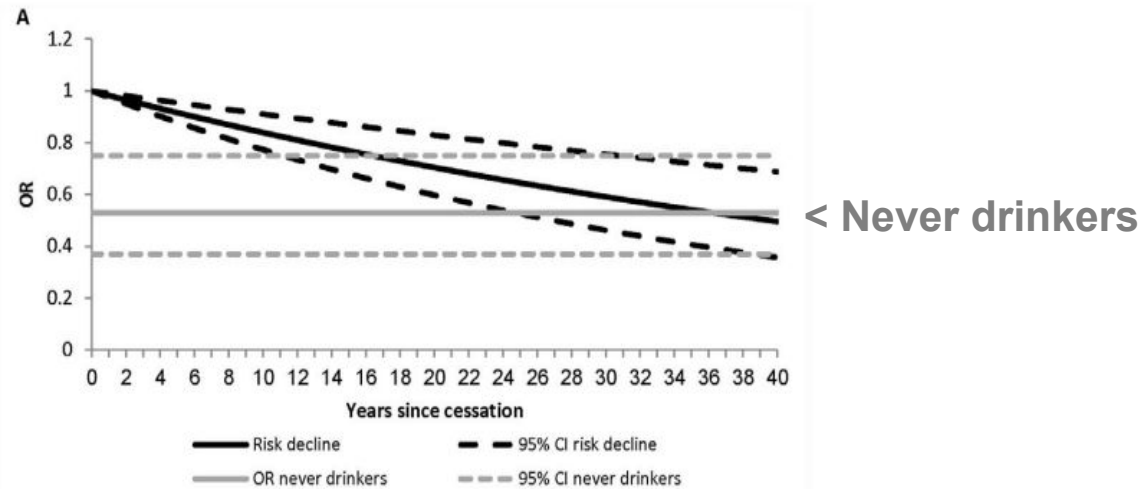
* Combined men and women (except female breast cancer) aged ≥ 30 yrs,

Alcoholic Beverage Consumption Guidelines

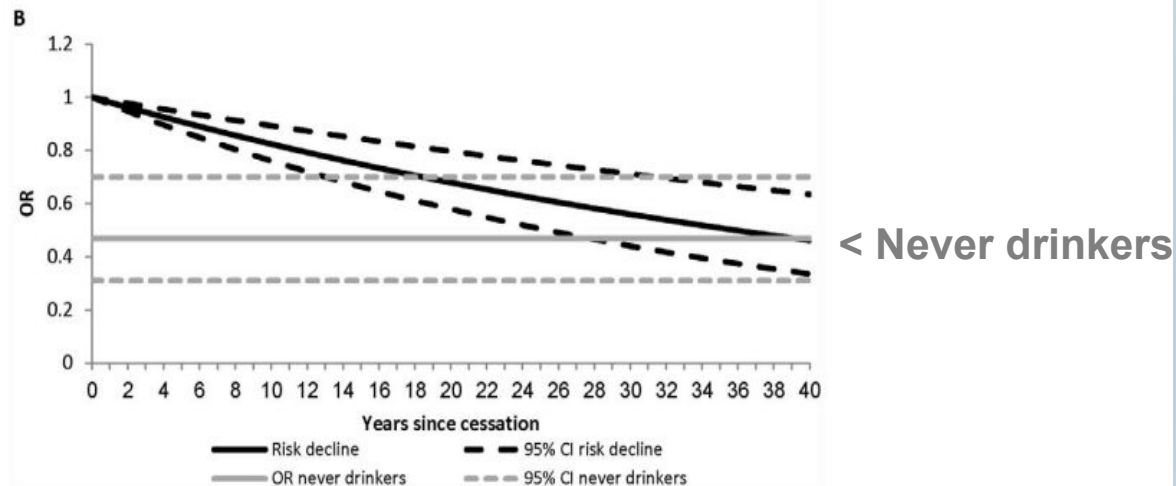
- **American Cancer Society Guidelines for Cancer Prevention**
 - It is best not to drink alcohol. People who choose to drink alcohol should limit their intake to no more than 2 drinks per day for men and 1 drink a day for women.
- **American Institute for Cancer Research**
 - For cancer prevention, it is best not to drink. If you choose to drink, keep amount to no more than one drink per day for women and two drinks per day for men.

Does quitting drinking or reducing consumption reduce alcohol associated cancer risk?

Laryngeal (n=4 studies)



Pharyngeal (n=8 studies)



International Agency for Research on Cancer



World Health
Organization

IARC Handbooks of Cancer Prevention

Volume 20: Reduction of Alcohol Consumption

22–26 May 2023

Lyon, France

[Call for Data](#) (closing date 22 April 2023)

[Call for Experts](#) (closing date 28 August 2022)

[Request for Observer Status](#) (closing date 24 February 2023)

[WHO Declaration of Interests](#) for this meeting

[Code of Conduct](#)

[IARC/WHO Temporary Advisers Agreement](#)

CONCLUSION

- Alcohol consumption, is a cause of at least seven types of cancer.
- For some types of cancer, risk increases even for low amounts of consumption.
- A significant proportion of cancer cases and deaths in the U.S. are attributed to alcohol consumption.
- Despite the growing evidence, questions remain.