



Global Burden of Cancer in 2012 Attributable to Alcohol Consumption

**International Agency for Research on Cancer
Lyon, France**

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Alcohol consumption and cancer

A causal relationship has been confirmed for oral cavity, oesophageal, colorectal, liver, laryngeal, and breast cancer sites.

Biological pathways:

- Ethanol metabolism
- Inhibition of the one carbon metabolism pathway
- Modification of hormone levels and associated signalling pathways

Aim of this study

To estimate the burden of new cancer cases and cancer deaths attributable to alcohol consumption

Data sources

All data by country, age and sex.

Outcome

Cancer incidence and mortality by site: GLOBOCAN 2012



Exposures

Alcohol consumption data: Adult *per capita* consumption of ethanol for 2005

- Global Information System on Alcohol and Health

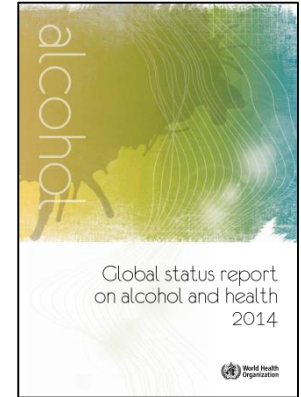
Drinking data: Surveys on drinking status and consumption among drinkers globally for 2005

Relative Risks:

Recent meta-analyses

Population data:

United Nations population division



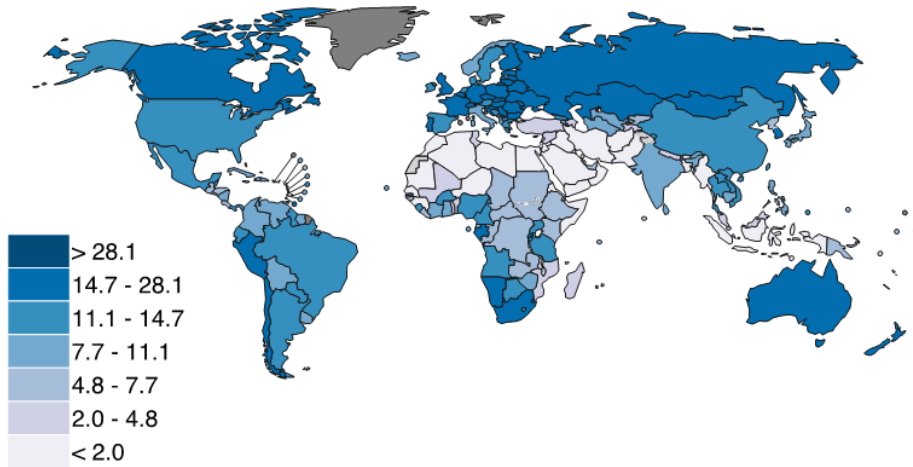
Population-Attributable Fraction

$$PAF = \frac{P_{LA} + P_{FD}RR_{FD} + \int_{>0}^{150} P_{CD}(x)RR_{CD}(x)dx - 1}{P_{LA} + P_{FD}RR_{FD} + \int_{>0}^{150} P_{CD}(x)RR_{CD}(x)dx}$$

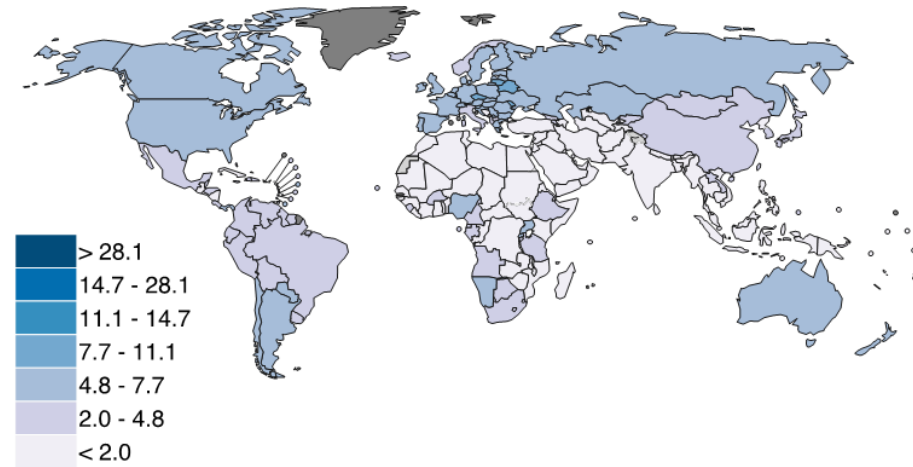
P_{LA} , P_{FD} and P_{CD} represent the prevalence of lifetime abstainers, former drinkers and current drinkers respectively.

RR_{FD} and RR_{CD} represent the RR functions for a cancer site for former drinkers and current drinkers respectively (given a daily ethanol consumption amount of x , in grams per day).

Alcohol consumption (ethanol, litres/adult/year)



Alcohol consumption in 2005
(Litres per adult per year), men



Alcohol consumption in 2005
(Litres per adult per year), women

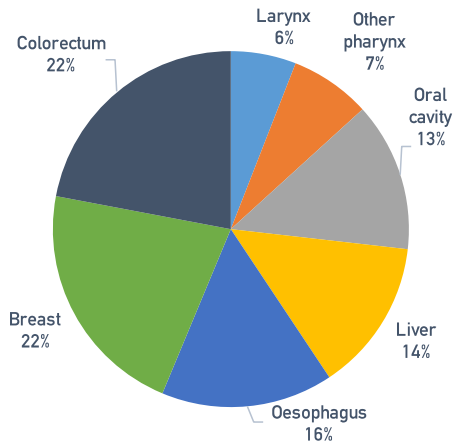
Alcohol-attributable cancers

662,000 Incident cases
per year



4.7%

of all cancer incidence

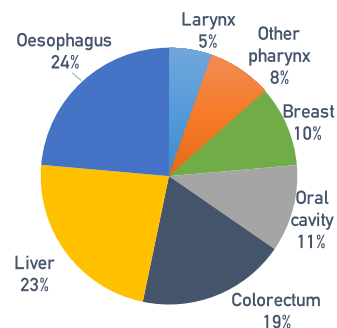


373,000 Deaths
per year

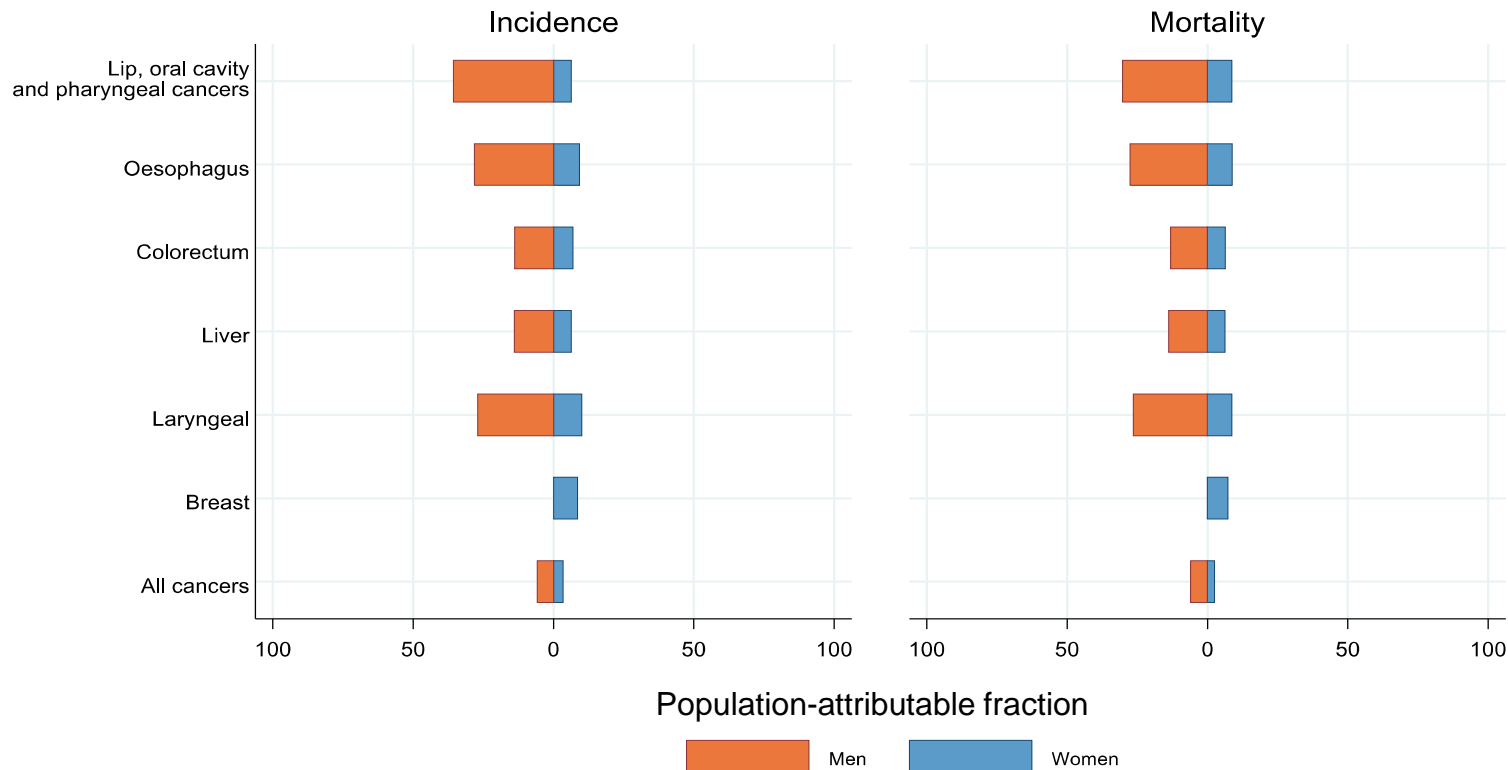


4.5%

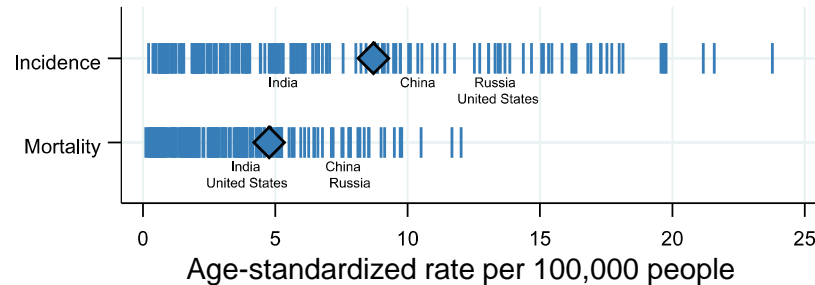
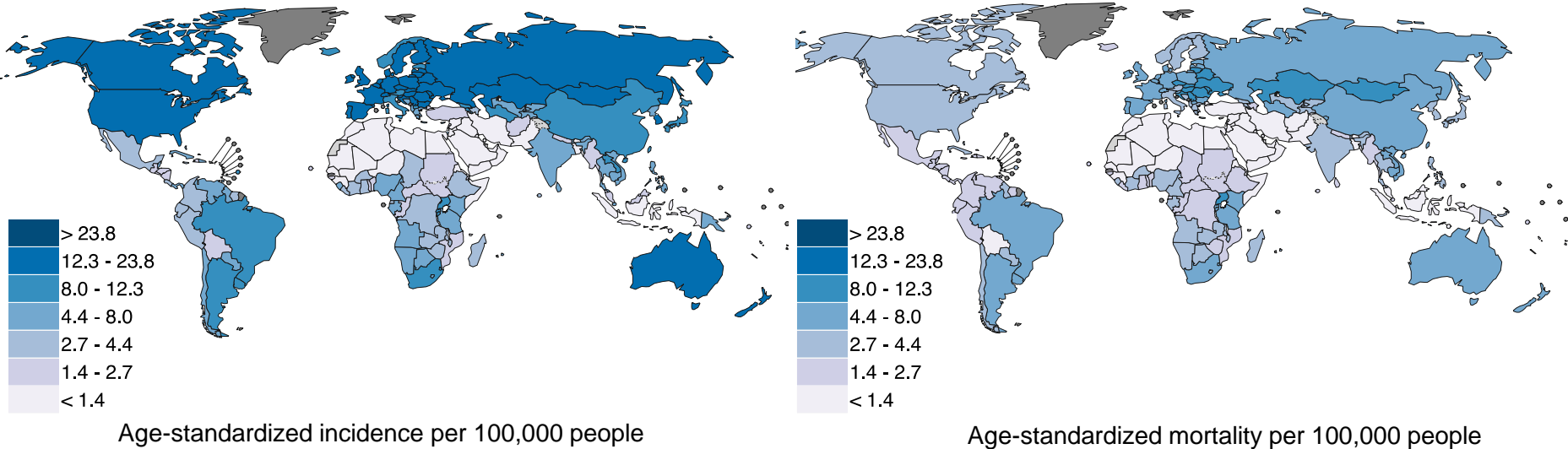
of all cancer mortality



Population-attributable fractions by cause



Alcohol-attributable cancers by country



Limitations

- The risk relationship between alcohol and cancer incidence may be modified by genetic variations in alcohol metabolism genes (such as **ADH** and **ALDH2** [the flushing gene]).
- With respect to oesophageal cancers, only squamous cell carcinoma is causally related to alcohol.
- Misclassification of light drinkers as lifetime abstainers may have led to a downward shift in the RR.
- Interaction with smoking is not taken into account.
- Cancers of the pancreas, stomach, prostate, gallbladder, lung, thyroid and kidney, as well as lymphoma, are not included.

Conclusions

- Alcohol leads to a large burden of new cancer cases (4.7%) and cancer deaths (4.5%).
 - Alcohol-attributable colorectal (22%) and breast cancers (22%) were the greatest contributors to new cancer cases.
 - Alcohol-attributable oesophageal (24%) and liver cancers (23%) were the greatest contributors to cancer deaths.
 - The burden of alcohol-attributable cancers was highest in Eastern Europe.

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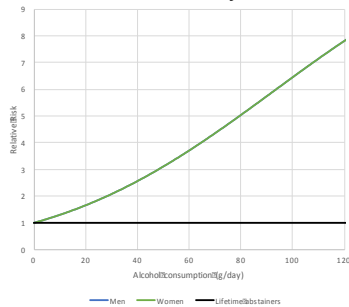
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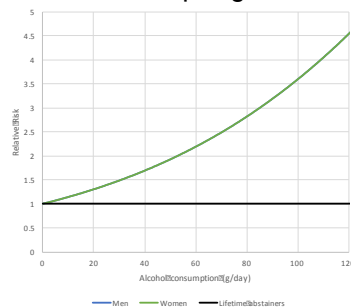
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Relative risk functions

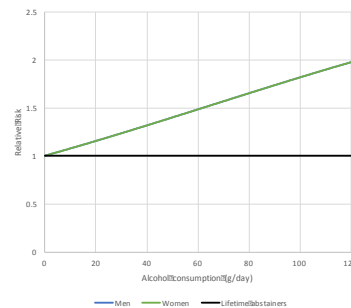
Oral cavity



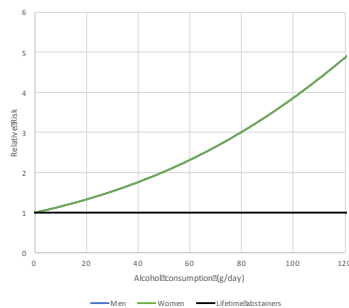
Esophageal



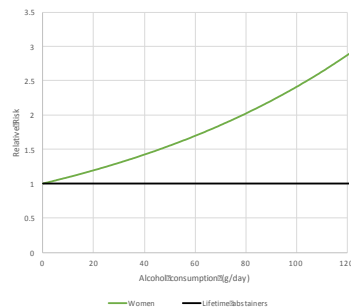
Liver



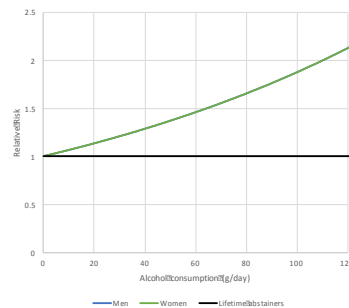
Larynx



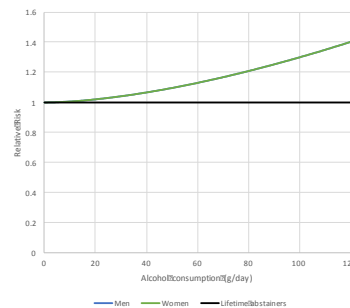
Breast



Colorectal



Pancreatic



Alcohol consumption data

