

# Alcohol and Cancer

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## Epidemiological Aspects

Ann Richardson

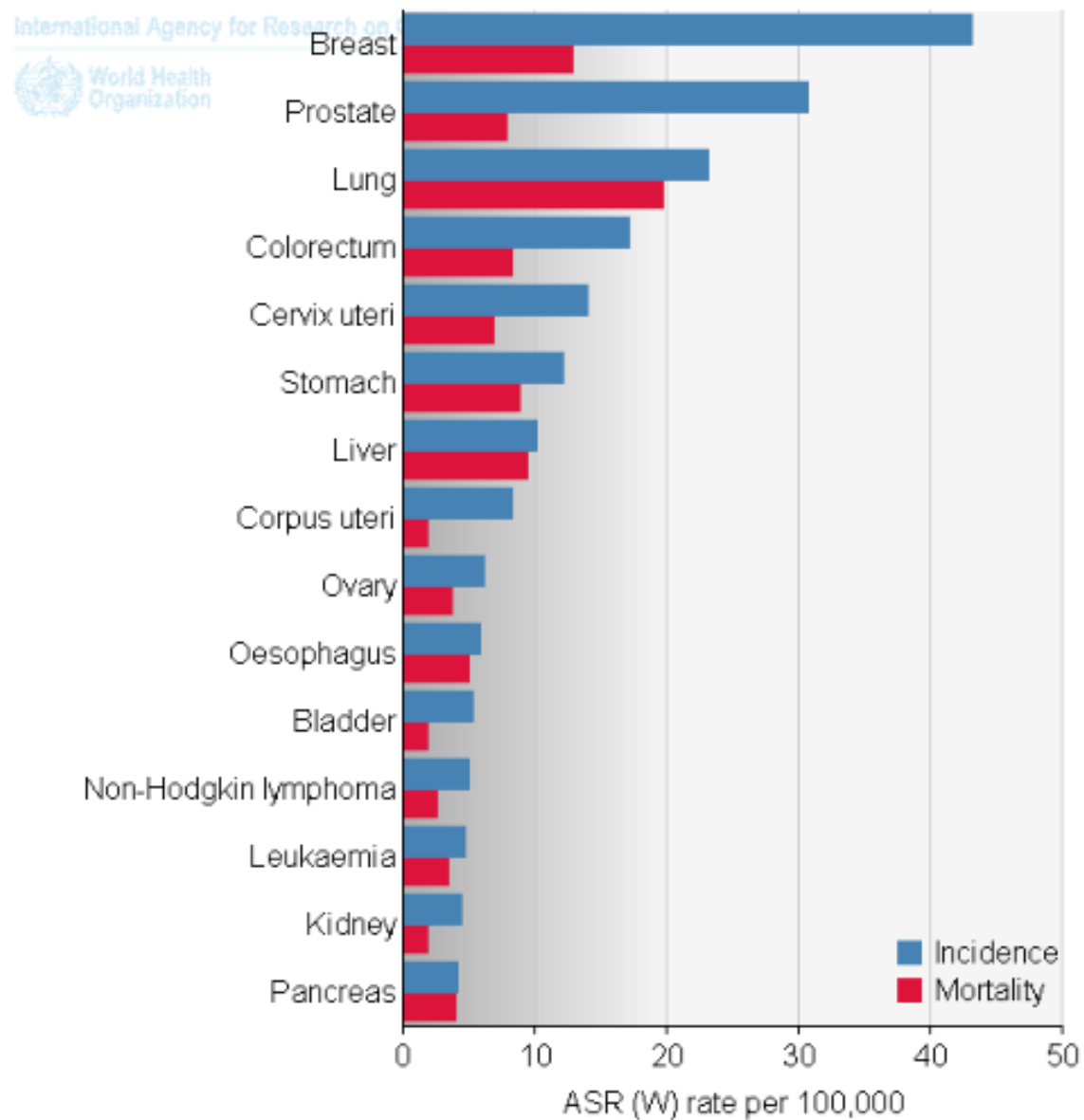
Wayne Francis Cancer Epidemiology Research Group

## Cancer is a leading cause of illness and death worldwide

- Over 14 million people are newly diagnosed with cancer each year
- Over 8 million people die from cancer each year

(Torre et al 2015)

## Estimated age-standardised incidence and mortality rates: both sexes



## World Cancer Research Fund, and American Institute for Cancer Research (WCRF and AICR) Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective (2007)

- *Convincing evidence* for mouth, pharynx, larynx, oesophagus, bowel (men), female breast
- *Probable evidence* for liver, bowel (women)

WHO International Agency for Research on Cancer (IARC) assessed alcohol as a Group 1 carcinogen (carcinogenic to humans)

- Mouth, pharynx, larynx, oesophagus, liver (1988)
- Bowel, female breast (2007)
- Pancreas (limited evidence) (2009)

The World Cancer Research Fund, and American Institute for Cancer Research (WCRF and AICR) and the International Agency for Research on Cancer (IARC) concluded that:

- Increasing alcohol consumption increases the risk of these cancers
- The effect is from alcohol, irrespective of the type of alcohol

A recent meta-analysis summarised the findings of 572 epidemiological studies, which included 486,538 people with cancer.

Alcohol increases the risk of cancers of the mouth, pharynx, larynx, oesophagus, bowel, liver, and female breast.

(Bagnardi et al 2015)

## Relative risks for heavy drinkers compared with non-drinkers and occasional drinkers

Oral and pharyngeal cancer	5.13 (4.31–6.10)
Oesophageal cancer (SCC)	4.95 (3.86–6.34)
Laryngeal cancer	2.65 (2.19–3.19)
Liver cancer	2.07 (1.66–2.58)
Breast cancer	1.61 (1.33–1.94)
Bowel cancer	1.44 (1.25–1.65)

(Bagnardi et al 2015)



## How are alcohol consumption and cancer assessed in epidemiological studies?

- Questionnaires (self- or interviewer-administered)
- Cancer registries
- Case-control studies
- Cohort studies

# Alcohol consumption

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- Selection bias (alcohol consumption in study participants compared with the wider population, loss to follow-up)
- Inaccuracies in reporting (for example under-reporting of alcohol intake)
- Confounding (factors that may distort the relationship between alcohol and cancer)

# Cancer registries

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- Population-based - may include the entire population of a country (as in New Zealand), or subnational regions
- Quality of information may vary (information may be limited in less developed countries/regions)
- Used for international comparisons and also for linkage and notification in case-control and cohort studies

# Case-control studies

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- People are selected on the basis of having cancer (cases) or not having cancer (controls)
- The past alcohol consumption of the two groups is assessed and compared to determine whether alcohol is a likely cause of the cancer

# Cohort studies

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- A group of people is followed over time to see who develops cancer and who does not
- Alcohol consumption is assessed at entry and during follow-up to find out whether alcohol is associated with the development of cancer

# Bradford Hill criteria

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Evidence that alcohol increases the risk of cancer:

- Strength of association
- Consistency
- Temporality
- Specificity
- Gradient (dose-response)
- Biological plausibility
- Experimental evidence

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572 studies conducted in North America (41%), Europe (32%), Asia (18%), and mixed/other regions.

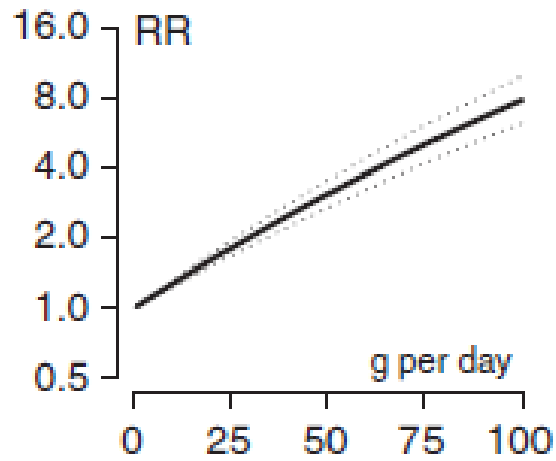
Case-control studies reported stronger associations than cohort studies.

Excluding studies with occasional drinkers included in the reference category did not change the results.

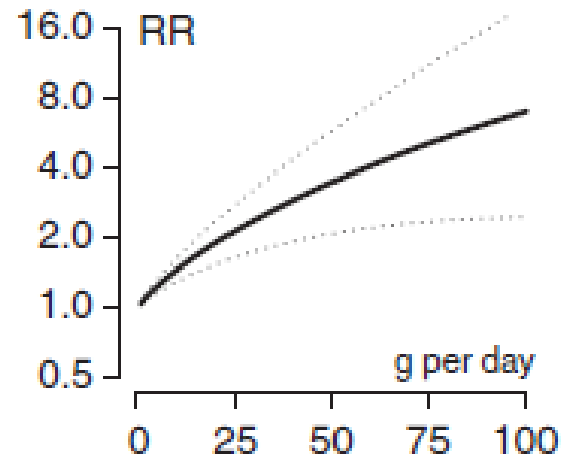
(Bagnardi et al 2015)



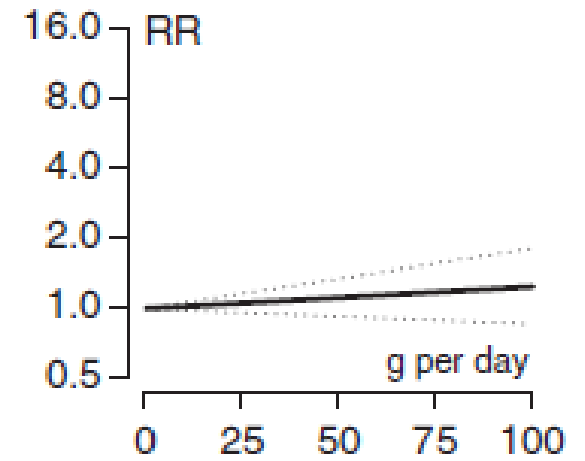
Oral cavity and pharynx



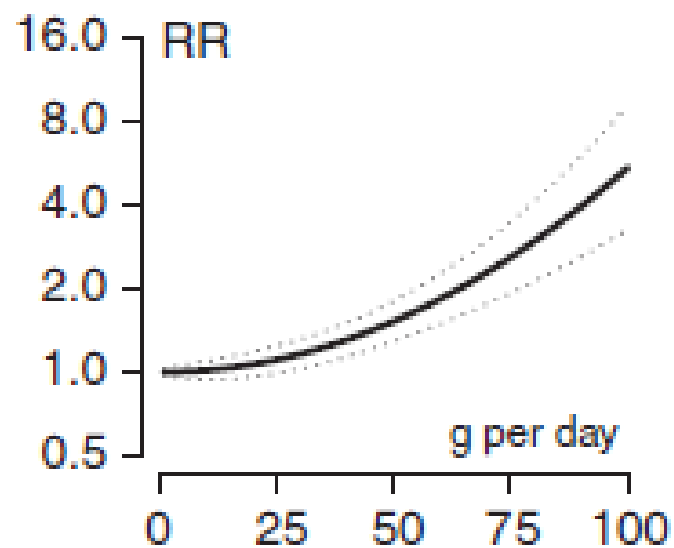
Oesophageal SCC



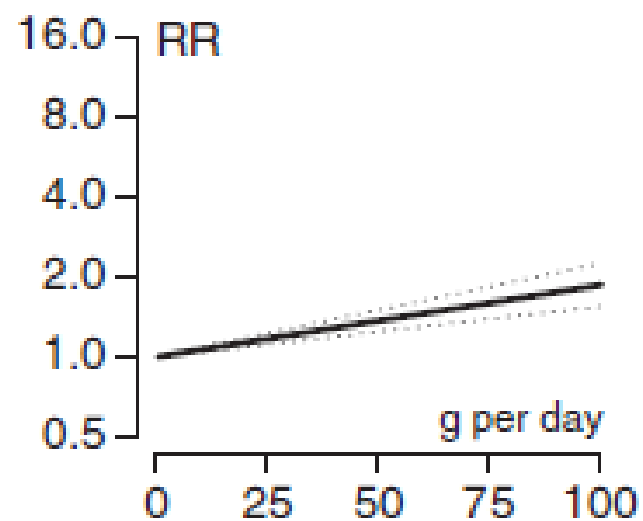
Oesophageal AC and gastric cardia



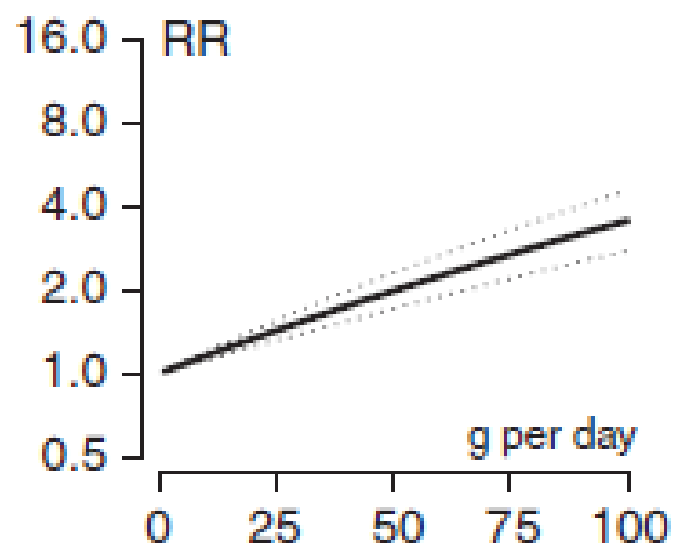
Liver



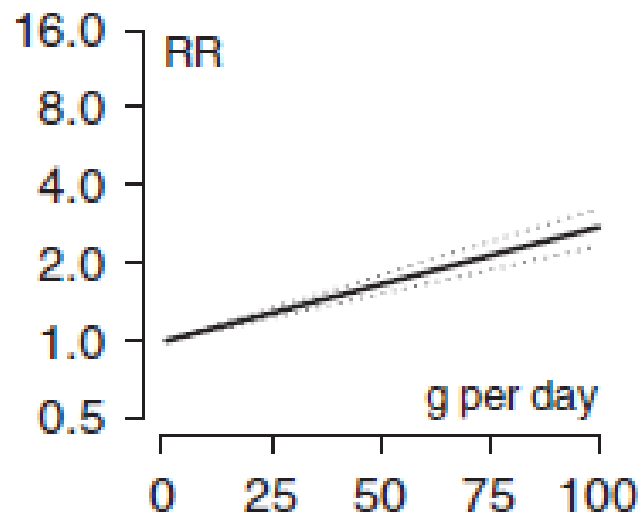
Colorectum



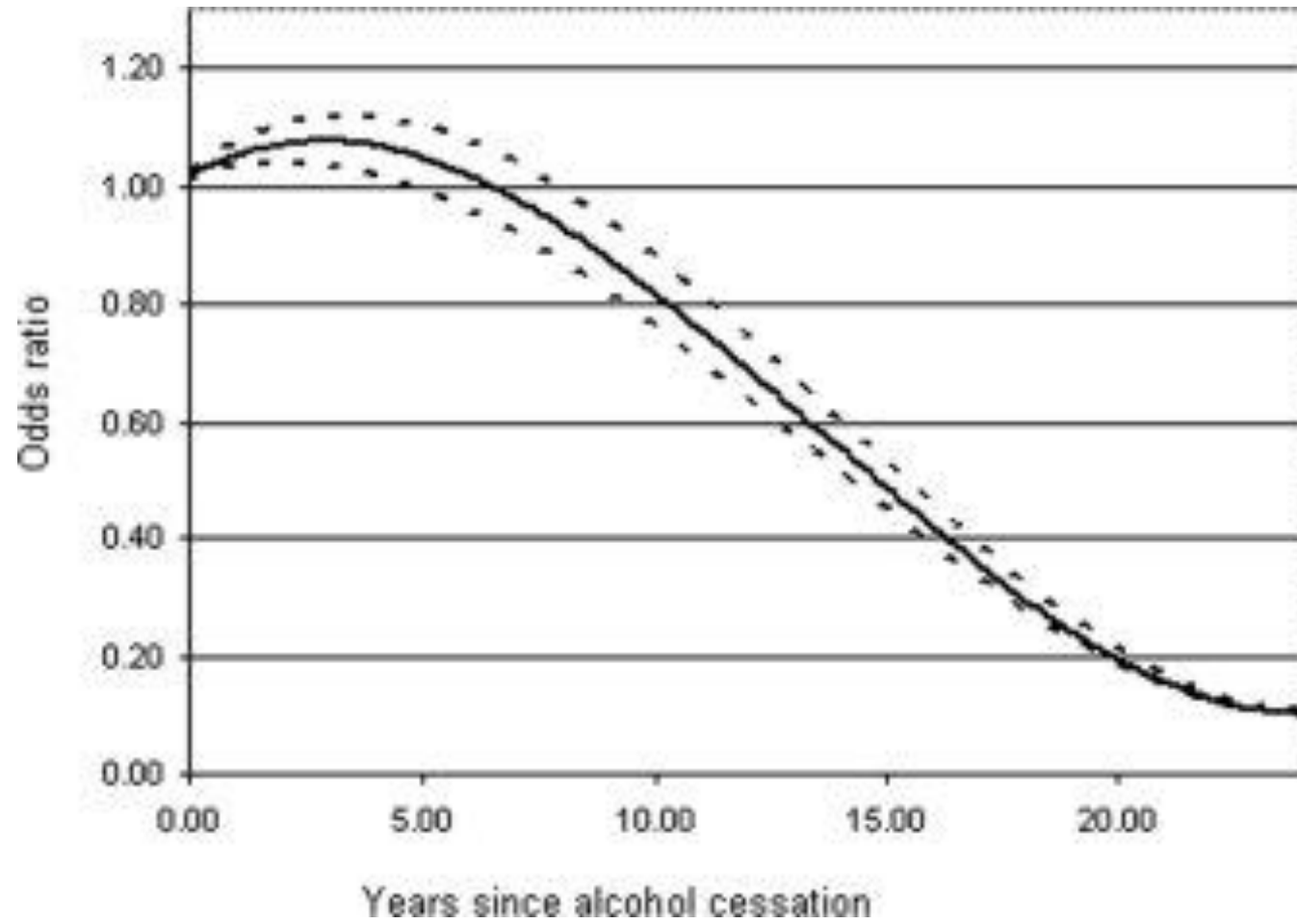
Larynx



Breast (female)



# Alcohol drinking cessation and its effect on oesophageal cancer

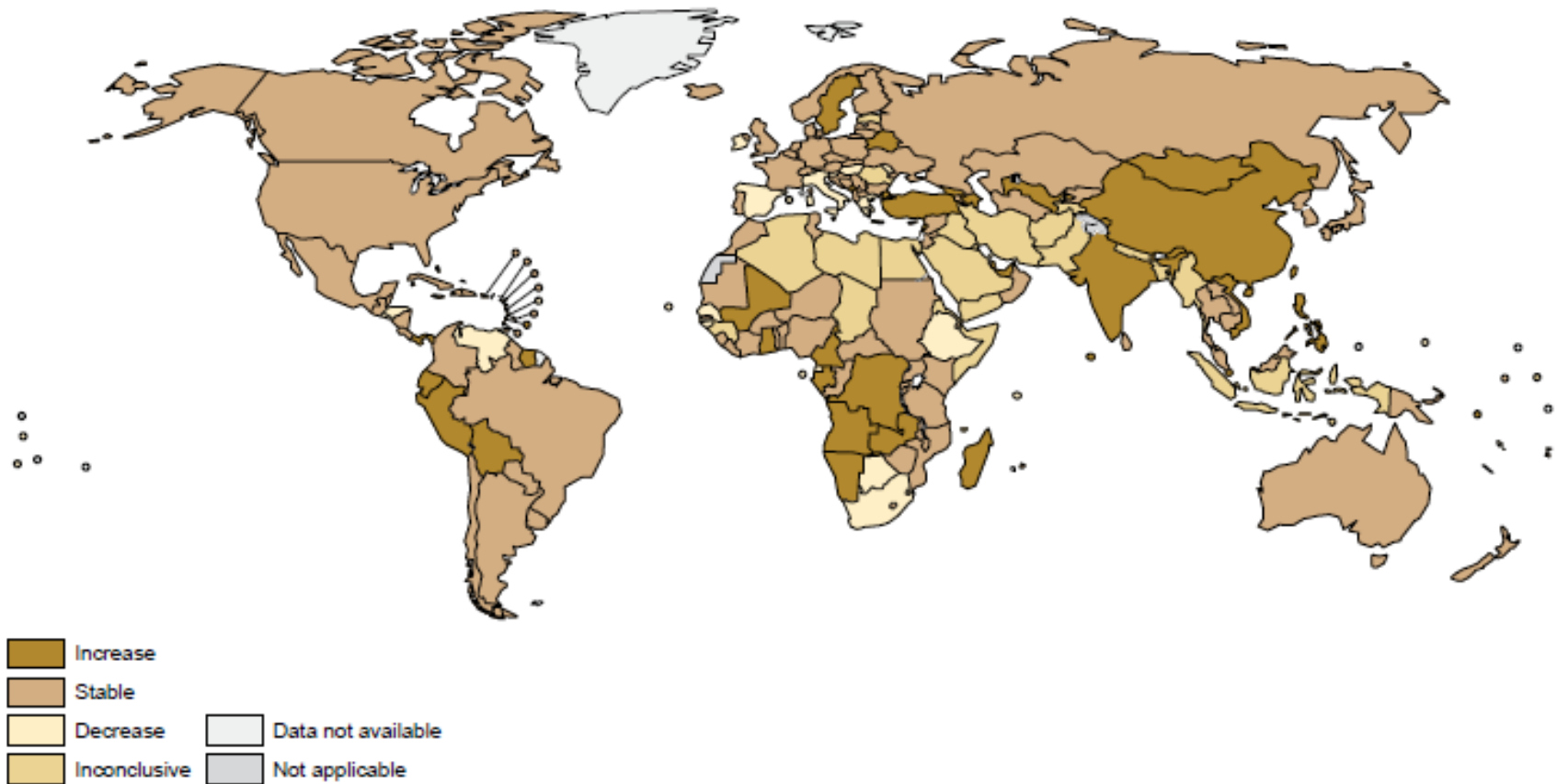


(Rehm et al 2007)

The global burden of cancer is expected to increase because of the aging and increasing size of the world's population, and because of the increasing prevalence of lifestyle factors known to cause cancer.

(Torre et al 2015)

## Five-year change in recorded alcohol per capita (15+ years) consumption, 2006–2010



(WHO 2014)