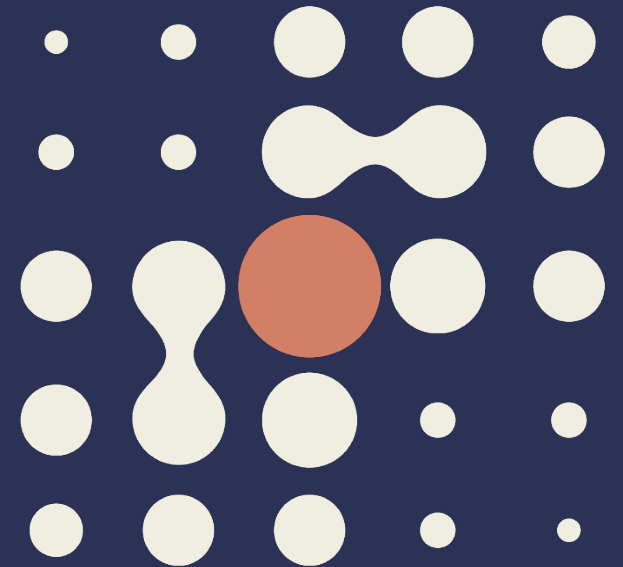


# Alcohol & cancer

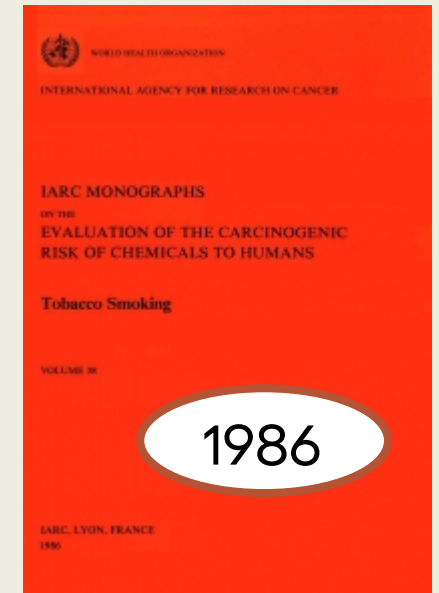
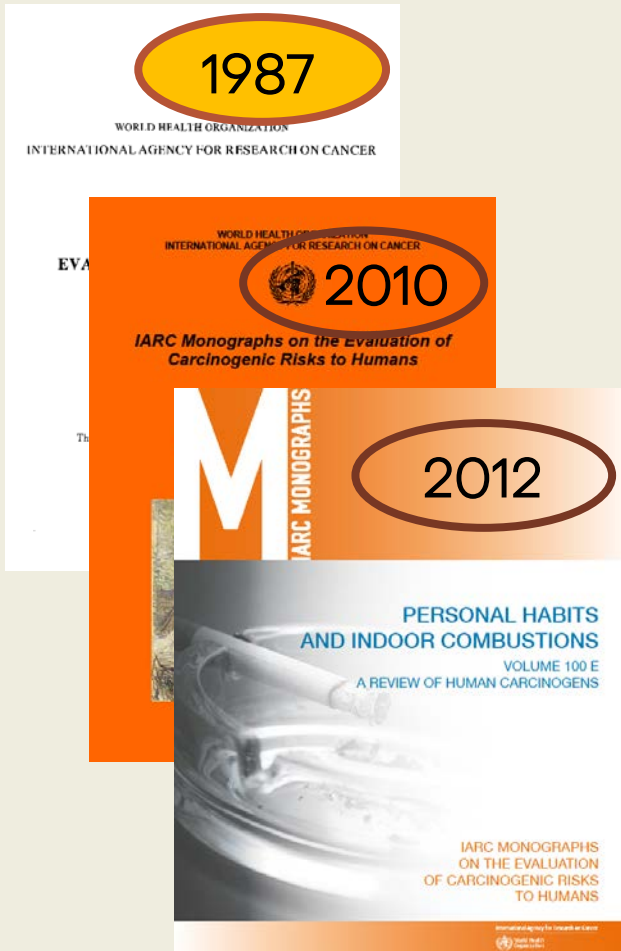
Béatrice Lauby-Secretan, PhD  
Head, *IARC Handbooks* Programme

International Agency  
for Research on Cancer

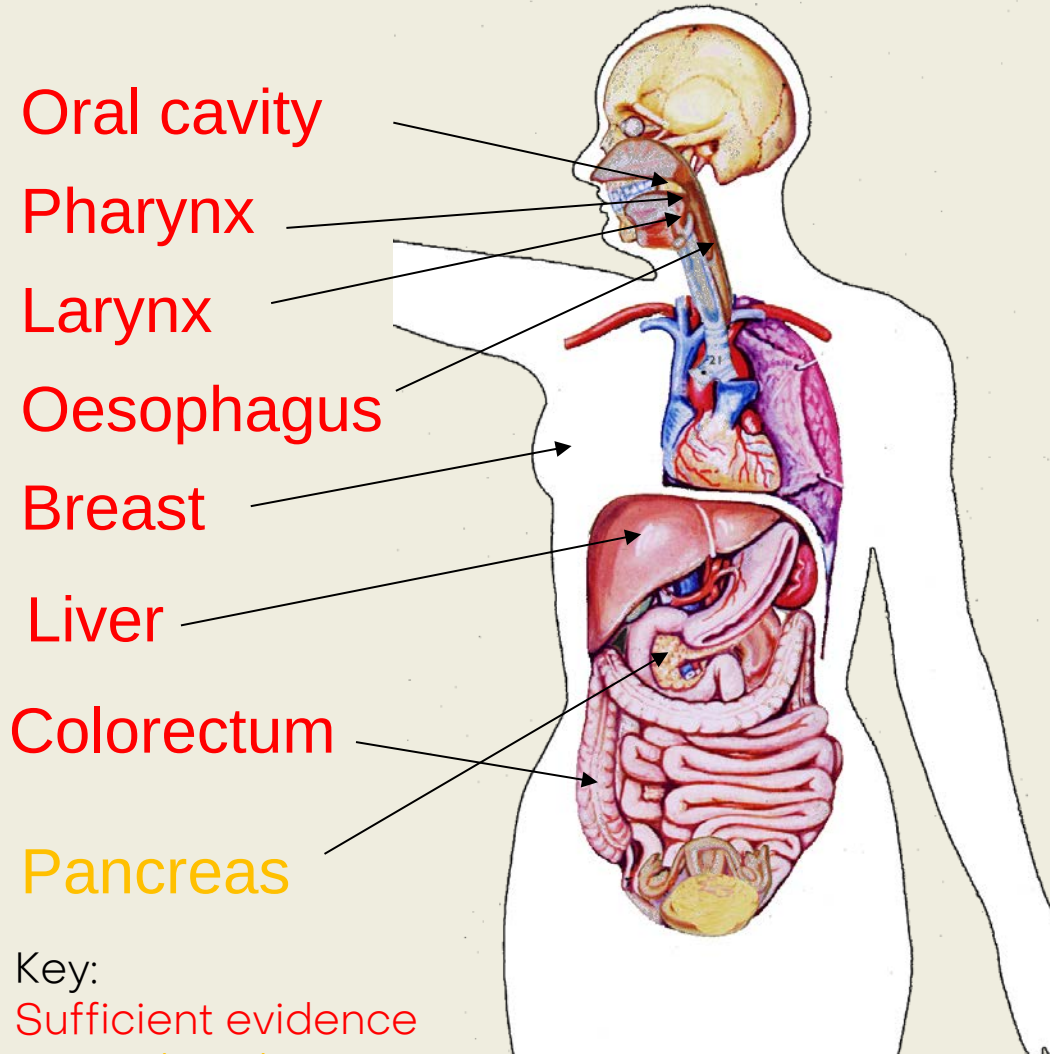


# The carcinogenicity of alcohol has been known since long.

- Consumption of alcohol is carcinogenic to humans (Group 1).
- Ethanol in alcoholic beverages is carcinogenic to humans (Group 1).
- Acetaldehyde associated with the consumption of alcoholic beverages is carcinogenic to humans (Group 1).



# Consumption of alcoholic beverages causes seven types of cancer



Key:  
Sufficient evidence  
Limited evidence



- All types of alcoholic beverages can cause cancer.

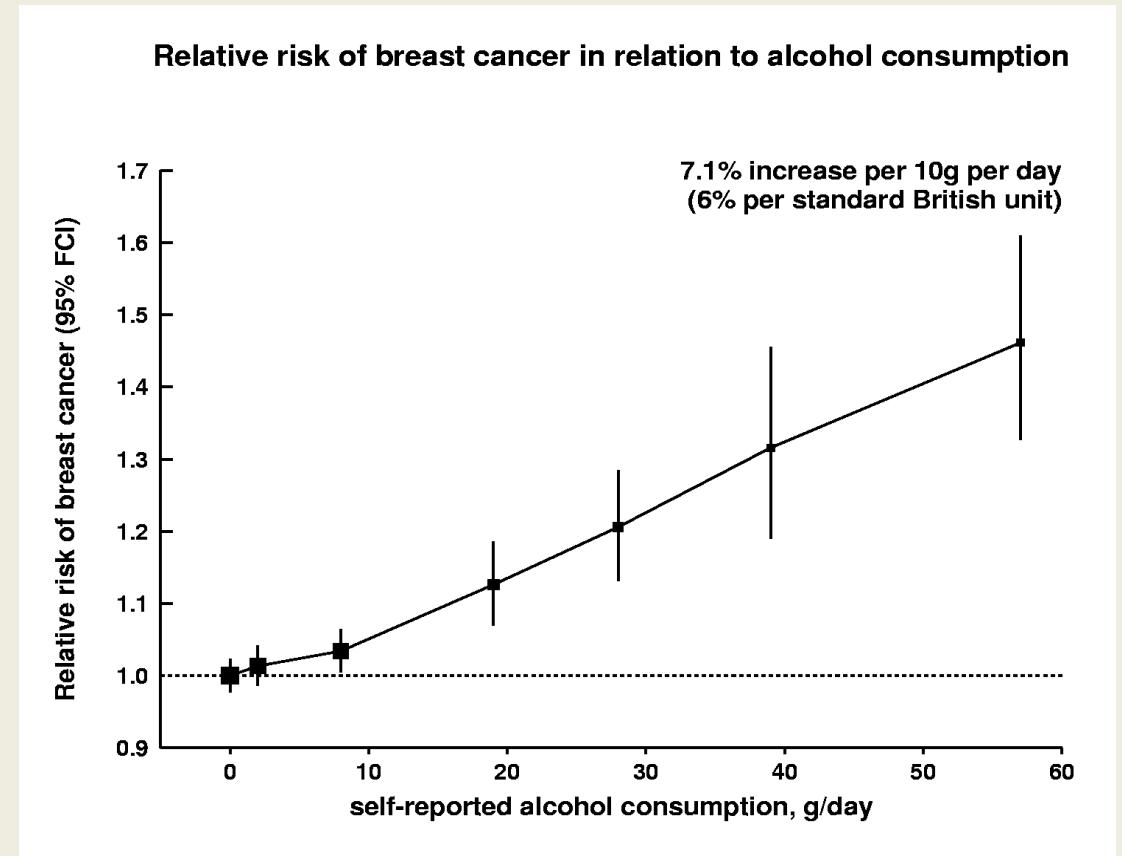
- One unit of measure is 10–12g of pure alcohol.



## The risk is further increased in some populations

- Ethanol is transformed into **acetaldehyde** in the body by bacterial enzymes.
- Acetaldehyde is **genotoxic**.
- Some populations (up to 30% in South-East Asia) have a **deficiency** in the enzyme that metabolizes the ethanol.
  - 10% residual activity
  - Accumulation of acetaldehyde in the body
- **Increased risk** of cancer compared to carriers of common allele.

## The risk already increases with the first glass consumed



# Prevalence and trend of alcohol use

## ➤ **Prevalence of Current Drinking** in 2019 (in adults >15 years) :

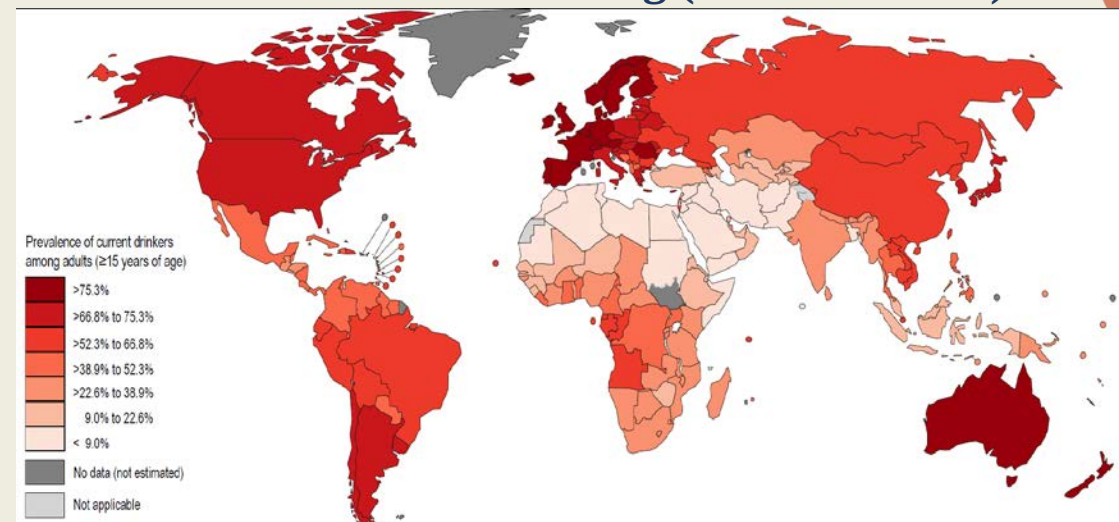
- Globally – 44%
    - Men – 52%, Women – 35%
  - EUR, AMR, WPR – >60%
  - AFR, SEAR – <30%
  - EMR – 4%
- Approx. 21% of global alcohol consumption in 2019 was unrecorded.

## ➤ **Adult *per capita* consumption** follows the same rank order.

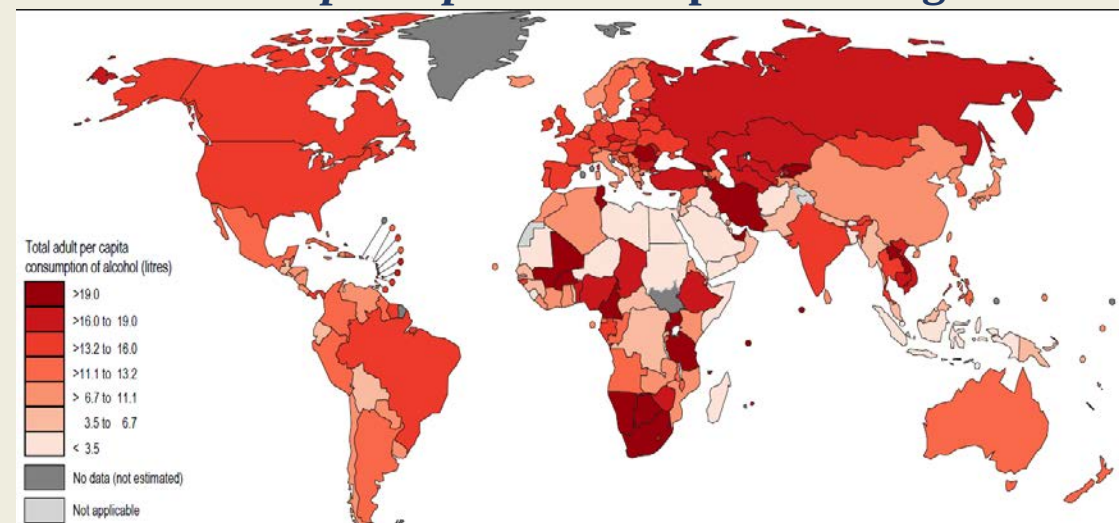
## ➤ **APC among drinkers** was high for some regions with low prevalence of current drinking and vice versa.

## ➤ In all alcohol indicators, men show more detrimental drinking patterns than women.

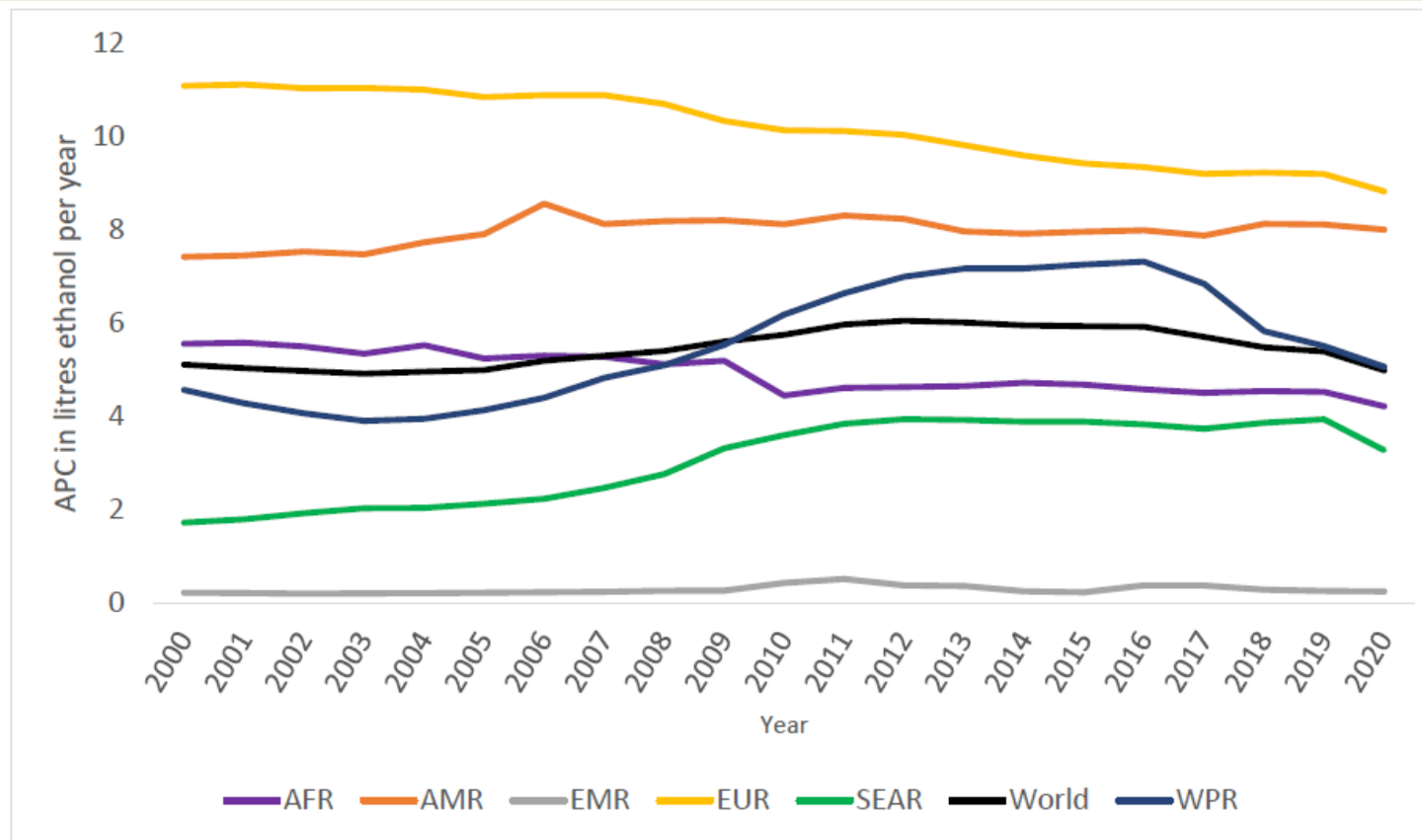
## Prevalence of current drinking (last 12 months)



## Adult alcohol *per capita* consumption among drinkers



# Trends in adult *per capita* consumption since 2000



AFR: African region; AMR: region of the Americas; EMR: Eastern Mediterranean region; EUR: European region; SEAR: South-East Asian region; WPR: Western Pacific Region; APC: adult alcohol per capita consumption.

Data source: WHO (2023).



# Determinants of consumption

## Sex & Gender

- Males > Females
- Gender-diverse populations: evidence gap

## Age

- Initiation: adolescence or early 20s
- Peak: early to mid-20s
- Plateau: into mid-life
- Decrease: older age

## Race, Ethnicity, Culture, Religion

Substantial variations

## Socioeconomic Status (SES)

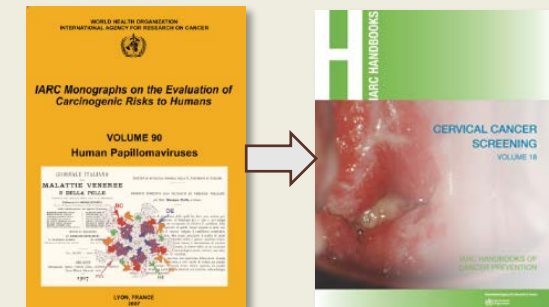
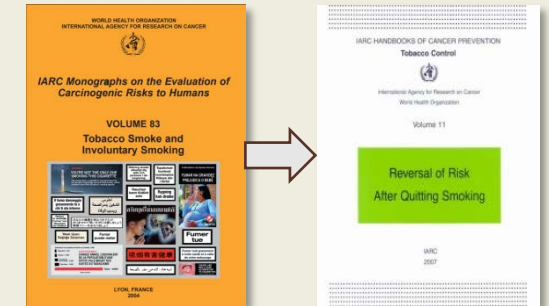
- Higher SES: higher prevalence & frequency
- Lower SES: counterfeit & surrogate alcohol consumption

## Smoking

Strong association with alcohol consumption

# The *Monographs* and *Handbooks* Programmes

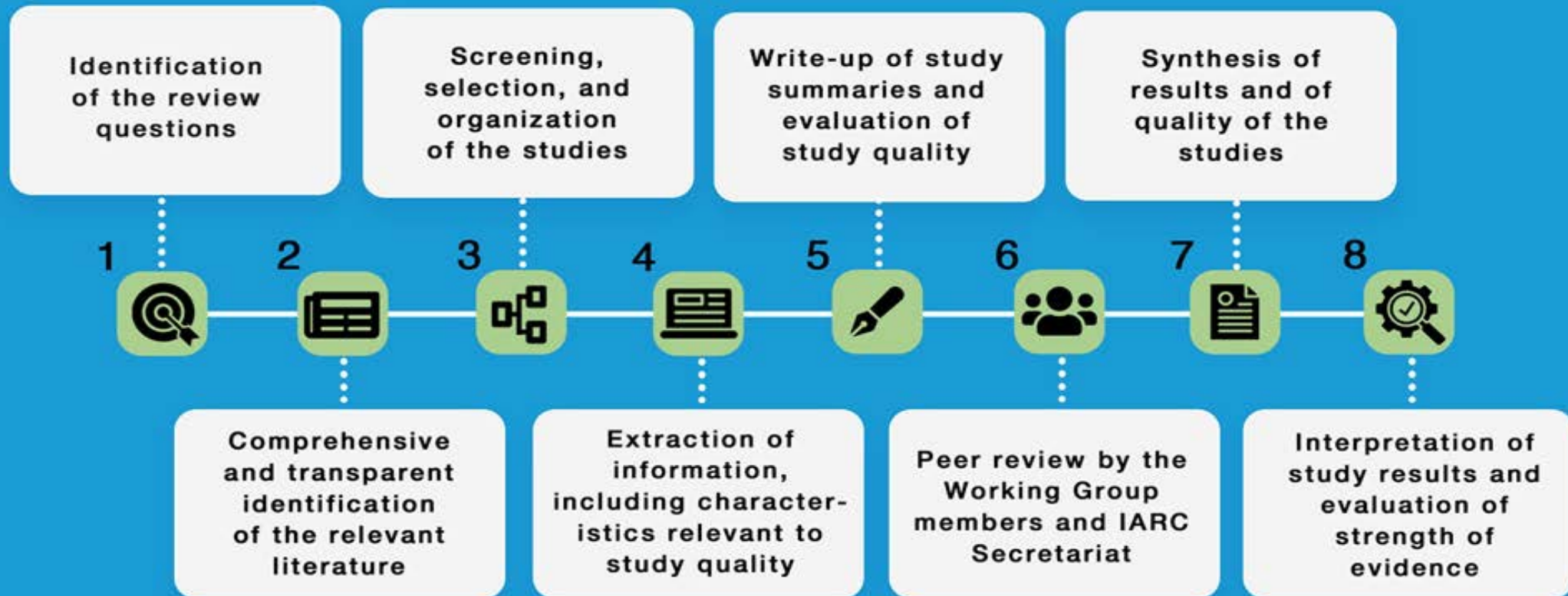
- ✓ The *IARC Monographs* identify risk factors for cancer in humans.
  - ✓ The *IARC Handbooks* series **complements** the *Monographs* evaluations of carcinogenic hazard.
  - ✓ Agents evaluated in the *Monographs* may fuel priorities for the *Handbooks*.
- 
- IARC convenes a **Working Group** of international independent scientists with different expertise.
  - The Working Group performs **comprehensive reviews** and **consensus evaluations** of the agents/ strategies/ interventions.
  - National and international health agencies use the evaluations to develop **evidence-based interventions** or **policy recommendations** for reducing cancer risk at the population level.





# Rigorous and transparent review and evaluation process, performed by WG

## Review and Evaluation Process



# *IARC Handbook on alcohol control*

## Part II



### Reducing consumption of alcoholic beverages

- Taxes and prices
- Availability restrictions
- Marketing restrictions
- Screening and interventions
- Treatment of AUD

## Part I



### Reducing incidence of alcohol-related cancers

- Oral cavity
- Larynx / Pharynx / Oesophagus
- Colon
- Liver
- Breast

# Determinants of reduction or cessation

## Health

- To preserve or improve health
- “Sick quitter” effect

## Smoking

Individuals who do not smoke >  
Individuals who smoke

## Social Networks

- Shared drinking/abstention norms
- Informal social control

## Social Role Transition

- Marriage
- Co-habiting relationship
- Parenthood

## Religion

- Individuals who formerly drank
- Periods of religious significance or fasting

## Affordability & Accessibility

- Economic crisis
- Wars
- Epidemics or pandemics

# Epidemiological studies

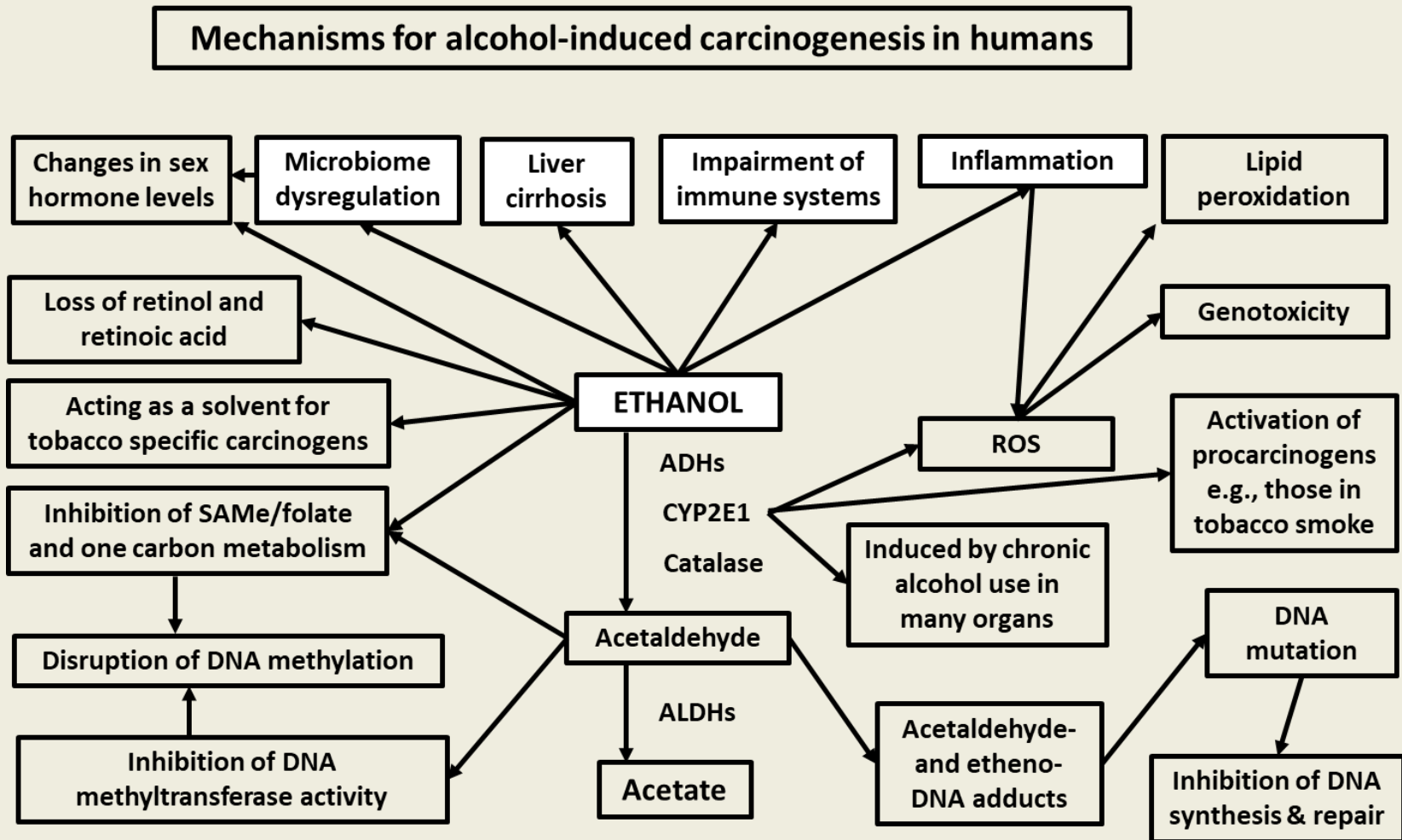
**Table 2.1 – Number of analyses available for reducing consumption, for time since alcohol drinking cessation and for alcohol drinking cessation. Some studies contributed evidence to more than one group.**

| Cancer type               | Types of Analyses <sup>a</sup>            |                                       |                                         |
|---------------------------|-------------------------------------------|---------------------------------------|-----------------------------------------|
|                           | Reducing alcohol consumption <sup>b</sup> | Time since alcohol drinking cessation | Alcohol drinking cessation <sup>c</sup> |
|                           | (n)                                       | (n)                                   | (n)                                     |
| Oral cavity               | 0                                         | 2                                     | 8                                       |
| Pharynx                   | 0                                         | 2                                     | 8                                       |
| Larynx                    | 1                                         | 1                                     | 6                                       |
| Oesophagus                | 1                                         | 8                                     | 14                                      |
| Upper aerodigestive tract | 2                                         | 3                                     | 5                                       |
| Liver                     | 1                                         | 4                                     | 13                                      |
| Colorectum                | 4                                         | 2                                     | 15                                      |
| Female breast             | 4                                         | 1                                     | 17                                      |

UADT, upper aerodigestive tract

## Main challenges:

- Most studies presented RRs for current and former using never drinking as reference category.
- The Working Group recalculated the RR for former drinking vs current drinking.
- Multiplicative interaction with tobacco smoking -> residual confounding?
- For several organ sites (breast, colon), small increase in risk or only with «heavy» drinking



## Mechanistic endpoints reviewed

Immune system-  
Inflammatory-  
Microenvironment

## Oxidative stress

## Genotoxicity

## Microbiome

## Epigenetics

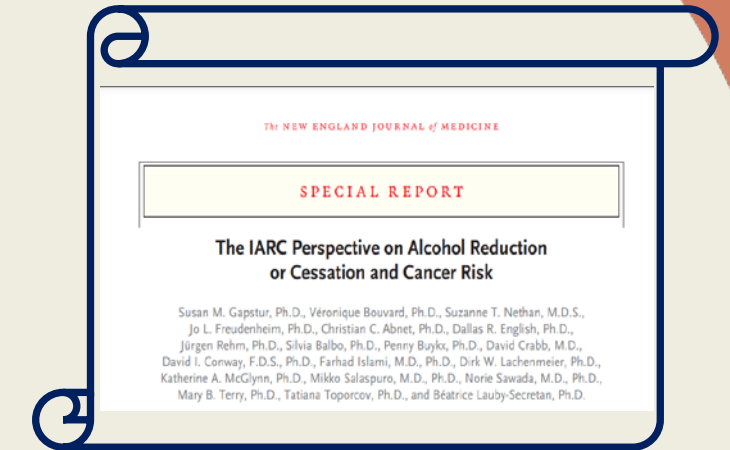
## Endocrine system

## Acetaldehyde metabolism

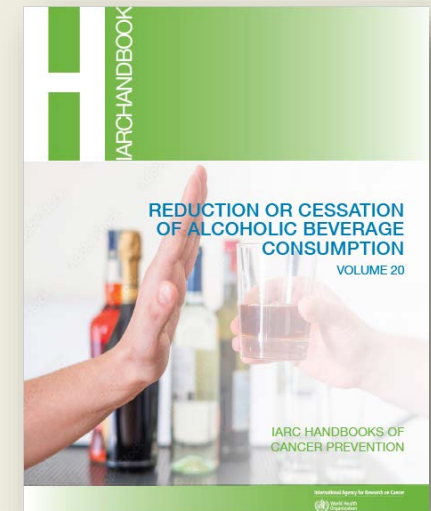
# Evaluations for Vol. 20A

28 Dec. 2023

| Organ Site  | Strength of the Evidence in Humans | Mechanistic endpoints                               |
|-------------|------------------------------------|-----------------------------------------------------|
| Oral cavity | <i>Sufficient</i>                  | Immune system-<br>Inflammatory-<br>Microenvironment |
| Esophagus   | <i>Sufficient</i>                  |                                                     |
| Larynx      | <i>Limited</i>                     | Oxidative stress                                    |
| Colorectum  | <i>Limited</i>                     | Genotoxicity                                        |
| Breast      | <i>Limited</i>                     | Microbiome                                          |
| Pharynx     | <i>Inadequate</i>                  | Epigenetics                                         |
| Liver       | <i>Inadequate</i>                  | Endocrine system                                    |
|             |                                    | Acetaldehyde metabolism                             |



4 July 2024





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[www.handbooks.iarc.fr](http://www.handbooks.iarc.fr)