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European Code against Cancer 4th Edition: Alcohol drinking and cancer☆

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ABSTRACT

Alcohol consumption is the third leading risk factor for disease and mortality in Europe. As evaluated by the International Agency for Research on Cancer (IARC) Monographs, a causal relationship is established for consumption of alcoholic beverages and cancers of the oral cavity, pharynx, larynx, oesophagus, liver, colorectum and female breast, even at low and moderate alcohol intakes. The higher the amount of alcohol consumed, the higher the risk of developing cancer. In Europe, an estimated 10% (95% CI: 7%–13%) of all cancer cases in men and 3% (95% CI: 1%–5%) of all cancer cases in women are attributable to alcohol consumption. Several biological mechanisms explain the carcinogenicity of alcohol; among them, ethanol and its genotoxic metabolite, acetaldehyde, play a major role. Taking all this evidence into account, a recommendation of the 4th edition of European Code against Cancer is: " If you drink alcohol of any type, limit your intake. Not drinking alcohol is better for cancer prevention."

Abbreviations: IARC, International Agency for Research on Cancer; EU, European Union; RR, Relative risk; UADT, Upper aero digestive tract; ADH, Alcohol dehydrogenase; ALDH, Acetaldehyde dehydrogenase; MTHFR, Methylenetetrahydrofolate reductase; ER, Estrogen receptor; PR, Progesterone receptor; WHO, World Health Organization.

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1. Introduction

Alcohol consumption is linked to a large number of health impairments, chronic diseases and deaths worldwide [1]. The 2012 Monograph of the International Agency for Research on Cancer (IARC) strengthens the evidence on the carcinogenicity of alcohol by tumour sites and by mechanisms of alcohol carcinogenesis even for low and moderate alcohol intakes [2,3]. The IARC Monographs reached the conclusion: "alcohol consumption 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)" [2]. Overall, there is no consistent difference in cancer risk between different types of alcoholic beverages [4–6]. While the mechanisms of alcohol carcinogenesis are not fully understood, the direct carcinogenicity of ethanol and its metabolites, the interplay with folate metabolism and the oestrogen pathway have been suggested, all of which would be further modulated by use patterns and genetic and environmental factors [2,3].

Box 1. European Code Against Cancer.

EUROPEAN CODE AGAINST CANCER
12 ways to reduce your cancer risk

1. Do not smoke. Do not use any form of tobacco.
2. Make your home smoke free. Support smoke-free policies in your workplace.
3. Take action to be a healthy body weight.
4. Be physically active in everyday life. Limit the time you spend sitting.
5. Have a healthy diet:
   - Eat plenty of whole grains, pulses, vegetables and fruits.
   - Limit high-calorie foods (foods high in sugar or fat) and avoid sugary drinks.
   - Avoid processed meat; limit red meat and foods high in salt.
6. If you drink alcohol of any type, limit your intake. Not drinking alcohol is better for cancer prevention.
7. Avoid too much sun, especially for children. Use sun protection. Do not use sunbeds.
8. In the workplace, protect yourself against cancer-causing substances by following health and safety instructions.
9. Find out if you are exposed to radiation from naturally high radon levels in your home. Take action to reduce high radon levels.
10. For women:
    - Breastfeeding reduces the mother's cancer risk. If you can, breastfeed your baby.
    - Hormone replacement therapy (HRT) increases the risk of certain cancers. Limit use of HRT.
11. Ensure your children take part in vaccination programmes for:
    - Hepatitis B (for newborns)
    - Human papillomavirus (HPV) (for girls).
12. Take part in organized cancer screening programmes for:
    - Bowel cancer (men and women)
    - Breast cancer (women)
    - Cervical cancer (women).

The European Code Against Cancer focuses on actions that individual citizens can take to help prevent cancer. Successful cancer prevention requires these individual actions to be supported by governmental policies and actions.

Europe is the highest alcohol-consuming region in the world, with an average consumption of more than twice the global average, a high prevalence of hazardous drinkers and an average alcohol-attributable cancer burden which by far exceeds the global average as well [1]. Taken together, the 4th edition of the European Code Against Cancer (Box 1) [7] advocates action-oriented recommendations for the general public. The Code recommends decreasing or cutting alcohol consumption in order to both prevent several types of cancer and to improve overall health.

1.1. European alcohol consumption among adult and young generations

Per capita alcohol consumption has been falling in the European Union (EU) as a whole over the past three decades, while remaining particularly high compared to the global average consumption. The most recent data from the Organisation for Economic Co-operation and Development show that individuals aged ≥15 years drink on average 9.4 L of pure alcohol per year [8]. Consumption tends to be higher in the Central-Eastern and Eastern countries as, for example, Estonia, Lithuania and Austria, all of which have an average consumption higher than 12 L per capita. At the other end of the spectrum, Mediterranean countries (e.g. Italy, Malta and Greece) and Nordic Countries (e.g. Norway, Sweden and Iceland) have relatively lower levels of consumption, in the region of 6–8 L of pure alcohol per adult person (Fig. 1). Gender, age and socio-economic status [9] are key factors in determining levels of alcohol consumption. Men are more likely to consume alcohol than women, and to drink more when they do [10], particularly in Central, Western and Northern EU countries. Compared to older adults, young and middle-aged people tend to drink higher volumes of alcohol [11]. Women with higher level of education tend to drink more alcohol while the opposite is generally true for men [10]. Hazardous drinking behaviours, such as binge drinking (i.e., the consumption of ≥60 g of pure alcohol on the same occasion and at least one day in the last month), have been increasing over the past 20 years [13], especially in Germany and Ireland and among younger generations [14–17]. The volume of alcohol consumed on a single occasion is important for many acute consequences of drinking such as alcohol poisoning, injury and violence. The prevalence of binge drinkers doubled in France and has increased by about 30% in Germany between 2002 and 2008 [13]. Repeated drunkenness among 15-years olds was reported by 36% of girls and 40% of boys in 2010 [8].

1.2. Effect of alcohol drinking on coronary heart disease

The evidence of a reduced risk of coronary heart disease at light to moderate alcohol consumption is important to consider. Several studies suggest a lower risk of both nonfatal myocardial infarction and fatal heart disease, likely confined to middle-aged or older individuals, when consuming one drink every second day compared to none [18–20]. However, controversy remains about whether this relationship is truly causal. Recent studies argue that alcohol consumption may increase the risk of heart disease even at low intakes and that the observed protective associations could be due to reverse causation and residual confounding [21,22].

2. Association with cancer

2.1. Cancer types associated with alcohol drinking

As evaluated by the IARC Monographs, alcohol consumption causes cancers of the oral cavity, pharynx, larynx, oesophagus,