International Agency for Research on Cancer

World Health Organization

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Global and regional cancer burden attributable to modifiable risk factors to inform prevention

Questions and Answers (Q&A)

1. What's new in this study?

This study[1] provides global estimates of new cancer cases in 2022 attributable to a broad set of 30 modifiable risk factors, including 9 infectious agents and 13 occupational exposures, across 36 cancer types in 185 countries. Combining behavioural, environmental, occupational, and infectious risk factors in a single framework and explicitly accounting for lag time between exposure and cancer onset, the study presents sex- and country-specific estimates, highlighting how the leading causes of preventable cancer differ markedly between regions and between women and men.

2. Why is this study important?

Nearly 4 in 10 new cancer cases worldwide in 2022 – about 7.1 million out of 18.7 million – are attributable to modifiable risk factors, underlining the scale of preventable cancer. The study identifies which risk factors matter most in each region (e.g. infections in many low- and middle-income countries versus tobacco smoking and excess body weight, measured using body mass index, in high-income settings), providing governments with concrete targets for investment and prevention policy. By focusing on incidence rather than deaths and including infections and ultraviolet radiation, this study fills gaps in earlier global assessments and strengthens the evidence base for primary prevention as a key pillar of cancer control.

3. What are the overall take-home messages and recommendations based on the analysis?

Cancer can be prevented, and modifiable risk factors are responsible for a large share of the global cancer burden. Tobacco control strategies, infection control measures (notably for human papillomavirus, hepatitis B virus, and hepatitis C virus), reduction of alcohol consumption, and policies addressing excess body weight, physical inactivity, and air pollution should be top priorities, tailored to local patterns. Countries should implement, monitor, and evaluate comprehensive policy packages (e.g. World Health Organization [WHO] "best buys" for tobacco and alcohol, vaccination and screening programmes, and environmental and occupational regulations), supported by improved surveillance systems for cancer and its risk factors.

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[1] Fink H, Langselius O, Vignat J, Rumgay H, Rehm J, Martinez RX, et al. (2026). Global and regional cancer burden attributable to modifiable risk factors to inform prevention. *Nat Med*. Published online 3 February 2026; https://doi.org/10.1038/s41591-026-04219-7

4. What are the 13 occupational exposures included, and why was the focus placed on them?

The 13 occupational carcinogens included in this assessment are asbestos, arsenic, benzene, beryllium, cadmium, chromium, diesel engine exhaust, formaldehyde, nickel, polycyclic aromatic hydrocarbons, silica, sulfuric acid, and trichloroethylene. These agents were selected because they are established causes of cancer in humans (based on *IARC Monographs* evaluations), have sufficiently robust exposure and risk data for many countries, and are amenable to prevention through regulation and workplace protection. However, they represent only a subset of all occupational carcinogens, and thus the results are likely to underestimate the full occupational cancer burden, underscoring the need for stronger surveillance and monitoring of occupational hazards in line with international labour and occupational health standards.

5. What types of occupational exposures were evaluated, and how significant were they as a contributor to cancer incidence?

The study evaluates occupational exposure to selected chemical and physical agents, such as asbestos, diesel engine exhaust, silica, metals, and certain solvents, using the WHO and International Labour Organization (ILO) estimates of exposure prevalence (how many people are exposed to these chemicals) and established relative risks. Globally, occupational exposures account for a modest but meaningful proportion of cancers compared with major behavioural and infectious risk factors; lung cancer and mesothelioma make up most of the attributable burden, and higher fractions are observed in some regions and among men.

6. What is suboptimal breastfeeding, and how and why does it increase the risk of cancer?

Suboptimal breastfeeding is defined as breastfeeding durations shorter than the optimal level, which was taken in this study as continued breastfeeding for 12–23 months, given evidence that protection against breast cancer strengthens when breastfeeding extends beyond 6 months. In addition to other benefits to the mother and the baby, breastfeeding reduces a woman's risk of breast cancer, probably by lowering cumulative lifetime exposure to endogenous hormones and promoting differentiation of breast tissue. Therefore, shorter durations of breastfeeding mean less of this protective effect and more breast cancer cases at the population level.

7. What are the nine infectious factors included, and why was the focus placed on them?

The infectious agents considered are *Helicobacter pylori*, high-risk human papillomavirus (HPV; types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 59), hepatitis B virus (HBV), hepatitis C virus (HCV), Epstein–Barr virus, human herpesvirus type 8, *Schistosoma haematobium*, human T-cell lymphotropic virus type 1, *Opisthorchis viverrini*, and *Clonorchis sinensis*. These agents have well-established causal links with specific cancers (e.g. cervical cancer, stomach cancer, liver cancer, bladder cancer, and Kaposi sarcoma) and remain highly prevalent in many low- and middle-income countries. They are also highly preventable through vaccines, treatment, and infection control measures.

8. Why do infectious agents remain a major contributor to the cancer burden in low- and middle-income regions, and what prevention strategies does the study highlight as most effective?

Infections account for a particularly large share of cancers in sub-Saharan Africa and parts of Asia, where high prevalence of HPV, *H. pylori*, HBV, HCV, and other agents is sustained by limited access to vaccines, testing and screening, safe water and sanitation, and timely treatment. The study highlights several effective strategies: scaling up HPV vaccination, implementing and maintaining HBV birth-dose vaccination and broader HBV/HCV control, and implementing test-and-treat or eradication programmes for *H. pylori* in high-risk settings.

9. Why is the proportion of cancers attributable to modifiable risk factors higher in men than in women?

Overall, about 45.4% of cancers in men versus 29.7% of cancers in women are attributable to the included modifiable risk factors. In men, the fraction is especially high in East Asia and parts of Europe. Men tend to have higher exposure to several major risk factors – notably tobacco smoking, alcohol consumption, and some occupational carcinogens – and these factors drive high burdens of lung, stomach, liver, and colorectal cancers, whereas women's risk profile is more diversified and variable between higher-income and lower-income regions. Some determinants that are particularly relevant for women, including several reproductive and hormonal factors, are not captured in this analysis, so the proportion of cancers attributable to modifiable risk factors in women is likely to be underestimated. The findings reinforce the need for gender-responsive cancer prevention and research, ensuring that policies and interventions are designed and implemented in ways that address the distinct risk profiles and social contexts of women and men.

10. What should be done to tackle this cancer burden?

Governments should intensify comprehensive tobacco and alcohol policies (taxation, marketing restrictions, smoke-free laws, and availability controls), alongside interventions to promote healthy diets, physical activity, and healthy body weight. Expanding coverage of HPV and HBV vaccination, infection control programmes, air quality improvements, ultraviolet radiation protection campaigns, and enforcement of occupational safety standards are critical, particularly when combined with strengthened cancer and risk factor surveillance systems.

11. What are the limitations of the study?

The estimates rely on the quality and completeness of available data on exposures, relative risks, and cancer incidence, which vary across countries, especially in low- and middle-income settings, and some population attributable fractions required modelling or imputation. The analysis assumes broadly similar relative risks across populations, applies simplified lag times between exposure and cancer onset, and uses a framework that treats exposures largely independently, so it cannot fully capture clustering and interactions between risk factors or uncertainty (formal uncertainty intervals are not presented). Some relevant risk factors (e.g. certain dietary components, synthetic hormones, and pesticides) were excluded because of data constraints, so the true preventable cancer burden is likely to be higher than estimated in this study.

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