

World Cancer Report: Cancer Research for Cancer Prevention

Questions and Answers

What is the IARC *World Cancer Report*?

The new IARC *World Cancer Report*¹ is the product of a collaboration between leading international scientists that describes multiple aspects of cancer research for cancer prevention. Starting with the latest trends in cancer incidence and mortality worldwide, [this publication](#) provides wide-ranging insights into cancer prevention based on the known causes of cancer, factors that determine how cancer develops, and the behaviour of different tumour types, and presents a broad scope of interventions to reduce the cancer burden from a global perspective. The scientific disciplines covered include descriptive epidemiology (the distribution of disease, and specifically cancer, within particular populations), cancer etiology (including infections, chemicals, radiation, metabolism and nutrition, and genetic factors), cellular and molecular biology, toxicology and pathology, behavioural and social sciences, public health, biostatistics, and informatics.

Who is this publication for?

World Cancer Report: Cancer Research for Cancer Prevention features the latest research from across multiple disciplines. It is aimed primarily at cancer researchers, academia, health professionals, and policy-makers, but this expert report remains accessible to a wider audience, including the general public, civil society, and the private sector.

What is the objective of the report?

The IARC [World Cancer Report](#) is the most comprehensive overview of relevant research yet available. This latest publication is part of a [well-established series](#). Produced about every 5 years, *World Cancer Report* provides the latest evidence on cancer prevention and serves as an authoritative reference in the cancer research community.

The volume editors of this new *World Cancer Report* are [IARC Director Dr Elisabete Weiderpass, former IARC Director Dr Christopher P. Wild](#), and [Professor Bernard W. Stewart](#) of the University of New South Wales, Sydney, Australia.

¹ Wild CP, Weiderpass E, Stewart BW, editors (2020). *World Cancer Report: Cancer Research for Cancer Prevention*. Lyon, France: International Agency for Research on Cancer. Available from: <http://publications.iarc.fr/586>.

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What does the latest *World Cancer Report* include?

Based on how cancer is distributed worldwide, and differences between and within particular countries, this new assessment offers a comprehensive overview of the global cancer burden as a starting point for documenting all known options for cancer prevention through the latest research.

The publication documents the causes of cancer, discussing infectious agents, alcohol consumption, metabolism and nutrition, physical activity, sedentary behaviour, and obesity as well as dietary carcinogens, occupational exposure, and the contamination of air, water, and soil, among other topics.

The biological processes that affect cancer development are also presented, with a focus on sporadic cancer, genomics and susceptibility, gene–environment interactions, and DNA repair, as well as inflammation and its pivotal role in cancer pathogenesis, to name but a few.

A full section is devoted to multiple chapters on the inequalities that affect the distribution of cancer within communities, clearly illustrating that in both high-income countries and low- and middle-income countries, there are groups of people in every community who are at a major disadvantage with respect to risk of cancer.

Options for prevention include avoiding exposure to carcinogens, for example by smoking cessation, as well as vaccination, screening, monitoring those at high genetic risk, using therapeutics to reduce cancer risk, and emerging molecular technology for early diagnosis.

What's new in this *World Cancer Report*?

The impact of cancer on the global community can now be defined with greater precision than ever before. The causes of cancer are now better understood in terms of both the precise biological changes induced by causative agents and the characteristics of exposed people who prove to be susceptible to cancer development. This is the broad background against which both biological and sociological variables determine the distribution of cancer and, in many instances, its potential prevention.

Factors determining cancer development and prevention

The causes of cancer vary markedly in their character and impact. Cancer is just one of the diseases caused by tobacco smoking, but lung cancer and other cancer types caused by smoking are among the most lethal of such diseases. Millions of people are infected with human papillomavirus (HPV), *Helicobacter pylori*, or hepatitis B virus or hepatitis C virus, and are thus at risk of developing cervical cancer, stomach cancer, and liver cancer, respectively. Complex biological processes, including DNA repair, the occurrence of overweight or obesity, and the consequences of inflammation, are crucial determinants of cancer development. These processes are delineated in the new *World Cancer Report*.

Although much is known about cancer causation, for many tumour types few, if any, relevant carcinogens have been identified. This applies to, for example, brain cancer and prostate cancer. For lung cancer, a broad spectrum of causes are known, beginning with active smoking and extending to second-hand

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smoke, certain occupations, and atmospheric pollution. Despite this, some individual cases of lung cancer have no evident cause. Such tumours, along with most cases of brain cancer and prostate cancer, are often described as sporadic. Another exciting first for the new *World Cancer Report* is a discussion of sporadic cancer and the biological principles that are thought to underpin the development of such cancer.

Biological processes are common to all people, but the distribution of cancer in all countries is subject to socioeconomic differences. For the first time, inequalities as a determinant of cancer incidence and mortality are specifically addressed in a separate section of the new *World Cancer Report*. Previous *World Cancer Reports* described the disproportionately increasing burden of cancer in low- and middle-income countries, and this trend clearly persists. However, in all countries, irrespective of income grouping, sections of the communities are disadvantaged both in relation to circumstances of risk and with respect to prevention and treatment services. In the new *World Cancer Report*, separate chapters evaluate inequalities that affect cancer incidence in Africa, China, Europe, India, and the USA.

Increasing options for cancer prevention

Cancer prevention is often identified with community campaigns, such as those to promote smoking avoidance or cessation, to ensure that exposure to asbestos does not occur in the workplace and elsewhere, to prevent particular infections, and, particularly for fair-skinned people, to avoid deliberate sun exposure without sun protection. All these ways of preventing cancer remain relevant; they are proven to reduce cancer incidence, and research continues to demonstrate their efficacy. However, cancer prevention involves a far greater range of initiatives than avoiding exposure to known carcinogens. Perhaps the most effective means of cancer prevention, and one that has the prospect of eliminating one tumour type completely, is vaccination against human papillomavirus (HPV), which is the cause of cervical cancer. Vaccination against hepatitis B and C viruses also has a proven impact on the incidence of liver cancer in certain communities.

The single greatest challenge to cancer prevention identified in the new *World Cancer Report* is overweight or obesity. Although the prevalence of overweight or obesity is readily identified with populations in high-income countries, this condition is now evident in many regions of the world. Multiple tumour types, including colorectal cancer and breast cancer, are attributable, at least in part, to overweight or obesity. The biological mechanisms by which overweight or obesity increases the risk of various tumour types are not yet fully explained. Altering community behaviour to reduce the prevalence of overweight or obesity is recognized as a means of preventing not only certain types of cancer but also other chronic diseases such as type 2 diabetes.

For sporadic cancers in different organs (i.e. cancers for which no recognized exposure accounts for tumour development), options for prevention are emerging and are being evaluated by researchers. For multiple tumour types, *World Cancer Report* discusses population-based screening for detection of cancer at an early stage or of preconditions leading to cancer development. One chapter describes early diagnosis on the basis of tumour DNA detected in blood, and another describes how individual susceptibility to tumorigenesis may be determined using genomic data.

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What is the difference between the *WHO Report on Cancer* and the *IARC World Cancer Report*?

In May 2017, the cancer resolution ([WHA70.12](#)) adopted at the Seventieth World Health Assembly requested WHO, in collaboration with IARC, to produce a comprehensive global report providing evidence-based public health- and policy-oriented guidance on cancer for WHO Member States. The outcome of this charge is the *WHO Report on Cancer: Setting priorities, investing wisely and providing care for all*. The WHO report complements the *IARC World Cancer Report* by synthesizing evidence to translate the latest knowledge into actionable policies to support governments to prevent and control cancer globally. These two complementary publications, launched jointly by WHO and IARC, will each contribute to an increased awareness, both professionally and in the wider community, of the lives affected by cancer, and what may be done, is being done, and should be done to decrease the impact of this disease.

What are the key messages in the *IARC World Cancer Report*?

Cancer is the second most common cause of death worldwide, and the burden of cancer is increasing in all countries. This poses a rapidly growing threat to individuals, health systems, and economies globally. Countries must accelerate their multisectoral, evidence-based, and resource-appropriate responses now to avoid 7 million cancer deaths over the next decade.

The cancer burden is predicted to nearly double over the next decade in low- and middle-income countries. If no additional action is taken, there will be millions of additional premature deaths from cancer over the next decade, and we will fail to achieve the United Nations Sustainable Development Goals target (Target 3.4) to reduce the total premature mortality from noncommunicable diseases, including cancer, by one third by 2030.

The global cancer burden is expected to reach 29 million new cancer cases per year by 2040, a 62% increase on the estimated 18.1 million cancers in 2018. The increases in the cancer incidence burden will affect all countries, but the predicted increases will be proportionately greatest in low-income countries, due to known infectious agents, chemicals including tobacco, and obesity.

World Cancer Report documents how the cancer burden continues to grow and emphasizes the need for urgent implementation of efficient prevention strategies to curb the disease.

For cervical cancer, lung cancer, and most other cancer types, the relative incidence is greatest among those at socioeconomic disadvantage, particularly including ethnic and racial minorities and Indigenous populations. Cancer inequalities reflect the cultures and environments in which people are born, live, and work and the uneven application of preventive measures, both between and within countries.

Vaccination and screening are effective for some cancer types but are differentially available. Most genomic data are from studies in individuals of European ancestry. In the future, the characterization of individual susceptibility to cancer and the closer identification of those at risk will enable precision cancer prevention.

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The International Agency for Research on Cancer (IARC) is part of the World Health Organization. Its mission is to coordinate and conduct research on the causes of human cancer and the mechanisms of carcinogenesis, and to develop scientific strategies for cancer control. The Agency is involved in both epidemiological and laboratory research and disseminates scientific information through publications, meetings, courses, and fellowships. If you wish your name to be removed from our press release emailing list, please write to com@iarc.fr.