

Key facts

- **Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020, or nearly one in six deaths.**
- **The most common cancers are breast, lung, colon and rectum and prostate cancers.**
- **Around one-third of deaths from cancer are due to tobacco use, high body mass index, alcohol consumption, low fruit and vegetable intake, and lack of physical activity. In addition, air pollution is an important risk factor for lung cancer.**
- **Cancer-causing infections, such as human papillomavirus (HPV) and hepatitis, are responsible for approximately 30% of cancer cases in low- and lower-middle-income countries.**
- **Many cancers can be cured if detected early and treated effectively.**

Overview

Cancer is a generic term for a large group of diseases that can affect any part of the body. Other terms used are malignant tumours and neoplasms. One defining feature of cancer is the rapid creation of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs; the latter process is referred to as metastasis. Widespread metastases are the primary cause of death from cancer.

The problem

Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020 (1). The most common in 2020 (in terms of new cases of cancer) were:

- **breast (2.26 million cases);**
- **lung (2.21 million cases);**
- **colon and rectum (1.93 million cases);**
- **prostate (1.41 million cases);**
- **skin (non-melanoma) (1.20 million cases); and**
- **stomach (1.09 million cases).**

The most common causes of cancer death in 2020 were:

- **lung (1.80 million deaths);**

- colon and rectum (916 000 deaths);
- liver (830 000 deaths);
- stomach (769 000 deaths); and
- breast (685 000 deaths).

Each year, approximately 400 000 children develop cancer. The most common cancers vary between countries. Cervical cancer is the most common in 23 countries.

Causes

Cancer arises from the transformation of normal cells into tumour cells in a multi-stage process that generally progresses from a pre-cancerous lesion to a malignant tumour. These changes are the result of the interaction between a person's genetic factors and three categories of external agents, including:

- physical carcinogens, such as ultraviolet and ionizing radiation;
- chemical carcinogens, such as asbestos, components of tobacco smoke, alcohol, aflatoxin (a food contaminant), and arsenic (a drinking water contaminant); and
- biological carcinogens, such as infections from certain viruses, bacteria, or parasites.

WHO, through its cancer research agency, the International Agency for Research on Cancer (IARC), maintains a classification of cancer-causing agents.

The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age. The overall risk accumulation is combined with the tendency for cellular repair mechanisms to be less effective as a person grows older.

Risk factors

Tobacco use, alcohol consumption, unhealthy diet, physical inactivity and air pollution are risk factors for cancer and other noncommunicable diseases.

Some chronic infections are risk factors for cancer; this is a particular issue in low- and middle-income countries. Approximately 13% of cancers diagnosed in 2018 globally were attributed to carcinogenic infections, including *Helicobacter pylori*, human papillomavirus (HPV), hepatitis B virus, hepatitis C virus, and Epstein-Barr virus (2).

Hepatitis B and C viruses and some types of HPV increase the risk for liver and cervical cancer, respectively. Infection with HIV increases the risk of developing

cervical cancer six-fold and substantially increases the risk of developing select other cancers such as Kaposi sarcoma.

Reducing the burden

Between 30 and 50% of cancers can currently be prevented by avoiding risk factors and implementing existing evidence-based prevention strategies. The cancer burden can also be reduced through early detection of cancer and appropriate treatment and care of patients who develop cancer. Many cancers have a high chance of cure if diagnosed early and treated appropriately.

Prevention

Cancer risk can be reduced by:

- **not using tobacco;**
- **maintaining a healthy body weight;**
- **eating a healthy diet, including fruit and vegetables;**
- **doing physical activity on a regular basis;**
- **avoiding or reducing consumption of alcohol;**
- **getting vaccinated against HPV and hepatitis B if you belong to a group for which vaccination is recommended;**
- **avoiding ultraviolet radiation exposure (which primarily results from exposure to the sun and artificial tanning devices) and/or using sun protection measures;**
- **ensuring safe and appropriate use of radiation in health care (for diagnostic and therapeutic purposes);**
- **minimizing occupational exposure to ionizing radiation; and**
- **reducing exposure to outdoor air pollution and indoor air pollution, including radon (a radioactive gas produced from the natural decay of uranium, which can accumulate in buildings — homes, schools and workplaces).**

Early detection

Cancer mortality is reduced when cases are detected and treated early. There are two components of early detection: early diagnosis and screening.

Early diagnosis

When identified early, cancer is more likely to respond to treatment and can result in a greater probability of survival with less morbidity, as well as less expensive

treatment. Significant improvements can be made in the lives of cancer patients by detecting cancer early and avoiding delays in care.

Early diagnosis consists of three components:

- being aware of the symptoms of different forms of cancer and of the importance of seeking medical advice when abnormal findings are observed;
- access to clinical evaluation and diagnostic services; and
- timely referral to treatment services.

Early diagnosis of symptomatic cancers is relevant in all settings and the majority of cancers. Cancer programmes should be designed to reduce delays in, and barriers to, diagnosis, treatment and supportive care.

Screening

Screening aims to identify individuals with findings suggestive of a specific cancer or pre-cancer before they have developed symptoms. When abnormalities are identified during screening, further tests to establish a definitive diagnosis should follow, as should referral for treatment if cancer is proven to be present.

Screening programmes are effective for some but not all cancer types and in general are far more complex and resource-intensive than early diagnosis as they require special equipment and dedicated personnel. Even when screening programmes are established, early diagnosis programmes are still necessary to identify those cancer cases occurring in people who do not meet the age or risk factor criteria for screening.

Patient selection for screening programmes is based on age and risk factors to avoid excessive false positive studies. Examples of screening methods are:

- HPV test (including HPV DNA and mRNA test), as preferred modality for cervical cancer screening; and
- mammography screening for breast cancer for women aged 50–69 residing in settings with strong or relatively strong health systems.

Quality assurance is required for both screening and early diagnosis programmes.

Treatment

A correct cancer diagnosis is essential for appropriate and effective treatment because every cancer type requires a specific treatment regimen. Treatment usually includes surgery, radiotherapy, and/or systemic therapy (chemotherapy, hormonal treatments, targeted biological therapies). Proper selection of a

treatment regimen takes into consideration both the cancer and the individual being treated. Completion of the treatment protocol in a defined period of time is important to achieve the predicted therapeutic result.

Determining the goals of treatment is an important first step. The primary goal is generally to cure cancer or to considerably prolong life. Improving the patient's quality of life is also an important goal. This can be achieved by support for the patient's physical, psychosocial and spiritual well-being and palliative care in terminal stages of cancer.

Some of the most common cancer types, such as breast cancer, cervical cancer, oral cancer, and colorectal cancer, have high cure probabilities when detected early and treated according to best practices.

Some cancer types, such as testicular seminoma and different types of leukaemia and lymphoma in children, also have high cure rates if appropriate treatment is provided, even when cancerous cells are present in other areas of the body.

There is, however, a significant variation in treatment availability between countries of different income levels; comprehensive treatment is reportedly available in more than 90% of high-income countries but less than 15% of low-income countries (3).

Palliative care

Palliative care is treatment to relieve, rather than cure, symptoms and suffering caused by cancer and to improve the quality of life of patients and their families. Palliative care can help people live more comfortably. It is particularly needed in places with a high proportion of patients in advanced stages of cancer where there is little chance of cure.

Relief from physical, psychosocial, and spiritual problems through palliative care is possible for more than 90% of patients with advanced stages of cancer.

Effective public health strategies, comprising community- and home-based care, are essential to provide pain relief and palliative care for patients and their families.

Improved access to oral morphine is strongly recommended for the treatment of moderate to severe cancer pain, suffered by over 80% of people with cancer in the terminal phase.

WHO response

In 2017, the World Health Assembly passed the [Resolution Cancer prevention and control in the context of an integrated approach \(WHA70.12\)](#) that urges governments and WHO to accelerate action to achieve the targets specified in

the [Global Action Plan for the prevention and control of NCDs 2013-2020](#) and the 2030 UN Agenda for Sustainable Development to reduce premature mortality from cancer.

WHO and IARC collaborate with other UN organizations, including the International Atomic Energy Agency, and partners to:

- increase political commitment for cancer prevention and control;
- coordinate and conduct research on the causes of human cancer and the mechanisms of carcinogenesis;
- monitor the cancer burden (as part of the work of the Global Initiative on Cancer Registries);
- identify “best buys” and other cost-effective, priority strategies for cancer prevention and control;
- develop standards and tools to guide the planning and implementation of interventions for prevention, early diagnosis, screening, treatment and palliative and survivorship care for both adult and child cancers;
- strengthen health systems at national and local levels to help them improve access to cancer treatments;
- set the agenda for cancer prevention and control in the 2020 WHO Report on Cancer;
- provide global leadership as well as technical assistance to support governments and their partners build and sustain high-quality cervical cancer control programmes as part of the Global Strategy to Accelerate the Elimination of Cervical Cancer;
- improve breast cancer control and reduce avoidable deaths from breast cancer, focusing on health promotion, timely diagnosis and access to care in order to accelerate coordinated implementation through the WHO Global Breast Cancer Initiative;
- support governments to improve survival for childhood cancer through directed country support, regional networks and global action as part of the WHO Global Initiative for Childhood Cancer using the CureAll approach;
- increase access to essential cancer medicines, particularly through the Global Platform for Access to Childhood Cancer Medicines; and
- provide technical assistance for rapid, effective transfer of best practice interventions to countries.

References

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- (2) de Martel C, Georges D, Bray F, Ferlay J, Clifford GM. Global burden of cancer attributable to infections in 2018: a worldwide incidence analysis. *Lancet Glob Health*. 2020;8(2):e180-e190.
- (3) Assessing national capacity for the prevention and control of noncommunicable diseases: report of the 2019 global survey. Geneva: World Health Organization; 2020.

Key facts

- **Breast cancer caused 670 000 deaths globally in 2022.**
- **Roughly half of all breast cancers occur in women with no specific risk factors other than sex and age.**
- **Breast cancer was the most common cancer in women in 157 countries out of 185 in 2022.**
- **Breast cancer occurs in every country in the world.**
- **Approximately 0.5–1% of breast cancers occur in men.**

Overview

Breast cancer is a disease in which abnormal breast cells grow out of control and form tumours. If left unchecked, the tumours can spread throughout the body and become fatal.

Breast cancer cells begin inside the milk ducts and/or the milk-producing lobules of the breast. The earliest form (in situ) is not life-threatening and can be detected in early stages. Cancer cells can spread into nearby breast tissue (invasion). This creates tumours that cause lumps or thickening.

Invasive cancers can spread to nearby lymph nodes or other organs (metastasize). Metastasis can be life-threatening and fatal.

Treatment is based on the person, the type of cancer and its spread. Treatment combines surgery, radiation therapy and medications.

Scope of the problem

In 2022, there were 2.3 million women diagnosed with breast cancer and 670 000 deaths globally. Breast cancer occurs in every country of the world in women at any age after puberty but with increasing rates in later life.

Global estimates reveal striking inequities in the breast cancer burden according to human development. For instance, in countries with a very high Human Development Index (HDI), 1 in 12 women will be diagnosed with breast cancer in their lifetime and 1 in 71 women die of it.

In contrast, in countries with a low HDI; while only 1 in 27 women is diagnosed with breast cancer in their lifetime, 1 in 48 women will die from it.

Who is at risk?

Female gender is the strongest breast cancer risk factor. Approximately 99% of breast cancers occur in women and 0.5–1% of breast cancers occur in men. The treatment of breast cancer in men follows the same principles of management as for women.

Certain factors increase the risk of breast cancer including increasing age, obesity, harmful use of alcohol, family history of breast cancer, history of radiation exposure, reproductive history (such as age that menstrual periods began and age at first pregnancy), tobacco use and postmenopausal hormone therapy. Approximately half of breast cancers develop in women who have no identifiable breast cancer risk factor other than gender (female) and age (over 40 years).

Family history of breast cancer increases the risk of breast cancer, but most women diagnosed with breast cancer do not have a known family history of the disease. Lack of a known family history does not necessarily mean that a woman is at reduced risk.

Certain inherited high penetrance gene mutations greatly increase breast cancer risk, the most dominant being mutations in the genes BRCA1, BRCA2 and PALB-2. Women found to have mutations in these major genes may consider risk reduction strategies such as surgical removal of both breasts or chemoprevention strategies.

Signs and symptoms

Most people will not experience any symptoms when the cancer is still early hence the importance of early detection.

Breast cancer can have combinations of symptoms, especially when it is more advanced. Symptoms of breast cancer can include:

- a breast lump or thickening, often without pain
- change in size, shape or appearance of the breast
- dimpling, redness, pitting or other changes in the skin
- change in nipple appearance or the skin surrounding the nipple (areola)
- abnormal or bloody fluid from the nipple.

People with an abnormal breast lump should seek medical care, even if the lump does not hurt.

Most breast lumps are not cancer. Breast lumps that are cancerous are more likely to be successfully treated when they are small and have not spread to nearby lymph nodes.

Breast cancers may spread to other areas of the body and trigger other symptoms. Often, the most common first detectable site of spread is to the lymph nodes under the arm although it is possible to have cancer-bearing lymph nodes that cannot be felt.

Over time, cancerous cells may spread to other organs including the lungs, liver, brain and bones. Once they reach these sites, new cancer-related symptoms such as bone pain or headaches may appear.

Treatment

Treatment for breast cancer depends on the subtype of cancer and how much it has spread outside of the breast to lymph nodes (stages II or III) or to other parts of the body (stage IV).

Doctors combine treatments to minimize the chances of the cancer coming back (recurrence). These include:

- surgery to remove the breast tumour
- radiation therapy to reduce recurrence risk in the breast and surrounding tissues
- medications to kill cancer cells and prevent spread, including hormonal therapies, chemotherapy or targeted biological therapies.

Treatments for breast cancer are more effective and are better tolerated when started early and taken to completion.

Surgery may remove just the cancerous tissue (called a lumpectomy) or the whole breast (mastectomy). Surgery may also remove lymph nodes to assess the cancer's ability to spread.

Radiation therapy treats residual microscopic cancers left behind in the breast tissue and/or lymph nodes and minimizes the chances of cancer recurring on the chest wall.

Advanced cancers can erode through the skin to cause open sores (ulceration) but are not necessarily painful. Women with breast wounds that do not heal should seek medical care to have a biopsy performed.

Medicines to treat breast cancers are selected based on the biological properties of the cancer as determined by special tests (tumour marker determination). The great majority of drugs used for breast cancer are already on the WHO Essential Medicines List (EML).

Lymph nodes are removed at the time of cancer surgery for invasive cancers. Complete removal of the lymph node bed under the arm (complete axillary dissection) in the past was thought to be necessary to prevent the spread of cancer. A smaller lymph node procedure called “sentinel node biopsy” is now preferred as it has fewer complications.

Medical treatments for breast cancers, which may be given before (“neoadjuvant”) or after (“adjuvant”) surgery, is based on the biological subtyping of the cancers. Certain subtypes of breast cancer are more aggressive than others such as triple negative (those that do not express estrogen receptor (ER), progesterone receptor (PR) or HER-2 receptor). Cancer that express the estrogen receptor (ER) and/or progesterone receptor (PR) are likely to respond to endocrine (hormone) therapies such as tamoxifen or aromatase inhibitors. These medicines are taken orally for 5–10 years and reduce the chance of recurrence of these “hormone-positive” cancers by nearly half. Endocrine therapies can cause symptoms of menopause but are generally well tolerated.

Cancers that do not express ER or PR are “hormone receptor negative” and need to be treated with chemotherapy unless the cancer is very small. The chemotherapy regimens available today are very effective in reducing the chances of cancer spread or recurrence and are generally given as outpatient therapy. Chemotherapy for breast cancer generally does not require hospital admission in the absence of complications.

Breast cancers that independently overexpress a molecule called the HER-2/neu oncogene (HER-2 positive) are amenable to treatment with targeted biological agents such as trastuzumab. When targeted biological therapies are given, they are combined with chemotherapy to make them effective at killing cancer cells.

Radiotherapy plays a very important role in treating breast cancer. With early-stage breast cancers, radiation can prevent a woman having to undergo a mastectomy. With later stage cancers, radiotherapy can reduce cancer recurrence risk even when a mastectomy has been performed. For advanced stages of breast cancer, in some circumstances, radiation therapy may reduce the likelihood of dying of the disease.

The effectiveness of breast cancer therapies depends on the full course of treatment. Partial treatment is less likely to lead to a positive outcome.

Global impact

Age-standardized breast cancer mortality in high-income countries dropped by 40% between the 1980s and 2020 (1). Countries that have succeeded in reducing breast cancer mortality have been able to achieve an annual breast cancer mortality reduction of 2–4% per year.

The strategies for improving breast cancer outcomes depend on fundamental health system strengthening to deliver the treatments that are already known to work. These are also important for the management of other cancers and other non-malignant noncommunicable diseases (NCDs). For example, having reliable referral pathways from primary care facilities to district hospitals to dedicated cancer centres.

The establishment of reliable referral pathways from primary care facilities to secondary hospitals to dedicated cancer centres is the same approach as is required for the management of cervical cancer, lung cancer, colorectal cancer and prostate cancer. To that end, breast cancer is a so-called index disease whereby pathways are created that can be followed for the management of other cancers.

WHO response

The objective of the WHO Global Breast Cancer Initiative (GBCI) is to reduce global breast cancer mortality by 2.5% per year, thereby averting 2.5 million breast cancer deaths globally between 2020 and 2040. Reducing global breast cancer mortality by 2.5% per year would avert 25% of breast cancer deaths by 2030 and 40% by 2040 among women under 70 years of age. The three pillars toward achieving these objectives are: health promotion for early detection; timely diagnosis; and comprehensive breast cancer management.

By providing public health education to improve awareness among women of the signs and symptoms of breast cancer and, together with their families, understand the importance of early detection and treatment, more women would consult medical practitioners when breast cancer is first suspected, and before any cancer present is advanced. This is possible even in the absence of mammographic screening that is impractical in many countries at the present time.

Notes

1. Age-standardization is a technique used to allow populations to be compared when the age profiles of the populations are quite different.