



## Cancer: Cancer in the 21<sup>st</sup> Century, The Role of Lifestyle and Nutrition, Food Controversies and Recommendations for Cancer prevention: Article

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### Abstract

About two and a half thousand years ago Hippocrates used the words *carcinoma* and *carcinoma* (in Greek, crab or crab-like) to describe cancerous growths. This was because the projections that seemed to reach out from tumours looked to them similar to crabs' claws. As known cancer is the second leading cause of death behind cardiovascular diseases. In fact, new cancer cases and deaths are expected in 2020. Many studies have shown that 30% of cancers are directly linked to poor nutrition, while obesity is associated with the appearance of more than 13 types of cancer. This article presents cancer statistics and predictions over the next few years, factors that contribute to the development of cancer such as smoking, alcohol, poor nutrition, obesity and much more causes. Myths and truths related to diet and cancer are mentioned, as well and finally there are recommendations for cancer prevention provided.

**Keywords:** Global Cancer; Lifestyle; Nutrition; Myths and Facts; Recommendations

### The sad truth about Cancer

Based on Cancer Research UK data in the UK, in 2012, it is estimated that 14.1 million new cases of cancer occurred in the world. A survey based on the GLOBOCAN 2012 predicts that the number of new cancer cases worldwide will increase to be 19.3 million by 2025 due to growth and ageing of the global population. [1] More than half of all cancers (56.8%) and cancer deaths (64.9%) in 2012 occurred in less developed regions of the world, and these proportions will increase further by 2025. Also according to Cancer Research UK 1 in 2 people (50%) in the UK born after 1960 will be diagnosed with some form of cancer during their lifetime [2,3]. Females have the highest lifetime risk of breast, lung and bowel cancers and males have the highest lifetime risk of prostate, lung and bowel cancers. Finally, an analysis published in the Journal of Cancer in 2015, concluded that over the next few years 50% of the population will be diagnosed with cancer at some point in their life. The World Cancer Report states that cancer rates are set to increase at an alarming rate globally. Therefore, we can make a dif-

ference by taking action today. We have the opportunity to stem this increase.

### What is Cancer?

There are more than 200 different types of cancer. Cancer – as it called by Hippocrates - is one of the most significant public health challenges of the 21<sup>st</sup> century.

Cancer is characterized by a collection of related diseases. In all types of cancer, some of the body's cells begin to divide without stopping and spread into surrounding tissues. [4] This is due to:

- Harmful changes in the genetic code of cells (DNA)
- The ability of cancer cells to evade apoptosis, despite their damage.
- Spread of cancer cells from the place where they first formed to another part of the body (Metastasis)

According to Cancer Research UK, most cancers start due to gene changes that happen over a person's lifetime, and more rarely cancers start because of inherited faulty genes passed down in families [5,6].

### Global cancer statistics for the most common cancers

As reported by the World Cancer Research Fund, lung and breast cancers were the most common cancers worldwide, each contributing 12.3% of the total number of new cases diagnosed in 2018. Colorectal cancer was the third most common cancer with 1.8 million new cases in 2018 [7].

Rank	Cancer	New cases diagnosed in 2018
	All cancers*	17,036,901
1	Lung	2,093,876
2	Breast	2,088,849
3	Colorectal**	1,800,977
4	Prostate	1,276,106
5	Stomach	1,033,701
6	Liver	841,080
7	Oesophagus	572,034

**Table 1:** Global cancer incidence: both sexes.

### How is cancer treated?

Three strategies exist to address the different forms of cancer:

- Primary prevention, focusing on avoiding agents that help in the development of cancer (Causes)
- Secondary prevention, focusing on early diagnosis and aiming at as early as possible treatment of the disease.
- Treatment regarding the clinically manifest forms of malignant neoplasm. We place emphasis on primary and secondary prevention.

### What factors affect the development of cancer?

Several environmental and lifestyle factors may act together to change a normal cell to a cancer cell. According to Cancer research UK, most cancers are caused by gene faults that develop during our lifetime. They may happen as we get older due to random mistakes when a cell is dividing. But what are those factors? Known causes of cancer include: tobacco smoking and its use, infectious agents, medication, radiation, industrial chemicals, and also some factors within the scope of this report — carcinogenic agents in food and drink.

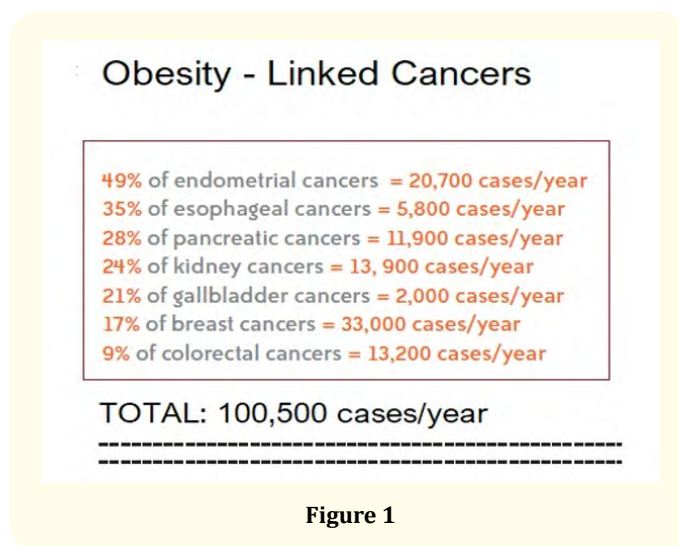
### Smoking

According to WHO, tobacco use is the single greatest avoidable risk factor for cancer mortality and kills approximately 6 million people each year, from cancer and other diseases.

Tobacco smoke has more than 7000 chemicals, at least 250 are known to be harmful and more than 50 substances are carcinogenic. At this point, it is worth mentioning the study carried out on 63 children about “what diseases causes smoking?”. Of these, 25 were well aware of the diseases, 22 knew the most important and 17 were ignorant of the diseases that caused by smoking [10]. Also Electronic cigarettes or e-cigarettes are handheld electronic devices that simulate the feeling of tobacco smoking [9]. Daily long-term use of high voltage (5.0 V) electronic cigarettes may generate formaldehyde-forming chemicals at a greater level than smoking, which was determined to be a lifetime cancer risk of approximately 5 to 15 times greater than smoking. However, the overall safety and long-term health effects of electronic cigarettes are still uncertain.

### Obesity

In the US, AICR estimates that every year, 110,000 deaths due to cancer are caused by obesity, making it the second leading cause of cancer deaths, behind smoking [11]. But how excess body weight may affect cancer risk? This can be caused in various ways. Through a number of mechanisms, some of which might be specific to certain cancer types. Within the last five years most cancer researchers have started viewing cancer as a metabolic disorder rather than a genetic disease. Extra body fat, especially around the waist, results in many metabolic abnormalities that contribute to the development of cancer [12]. The American Institute for Cancer Research lists these cancers associated with excess body fat [13].



**Figure 1**

Polyphagia is the key that opens the wrong door to all illnesses.

“Let food be your medicine and medicine be your food”. Hippocrates.

Tips for Healthy Eating:	
1.	Eat when you feel (indeed) hungry
2.	The regular meal time helps the body a lot, but it is not mandatory.
3.	Do not eat more than you need to eat. Eat when you feel hungry
4.	The ancients recommended: “Get up from the table as long as you feel you can still keep eating”
5.	Do not eat fastly. Chew well otherwise stomach loads the job that teeth and salivary glands have to do.
6.	Do not eat hot food or hot bread and do not drink extremely frozen beverages or water.

Table 2

Apathy, sciolism and indifference are the three weapons which we ourselves arm cancer with and help him kill us.

### Sedentary lifestyle

Physical inactivity is a well-established risk factor for colorectal cancer (CRC). It has been estimated that 32% of colon cancers can be related to sedentary life. Recent studies have characterized physical activity (PA), sedentary behavior, and cardiorespiratory fitness as distinct, interrelated constructs that influence the risk of CRC and related outcomes [14]. Exercise helps constipation by lowering the time it takes food to move through the large intestine. This limits the amount of water your body absorbs from the stool and keeps your bowel working normally.

### Drinking alcohol

Alcohol consumption in small quantities is not harmful to health. This means 1 to 2 drinks a day for men, and up to 1 drink a day for women. However, excessive consumption and abuse have been associated with an increased risk of cancer of the oral cavity, esophagus, pharynx, larynx, breast and liver [15]. The harmful effect of alcohol increases significantly when combined with smoking.

### Poor diet

In many countries, cancer ranks the second most common cause of death following cardiovascular diseases. When we sit at

the table our eating choices can affect our risk of developing certain types of cancer. High-energy and high-fat diets can lead to overweight or obesity one of the biggest risk factors for cancer [16].

### Virus infections and other microbiological factors

The association between microbes in the oral cavity and various types of cancer is becoming increasingly more recognized. These factors belong to the families of viruses, bacteria, parasites. According to the National Cancer Institute Human papillomavirus (HPV) is a group of more than 200 related viruses, and is the cause of most cervical cancers. Hepatitis B and C viruses can cause liver cancer. Human immunodeficiency virus (HIV) is, also, associated with the development of lymphomas and sarcomas [17]. What is more Helicobacter pylori is a bacterium that colonizes approximately 50% of the world's population. Infection with H. pylori causes chronic inflammation and significantly increases the risk of developing duodenal and gastric ulcer disease and gastric cancer [18].

### Environmental factors

Many environmental factors are responsible for causing cancer. Air pollution, smoking tobacco, passive smoking, solarium tanning, excessive exposure to some chemicals and deliberate exposure to sunlight are some of the proven risks of cancer [19]. Some Chemicals called aromatic amines, such as Benzedrine and beta-naphthylamine, which are sometimes used in the dye industry - , can cause bladder cancer. Benzene, a highly toxic chemical that is also used for dozens of industrial purposes is responsible for the development of a variety of blood diseases, such as leukemia [20]. Also Asbestos, a natural mineral that has been utilized in thousands of products because of its durability, heat and chemical resistance, can eventually lead to serious health problems, like mesothelioma and asbestosis. Workers in the asbestos industry tend to have high smoking rates compared to the general population [21].

### Myths and facts about nutrition and cancer (Food Controversies)

#### Drinking alcohol

There is no conclusive evidence that proves eating sugar will make cancer grow or speed up its growth. However, we do know that too many sugary foods and beverages in the diet can lead to weight gain, overweight, obesity or diabetes which significantly raises the risk of a number of different types of cancer. [22]. Moreover, something that diets which are high in sugar do, is to increase

inflammation in your body and probably cause insulin resistance, both of which are linked to cancer [23].

### Is there a special diet to beat cancer?

There is no diet that can cure cancer. Neither the Alkaline diet nor the Ketogenic diet can do this, as some people believe. However, there are observational studies supporting that high consumption of certain foods may increase or decrease the likelihood of cancer development. Studies suggest that a simple lifestyle changes, such as following a balanced diet with lean protein, fruits, vegetables, whole grains, low-fat dairy, limited sugar, salt and alcohol, could prevent 30 – 50% of all cancers [24,25].

### Dairy foods increase the risk of cancer

Some studies indicate that dairy products may protect against cancer, while others suggest that dairy may increase the risk of cancer. The truth is somewhere in the middle . and it depends on the cancer type. According to a new meta – analysis (including data from 32 different studies) in the American Journal of Clinical Nutrition, high intakes of dairy products ( $\geq 2.5$  servings/day), increase the risk of prostate cancer. [26]. However, in regards to the associations between dairy products and breast cancer, the epidemiology studies reviewed do not provide consistent evidence. As for other cancers such as: colorectal, bladder and esophageal, results are more encouraging. A recent meta – analysis of 61 studies revealed that fermented dairy foods intake significantly decreased bladder cancer, colorectal cancer and esophageal cancer risk. In stratified analyses, significantly decreased colorectal cancer risk was found to be associated with cheese intake. Yogurt consumption decreased bladder cancer and colorectal cancer risk at a great level. This meta-analysis indicated that fermented dairy foods intake was associated with an overall decrease in cancer risk [27].

### Superfoods prevent cancer

#### What is a superfood?

Superfood is a marketing term for food with apparently health benefits as a result of some part of its nutritional analysis, or its overall nutrient density. Greens, green tea, Quinoa, Chia seeds, Berries, Goji, Spinach, Broccoli, Almonds, whole gamut and avocado are some of them. It's true that a healthy, balanced and varied diet can lower risks of certain cancers. It also may help prevent other conditions, such as type 2 diabetes, osteoporosis and heart disease. However, it is unlikely that any single food or specific "superfood", on their own will directly affect the risk of cancer in a positive way

[28]. Antioxidants, vitamins, and minerals are some of food components that seem to protect the body from the effects of carcinogenic elements. However, foods contain many chemicals and laboratory studies are usually carried out using a purified ingredient from a particular food. Add to that, scientists have to use very large doses of these purified compounds to see any effects in their studies. Remember that an isolated chemical may behave very differently in a test tube than when it is eaten as part of food.

### Organic Foods decrease the risk of cancer

What does organic really mean? According to the USDA, organic farming practices preserve the environment and avoid most synthetic materials, including pesticides and antibiotics. Among other requirements, organic farmers must receive annual on-site inspections, use only USDA - approved materials, and not use genetically modified crops. But does eating organic food protect us from cancer? [29]. The truth is, few studies have examined the association of organic food consumption with cancer risk. According to results from a large, population-based observational study of 68 946 French adults (78.0% female mean age at baseline, 44.2 years), published in October 2018 from the Institute National de Sante et de Recherche Medicale in France [30], a higher frequency of organic food consumption was associated with a reduced risk of cancer. In this study, between 2009 and 2016, cancer was diagnosed in 1,340 of the volunteers. The most common type was breast cancer (459 cases), followed by prostate cancer (180 cases), skin cancer (135 cases), colorectal cancer (99 cases), nonHodgkin's lymphoma (47 cases) and other types of lymphomas (15 cases).. In fact, only three types of cancer had a statistically significant association with organic food consumption. One of them was postmenopausal breast cancer, another was nonHodgkin's lymphoma and the last category was all lymphomas. But why can't we just compare the health of those who buy organic to those who do not? Based on a cohort study which examined the profiles of organic food consumers in a large sample of French adults, organic consumers do report being significantly healthier than conventional consumers [31]. Also organic consumers tend to eat more plant foods in general, less sweet and alcoholic beverages, processed meat or milk. Their nutrient intake profiles (fatty acids, most minerals and vitamins, fibers) were healthier and more closely adhered to dietary guidelines. So no wonder why they are and feel so much better. In contrast to the first big study in France, the Million Women Study [32] in the UK (with 623. 080 middleaged UK women) - the first to

examine the association between the consumption of organic food and subsequent risk of cancer - found that the only significant risk reduction by the organic food consumption, was for non-Hodgkin's lymphoma. This is consistent with data showing a higher risk of developing lymphoma in those who have higher levels of pesticides stored in their butt fat, which they looked at only because studies on farmworkers found higher rates of lymphoma. Finally further research is required to identify which specific factors are responsible for potential protective effects of organic food consumption on cancer risk.

### Good news

The World Health Organization (WHO) estimates that 30-50 % of cancers can be prevented. Data from other official sources, such as the American Cancer Research Institute (AICR), estimate that adopting a healthy eating plan, following regular physical activity and maintaining a healthy weight can prevent 35-40% of cancers. The percentage for colorectal cancer is even greater, reaching the 50%. At the same time the Cancer Research UK, support that more than 4 in 10 cancer cases could be prevented, largely through lifestyle changes.

### Recommendations for Cancer Prevention

#### European Code Against Cancer (ECAC)

Detecting and treating the disease at an early stage can significantly improve a person's outlook.

1. Do not smoke. If you smoke, stop as soon as possible and do not smoke in the presence of others making passive smokers.
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. If you drink alcohol of any type (beer, wine or any other kind), limit your intake.
6. Not drinking alcohol is better for cancer prevention.
7. In the workplace, protect yourself against cancercausing substances by following health and safety instructions.
8. Find out if you are exposed to radiation from naturally high radon levels in your home. Take action to reduce high radon levels.

9. 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.
10. Avoid too much sun, especially for children. Use sun protection. Do not use sunbeds.
11. Ensure your children take part in vaccination programmes for: Hepatitis B (for newborns) Human papillomavirus (HPV) (for girls).
12. 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.
13. Take part in organised cancer screening programmes for: Bowel cancer (men and women) Breast cancer (women) Cervical cancer (women)

When to see a doctor: If you have any signs or symptoms, see your health care provider or a mental health professional.

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