



Eating ourselves to Cancers: Is there an Association between Cancers and Nutrition?

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Abstract

Malignant neoplasms, which are widely referred to as cancers, are among the top ten leading causes of mortality in the World as well as in Jamaica. The U.S. Department of Health and Human Services. (and, a) classified cancers into six (6) main groups: 1. Carcinoma, 2. Sarcoma, 3. Myeloma, 4. Leukemia, 5. Lymphoma, and 6. Mixed types. In 2020, statistics published by the World Health Organization (WHO, 2021) indicated that cancers accounted for 4,576 deaths (male, 53.7%, n=2457; female, 46.3%, n=2119) in Jamaica with the leading cause being prostate (18.5%, n=844), breast (13.9%, n=637), lung (10.2%, n=468), colorectum (8.7%, n=398), Cervix uteri (5.4%, n=247), Stomach (4.2%, n=192), Non-Hodgkin lymphoma (3.3%, n=150), and corpus uteri (141). There is a similarity between the types of cancer in Jamaica and the rest of the World. The nutritional habits of high meat and animal product consumption are linked with several types of cancer. Across many nations, the cancer rate rises and falls because of different environmental and nutritional factors. Countries with meat-eating diets as their predominant source of protein are equipped with evidence of the incidence and prevalence of colorectal and another specific types of cancer. Jamaicans have crossed a nutritional fault line and are eating themselves to cancer and, by extension, death, and this means there is a need to implement a national public health campaign on healthy and responsible eating as well as punitive measures for fast/junk food and high-sugar beverages.

Keywords: Cancer, diet, death, neoplasm, nutrition, public health.

Introduction

Malignant neoplasms, which are widely referred to as cancers, are among the top ten leading causes of mortality in the World as well as in Jamaica (Dattani et al., 2023; Statistical Institute of Jamaica, and World Health Organization (WHO), 2020; see also, Annex 1). Bray et al. (2018) predicted that cancers should be the leading cause of death globally by the end of the century. The U.S. Department of Health and Human Services. (and, a) classified cancers into six (6) main groups: 1. Carcinoma, 2. Sarcoma, 3. Myeloma, 4. Leukemia, 5. Lymphoma, and 6. Mixed types. From the classifications of the U.S. Department of Health and Human Services, there are myriad

cancers, and some are placed in a holding area, which is referred to as mixed cancers. The question, therefore, is how many cancers are there? The U.S. Department of Health and Human Services (n.d., a) states that there are 'hundreds of different types' According to the U.S. Department of Health and Human Services (n.d., b),

The word cancer comes from the Latin (originally Greek) derived term for crab because of the way cancer sticks to any part that it seizes upon in an implacable form like adhesive and paper. Hippocrates describes cancer as possessing a group of cells in the body that incline to reach out and spread like "the arms of a crab." Besides the popular, generic term "cancer" used by most people, there is another more technical term: neoplasia. Neoplasia (neo = new, plasma = tissue or cells) or neoplasm means new tissue in Greek. This indicates that cancers are new growths of cells in the body.

The U.S. Department of Health and Human Services (nd) has provided some historical context for cancers dating back centuries to Greece. However, an important issue is whether this high morbidity in Jamaica is associated with one's nutrition/diet. This paper evaluates the relationship between cancers and nutrition/diet and provides some justification for Jamaica's cancer phenomenon.

In Jamaica, malignant tumours are among the top 10 leading causes of mortalities (Mendoza, 2023; Statista, nd; Statistical Institute of Jamaica (STATIN, nd). In 2020, statistics published by the World Health Organization (WHO, 2021) indicated that cancers accounted for 4,576 deaths (male, 53.7%, n=2457; female, 46.3%, n=2119) in Jamaica with the leading cause being prostate (18.5%, n=844), breast (13.9%, n=637), lung (10.2%, n=468), colorectum (8.7%, n=398), Cervix uteri (5.4%, n=247), Stomach (4.2%, n=192), Non-Hodgkin lymphoma (3.3%, n=150), and corpus uteri (141). There is a similarity between the types of cancer in Jamaica and the rest of the World. Table 1 below presents the top 10 types of cancer in Jamaica and the rest of the World. Table 2, on the other hand, disaggregated the top five deaths caused by cancers for both genders in Jamaica.

Table 1: Top 10 types of cancer in Jamaica and the rest of the World for 2020

Jamaica	Rest of the World
1. Prostate	1. Breast
2. Breast	2. Lung
3. Colon	3. Prostate
4. Lung	4. Colon
5. Uterine	5. Stomach
6. Cervical	6. Liver
7. Non-Hodgkin's lymphoma	7. Rectum
8. Stomach	8. Cervix
9. Rectum	9. Oesophagus
10. Multiple myeloma	10. Thyroid

Source: Ministry of Health and Wellness, Jamaica (2021)

Table 2: Top 5 deaths caused by cancers in Jamaica by Gender for 2020

Male	Female
1. Prostate	1. Breast
2. Colorectum	2. Corpus uteri
3. Lung	3. Cervix uteri
4. Stomach	4. Colorectum
5. Non-Hodgkin lymphoma	5. Lung

Source: World Health Organization. (WHO, 2021)

Additionally, the statistics revealed that 1 in every 5 Jamaicans is at risk of having cancer before 75 years old (male, 22.2%; female, 18.3%) and that 12.3% of the Jamaicans are at risk of dying from a neoplasm (male, 13.5%; female, 11.1%). The Harvard Chin School of Public Health (2021) indicated that 1 in 5 men and 1 in 6 women globally are at risk of developing cancer during their lifetime. A question that must be brought into the cancer discourse in Jamaica is the contribution of food consumption. This paper examines whether food consumption or nutrition contributes to the development of cancers and, if so, which ones.

Diet/Nutrition

Diet has always been associated with life expectancy or longevity, which accounts for the importance of encouraging food choices and eating habits in people (Fadnes et al., 2022; Harvard School of Public Health, 2023; World Economic Forum, 2022). According to the Harvard T.H. Chan School of Public Health (2023), "Individuals with five low-risk lifestyle factors: a diet that promotes health and wellness; structured exercise programme (at least 30 minutes daily of moderate to vigorous activity), appropriate body mass index of 18.5-24.9), limited exposure to smoking, and limited daily or weekly consumption (up to 1 drink daily for women, and up to 2 daily for men). On the contrary, individuals that do not adhere to the above-mentioned lifestyle procedures and practices may live a shorter life of up to 14 years." PLOS. (2022) forwarded that diet would add at least 10 years to one life (see also, American Institute for Cancer Research, 2022; NIHR Leicester Biomedical Research Centre, 2020). Using a published study, Salehin et al., 2023 opined that a balanced and adequate plant-based diet reduces heart disease and cancer risk and supports brain health. Salehin *et al.*'s perspective introduces brain health into the dieting discourse, which other studies support. According to Salehin et al. (2023), "There is a strong association between the consumption of a plant-based diet and a lower all-cause mortality; plant-based vegetarians have a lower risk of diagnosis with ischemic heart disease with reduced IHD-related mortality" (p.3337; see also Crowe *et al.*, 2013; Orlich *et al.*, 2013).

Diet/Nutrition and Cancers

"Decades of research in populations with different nutritional practices have resulted in scientists theorizing that there is an important relationship between eating habits and the risk of developing cancer" (Key et al., 2020)

The Physician Committee for Responsible Medicine (2024) opined, "A diet that is predominantly plant-based with variety, control, and adequacy of fruit, daily consumption of vegetables, nuts, grains, and legumes, and adherence to limited consumption of fats, oils, sugary products and

avoidance of meat, dairy, and eggs is predicted to be healthier. Nutrient-dense plant-based foods are high in fibre, high in macronutrients, micronutrients, and trace elements, free of cholesterol, and a reduced amount calories and saturated fat." The spoken words of the Physician Committee for Responsible Medicine may appear non-scientific, so it is fitting to support this with empirical and scientific inquiries. Hever & Cronise (2017) and Melina *et al.* (2016) have conducted scientific inquiries and found a direct relationship between the consumption of a diet that is predominantly plant-based and healthier outcomes with a lower likelihood for the development of cancer. Orlich *et al.* (2013) and Crowe *et al.* (2013) found that a plant-based diet is natural with lower exposure to cholesterol, sodium and other agents that are associated with the development of morbidity or mortality from ischemic heart disease (Crowe *et al.*, 2013, p. 597).

Additionally, the Physician Committee for Responsible Medicine (2024) postulated that a plant-based diet accounts for lowering the risk of heart disease, diabetes, and the risk of cancer weight, as well as being good for brain health. Therefore, a plant-based diet, frequently referred to as a vegetarian diet, is one's health, which is supported by the literature (Ornish *et al.*, 1990; Snowdon & Phillips, 1985; Tusso *et al.*, 2013). Tusso *et al.* (2013) remarked, "Health providers should advise their patients and educate the population that a diet that is mainly plant-based with limited consumption of meats and other products from animals, especially red meats will be consuming meals with whole grains with higher fibres that are not stripped of their nutrients; green leafy vegetables that have insoluble fibres, root tubers with soluble fibres. Dieticians, health counsellors, and other healthcare providers should be educated and have access to information about plant-based diets so they can teach them to staff and patients" (p. 64). The Department of Health, State Government of Victoria, Australia. (2023) stated, "High-fat, low-fibre diets containing animal-based products that are high in cholesterol may increase the risk of many cancers including bowel, lung, prostate and uterine cancers," which was concurred by the National Cancer Institute (2023).

The nutritional habits of high meat and animal product consumption are linked with several types of cancer (Giles *et al.*, 2023; Key *et al.*, 2020; Papadimitriou *et al.*, 2021). Across many nations, the cancer rate rises and falls because of different environmental and nutritional factors. Countries with meat-eating diets as their predominant source of protein are equipped with evidence of incidence and prevalence of colorectal and another specific types of cancer (Key *et al.*, 2020; Ksouri, 2019; Donaldson, 2004). A case-control study of the Chinese culture revealed that the high consumption of salted fish reportedly had a high link to oral and pharynx cancer (Key *et al.*, 2020; Takachi *et al.*, 2009).

A high sugar intake, consumption of refined flour products, low fibre intake, excessive consumption of red meat, and an imbalance of fats have links to prevalent cancers such as prostate, rectal, colon, and lung cancer (Key *et al.*, 2020; Donaldson, 2004; Lian, 2023; Farvid *et al.*, 2021; Ksouri, 2019). These refined products lack fibre and essential vitamins like B and E, which play a protective role against cancer. Evidence also suggests that the excessive consumption of processed foods, including processed meats, sweets, fried foods, and refined grains, is tied to all cancers, but specifically colorectal, breast, and ovarian cancer, accounting for high mortality rate among women (Lian *et al.*, 2023; Isaken, 2023; Chang *et al.*, 2022; Ksouri, 2019).

Furthermore, it is important to consider the liquid area of deity habit on specific cancer types. Although the impact of artistically sweetened beverages on incidence is unclear, studies suggested that the daily association of daily ASB intake might be positively associated with leukaemia (Yin et al, 2022; Llahá et al, 2021). Additionally, skin cancer is reportedly linked to high alcohol intake (Abnet et al., 2018). Coffee and its products that are consumed globally are associated with an increase in the risk for many cancers, specifically mouth, stomach, and pancreatic cancer (Longnecker, 1995; Bagnardi et al., 2001). This emphasises the multifaceted nature of dietary influences on cancer risk. On the contrary, the consumption of foods high in fruits, vegetables, extra virgin olive oil, whole grains, and other unprocessed or minimally processed foods lowers the possibility of the development of all types of cancer (Ksouri, 2019). A fibre- and soy-rich diet and a limiting intake of fats decrease the risk of cancer (De Cicco, 2019). Polyphenols found in some fruits play an important role in the prevention of carcinogenesis, including prostate cancer (Cháirez-Ramírez, 2021). While certain dietary habits and nutritional factors are inclined to promote an increase the risk for the onset of various types of cancer, adopting a diet of plenty fruits, green leafy vegetables, whole grains, and minimally processed foods can help minimize the risk of exposure to free radicals and cancer, and promote overall health and well-being (Chan et al., 2019; Giles et al., 2023; Papadimitriou, N., Markozannes, G., Kannelopoulou, A. et al., 2021; Rock et al., 2020; World Cancer Research Fund/American Institute for Cancer Research, 2018).

The National Cancer Institute (2023) aptly summarized the importance of diet to good health as well as cancer management and/or treatment. They postulated, “Nutrition is the processes that humans use to take in the different nutrients in the their appropriate amount to be used by the body for growth, to keep the body healthy, and to replace tissue. Good nutrition is important for good health. A healthy diet includes foods and liquids that have important nutrients (vitamins, minerals, proteins, carbohydrates, fats, and water) the body needs.” and continued, “Nutrition goals during cancer therapy are based on a person's cancer type, cancer stage, and other medical conditions. Eating the right amount of protein and calories is important for healing, fighting infection, and having enough energy.” While a plant-based diet is good for health and reduces the risk of health conditions such as cancer, a diet with mostly carbohydrates and added sugar is detrimental to one's good health (Willett *et al.*, 2006). Hever and Cronise (2017) argued, “Refined carbohydrates from sugars, flours, and other processed foods can lead to malnourishment and promote illness.”

Papadimitriou et al. (2021) provided some context in the cancer and nutrition debate when they forward:

There is evidence that diet and nutrition are modifiable risk factors for several cancers, but associations may be flawed due to inherent biases. Nutritional epidemiology studies have largely relied on a single assessment of diet using food frequency questionnaires. We conducted an umbrella review of meta-analyses of observational studies to evaluate the strength and validity of the evidence for the association between food/nutrient intake and the risk of developing or dying from 11 primary cancers. It is estimated that only a few single food/nutrient and cancer associations are supported by strong or highly suggestive meta-analytic evidence, and future similar research is unlikely to change this evidence (p. 1).

On examining Papadimitriou et al.'s work, there is some validity in the cancer and nutrition/diet paradigm. The association between cancer and nutrition/diet is a reality, irrespective of the research paradigm used. The relationship between diet and cancers has been empirically established in this paper, but what about the chemicals in the food preparation process? Are they increasing the risk of cancers in people?

Chemicals in food preparation

Approximately 2500 chemicals are added to food during processing, improving its palatability and shelf-life, and over 12000 chemicals unintentionally escape into processed products associated with carcinogenesis. However, many food substances generally recognized as safe (GRAS) are suspected to have some level of carcinogenicity. Pesticide residue added to foods to increase shelf-life, hydrazines in mushrooms, aflatoxin B1, and vinyl chlorides are substances that directly or indirectly enter foods and are carcinogenic (National Research Council (U.S.) Committee on Diet, Nutrition, and Cancer, 1983). The long-term consumption of meat grilled directly over high flame produces heterocyclic amines (HCAs) and polycyclic aromatic hydrocarbons (PAHs) that are linked to the development of prostate, colon, and pancreatic cancer.

There is an association between the consumption of nitrosamines and the development of cancers of the oesophagus, stomach, and nasopharynx (Tricker & Preussmann, 1991; Gulsum & Nilufer, 2023). Nitrates and nitrite preservatives in foods are associated with the development of gastric, colorectal, and non-Hodgkin's lymphoma cancers (Braga-Dantas, 2021). Butylated hydroxyanisole (BHAs) is added to added to many perishable food items to increase their shelf-life. However, BHAs are associated with an increase in metabolic and carcinogenic disorders of the thyroid, endocrine, and neuromuscular functions (Zhang et al., 2023). Many beverage drinkers are exposed to the development of leukaemia and other forms of cancers from the consumption of beverages that form benzene when sodium benzoate reacts with ascorbic acid in the bottles (Center for Science in Public Interest, 2024). Artificial food colouring including (Yellow-5) tartrazine induces the development of breast cancer in rats with a genotoxic effect in humans at both small and large concentrations and could promote the development of cancer-causing cells (Zingue et al., 2021). The literature has provided empirical evidence on the relationship between diet/nutrition and cancer; however, is there a diet for cancer patients? Additionally, is there a diet to reduce the risk of cancer-causing pathogens?

Diet therapy for cancer patients

The goal of nutrition therapy for cancer patients is to maintain a healthy weight, preserve muscle tissue, prevent or correct nutrient deficiencies, and provide a diet that patients can tolerate and enjoy despite complications (Rock et al., 2012). According to Freudenheim (2013), diet and lifestyle strongly influence cancer risk as various food components can alter the process of DNA repair, gene expression, or cell differentiation. The World Health Organization (2018) argued that there are effective treatments for cancers, but that prevention has the greatest potential influence on reducing the burden on a population.

Alcohol consumption has been linked to about 1 in 30 cancer deaths, with correlations to cancers of the head and neck, liver, colon, rectum, and breast (Nelson et al., 2013). Food preparation methods such as cooking meat, poultry, and fish at high temperatures can lead to the formation of carcinogens in these foods (Turesky & Le Marchhand, 2011).

Consuming fruits and vegetables may reduce the risks of developing some cancers by providing nutrients and phytochemicals with antioxidant activity (Willett et al., 2014). These substances can help prevent or reduce oxidative reactions in cells that cause DNA damage, inhibit carcinogen production, enhance immune responses, or promote enzyme reactions that inactivate carcinogens. The American Cancer Society provides guidelines for reducing cancer risks such as limiting the consumption of energy-dense foods and sugary drinks, choosing whole-grain products over processed grains, consuming non-starchy vegetables daily, and limiting the intake of red and processed meats (Kushi et al., 2007). The World Health Organization (Ullrich, 2007) forwarded that between 30-40% of the burden of cancer is attributed to lifestyle risk factors including alcohol consumption, tobacco smoking, a diet low in fruits and vegetables, overweight and obesity, and physical inactivity. Hence, Table 3 presents foods that are likely to prevent/reduce cancer-causing pathogens. Schwingshackl & Hoffmann G. (2015) found that a healthy diet pattern is likely to reduce the risk of cancer by between 10-20%.

Table 3: Examples of foods to fight cancer may include

Fruits and vegetables	Carbohydrates	Protein	Milk	Oils
<ul style="list-style-type: none"> • Apples • Berries • Carrots • Pawpaw • Pineapple • Tomatoes • Grapes • Boy choy • Brussels sprouts • Cauliflower • Garlic • Grapefruit • Leafy greens • Oranges • lemons • Pears • Spinach • Romaine lettuce • Kale • Cruciferous vegetables • Broccoli 	<ul style="list-style-type: none"> • Wild rice or brown rice • Whole grain pasta • Sweet potatoes • Irish potatoes • Yams • Green bananas • Oatmeal • Quinoa 	<ul style="list-style-type: none"> • Tofu • Lentils • Black, red or pinto beans • Garbanzo beans/chick peas • Peanuts • Walnuts • Cashew nuts 	<ul style="list-style-type: none"> • Soy milk • nuts milk 	<ul style="list-style-type: none"> • Olive oil • Canola oil • Avocado • Walnut oil • Sesame oil • Soy oil

<ul style="list-style-type: none">• Leek• Beetroot• Cabbage				
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Conclusion

Nutrition plays a critical role in bad/good health, lowering risk factors and the risk of cancers and other health conditions (Chan et al., 2019; Donaldson, 2004; Rock et al., 2020). The association between diet and cancer and diet and cancer treatment has been scientifically established and there is no denying that cancer tumours develop with the consumption of fatty goods, red meats, processed meats, eggs, and butter. A plant-based diet is a healthy alternative to added sugar, saturated fats, carbohydrates, and alcohol consumption. Jamaicans are eating themselves to cancer. A non-probability cross-sectional study by LaFoucade et al. (2022) found that 48.6% of Jamaicans aged ≥ 18 years were unhealthy eaters because those meals were less expensive compared to healthy foods (52.5%). There is, therefore, a challenge for a request of the Jamaican Minister of Health and Wellness, Dr. Christopher Tufton (Anderson-Gordon, 2023), for children to reduce their consumption of ultra-processed foods that are high in fats, sodium, and sugar. Although Dr Tufton articulated, "... the data revealed that 22 per cent of 13 to 17-year-olds have three fast-food meals daily" (Anderson-Gordon, 2023), a similar argument can be made for the general populace, and this is compounded with high sugar consumption, which emphasizes the eating dilemma of the society. Jamaicans have crossed a nutritional faultline and are eating themselves to cancer and, by extension, death, and this means there is a need to implement a national public health campaign on healthy and responsible eating as well as punitive measures for fast/junk food and high-sugar beverages.

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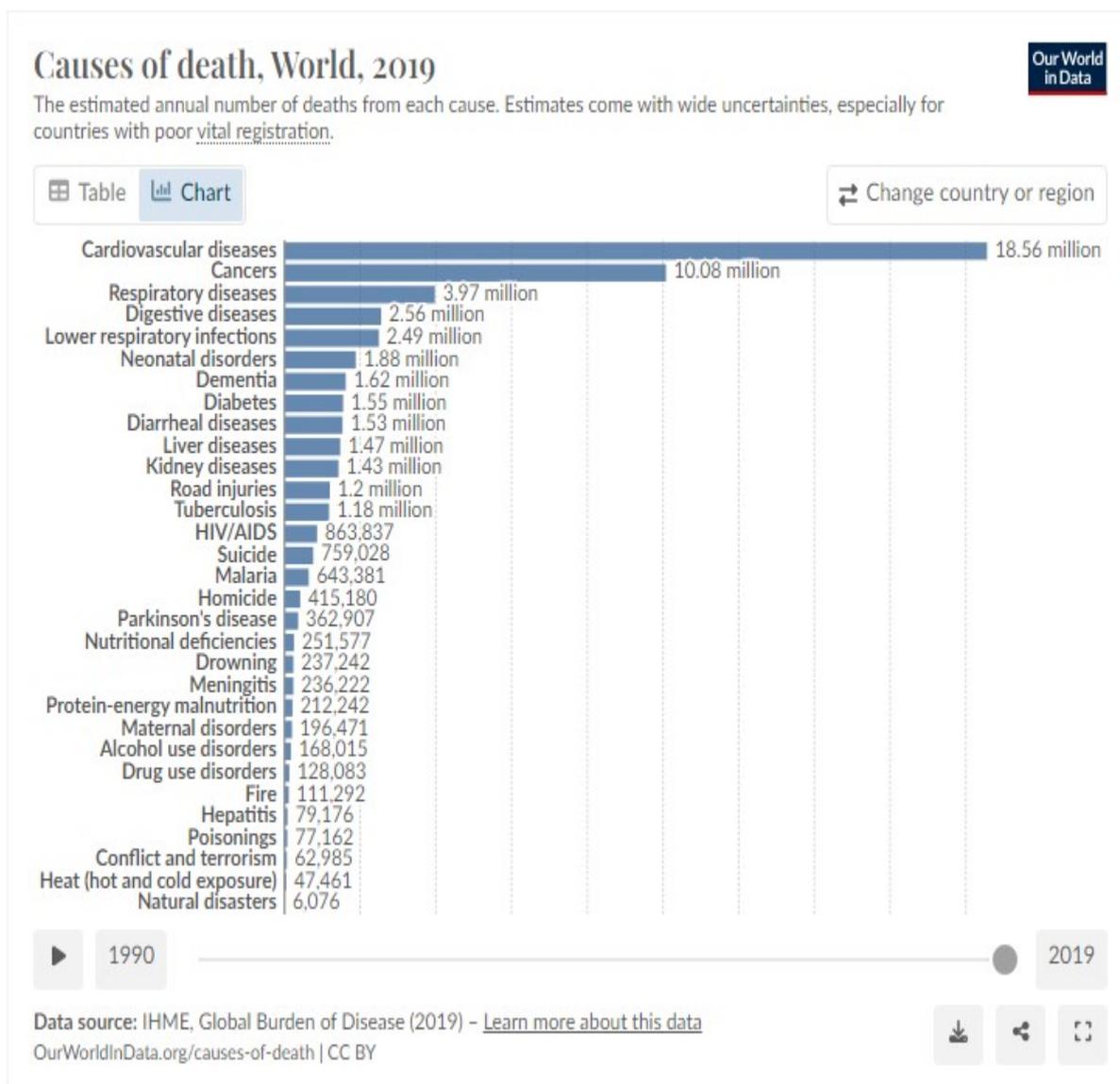
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Annexe

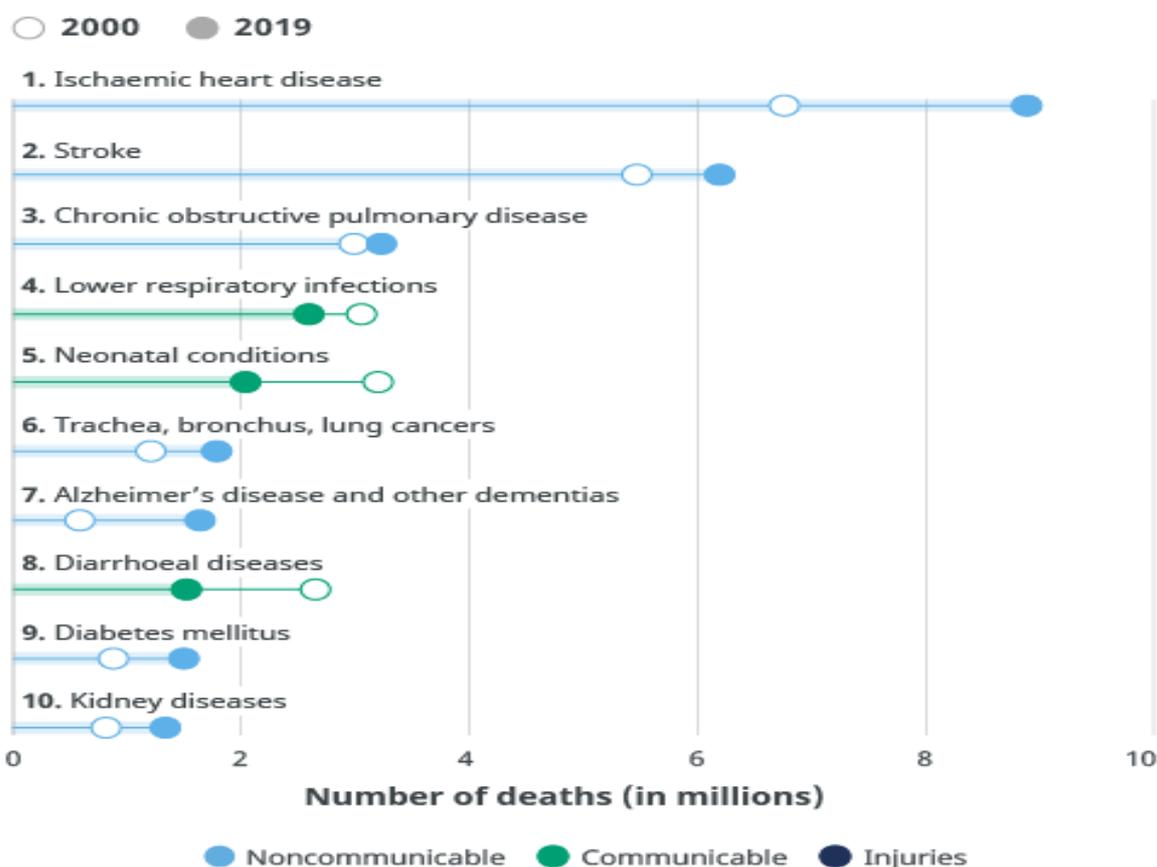
World: Cause of Deaths



Source: Dattani, et al. (2023)

World: Leading causes of death

Leading causes of death globally



Source: WHO Global Health Estimates.

Source: WHO Global Health Estimates (WHO, 2020)

Jamaica: Top 10 leading cause of mortality, 2015-2018

Details	2015	2016	2017	2018
Diabetes Mellitus	2114	2339	2375	2433
Cerebrovascular Diseases	2350	2284	2234	2232
External causes	1994	1994	2168	2001
Hypertensive Diseases	1411	1520	1518	1478
Ischaemic Heart Diseases	1484	1499	1435	1528
Malignant Neoplasm of the Prostate	651	671	711	723
Other heart diseases	685	655	653	601
The remainder of Malignant Neoplasms	1040	742	593	563
Human Immunodeficiency Virus Disease	535	539	539	486
Diseases of the genitourinary system	291	352	357	513

Source: Statistical Institute of Jamaica (STATIN). (nd). Leading Cause of Death to Persons 5 Years and Older (Both Sexes. Kingston: STATIN.

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