



## Cancer Epidemiology: An Analysis of Preventable Modifiable Risk Factors

Jacob Taylor\*

### Abstract

In the United States, over 40% of men and women will receive a cancer diagnosis at some point in their lives. Recent decades have seen a significant gain in our understanding of how cancer develops and progresses, which has improved screening and treatment options and increased the number of survivors who live longer after diagnosis. The published literature has extensively examined the epidemiologic evidence of lifestyle-related factors and cancer risk and survival, with suggestions for cancer prevention and control and tactics for implementation evolving throughout time. The burden of cancer, general measurement problems in cancer epidemiology and the status of the science in relation to certain lifestyle-related risk factors and cancer are all summarized in this study. According to estimates, adopting a better lifestyle could prevent between one-third and 50% of cancer cases.

**Keywords:** Lifestyle, Preventable, Cancer epidemiology

### Introduction

The breast, lung, rectum, colon, uterine, and thyroid malignancies are the five most prevalent cancer forms in women. Prostate, lung and bronchi, colon and rectum, urinary bladder, and skin melanoma are among the most typical cancer locations in males. With an estimated 1630 cancer deaths every day, cancer is currently the second most common cause of death in the United States despite advancements in treatment and prognosis over the years. Lung and bronchus cancers account for a quarter of all cancer-related deaths each year, making them the leading cause of mortality from cancer in both men and women. The burden of cancer has grown globally. Alarming, the World Health Organization (WHO) projects that over the next 20 years, there will be a roughly 70% increase in the number of new cancer cases. The incidence and mortality rates of cancers linked to viral infections, such as hepatitis-related liver cancer and Human Papillomavirus (HPV)-related cervical cancer, are typically higher in developing countries despite the fact that there is considerable overlap in common cancer types across the globe. Healthy lifestyle choices, such as quitting smoking, maintaining a healthy Body Mass Index (BMI), limiting alcohol use, and leading an active lifestyle, are thought to reduce cancer risk by between one-third and half.

### Discussion

Exposure to infectious agents and hormone exposure are two other

significant areas of epidemiologic research on modifiable risk factors and cancer risk or survival covered in this study. Although radiation, environmental, occupational, and genetic risk factors also significantly contribute to the risk of cancer, this study does not address these exposures. The likelihood of survival has increased thanks to advances in treatment and early detection. In the United States, there were an estimated 15.5 million cancer survivors in 2016, and by the end of 2025, there are expected to be over 20 million survivors there. Female breast (about 3.56 million), prostate (about 3.3 million), and non-melanoma skin cancer were the 5 greatest site-specific survivor categories in 2016. 1.45 million cases of colon and rectum, 757190 cases of endometrial cancer, and melanoma (614460). As this rapidly expanding population faces the danger of recurrence, long-term unfavourable treatment effects, as well as increased risks of physical and mental comorbidities, cancer survivorship is becoming an increasingly relevant public health concern. A cancer diagnosis is, however, frequently seen as a "teachable moment" because survivors may be more motivated to alter previously unconcerned health practices. Thus, if certain lifestyle-related factors are found to enhance cancer outcomes, this demographic may be more willing to explore modifying them.

Over the course of the 20th century, tobacco use skyrocketed, reaching a high in the 1960s, when the historic 1964 Surgeon General's Report, Smoking and Health, described the health dangers connected with smoking and represented a significant step toward lowering smoking rates in the United States. Several cancers, including acute myeloid leukaemia and cancers of the head and neck, bronchus and lung, stomach, liver, pancreas, kidney and ureter, cervix, bladder, colon, and rectum, are causally linked to smoking, according to a 2014 Surgeon General's report that documented 50 years of evidence after the original report. The second most frequent cancer in both men and women and the main cause of cancer death is lung or bronchial cancer. Smokers are thought to have a 25-fold increased risk of getting lung cancer compared to nonsmokers, despite the fact that many known lifestyle determinants are progressively associated with disease risk or mortality. Additionally recognized cancer risk factors are smokeless tobacco and secondhand smoking.

Smoking continues to be the largest cause of early disease and death in the United States, despite awareness of the negative effects of smoking and governmental measures aimed at reducing smoking rates. According to the Centers for Disease Control and Prevention, the number of US people who now smoke cigarettes is over 40 million, with the Midwest and South having the highest smoking rates. Nevertheless, according to the American Lung Association, more than 70% of smokers wish to stop, and 44% of them made unsuccessful attempts to do so in the previous year. According to the Surgeon General's Report, a former smoker's risk of dying from lung cancer is projected to be halved 10 years after quitting smoking compared to a current smoker. This desire to stop and the shift in lung cancer death risk that followed indicate the ongoing potential for research on multilayer interventions (such as individual, community, workplace, and policy) to reduce tobacco use. A PubMed search for "tobacco cessation" returns about 28000 publications, demonstrating the diversity of tried-and-true methods for tobacco control.

\*Corresponding author: Jacob Taylor, Editorial Office, Clinical Oncology: Case Reports, United Kingdom E-mail: oncologyreport@escienceopen.com

Received: July 04, 2022; Manuscript No: COCR-22-71237; Editor Assigned: July 06, 2022; PreQC Id: COCR-22-71237 (PQ); Reviewed: July 21, 2022; QC No: COCR-22-71237 (Q); Revised: July 23, 2022; Manuscript No: COCR-22-71237 (R); Published: July 30, 2022; DOI: 10.4172/cocr.5(7).242

Additionally, via the use of the media, taxation, and legislative restrictions on the sale and use of tobacco products, states, nations, and multilateral organizations like the WHO has developed and enhanced tobacco control programs.

Electronic cigarettes have been recommended as a good substitute to lessen traditional cigarette use or to support efforts to stop smoking. However, it is still unclear what effects e-cigarettes may have on your health, such as an increased risk of cancer. In order to understand the long-term consequences on health, studies are now being conducted to ascertain the health effects of e-cigarettes. Smokers may have a higher risk of treatment-related issues, recurrence, and secondary malignancies after receiving a cancer diagnosis. According to a poll of adult cancer survivors, between 88% and 92% of them reported not smoking, compared to just 80% of healthy US adults.

**Obesity** Over one-third of US individuals, as determined by nationally representative surveys, are believed to be obese, with a BMI of less than 30 kg/m<sup>2</sup>. The high prevalence of obesity has a significant impact on public health; according to estimates in an International Agency for Research on Cancer (IARC) handbook on cancer prevention from 2002, obesity may account for 11% of cases of colon cancer, 9% of cases of postmenopausal breast cancer, 39% of cases of endometrial cancer, 25% of cases of kidney cancer, and 37% of cases of oesophageal cancer. Obesity rates among women over 60 have increased alarmingly during the past five years, rising from 31.5% in 2003 to 38.1% in 2012. Given that cancer is an ageing-related disease and that weight gain may make cancer risk more severe, this trend of weight growth in older women is very concerning. Higher levels of leisure time MVPA were associated with a lower risk of 13 different cancers, including (in order of magnitude of effect) oesophageal carcinoma, liver, lung, kidney, gastric cancer, endometrial cancer, myeloid leukaemia, myeloma, colon, head and neck, rectal, bladder, and breast cancer, according to a 2016 study combining data from 1.44 million participants. Comparing high to low levels of leisure time physical activity, the hazard ratios varied from 0.58 to 0.90; noteworthy, risk reductions of 20% or more were observed for 7 of the malignancies.

This study added solid evidence of links for more cancer sites than were previously described in the literature, making it the most thorough review of physical activity and cancer risk to date. Physical activity has also been linked, in observational studies, to lower breast and colon cancer-specific mortality. That has been published has concentrated on physical activity and cancer intermediary indicators including hormone levels and inflammation since these intermediaries have been associated with an increased risk of developing cancer. Additional research has refuted the notion that women with breast cancer-related lymphedema shouldn't engage in weight lifting and shown that it is not only safe but also advantageous for alleviating lymphedema symptoms and boosting strength. Additional study is still required to better understand when, when, and how cancer survivors should incorporate physical exercise into health promotion programs based on their own baseline fitness, needs unique to their cancer or treatment, or readiness for change. Additionally, despite recent advances in "precision oncology" research and variations in exercise response according to tumour features, the mechanisms through which physical activity may influence cancer mortality or recurrence are not well known.

Complex problems of synergism and independence arise in studies evaluating obesity, physical inactivity, sedentary time, and food as risk factors for cancer incidence or survival. Studies that aim to show that one of these risk variables is independent typically include both unadjusted and adjusted values. The additional variables are frequently regarded by researchers as mediators or confounders of the relevant association. Given that specialists have different opinions on the most effective ways to model these aspects together, an investigator's operationalization of these connected factors in statistical studies should be carefully studied and thoroughly reported in publications. In terms of applied public health, the US Department of Health and Human Services, the WHO, and independent research agencies that focus specifically on cancer usually propose the same objectives for behaviours related to nutrition, physical activity, and weight both before and after a diagnosis. Neither for the general population nor for cancer survivors, there are currently any federal standards for sedentary time. Estrogens in particular are recognized to have significant roles in the initiation, spread, and survival of cancer. Unsurprisingly, cancers of the reproductive system, including breast, endometrial, and ovarian cancers, have been widely researched in this area; however, cancers of other organ sites, such as the lung, have also been investigated in relation to hormone levels. Lactation, oral contraceptive use, and menopausal hormone therapy are examples of lifestyle choices that have an impact on hormone levels in women and may change cancer risk. The research relating sex hormones to cancer risk in men is less clear-cut. The use of oral contraceptives has been linked to a higher risk of breast cancer, cervical cancer, and benign liver tumours, but decreased risk of endometrial and ovarian malignancies. An IARC Working Group examined the potential carcinogenic effects of menopause treatment and combined estrogen-progestogen contraception in women in 2007. On the basis of sufficient evidence of increased risk for breast cancer among current and recent users as well as increased risk for cervical and liver cancer among populations at low risk for HBV infection, combined oral estrogen-progestogen contraceptives were classified as carcinogenic to humans overall. But the Working Group also emphasized strong proof of beneficial correlations between oral contraceptive use and endometrial and ovarian malignancies. Progestogen-only contraceptives, on the other hand, were categorized as probably carcinogenic to humans in an earlier IARC Monograph because there was insufficient proof of their carcinogenicity in human investigations.

## Conclusion

In conclusion, these potentially changeable risk variables could account for up to 50% of cancer incidents. To better understand the timing and dose of many of the exposures described as risk factors for cancer or prognosis, more research is required. The risk factors mentioned above offer significant potential for public health programming to promote and support healthy behaviours, in addition to the essential current research on other aspects of cancer epidemiology like genetics or environmental and occupational risks. In order to assess the application of effective results in practical contexts, the discipline of implementation research has taken up this issue. To better understand how to alter cancer-related behaviours and how doing so might impact cancer incidence and survival, more research is still required. Policymakers and public health professionals should take into account multilevel initiatives that target not only individual level but also societal and systemic level activities given the difficulties of behavioural transformation.

Author Affiliations

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Editorial Office, Clinical Oncology: Case Reports, United Kingdom

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