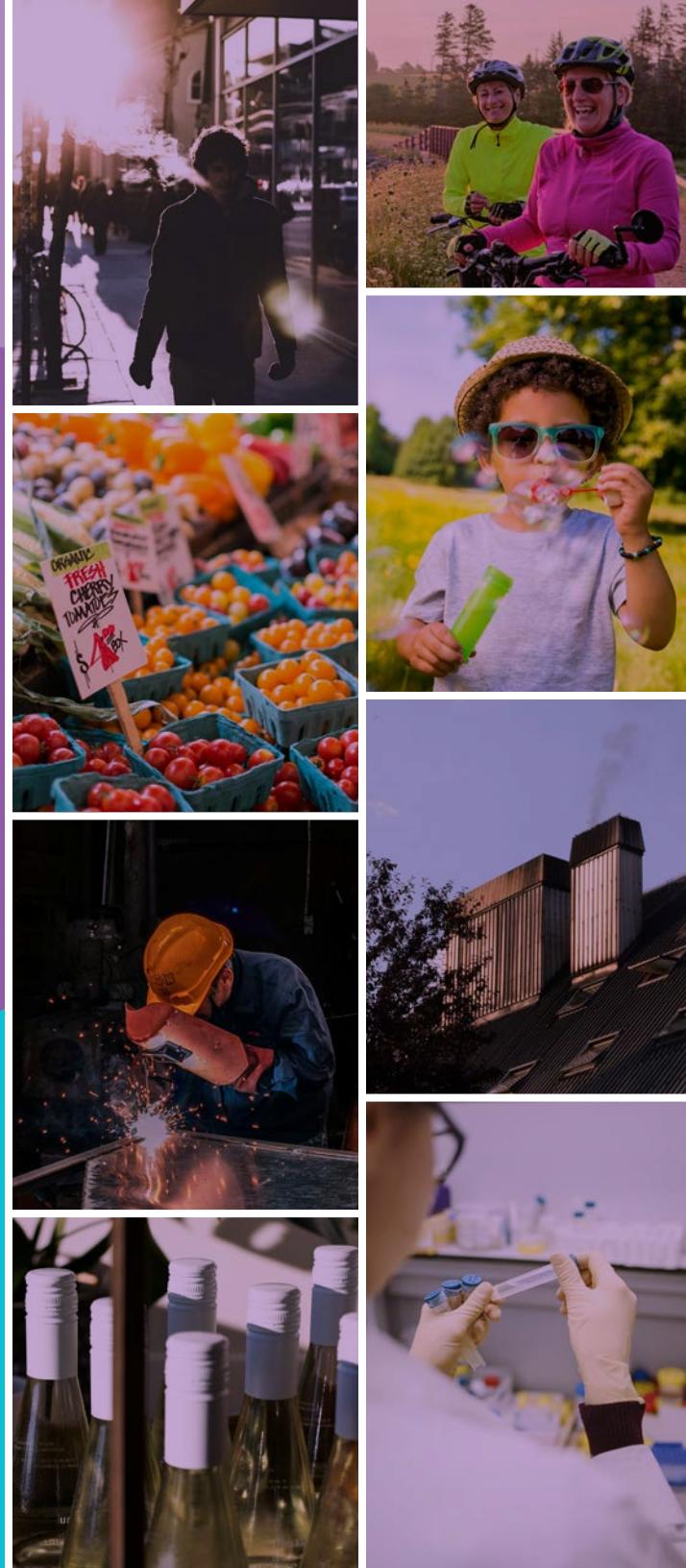


January 2026

BRITISH COLUMBIA CANCER PREVENTION INDICATOR REPORT: INDICATORS AND POLICIES



FOREWORD



**DR. PARIS-ANN
INGLEDEW**

Executive Vice President &
Chief Medical Officer
BC Cancer



CHRISTINE MASSEY

Executive Vice President
Population Health and
Wellness, BC Centre for
Disease Control

In 2023, the Province of British Columbia released a [10-Year Cancer Action Plan](#), outlining immediate steps to better prevent, detect, and treat cancers. Cancer prevention is an impactful and cost-effective way to reduce the risk of getting, and ultimately the burden, of cancer. It is estimated that about 40% of cancers are preventable by addressing modifiable risk factors, such as commercial tobacco smoking, alcohol use, and exposure to ultraviolet radiation.

However, it is not enough to understand these risk factors in isolation. We must also recognize that health outcomes, including cancer risk, are shaped by the social and economic conditions in which people live, work, and grow.

This Cancer Prevention Indicator Report serves as a guide to understanding where we are now and where we must focus our shared efforts. By examining the most recent data from different sources, such as the Canadian Community Health Survey, through the lens of income, education, and other determinants of health, we uncover more than numbers—we reveal where disparities exist. The report highlights the impact of modifiable risk factors on cancer, and outlines suggested policy actions that support people and communities in addressing cancer risk.

In reflecting on our path forward, we draw inspiration from the [Coast Salish teachings](#) that were gifted to the Provincial Health Services Authority by Knowledge Keeper, Siem Te'ta-in. One such teaching, nuts a maht (we are one) reminds us that all living things are connected, and every person and community has inherent value and dignity. The health of our people is deeply linked to the health of the land, water, and ecosystems we all depend on. Our efforts must be grounded in respect for these connections and designed to uplift everyone.

This report is a guide, but also a call to action. It is an invitation for all health leaders, policymakers, and communities to come together, tee ma thit (do your best), and play an active role in reducing the burden of cancer in our communities. We thank the multiple partners across the entire health system that contributed to this report and work every day to collaboratively address the health needs of British Columbians. May this report encourage us to approach cancer prevention with intention, focus, and equity, as we move toward the goal of a cancer free future.

Dr. Paris-Ann Ingledeew & Christine Massey

ACKNOWLEDGEMENTS

BC Cancer and BC Centre for Disease Control provide services to a diverse population including First Nations, Métis Peoples and Inuit living in various settings and communities across British Columbia. As a provincial network, we operate on the unceded traditional and ancestral lands of First Nations. Our main offices are located on the traditional and ancestral lands of the xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations.

REPORT DEVELOPMENT TEAM

Fabio Feldman, BC Cancer
Javis Lui, BC Cancer
Trang Nguyen, BC Cancer
Cheryl Peters, BC Cancer & BCCDC
Isabella Piechota, BC Cancer
Ashley Veevers, MPH Student, University of Victoria

TECHNICAL REVIEWERS AND CONTRIBUTORS

Greg Baytalan, Interior Health
Kristin Campbell, BC Cancer, UBC
Hugh Davies, UBC
Andy Delli Pizzi, Interior Health
Trevor Dummer, UBC
Jia Hu, BCCDC
Sunil Kalia, UBC
Suzanna Kaptur, Fraser Health
Falyne Katz, Melanoma Canada
Stephen Lam, BC Cancer
Denise Laronde, BC Cancer
Gethsemane Luttrell, Island Health
Geoffrey McKee, BCCDC
Silvina Mema, Interior Health

Rachel Murphy, BC Cancer, UBC

Colin Murray, WorkSafeBC
Renelle Myers, BC Cancer
Tim Naimi, University of Victoria
Gina Ogilvie, BCCDC & UBC
Michael Schwandt, Vancouver Coastal Health
Adam Sherk, University of Victoria, Canadian Centre on Substance Use and Addiction
Chase Simms, BCCDC
Tim Stockwell, University of Victoria
Ashley Tremblay, BC Cancer

DATA AND ANALYSIS

Anthony Leamon, BCCDC
Rita Zhang, BCCDC

SPECIAL THANKS TO MEMBERS OF THE CANCER PREVENTION COMMITTEE

Stephen Barbazuk, First Nations Health Authority
Warren Clarmont, BC Cancer
Tanya Davoren, Métis Nation BC
Andy Delli Pizzi, Interior Health
Sabrina Dosanjh-Gantner, Northern Health
Fabio Feldman, BC Cancer

Lindsay Forsman-Philips, CAREX Canada

Precillianne Hipolito, BC Cancer
Jia Hu, BCCDC
Jagbir Kaur, BC Cancer
Martin Lavoie, Office of the Provincial Health Officer
Javis Lui, BC Cancer
Gethsemane Luttrell, Island Health
Tracy Martell, Ministry of Health
Geoffrey McKee, BCCDC
Niamh McMahon, BC Cancer
Silvina Mema, Interior Health
Rachel Murphy, BC Cancer, UBC

Colin Murray, WorkSafeBC
Gina Ogilvie, BCCDC & UBC
Cheryl Peters, BC Cancer & BCCDC
Amrit Rai, Fraser Health
Michael Schwandt, Vancouver Coastal Health
Juan Solorzano, Ministry of Health
Joanne Telfer, CAREX Canada
Ashley Tremblay, BC Cancer
Xibiao Ye, Office of the Provincial Health Officer

GRAPHIC DESIGN

Tiffany Zhong

PROJECT SUPPORT

Ashley Kang

TABLE OF CONTENTS

INTRODUCTION	5
CHAPTER 1: SMOKING AND CANCER RISK	9
CHAPTER 2: PHYSICAL ACTIVITY AND CANCER RISK	29
CHAPTER 3: NUTRITION AND CANCER RISK	44
CHAPTER 4: ALCOHOL AND CANCER RISK	64
CHAPTER 5: UV RADIATION AND CANCER RISK	83
CHAPTER 6: ENVIRONMENTAL EXPOSURES AND CANCER RISK	96
CHAPTER 7: OCCUPATIONAL EXPOSURES AND CANCER RISK	115
CHAPTER 8: INFECTIONS AND CANCER RISK	132
TECHNICAL APPENDIX	146
GLOSSARY	165

INTRODUCTION

Background

A variety of factors contribute to the development of many cancer types, including some environmental exposures, infections, diet, and lower levels of physical activity¹.

Four in 10 cancer cases can be prevented through healthy living behaviours and supportive policies². According to the Canadian Population Attributable Risk of Cancer (ComPARe) study, approximately 33-37% of incident cancer cases in Canada among adults aged 30 years and over are attributable to risk factors that are at least theoretically modifiable². In 2015, 8,500 cancer cases were estimated as preventable in British Columbia alone².

As recognized by the Canadian Cancer Society and World Cancer Research Fund International, the most common risk factors that impact cancer rates are smoking, alcohol, physical inactivity, dietary factors, ultraviolet radiation, environmental exposures, occupational exposures, and certain infections, for example, human papillomavirus (HPV) and hepatitis B^{3,4}.

The Prevention System Quality Index by Cancer Care Ontario provides province-specific evidence on cancer risk indicators, current activities, and gaps to inform policy⁵. As the provision of health care is a provincial responsibility in Canada, similar resources and indicators according to other provinces and territories is necessary for setting cancer prevention priorities and coordinating activities.

Purpose

This report highlights key quantitative indicators, policies, programs, and potential policy actions relating to cancer risk factors and exposures among British Columbians. This document targets the province's goals for primary prevention of cancer and is intended for use by an array of interdisciplinary partners such as policymakers and program planners to inform cancer prevention efforts across BC. Regular revisions are anticipated as new data become available and as prevention priorities, policies, and programs advance over time.

A Framework for Action

Opportunities to reduce the impact of cancer risk factors exist through evidence-based programs and policies that link individual behaviours, familial, peer and professional relationships, and even larger group settings⁶. The socio-ecological model (SEM) is a conceptual framework that organizes these interactions across the following categories: individual, interpersonal, organizational, community, and public policy⁷. These SEM categories are nested within each other. By considering factors at multiple levels, health interventions can be more effective⁷. In this document, cancer prevention indicators and associated interventions, programs, and policies will be summarized, described and aligned with levels of the SEM:

INDIVIDUAL INTERPERSONAL ORGANIZATIONAL COMMUNITY PUBLIC POLICY

SOCIO-ECOLOGICAL MODEL (SEM)

INDIVIDUAL

Individual behaviours, such as commercial tobacco use, inadequate nutrition and physical inactivity, can impact cancer risk. Health promotion efforts that improve education, awareness and health literacy can support informed choices. However, these behaviours are shaped by broader determinants of health. To reduce individual burden, it is important to also focus on community, organizational, and policy-level changes that address the broader conditions influencing health.

INTERPERSONAL

The presence of a social network and supports can impact cancer risk. Examples of interpersonal relationships that can influence successful cancer prevention initiatives are parents and children, teachers and students, health care providers and patients, and even community leaders and members. Community-based events and peer support are examples of strategies that ensure cancer prevention programming reaches intended groups in ways that are meaningful.

ORGANIZATIONAL

Much can be done to mitigate cancer risk at the organizational level, such as interventions targeting exposures in the workplace, encouraging nutritious food and physical activity environments and benefits, implementing measures and policies to reduce alcohol-related harm, and promoting subsidized smoking cessation programs. Health and safety strategies to mitigate and/or eliminate hazards in community and workplace environments to reduce cancer risk are outlined by [CAREX Canada](#).

COMMUNITY

Cancer prevention efforts in the community focus on how local environments, cultural values, and shared spaces influence health. Things like access to nutritious foods, safe places to exercise, and exposure to harmful substances can all affect cancer risk. Community-based programs that use local languages and reflect cultural practices can help raise awareness and reduce barriers. Policies that support walkable neighbourhoods, shaded green spaces, and smoke-free areas also make it easier for people to live healthier lives.

PUBLIC POLICY

Regulations, laws, and media play crucial roles in cancer prevention efforts. Effective strategies should focus on supporting research to evaluate and mitigate the prevalence of known risk factors, integrating primary prevention into health care practices, and developing and implementing provincial policies that support cancer risk reduction.

Considerations

Evidence Sources and Data Considerations

To better understand how modifiable behaviours contribute to cancer risk, this report draws on findings from the Canadian Population Attributable Risk of Cancer (ComPARe) study. Although its estimates are derived from 2015 data, the unique methodological framework used remains the most comprehensive and relevant source for estimating the population-attributable risk of cancer provincially⁸. The study's approach, which examines high-quality national and provincial cancer registry data with historical exposure prevalence and relative risk estimates, provides a foundation for understanding modifiable cancer risk at both national and provincial levels. Given the absence of newer population-level attributable risk analyses, the ComPARe study continues to offer a valid and evidence-based reference point for informing cancer prevention planning.

To complement these estimates, this report incorporates the most recent data available from the Canadian Community Health Survey (CCHS), spanning 2019 to 2022, along with other population-level datasets ranging from 2015 to 2025. The CCHS collects data on a wide range of risk and protective factors, offering important insights into community-level patterns in BC and Canada. Its ability to be stratified by demographic and social determinants of health makes it a valuable resource for identifying inequities and understanding regional variations in health behaviours.

Interpreting Indicators Within a Broader Context

While individual-level indicators, such as smoking, nutrition, or physical activity, are important to monitor, they are best understood within the broader social and structural context. Health behaviours do not occur in isolation; they are influenced by factors such as income, education, housing, cultural safety, and access to supportive environments. To meaningfully reduce the burden of cancer, health promotion efforts should be supported by changes at the community, organizational, and policy levels. Framing individual indicators within this wider lens helps identify upstream opportunities to make healthy choices the easier choices, and improve health outcomes across populations.

Understanding Sex and Gender Differences

It is also important to acknowledge that many of the data sources referenced in this report collect information based on binary sex (male/female), which does not fully capture the experiences of Two-Spirit, transgender or gender-diverse individuals. This limitation affects the ability to examine disparities along gender identity lines, including those shaped by social determinants, access to care, or experiences of discrimination. It can also create confusion in interpreting data: disparities identified by sex (which may be rooted in biological factors such as hormone levels or body structure) may be mistakenly used to explain disparities that are in fact driven by gendered factors, such as health-seeking behaviours or health risk behaviours⁹. Future efforts to expand data collection and analysis in more inclusive ways will be essential to ensuring all populations are meaningfully represented in cancer prevention and control strategies.



REFERENCES

1. Pader, J., Ruan, Y., Poirier, A. E., Asakawa, K., Lu, C., Memon, S., ... & Brenner, D. R. (2021). Estimates of future cancer mortality attributable to modifiable risk factors in Canada. *Canadian Journal of Public Health*, 112(6), 1069-1082. <https://doi.org/10.17269/s41997-020-00455-7>
2. Poirier, A. E., Ruan, Y., Volesky, K. D., King, W. D., O'Sullivan, D. E., Gogna, P., Walter, S. D., Villeneuve, P. J., Friedenreich, C. M., Brenner, D. R., & ComPARe Study Team (2019). The current and future burden of cancer attributable to modifiable risk factors in Canada: Summary of results. *Preventive medicine*, 122, 140-147. <https://doi.org/10.1016/j.ypmed.2019.04.007>
3. Lee, S. (n.d.). What causes cancer? Canadian Cancer Society. Retrieved July 27, 2022, from <https://cancer.ca/en/cancer-information/what-is-cancer/what-causes-cancer>
4. Cancer risk factors that affect cancer: Exposures: WCRF International. (2022, April 21). Retrieved July 27, 2022, from <https://www.wcrf.org/diet-activity-and-cancer/risk-factors/>
5. Ontario Health (Cancer Care Ontario). Prevention System Quality Index 2020. Toronto: Queen's Printer for Ontario; 2020. Retrieved from <https://www.cancercareontario.ca/sites/ccocancercare/files/assets/PSQI2020-FullReport.pdf>
6. Brenner, D. R., Poirier, A., Woods, R. R., Ellison, L. F., Billette, J. M., Demers, A. A., Zhang, S. X., Yao, C., Finley, C., Fitzgerald, N., Saint-Jacques, N., Shack, L., Turner, D., Holmes, E., & Canadian Cancer Statistics Advisory Committee (2022). Projected estimates of cancer in Canada in 2022. *CMAJ : Canadian Medical Association Journal*, 194(17), E601-E607. <https://doi.org/10.1503/cmaj.212097>
7. Hiatt, R. A., & Breen, N. (2008). The social determinants of cancer: a challenge for transdisciplinary science. *American journal of preventive medicine*, 35(2), S141-S150. <https://doi.org/10.1016/j.amepre.2008.05.006>
8. Brenner, D. R., Poirier, A. E., Walter, S. D., et al. (2018). Estimating the current and future cancer burden in Canada: Methodological framework of the Canadian Population Attributable Risk of Cancer (ComPARe) study. *BMJ Open*, 8(7), e022378. <https://doi.org/10.1136/bmjopen-2018-022378>
9. Kaufman, M. R., Eschliman, E. L., & Karver, T. S. (2023). Differentiating sex and gender in health research to achieve gender equity. *Bulletin of the World Health Organization*, 101(10), 666-671. <https://doi.org/10.2471/BLT.22.289310>



CHAPTER 1

SMOKING AND CANCER RISK

Part 1 Smoking Commercial Tobacco and Cancer Risk

Part 2 Examples of Smoking Programs and Policies in British Columbia

Part 3 Actionable Areas

PART 1 SMOKING COMMERCIAL TOBACCO AND CANCER RISK

Lung cancer is the leading cause of cancer death in British Columbia, with commercial tobacco use being the largest contributing risk factor.

For this report, commercial tobacco use is discussed as being linked to cancer risk, unless otherwise specified by the data source. This refers to smoking products like cigarettes and hookahs and using smokeless tobacco products like chewing tobacco. As outlined by [First Nations Health Authority \(FNHA\)](#), this differs from traditional tobacco use, which is part of Aboriginal culture in many parts of BC and Canada for ceremonial and spiritual purposes. It is important not to conflate traditional tobacco use with the harmful effects of commercial tobacco use.

The Canadian Strategy for Cancer Control highlights smoking cessation as a priority in the reduction of cancer risk.

Quantitative data can be used to assess the uptake and impact of effective smoking cessation strategies in reducing cancer risk. Research demonstrates that non-smoking recommendations have the highest primary prevention adherence (94.8%) compared to recommendations addressing other risk factors (alcohol use, diet) for some cancer types¹.

As of 2015, attributable cancer cases due to commercial tobacco smoking was 29.4% in Canada and 27.7% in BC². Further, research has shown that the risk for developing lung cancer due to radon is even higher for people who smoke tobacco³. Radon is a colourless, odourless radioactive gas that is naturally released from the ground. It is the leading cause of lung cancer for people who do not smoke and the second leading cause for people who smoke³. See **Chapter 6** for more on radon.

Lung cancer risk and the success of programs to reduce commercial tobacco smoking and improve cessation uptake are heavily influenced by health inequities, which are unfair, unjust, and preventable health disparities⁴.

Structural determinants, such as systemic racism, colonialism, discrimination, economic policies, and cultural norms shape access to and engagement in opportunities. Social determinants, including income, education, employment, and housing, also act as upstream factors⁴. Together, these determinants of health ultimately affect commercial tobacco smoking behaviours and lung cancer risks.

What impact does smoking commercial tobacco have on cancer risk?

Quantitative Indicators of Cancer Risk Attributable to Tobacco Smoking in BC

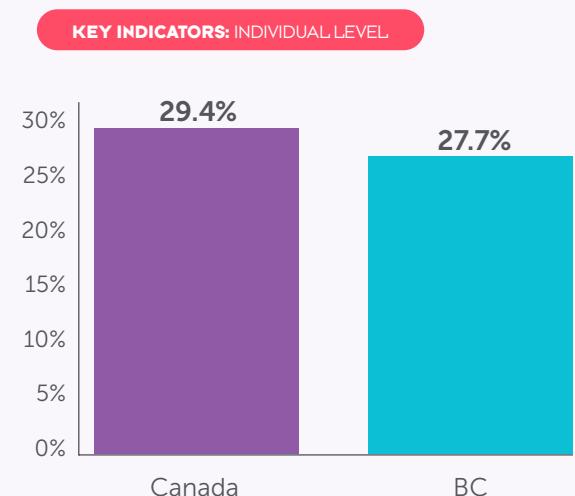


Figure 1 – Population attributable risk of cancer due to smoking (all ages), 2015

Source [ComPARe](#), 2015

Table 1 – Number of cancer cases attributable to commercial tobacco smoking in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Lung	1146	1066	2212
Bladder	101	31	132
Colorectal	..	133	133
Oral	367	81	448
Breast	..	133	133
Esophagus	89	28	117
Pancreas	57	42	99
Kidney	69	28	97
Larynx	70	10	80
Liver	63	14	77
All Associated	2322	1657	3978

Table 2 – Percentage of cancer cases attributable (PAR) to commercial tobacco smoking in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Lung	73	66.4	69.7
Bladder	39	31.8	37.5
Colorectal	11.2	8.4	10
Oral	39.7	31.9	37.5
Breast	..	4.2	4.2
Esophagus	42.4	34.5	40.2
Pancreas	17.1	13.1	15.2
Kidney	17.2	13.4	15.8
Larynx	73.3	66.5	72.4
Liver	24.2	19.2	23.1
All Associated	36.2	20.9	27.7

How does BC measure in terms of commercial tobacco smoking?

Quantitative Indicators of Commercial Tobacco Smoking in BC

Compared to Canada (12.5%), smoking rates in BC were 9.5% among adults aged 18+ in 2022, which was the lowest compared to other provinces and territories. Prevalence of adults who reported formerly smoking was 23.4% in BC and 23.2% in Canada⁵.

Among youth, there has been a steady decline in tobacco use over the past 30 years. According to the 2023 BC Adolescent Health Survey, 15% of youth aged 12-19 had ever smoked tobacco, including 2% who smoked tobacco exclusively and 13% who both smoked and vaped⁶. Among youth who had tried smoking, 40% reported smoking in the past month⁶. Smoking status stratified by social determinants of health (household income, education and living in rural/remote communities) can also support system-level policy reforms.

KEY INDICATORS: INDIVIDUAL LEVEL

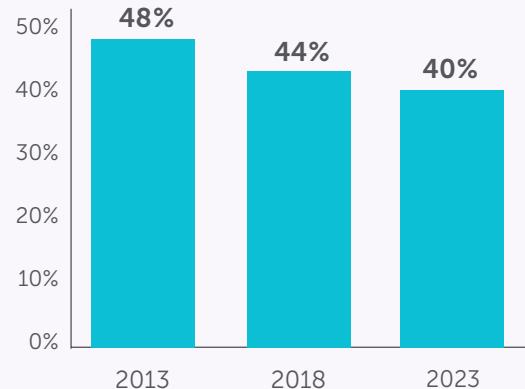


Figure 3 – Prevalence of youth, aged 12-19, who smoked commercial tobacco in the past month in BC (among those who had ever smoked tobacco), by year

KEY INDICATORS: INDIVIDUAL LEVEL

Source CCHS, 2021-2022

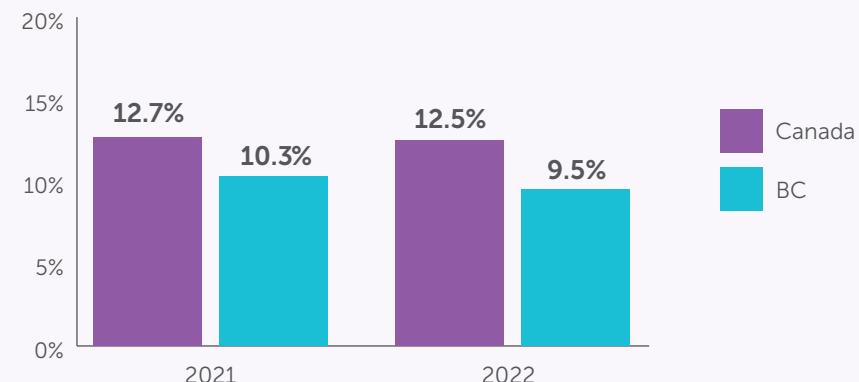


Figure 2 – Prevalence of current daily or occasional commercial tobacco smoking in BC, 18 years and over, by year

Table 3 – Prevalence of current cigarette smoking, daily or occasional, in BC, by age group, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source CCHS, 2022

Age	Males and Females (%)
12-17	..
18-34	7.7
35-49	8.8
50-64	9.7
65+	4.7
Total	7.7

Note: Estimates derived from 2022 CCHS PUMF. Variations from provincial totals reported elsewhere may reflect a question-flow change and potential survey cycle adjustments. See *Technical Appendix* for details.

Table 4 – Prevalence of current smoking, former smoking, and never smoking, referring to commercial tobacco smoking, in BC, by sex (all ages), 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Smoking Status	Males (%)	Females %
Current Smoking	10.0	5.6
Former Smoking	25.3	21.9
Never Smoking	64.8	72.5

Table 5 – Prevalence of current smoking, referring to commercial tobacco smoking, in BC, by household income (all ages), 2022

KEY INDICATORS: INTERPERSONAL LEVEL

Source [CCHS, 2022](#)

Household Income	Males and Females (%)
No income or less than \$40,000	9.8
\$40,000-\$59,999	9.7
\$60,000-\$79,999	8.8
More than \$80,000	6.9

Table 6 – Prevalence of current smoking, referring to commercial tobacco smoking, in BC, by household education level (all ages), 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Education level	Males and Females (%)
No post-secondary education	11.2
Post-secondary certificate/diploma/university degree	6.7

Table 7 – Prevalence of current smoking, referring to commercial tobacco smoking, by health authority in BC (all ages), 2022

KEY INDICATORS: COMMUNITY LEVEL

Source [CCHS, 2022](#)

Health Authority	Males and Females (%)
Fraser Health	8.2
Interior Health	10.2
Island Health	7.3
Northern Health	14.9
Vancouver Coastal Health	4.4

How does BC measure in terms of second-hand smoke exposure?

Quantitative Indicators of Second-Hand Smoke Exposure in BC

Second-hand smoke exposure is defined as a combination of smoke exhaled by people who smoke and smoke released directly into the air from burning cigarettes and other tobacco products⁷. As second-hand smoke increases risk of lung cancer, it is important to capture second-hand smoke data to identify the non-smoking population who may be at risk of exposure⁷.

Children and youth are more likely to experience negative effects of second-hand smoke⁷. As well, males experience greater harms by the effects of second-hand smoke than females⁷. In BC, rates of second-hand smoke exposure are lower than the estimate for Canada overall.

Table 8 - Number of cancer cases attributable to second-hand smoke in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Male (n)	Females (n)	Males and Females (n)
Colorectal	28	18	47
Lung	16	16	32
Breast	..	25	25
Cervix	..	12	12
All Associated	71	45	116

Table 9 - Percentage of cancer cases attributable (PAR) to second-hand smoke in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Colorectal	1.6	1.3	1.5
Lung	1.0	1.0	1.0
Breast	..	0.8	0.8
Cervix	..	7.6	7.6
All Associated	1.3	1.1	1.2

Table 10 – Prevalence of second-hand smoke exposure in BC, by age group, 2019 to 2020

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2019/2020](#)

Age	Males and Females (%)
12-17	18.8
18-34	18.8
35-49	15.1
50-64	9.9
65+	6.2
Total	13.3

Table 11 – Prevalence of second-hand smoke exposure in BC, by sex (all ages), 2019 to 2020

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2019/2020](#)

Sex	Exposed to Second-Hand Smoke (%)
Male	15.5
Female	11.2

Table 12 – Prevalence of second-hand smoke exposure in BC, by household income (all ages), 2019 to 2020

KEY INDICATORS: INTERPERSONAL LEVEL

Source [CCHS, 2019/2020](#)

Household Income	Males and Females (%)
No income or less than \$40,000	14.6
\$40,000-\$59,999	12.4
\$60,000-\$79,999	15.3
More than \$80,000	12.6

Table 13 – Prevalence of second-hand smoke exposure in BC, by household education level (all ages), 2019 to 2020

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2019/2020](#)

Education Level	Males and Females (%)
No post-secondary education	13.0
Post-secondary certificate/diploma/university degree	13.1

Table 14 – Prevalence of second-hand smoke exposure, by health authority in BC (all ages), 2019 to 2020

KEY INDICATORS: COMMUNITY LEVEL

Source [CCHS, 2019/2020](#)

Health Authority	Males and Females (%)
Fraser Health	14.5
Interior Health	11.9
Island Health	11.6
Northern Health	14.4
Vancouver Coastal Health	13.0

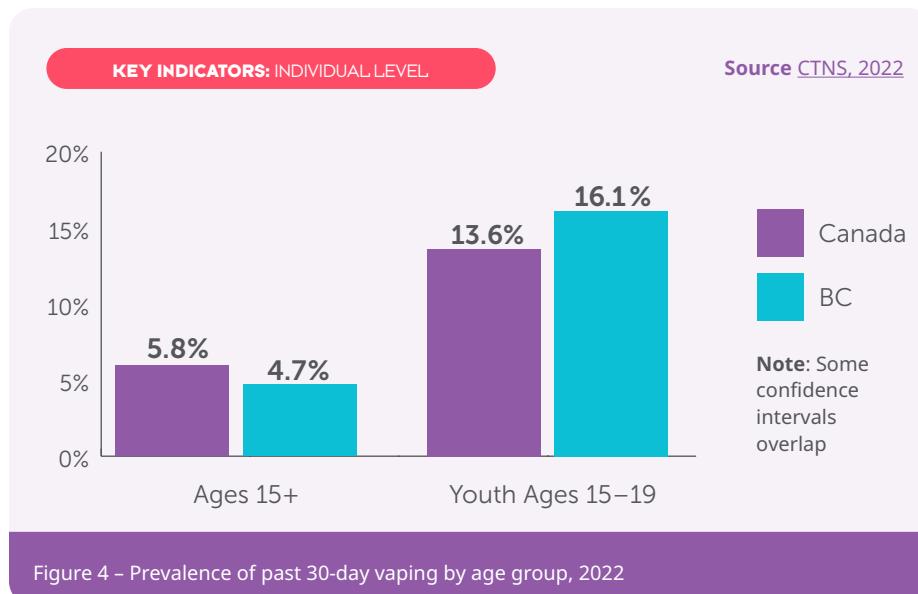
How does BC measure in terms of vaping?

Quantitative Indicators of Vaping in BC

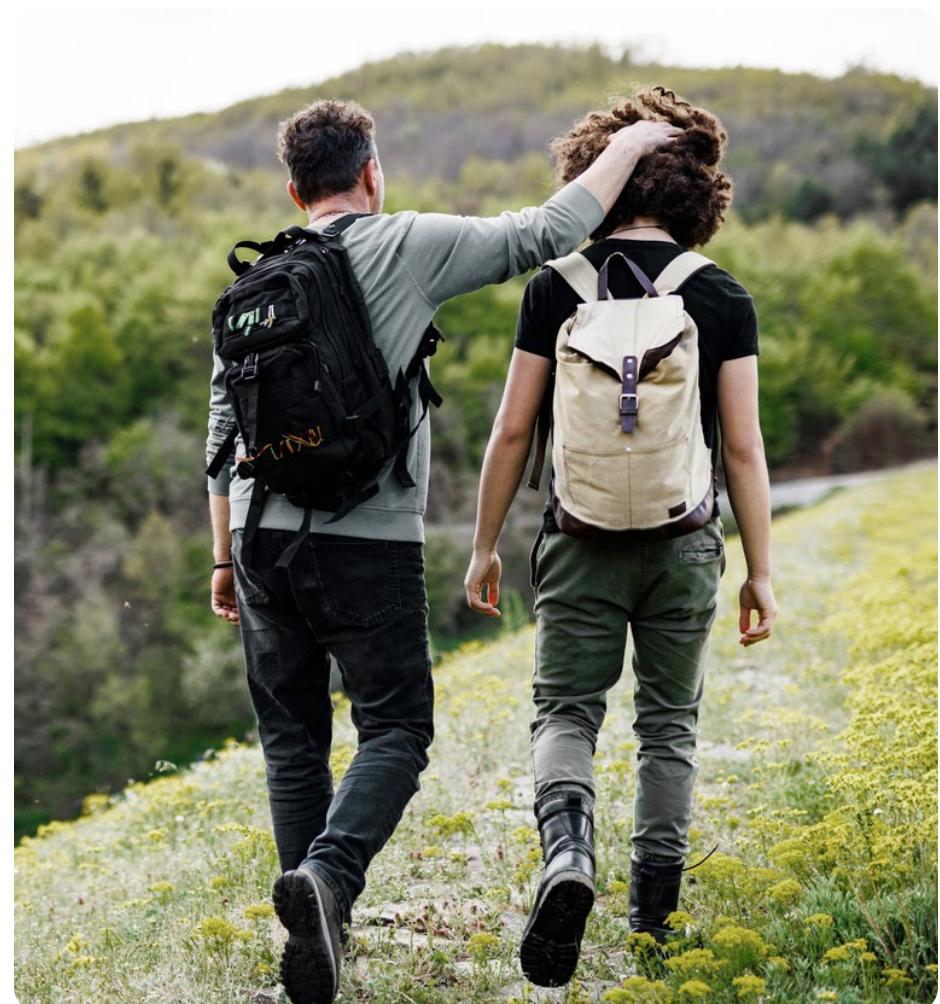
Vaping rates in British Columbia vary significantly between adults and youth. While more research is required to establish evidence of the long-term risks of vapour product use, youth who use vapour products such as e-cigarettes containing nicotine are at an increased risk of initiating smoking. Recent studies have also shown significant vaping trends among youth in Canada⁸.

Among adults, data from the 2022 Canadian Tobacco and Nicotine Survey shows that approximately 5% of British Columbians aged 15 and older reported vaping in the past 30 days⁵. Vaping was more common among younger age groups, particularly those aged 15-19.

According to the 2023 BC Adolescent Health Survey, 26% of youth aged 12-19 reported ever vaping, and over half of youth (57%) who had tried vaping had vaped in the past 30 days, including 15% who had done so daily⁶. Flavoured products, social influences, and perceptions of reduced harm contribute to higher use among youth^{5,6}.



This contrast between adult and youth indicators points to different underlying factors and emphasizes the need for age-specific policies, education, and cessation supports. BC has released a 10-Point Vaping Action Plan, which focuses on youth programming, and use of regulatory authority to restrict access and exposure to vape products. Lung cancer risk reduction recommendations as outlined by the Canadian Cancer Society and World Cancer Research Fund International include not smoking or using any form of commercial tobacco.



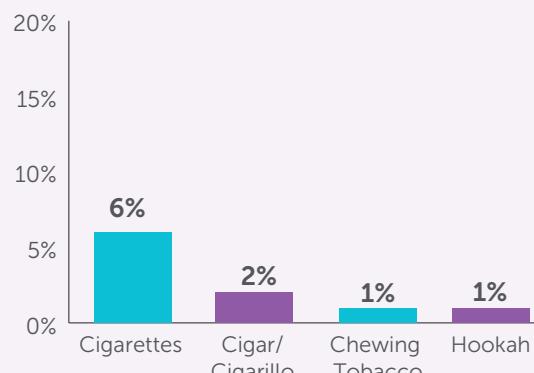
KEY INDICATORS: INDIVIDUAL LEVEL

Figure 5 – Nicotine-related products youth, aged 12-19, used in the past month, 2023

Source [BC AHS, 2023](#)

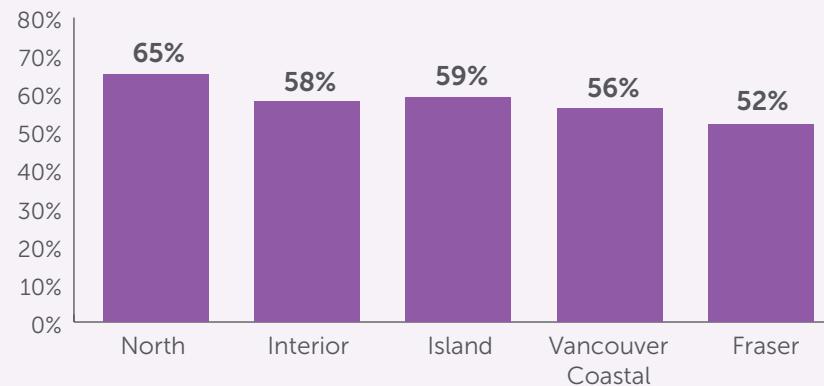
KEY INDICATORS: COMMUNITY LEVEL

Figure 6 – Prevalence of youth, aged 12-19, who had vaped in the past month (among those who had ever vaped), by health authority in BC, 2023

Source [BC AHS, 2023](#)

Note: The differences were not statistically significant between the Interior, Vancouver Island, and Vancouver Coastal; and between Vancouver Coastal and Fraser.



Behavioural interventions in British Columbia

The most common tobacco cessation methods are quitting without aid, reducing the number of cigarettes smoked and using nicotine replacement therapies (NRT) such as gum, lozenges, and patches.

Along with common NRTs, prescription medications like Varenicline or Bupropion are also used and most effective when combined with behaviour therapy. In 2020, the Ministry of Health conducted the BC Smoking Cessation Program Survey to assess people who accessed smoking cessation aids. Overall, the quit rate was 37% in the 2020 evaluation compared to 27% in the 2015 evaluation⁹.

Most smoking cessation programs in BC focus on individual behaviour change. At the policy level, workplace regulations and taxation may also support behaviour change. Smoking cessation programs provide education and support in individual or group settings, and can consist of counseling, self-help resources and apps. As well, culturally safe tobacco cessation supports for First Nations, Métis, Inuit, and urban Indigenous communities are available in BC through programs such as the FNHA Health Benefits Program, [Talk Tobacco](#), and [QuitNow BC](#).

Financial coverage of smoking cessation medications varies across Canada¹⁰. The [BC Smoking Cessation Program](#) covers NRT or prescription medication for up to 12 weeks per year. In 2023, BC Cancer launched an [NRT pilot program](#) in Prince George, which provides a supply of NRTs to begin cessation for those receiving cancer treatment at the point of care. In general, physicians, nurse practitioners, pharmacists, and dentists can prescribe smoking cessation medications in BC.



KEY INDICATORS: INDIVIDUAL LEVEL

Source [BC Stats, 2020](#)

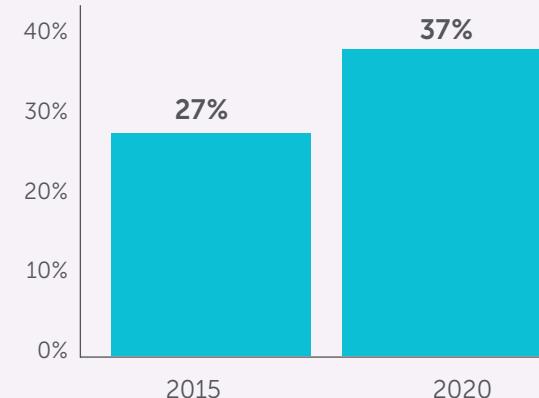


Figure 7 – Overall smoking cessation rate among those who accessed smoking cessation aids in BC, 19 years and over, by year

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CTNS, 2021-2022](#)

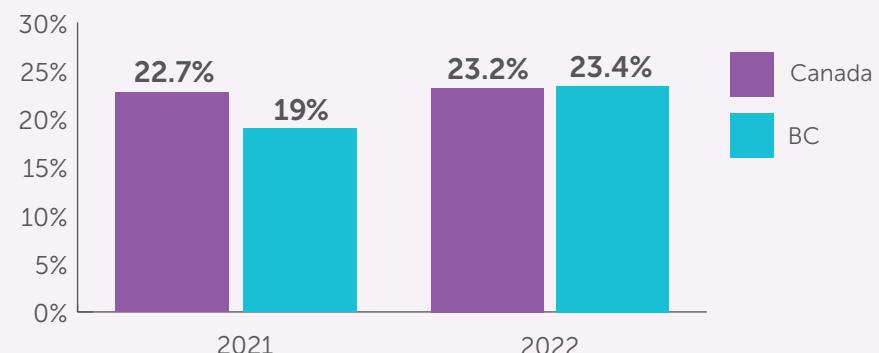


Figure 8 – Prevalence of former smoking among adults, 15 years and over, by year

Smoking cessation support for those experiencing mental illness and/or addictions

People affected by mental illnesses and/or addictions are significantly more likely to smoke, smoke at heavier frequencies, and experience lower quit rates, compared to those who smoke within the broader population¹¹.

According to the Canadian Partnership Against Cancer, smoking cessation supports for those experiencing mental illness and/or addictions varies across Canada¹². BC provides adaptations to cessation aid coverages and implements

appropriate policies and protocols. For example, QuitNow BC supports clients who may be experiencing issues with mental illness and addictions, and the BC Ministry of Mental Health and Addictions has created the well-being platform [HelpStartsHere](#), which aids programs in referring clients to mental health services. However, the province does not currently provide a directly targeted mental health/addictions smoking cessation program. Provinces providing these adaptations include YT, AB, MB, SK, ON, QC, NB, NS, PE, and NL.

Health equity considerations of commercial tobacco smoking

Health inequities, driven by structural determinants like systemic racism, colonialism, and economic policies shape access to resources and opportunities, ultimately impacting smoking behaviours and lung cancer risk.

Colonialism and systemic racism drive higher smoking rates among Indigenous populations, while targeted tobacco marketing exacerbates inequities. Interventions such as plain packaging regulations and culturally safe tobacco cessation supports highlight the value of equity-focused policies and programs. These initiatives help address systemic barriers and create supportive environments for reducing commercial tobacco use and associated cancer risks.

KEY INDICATORS: COMMUNITY LEVEL

Source [CPAC, 2019](#)

	AB	BC	MB	NB	NL	NS	ON	PE	QC	SK	NT	NU	YT
Mental health/addictions smoking cessation program available	✓			✓	✓	✓	✓	✓	✓				✓
Adaptation to quitline	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓
Adaptation to cessation aid coverage	✓	✓	✓		✓		✓						
Implementation of policy, protocol, and/or training	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓

Figure 9 – Availability of smoking cessation supports for those experiencing mental illness and/or addictions, by province and territory, 2019



PART 2 EXAMPLES OF POLICIES AND PROGRAMS ADDRESSING SMOKING IN BRITISH COLUMBIA

- INDIVIDUAL**
 - [BC Smoking Cessation Program \(BC Pharmacare\)](#)
 - [FNHA Health Benefits Program](#)
- INTERPERSONAL**
 - [QuitNow BC](#)
 - [Walk or Run to Quit](#)
 - [Foundry – Youth Substance Use and Wellness Services](#)
- ORGANIZATIONAL**
 - [Smoke Free Environment Signage](#)
 - [Healthy Workplaces - Smoke-Free Workplaces](#)
- COMMUNITY**
 - [Talk Tobacco – Indigenous Quit Smoking and Vaping Support](#)
 - [Smoke-Free Areas - Universities and Colleges, Health Care Facilities, and other Public Spaces](#)
 - [BC Youth Advisory Council on Health and Wellness \(BC YAC\)](#)
- PUBLIC POLICY**
 - [Tobacco Product Taxation](#)
 - [BC's Tobacco Control Strategy](#)
 - [Tobacco and Vapour Products Control Act](#)



INDIVIDUAL LEVEL

BC Smoking Cessation Program (BC Pharmacare)

The BC Smoking Cessation Program provides subsidization of NRTs such as gum, lozenges and patches, and smoking cessation prescriptions drugs for eligible BC residents of all ages. Pharmacare pays for full coverage of NRTs and partial or full coverage of certain smoking cessation prescription drugs.

FNHA Health Benefits Program

The FNHA Health Benefits Program aims to cover medically necessary items, services, and travel for status First Nations people living in BC with a comprehensive and community-driven health benefit plan. This includes free NRT products and prescription medication for tobacco smoking cessation.

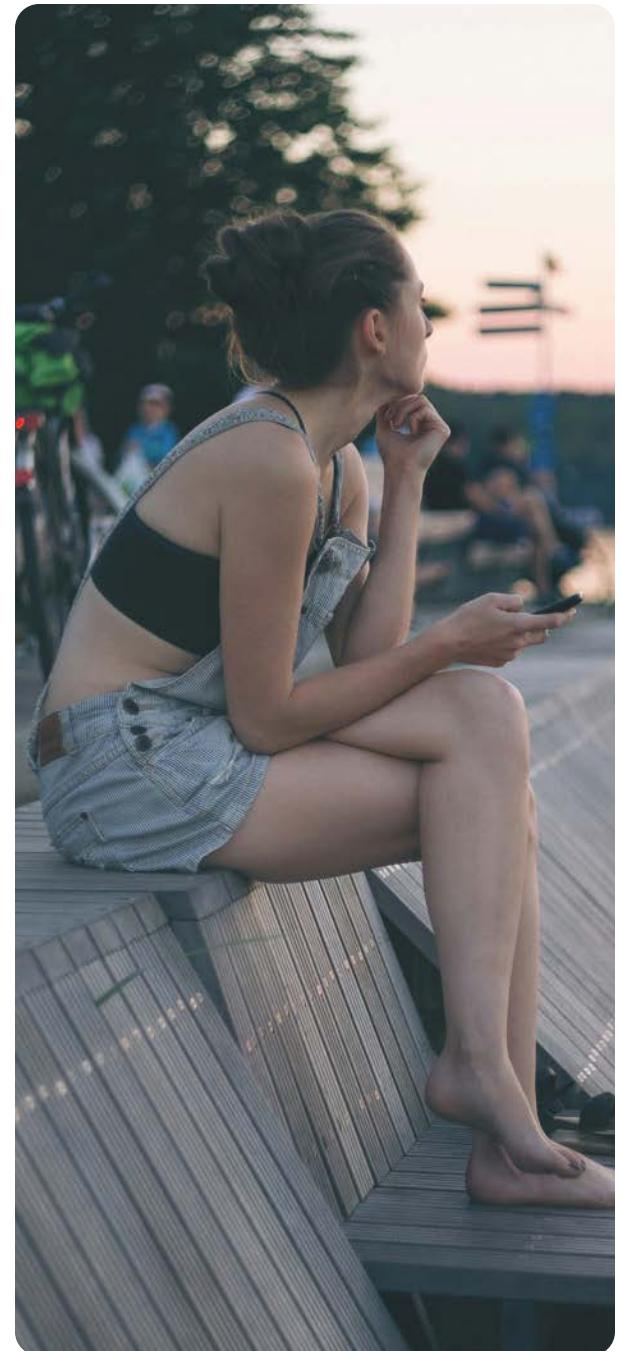
INTERPERSONAL LEVEL

QuitNow BC

QuitNow BC is a provincial program offering free support services to help people and loved ones quit or reduce smoking, vaping and other commercial tobacco use. The program includes coaching services, peer support by phone and live chat, community/group programs, and goal tracking. Services are free to access and available for those aged 10 and older.

Walk or Run to Quit

This exercise program was a partnership between the Canadian Cancer Society and Running Room that supported use of walking or running to help people quit smoking. The training program taught participants how to walk or run five kilometres over a 10-week course, in combination with receiving smoking cessation resources. Research has shown physical activity can alleviate negative nicotine withdrawal symptoms, decrease tobacco cravings, and reduce stress¹³.



INTERPERSONAL LEVEL

Foundry - Youth Substance Use and Wellness Services

Foundry BC provides mental health, substance use and other wellness services for youth ages 12-24, as well as peer and family support at 17 centres across the province. Services are free and confidential, and do not require a referral. In-person and online counselling appointments are available. Foundry is powered by BC Children's Hospital, with support from the Government of British Columbia, Graham Boeckh Foundation, Michael Smith Foundation for Health Research, Providence Health Care and St. Paul's Foundation.

ORGANIZATIONAL LEVEL

Smoke Free Environment Signage

BC Lung Foundation offers provincial and municipal signage compliant with the BC Tobacco and Vapour Control Act. They currently collaborate with BC health authorities and municipalities to update signage resources. Regional signage is presently accessible for multiple communities, such as Burnaby, Chilliwack, Langley, Victoria and more.

Healthy Workplaces - Smoke-Free Workplaces

The Healthy Workplaces Program was a partnership between the Canadian Cancer Society BC and Yukon Division and the BC Ministry of Health. It offered guidance for creating healthier workplaces and was utilized by over 750 businesses. Among its initiatives was "Smoke-Free Workplaces," which provided educational materials, fact sheets, tips, and health benefits for employers to share with employees or among co-workers as part of Workplace Wellness Challenges. Additionally, workplace electronic campaigns targeting commercial tobacco smoking through knowledge mobilization campaigns, awareness strategies, social media and text messages, and self-directed online programs exist in other parts of Canada.



COMMUNITY LEVEL

Talk Tobacco – Indigenous Quit Smoking and Vaping Support

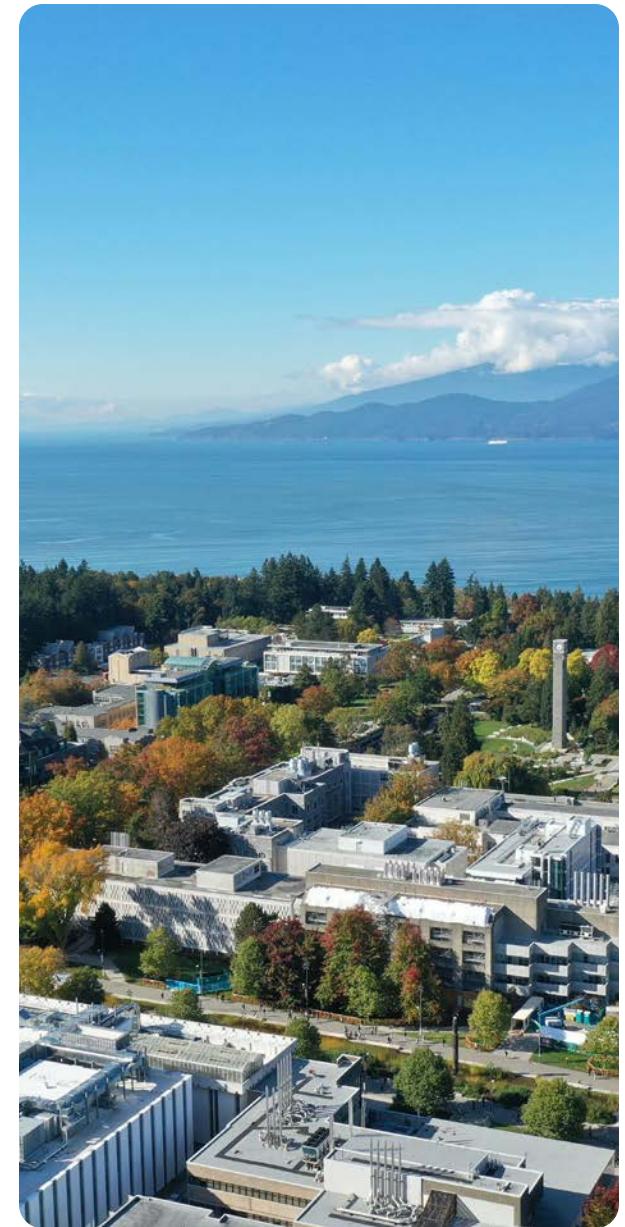
Talk Tobacco delivers free and confidential commercial tobacco and vaping cessation services to First Nation, Métis, Inuit, and urban Indigenous communities. Taking careful consideration of the role of traditional and ceremonial tobacco in many Indigenous cultures, Talk Tobacco offers culturally relevant, accessible and targeted information on how to quit smoking or vaping. Resources are guided by Indigenous leaders, partners, community members, and health care providers. Services are available via phone, online messaging and text.

Smoke-Free Areas – Universities and Colleges, Health Care Facilities, and other Public Spaces

At least 15 universities and colleges in British Columbia currently implement smoke-free policies in designated areas¹⁴. Smoking on health authority properties is prohibited except for designated smoking rooms in hospitals¹⁵. Semi-enclosed patios may be exempt from prohibitions, most other provinces and territories prohibit smoking on patios altogether¹⁵. No province or territory has legislation for smoking in private homes, or full smoking bans in multi-unit dwellings or correctional facilities¹⁵.

BC Minister of Health's Youth Advisory Council on Health and Wellness (BC YAC)

The BC YAC is a province-wide, youth-led group supported by the McCreary Centre Society in partnership with the BC Ministries of Health and Education. The council provides youth perspectives to inform provincial decisions related to health and wellness, with a particular focus on topics such as vaping, tobacco use, and mental health. Members meet regularly to share lived experiences, identify emerging youth health priorities, and contribute to the development of youth-informed policies and educational resources.



PUBLIC POLICY LEVEL

Tobacco Products Taxation

Current tobacco control strategies in BC aim to decrease frequency and negative impacts of commercial tobacco use through harm reduction¹⁶. Taxation on all tobacco products including cigarettes, heated tobacco products, cigars and loose tobacco exists in BC. As of July 1, 2022, 7% PST has been implemented in addition to the tobacco tax.

BC's Tobacco Control Strategy

Consistent with the best practices, principles and components of tobacco control programs at the federal, provincial, and state levels in Canada and the United States, the goal of BC's Tobacco Control Strategy is to equip policymakers and service providers with evidence to help reduce death and illness caused by commercial tobacco use, and to reduce related costs incurred by the health care system. This comprehensive strategy focuses on three key areas: prevention programs (preventing youth and young adults from starting commercial tobacco use), cessation programs (encouraging and assisting people who use commercial tobacco to reduce use or quit), and protections programs (protecting British Columbians, especially infants and children, from second-hand smoke).



PUBLIC POLICY LEVEL

Tobacco and Vapour Products Control Act

Administered by the BC Ministry of Health and enforced by each of the five health authorities, this legislation regulates the use, sale, and display of tobacco products. Areas covered are:

- Prohibiting tobacco sales to minors under 19, sale of cigarettes in packages of less than 20, and mandating warning signs at registers.
- Regulating the sale, distribution, and promotion of tobacco products.
- Restricting the locations where tobacco products can be sold, offered, or distributed.
- Establishing guidelines for the use and display of tobacco products in public spaces.
- Defining the powers of enforcement officers allowing them to seize items as evidence in tobacco-related offenses.

In 2019, BC introduced a [10-point Action Plan](#) to protect youth from the harms of vaping and vapour products. As part of this plan, the E-Substances Regulation was added under the Tobacco and Vapour Products Control Act and enacted in 2020. Among its policies, the regulation prohibits any advertising of vapour products visible or audible to youth (e.g., in store windows or transit hubs); restricts flavoured vaping products (other than tobacco flavour) to age-restricted retail shops; bans certain flavours (such as confectionary, dessert, soft drink, energy drink, and cannabis flavours); and limits nicotine content to a maximum of 20 mg/mL. Other measures included in the plan are the creation of youth advisory councils, the development of education materials for schools, and enhancements to QuitNow resources for youth wanting to quit vaping.



PART 3 ACTIONABLE AREAS

INDIVIDUAL

- Improve access to smoking cessation medication and NRT coverage and establish smoking cessation programs in settings beyond health care facilities and workplaces, such as cultural centres and schools.

COMMUNITY

- Develop and implement targeted smoking cessation programs and resources to accommodate people with unique challenges such as mental illness and addictions.
- Further develop culturally safe and relevant smoking cessation supports, and ensure cultural competency training among support staff to better meet the health needs of equity-deserving communities.

ORGANIZATIONAL

- Increase awareness and education of the nuanced link between smoking and cancer, as emerging research efforts describe the risk associated with vaping nicotine and second-hand smoke.
- Provide educational tools and resources to allied health professionals and service providers regarding smoking and cancer prevention.

PUBLIC POLICY

- Enhance smoke-free policies in public spaces, multi-unit dwellings and nearby schools to create supportive environments that encourage smoking cessation and protect people who do not smoke from second-hand smoke exposure.
- Collaborate with housing authorities to create healthy living environments.

REFERENCES

1. Sweeney-Magee, M., Gotay, C., Karim, M. E., Telford, J., & Dummer, T. (2022). Patterns and determinants of adherence to colorectal cancer primary and secondary prevention recommendations in the BC Generations Project. *Health promotion and chronic disease prevention in Canada: research, policy and practice*, 42(2), 79–93. <https://doi.org/10.24095/hpcdp.42.2.04>
2. ComPARe. (2015). *Compare study on preventable cancers in Canada*. Retrieved July 27, 2022, from <https://prevent.cancer.ca/>
3. CAREX Canada. (2023, January 24). *Radon - CAREX Canada*. <https://www.carexcanada.ca/profile/radon/>
4. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/pph-framework/bc_population_and_public_health_framework.pdf
5. Health Canada. (2023). *Canadian Tobacco and Nicotine Survey (CTNS): Summary of results for 2022*. Retrieved from <https://www.canada.ca/en/health-canada/services/canadian-tobacco-nicotine-survey/2022-summary.html>
6. Smith, A., Poon, C., Peled, M., Forsyth, K., Saewyc, E., & McCreary Centre Society. (2024). *The Big Picture: An overview of the 2023 BC Adolescent Health Survey provincial results*. McCreary Centre Society. https://mcs.bc.ca/pdf/2023_bcahs_the_big_picture.pdf
7. Statistics Canada. (2009). *Second-hand smoke*. <https://www150.statcan.gc.ca/n1/pub/82-229-x/2009001/envir/shs-eng.htm#im>
8. Health Canada. (2023, October 31). *Vaping in Canada: What we know*. <https://www.canada.ca/en/health-canada/services/smoking-tobacco/surveys-statistics-research/vaping-what-we-know.html>
9. BC Stats. (2020, November 16). *Report on the B.C. Smoking Cessation Program Evaluation Survey*. Retrieved December 29, 2023, from https://www2.gov.bc.ca/assets/gov/health/health-drug-coverage/pharmacare/bc_smoking_cessation_survey_evaluation_20201116.pdf
10. Canadian Partnership Against Cancer. (2022, August 18). *Coverage of smoking cessation aids among provinces and territories*. <https://www.partnershipagainstcancer.ca/topics/coverage-smoking-cessation-aids-canada/>
11. Kalman, D., Morissette, S. B., & George, T. P. (2005). Co-morbidity of smoking in patients with psychiatric and substance use disorders. *The American journal on addictions*, 14(2), 106–123. <https://doi.org/10.1080/10550490590924728>
12. Canadian Partnership Against Cancer. (2019). *Leading Practices in Smoking Cessation for Persons Living with Mental Illnesses and/or Addictions (v3.0)*. Available at: https://s22457.pcdn.co/wp-content/uploads/2019/05/Smoking-Cessation-Program-Scan_Mental-illnesses_2019_EN.pdf, Accessed: December 29, 2023

REFERENCES

13. Taylor, A. H., Ussher, M. H., & Faulkner, G. (2007). The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect and smoking behaviour: a systematic review. *Addiction*, 102(4), 534-543. <https://onlinelibrary.wiley.com/doi/10.1111/j.1360-0443.2006.01739.x>
14. Ash Policy Hub. (n.d.). *British Columbia Post-Secondary Policy Chart*. <https://ashpolicyhub.ca/british-columbia-hub/post-secondary-policy-chart/>
15. Canadian Partnership Against Cancer. (2019). *Commercial Tobacco Policy Pack*. Available at <https://s22457.pcdn.co/wp-content/uploads/2019/06/Commercial-Tobacco-Policy-Pack-EN.pdf>. Accessed: December 29, 2023
16. Singhavi, H., Ahluwalia, J. S., Stepanov, I., Gupta, P. C., Gota, V., Chaturvedi, P., & Khariwala, S. S. (2018). Tobacco carcinogen research to aid understanding of cancer risk and influence policy. *Laryngoscope investigative otolaryngology*, 3(5), 372-376. <https://onlinelibrary.wiley.com/doi/10.1002/lio2.204>



CHAPTER 2

PHYSICAL ACTIVITY AND CANCER RISK

Part 1 Physical Activity and Cancer Risk

Part 2 Examples of Physical Activity
Programs and Policies in British Columbia

Part 3 Actionable Areas

PART 1 PHYSICAL ACTIVITY AND CANCER RISK

Physical activity is defined as movement of the body requiring energy, and can be accomplished through leisure activity, active commuting, and exercise¹.

Physical activity has been shown to help reduce risk of the following cancer types: lung, breast, colon, bladder, endometrium, esophagus, kidney, and stomach².

It helps reduce cancer risk by supporting healthy hormone levels, improving insulin sensitivity, reducing inflammation, and aiding digestion². According to the World Health Organization (WHO), approximately 35% of cancer-related mortality is attributable to physical inactivity and obesity.

The Canadian Partnership Against Cancer (CPAC) defines physical inactivity as not engaging in enough moderate to vigorous aerobic physical activity (MVPA) to meet the guidelines. This is separate from sedentary behaviours, which include activities done sitting, reclining, or lying down. Physical activity and sedentary behaviours can co-occur and contribute to cancer risk independently. A person might meet the physical activity guidelines but still spend large amounts of time sitting for work or leisure.

Prevention guidelines for physical activity are consistent amongst World Cancer Research Fund International, WHO and Canadian 24-Hour

Movement Guidelines. In general, one should be physically active, move more, and sit less. Being physically active for adults is defined as participating in at least 150 minutes of MVPA per week³. For aerobic exercise, 150 minutes of moderate intensity exercise per week or 75-150 minutes of vigorous intensity exercise per week is recommended². Physical activity may also be achieved through active transportation, which includes “any human-powered methods of travel, including walking, cycling (including e-bikes), water or winter transportation, or using mobility devices⁴. Attributable cancer cases due to physical inactivity is 8.4% in BC, while attributable cancer cases due to sedentary behaviour is slightly higher in BC compared to the Canadian average, at 6.5% versus 5.7%⁵.

Cancer risk associated with physical inactivity and the success of programs to improve physical activity rates are heavily influenced by health inequities, which are unfair, unjust, and preventable health disparities⁶.

Structural determinants, such as systemic racism, colonialism, discrimination, economic policies, cultural norms, anti-fat bias, and urban design shape access to and engagement in opportunities. Social determinants, including income, education, employment, and housing, also act as upstream factors⁶. Together, these determinants of health ultimately impact physical activity levels and cancer risks.



What impact does physical inactivity have on cancer risk?

Quantitative Indicators of Cancer Risk Attributable to Physical Inactivity in BC

KEY INDICATORS: INDIVIDUAL LEVEL

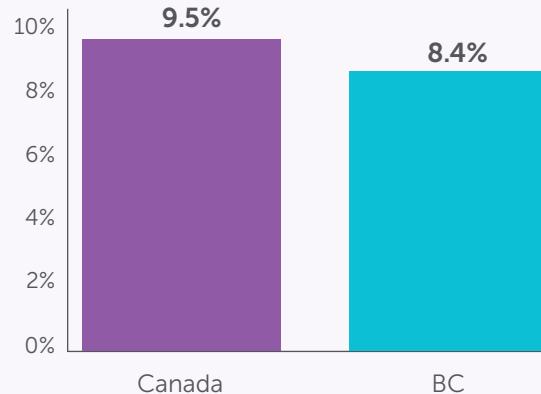


Figure 1 – Population attributable risk of cancer due to physical inactivity (all ages), 2015

Source [ComPARe, 2015](#)

KEY INDICATORS: INDIVIDUAL LEVEL

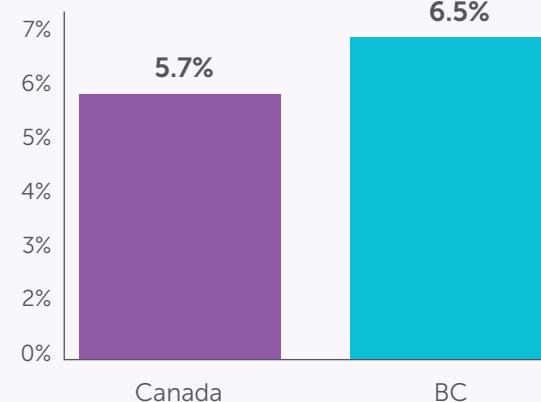


Figure 2 – Population attributable risk of cancer due to sedentary behaviours (all ages), 2015

Source [ComPARe, 2015](#)



Table 1 – Number of cancer cases attributable to physical inactivity in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (n)	Females (n)	Males and Females (n)	
Lung	157	173	330	
Breast	..	209	209	
Colon	78	78	156	
Bladder	101	31	132	
Endometrium	..	97	97	
Rectum	44	31	76	
Head and Neck	47	18	65	
Kidney	26	15	42	
Stomach	26	14	40	
Liver	28	9	37	
All Associated	578	724	1303	

Table 2 – Percentage of cancer cases attributable (PAR) to physical inactivity in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (%)	Females (%)	Males and Females (%)	
Lung	10.0	10.8	10.4	
Breast	..	6.7	6.7	
Colon	7.2	8.2	7.7	
Bladder	10.7	12.2	11	
Endometrium	..	12.5	12.5	
Rectum	6.6	7.3	6.8	
Head and Neck	8.5	9.4	8.7	
Kidney	6.6	7.3	6.8	
Stomach	10.1	11.4	10.5	
Liver	10.8	12	11.1	
All Associated	8.3	8.4	8.4	

Table 3 - Number of cancer cases attributable to sedentary behaviour in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (n)	Females (n)	Males and Females (n)	
Colorectal	143	106	249	
Breast	..	99	99	
Endometrium	..	87	87	
Ovarian	..	42	42	
All Associated	143	335	477	

Table 4 - Percentage of cancer cases attributable (PAR) to sedentary behaviour in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (%)	Females (%)	Males and Females (%)	
Colorectal	8	7.7	7.9	
Breast	..	3.2	3.2	
Endometrium	..	11.3	11.3	
Ovarian	..	13.1	13.1	
All Associated	8	6	6.5	

How does BC measure in terms of physical activity?

Quantitative Indicators of Physical Activity in BC

Measuring physical activity levels across BC allows for monitoring of active behaviours and helps identify gaps in the availability of physical activity supports, like recreational facilities. Physical activity rates in BC are captured through the Canadian Community Health Survey and ParticipACTION report cards, summarizing national and provincial survey data. In 2021, an estimated 62% of BC adults aged 18 and older self-reported at least 150 minutes of physical activity per week, as compared to 54% in Canada. Overall, BC has the highest rate of people reporting that they meet the guidelines for MVPA and the lowest rate of physically inactive individuals among all provinces and territories.



KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2017-2021](#)

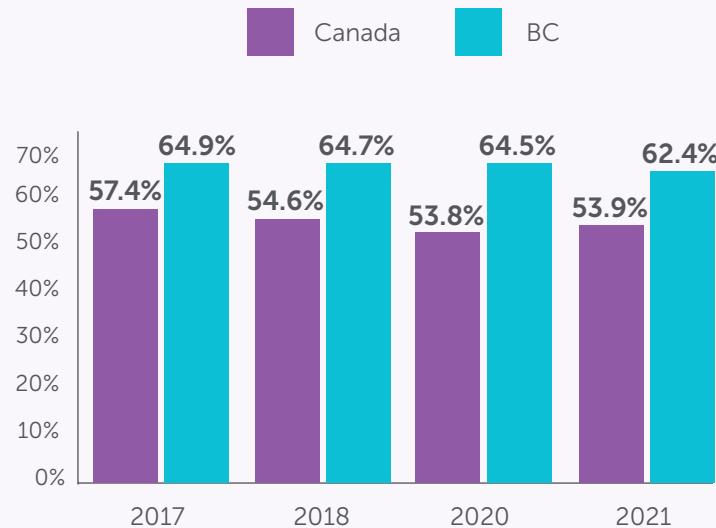


Figure 3 – Prevalence of adults who reported 150 minutes per week of physical activity, 18 years and older, by year

Table 5 – Prevalence of individuals who self-reported at least 150 minutes of physical activity per week in BC, by age group, 2021

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2021](#)

Age	Males (%)	Females (%)	Males and Females (%)
18-34	69.0	59.3	64.2
35-49	68.7	61.2	64.8
50-64	72.0	65.6	68.7
65+	53.4	48.3	50.7

Table 6 – Prevalence of adults who reported 150 minutes per week of physical activity, 18 years and older, by sex, 2021

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2021](#)

Male (%)	Female (%)	Males and Females (%)
66.2	58.7	62.4

Table 8 – Prevalence of adults who reported 150 minutes per week of physical activity, 18 years and older, by household education level, 2021

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2021](#)

Education Level	Males and Females (%)
Less than secondary education	39.0
Post-secondary certificate/diploma/university degree	64.3



Table 7 – Prevalence of adults who reported 150 minutes per week of physical activity, 18 years and older, by household income quintile, 2021

KEY INDICATORS: INTERPERSONAL LEVEL

Source [CCHS, 2021](#)

Household Income	Males and Females (%)
First Quintile (Lowest)	53.8
Second Quintile	54.6
Third Quintile	61.6
Fourth Quintile	69.3
Fifth Quintile (Highest)	70.5

Table 9 – Prevalence of adults who reported at least 150 minutes per week of physical activity, 18 years and older, by health authority in BC, 2023

KEY INDICATORS: COMMUNITY LEVEL

Source [BC COVID-19 SPEAK Survey 2023, Round 3](#)

Health Authority	Males and Females (%)
Fraser Health	54.9
Interior Health	63.5
Island Health	63.2
Northern Health	62.8
Vancouver Coastal Health	58.7

KEY INDICATORS: INDIVIDUAL LEVEL

Source [Active Transport Report Card, 2019/2020](#)

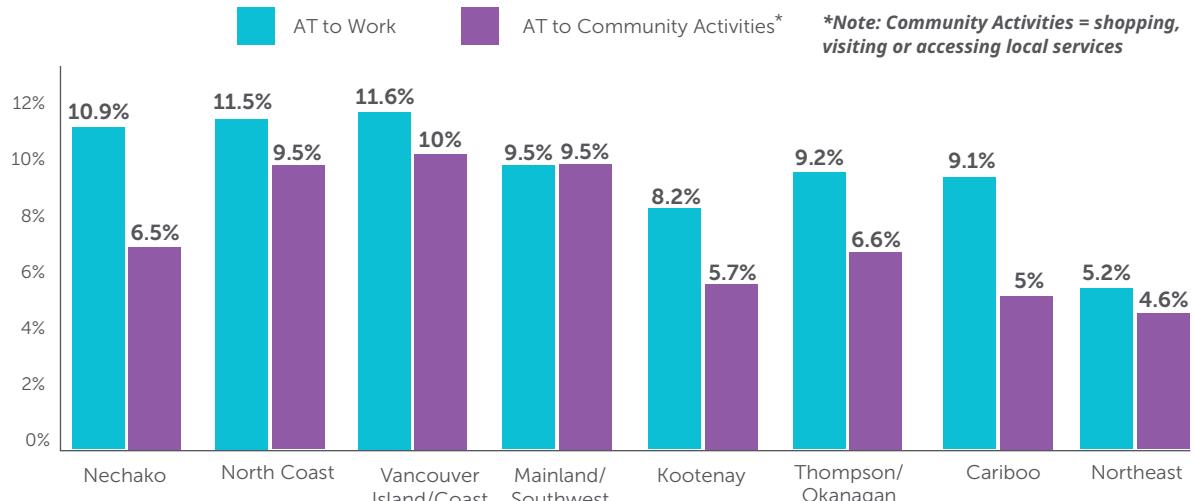
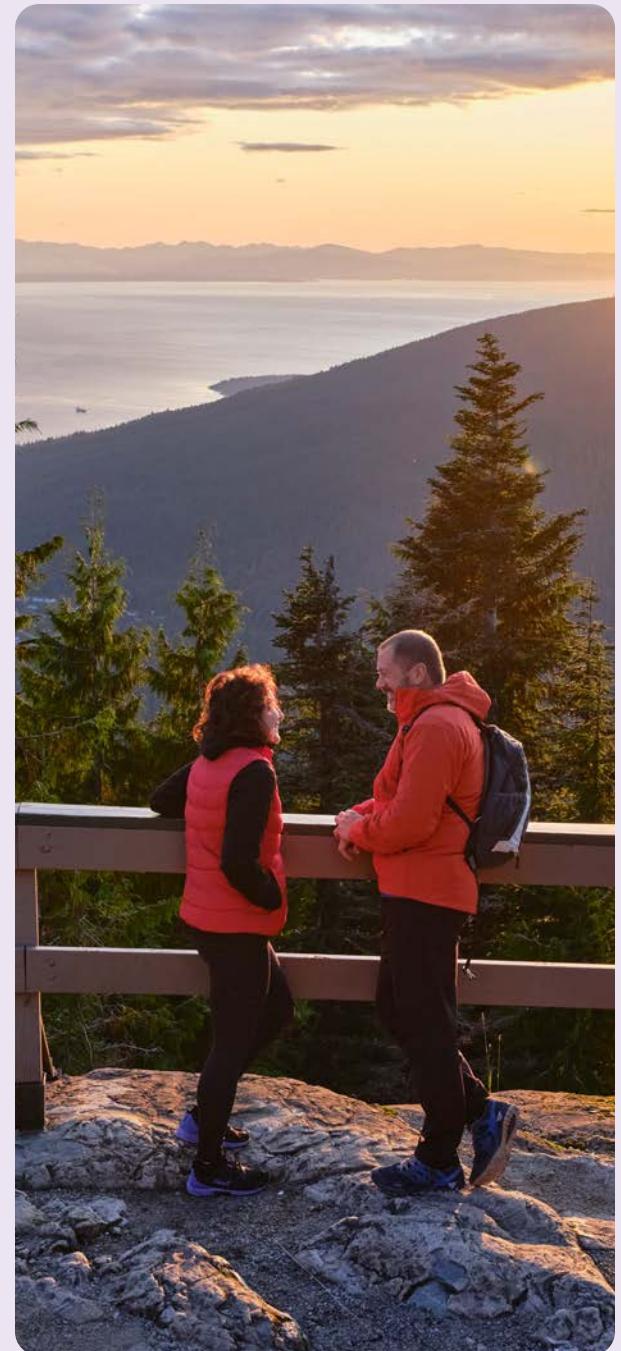


Figure 4 – Percentage of individuals who used active transport (AT) in BC in 2019/2020, by region



How physically active are youth?

Quantitative Indicators of Youth Physical Activity in BC

Young people may experience differential access to sports, dance, physical activity in schools, and play due to socio-economic barriers. Physical literacy (the motivation, confidence, knowledge and understanding of the value inherent in physical activity) is critical for lifelong participation in physical activity.

Canadian 24-Hour Movement Guidelines recommend limiting prolonged amounts of sitting, less than two hours per day of recreational screen time, and at least 60 minutes of MVPA per day for children and youth five to 17 years old³. According to Statistics Canada, in 2021, approximately 54% of BC youth aged 12-17 reported engaging in at least 60 minutes of daily physical activity. More males (66.5%) than females (39.9%) reported meeting this guideline⁷. Compared to previous years, youth were also less likely to participate in sports and exercise on a weekly basis⁸.

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2017-2021](#)

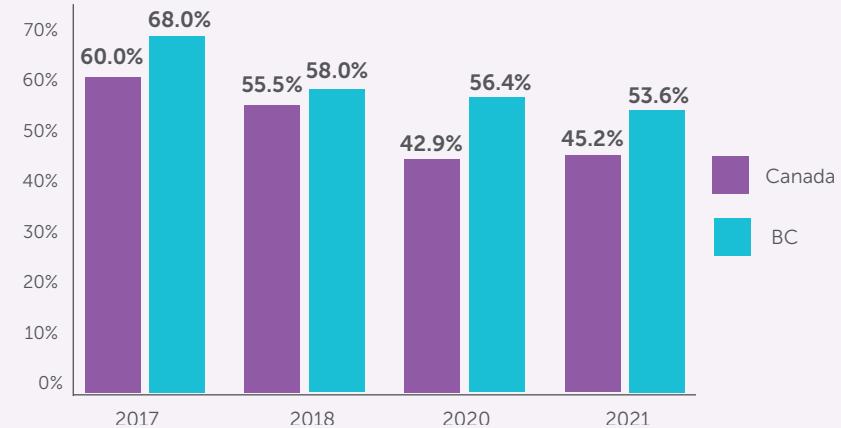


Figure 5 – Prevalence of youth (aged 12-17) who self-reported at least 60 minutes of physical activity per day, by year

KEY INDICATORS: COMMUNITY LEVEL

Source [BC AHS, 2023](#)

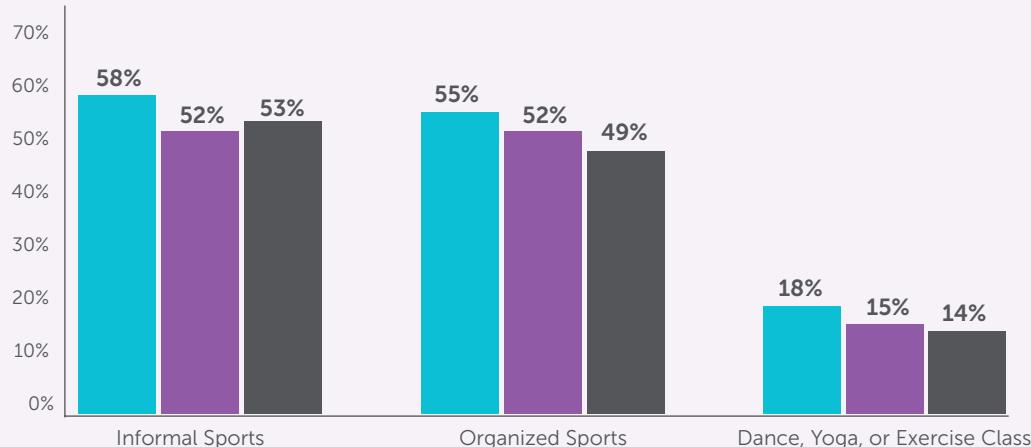


Figure 6 – Prevalence of students (aged 12-19) who participated in physical activity at least weekly, by year and type

KEY INDICATORS: INDIVIDUAL LEVEL

Source [BC AHS, 2023](#)

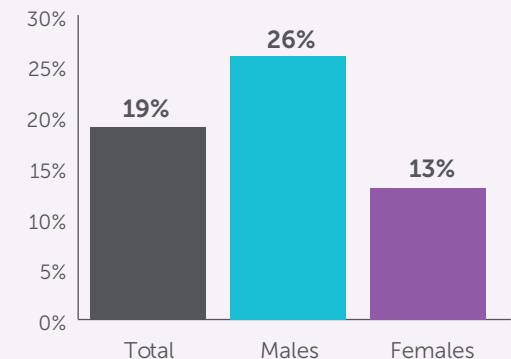
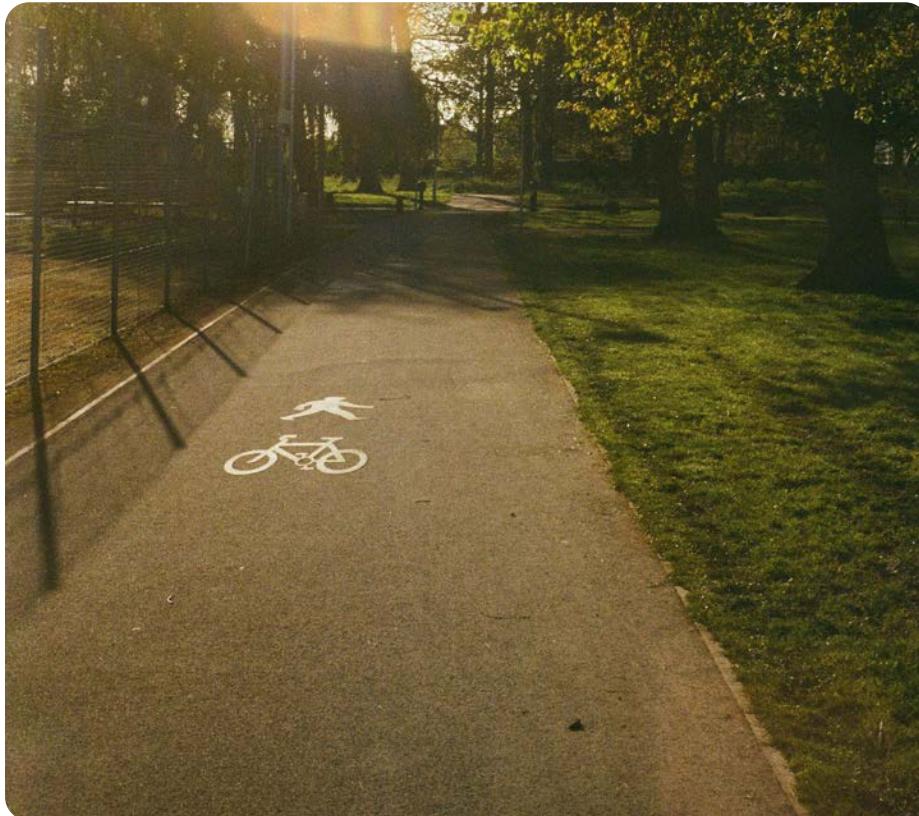


Figure 7 – Prevalence of students (aged 12-19) meeting Canadian 24-Hour Movement Guidelines of at least 60 minutes of MVPA per day, 2023

Health equity considerations of physical activity

Health inequities, driven by structural determinants like systemic racism, colonialism, and environment influence access to resources and opportunities, ultimately impacting physical activity levels and cancer risks.

Geographic isolation and inequitable urban planning limit access to safe, free spaces for recreation and active transport opportunities, disproportionately affecting equity-deserving communities. Effective cancer prevention requires addressing these structural determinants through equity-focused policies and programs that remove systemic barriers, invest in built environments, and create supportive opportunities for all people and communities to engage in active lifestyles.



PART 2 EXAMPLES OF PHYSICAL ACTIVITY PROGRAMS AND POLICIES IN BRITISH COLUMBIA

INDIVIDUAL

- [Canadian 24-Hour Movement Guidelines](#)
- [BC Recreation and Parks Association Choose to Move](#)

INTERPERSONAL

- [Walk or Run to Quit](#)
- [BC Healthy Communities – Active School Travel Pilot Program](#)

ORGANIZATIONAL

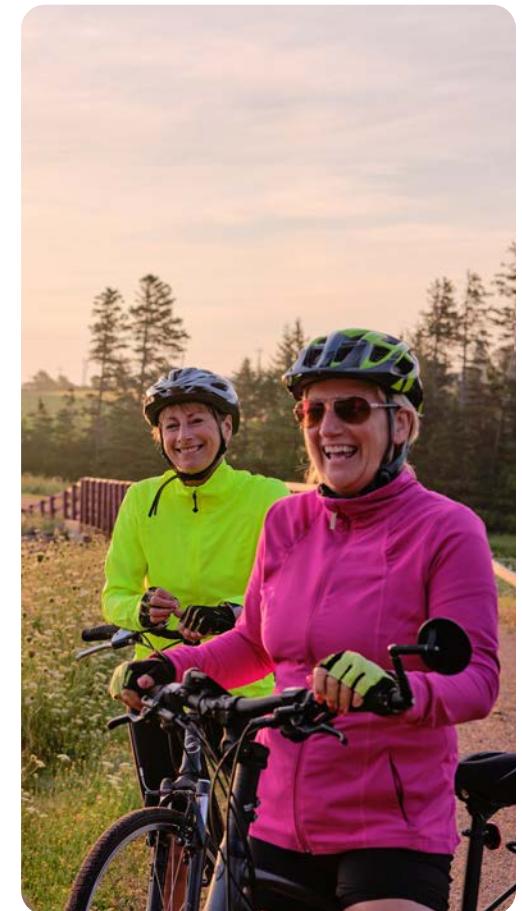
- [Canadian Cancer Society – Healthy Workplaces Program](#)
- [GoByBike](#)

COMMUNITY

- [I-SPARC Healthy Living](#)

PUBLIC POLICY

- [BC Physical Activity Strategy \(2020\)](#)
- [BCCDC Healthy Built Environmental Linkages Toolkit](#)
- [BC Cycling Policy](#)



INDIVIDUAL LEVEL

Canadian 24-Hour Movement Guidelines

These guidelines for physical activity and sedentary behaviours are categorized by age group: Early years (0-4 years), Children and youth (5-17 years), Adults (18-64 years), Older Adults (65+ years).

Choose to Move

Led by the BC Recreation and Parks Association and funded by the BC Ministry of Health, this free, evidence-based program supports older adults in becoming more physically active through personalized coaching, group meetings, and regular check-ins. The program is offered in partnership with local recreation departments across the province.

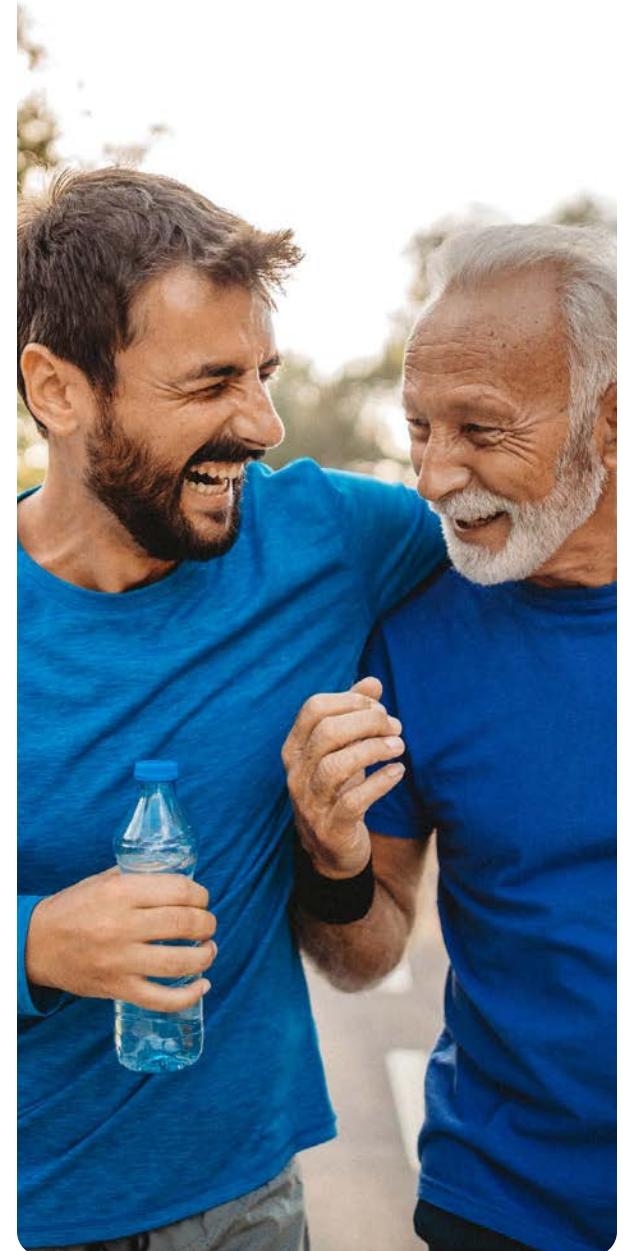
INTERPERSONAL LEVEL

Walk or Run to Quit

This national program was a three-year partnership (2017-2019) between the Canadian Cancer Society and Running Room that supported use of walking or running to help people quit smoking. The training program taught participants how to walk or run five kilometres over a 10-week course, in combination with receiving smoking cessation resources. Research has shown physical activity can alleviate negative nicotine withdrawal symptoms, decrease tobacco cravings, and reduce stress⁹.

Active School Travel Pilot Program

Led by BC Healthy Communities and funded by the BC Ministry of Transportation and Infrastructure, this pilot aims to support students and families to walk, bike, or scooter to and from school more often. Schools that sign up for the program receive funding, evidence-based tools, and capacity building resources.



ORGANIZATIONAL LEVEL

Healthy Workplaces Program

This was a partnership between the Canadian Cancer Society and the BC Ministry of Health to support employers and employees in developing healthy workplaces. Its online resources have been used by over 750 businesses in BC and beyond. The program provided educational resources, fact sheets, and suggestions for how to support, develop and enact physical activity policies in the workplace.

GoByBike

Formerly Bike to Work BC, this non-profit society develops province-wide campaigns focused on cycling for transportation. These include stand-alone awareness weeks and encouraging workplaces to challenge each other. Programs aim to refocus individual mindsets towards a fun, economic, and environmental-friendly view towards active transportation.

COMMUNITY LEVEL

I-SPARC Healthy Living

The Indigenous Sport, Physical Activity and Recreation Council (I-SPARC) is a provincial organization dedicated to improving the health and wellness of Indigenous peoples throughout BC. Through partnerships with First Nations communities, Métis Chartered Communities, Aboriginal Friendship Centres, and schools, I-SPARC delivers culturally grounded programs that promote active living and community connection.

Its Healthy Living initiatives, such as the Indigenous RunWalkWheel, HealthBeat, and Honour Your Health Challenge, support individuals, families, and communities to lead healthier, more active lives. These initiatives build capacity at the local level and increase access to sport, recreation, and physical activity opportunities throughout the province.



PUBLIC POLICY LEVEL

BC Physical Activity Strategy

This strategy provides a framework for enhancing participation in physical activity through collaborations with various partners and local health authorities. The 10-year plan includes key focus areas such as infants and youth, Indigenous communities, and seniors. According to the BC Adolescent Health Survey (2023), youth participation in physical activities including informal sports, organized sports, dance, yoga, and exercise class has decreased over time⁸.

BCCDC Healthy Built Environmental Linkages Toolkit

This policy toolkit includes a conceptual framework, planning principles to support healthy neighbourhood design, and other practice considerations associated with modifiable lifestyle factors.

BC Cycling Policy

This policy supports and encourages cycling through integration of bikes onto highways. It includes route evaluations, safety and travel requirements, budgeting of signage and marking.



PART 3 ACTIONABLE AREAS

ORGANIZATIONAL

- Collaborate with government, health care professionals and community leaders to raise awareness about physical activity and its role in cancer risk through targeted messaging for various demographics such as youth, Indigenous communities, and sedentary workers.
- Provide training and resources to service providers for effective knowledge disseminations regarding physical activity and cancer prevention.

COMMUNITY

- Enhance physical activity opportunities for youth by advocating for comprehensive and culturally diverse physical education curricula in schools beginning in early years, aligned with Canadian 24-Hour Movement Guidelines.
- Address socio-economic barriers through subsidies and financial assistance for sports and recreational activities.

PUBLIC POLICY

- Promote use of active transportation and healthy built environments among families and the public by encouraging investment in infrastructure such as safe cycling lanes, pedestrian-friendly walkways, and recreational spaces.
- Collaborate with local bodies to establish safe and shaded routes to schools to encourage families to use active transportation.
- Adoption of the BCCDC Healthy Built Environment Linkages Toolkit by urban planners to create neighbourhood designs that promote equitable opportunities for physical activity.

REFERENCES

1. World Health Organization. (2022, October 5). *Physical activity*. Retrieved November 3, 2023, from <https://www.who.int/news-room/fact-sheets/detail/physical-activity>
2. World Cancer Research Fund. (2025, June 3). *Be physically active*. Retrieved from <https://www.wcrf.org/research-policy/evidence-for-our-recommendations/be-physically-active/>
3. Canadian Society for Exercise Physiology. (2025). *Canadian 24-Hour Movement Guidelines*. Retrieved from <https://csepguidelines.ca/>
4. British Columbia Ministry of Transportation and Infrastructure, CleanBC (n.d.). *Move. Commute. Connect. Active Transportation Report Card 2019/2020*. Retrieved August 26, 2024, from https://www2.gov.bc.ca/assets/gov/driving-and-transportation/environment/active-transportation/active_transportation_report_card.pdf
5. ComPARe. (2015). *Compare study on preventable cancers in Canada*. Retrieved July 27, 2022, from <https://prevent.cancer.ca/>
6. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/pph-framework/bc_population_and_public_health_framework.pdf
7. Statistics Canada. [Table 13-10-0096-01](https://doi.org/10.25318/13-10-0096-01) Health characteristics, annual estimates, inactive
8. Smith, A., Poon, C., Peled, M., Forsyth, K., Saewyc, E., & McCreary Centre Society. (2024). *The Big Picture: An overview of the 2023 BC Adolescent Health Survey provincial results*. McCreary Centre Society. https://mcs.bc.ca/pdf/2023_bcahs_the_big_picture.pdf
9. Taylor, A. H., Ussher, M. H., & Faulkner, G. (2007). The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect and smoking behaviour: a systematic review. *Addiction*, 102(4), 534-543. <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1360-0443.2006.01739.x>



CHAPTER 3

NUTRITION AND CANCER RISK

Part 1 Nutrition and Cancer Risk

Part 2 Examples of Nutrition Programs and Policies in British Columbia

Part 3 Actionable Areas

PART 1 NUTRITION AND CANCER RISK

A significant number of cancers may be preventable through healthy eating, physical activity and maintaining a healthy weight¹.

In this chapter, the terms “overweight” and “obese,” based on BMI classification by the World Health Organization, are used to reflect survey methodology and ensure data reporting accuracy. These terms may be stigmatizing, and as such, the chapter will use person-first language, such as “people with higher weights,” in discussing indicators, programs, and policies to avoid reinforcing harmful biases.

There is strong evidence that consumption of whole grains, fibre-rich foods, non-starchy vegetables and fruit can aid in the prevention of many of the most common cancer types.

As such, the World Cancer Research Fund International has developed dietary recommendations for cancer prevention including five servings minimum per day of fruits and vegetables (one serving = 125 ml of whole fruit, vegetable or vegetable juice, or 250 ml of leafy vegetables), and at least 30 g per day of dietary fibre, among others².

Foods linked to increased cancer risk are sugar-sweetened beverages, red and processed meat, processed foods, and refined grain products^{2,3}.

It is recommended that people maintain healthy body size for cancer prevention, as higher weight, particularly excess abdominal fat, increases cancer risk^{2,4}. While evidence continues to grow linking nutrition to cancer prevention, more research is needed to understand how specific foods and nutrients relate to particular cancer types¹. The data presented here reflect the best available information, and ongoing monitoring of dietary intake patterns in BC will help inform prevention opportunities over time.

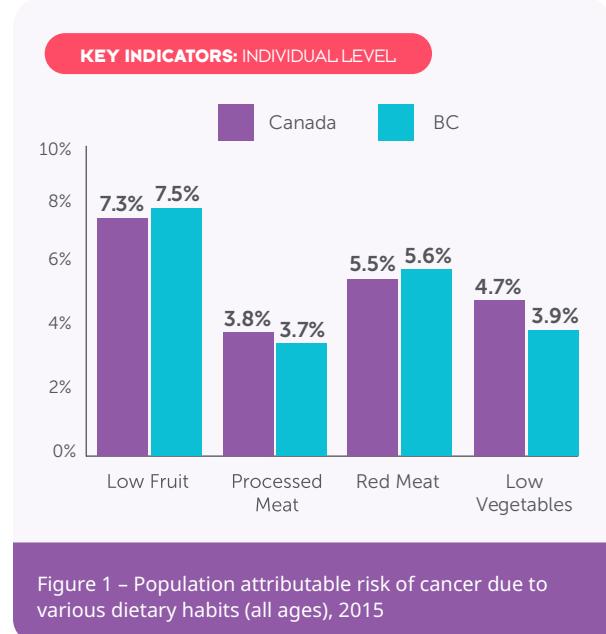
Cancer risk associated with nutrition and body weight, along with the success of programs to encourage healthier eating habits and maintaining a healthy body size, are heavily influenced by health inequities, which are unfair, unjust, and preventable health disparities⁵.

Structural determinants, such as systemic racism, colonialism, discrimination, economic policies, cultural norms, anti-fat bias, and commercial food systems shape access to and engagement in opportunities. Social determinants, including income, education, employment, and housing, also act as upstream factors⁵. Together, these determinants of health ultimately impact dietary habits and cancer risks.

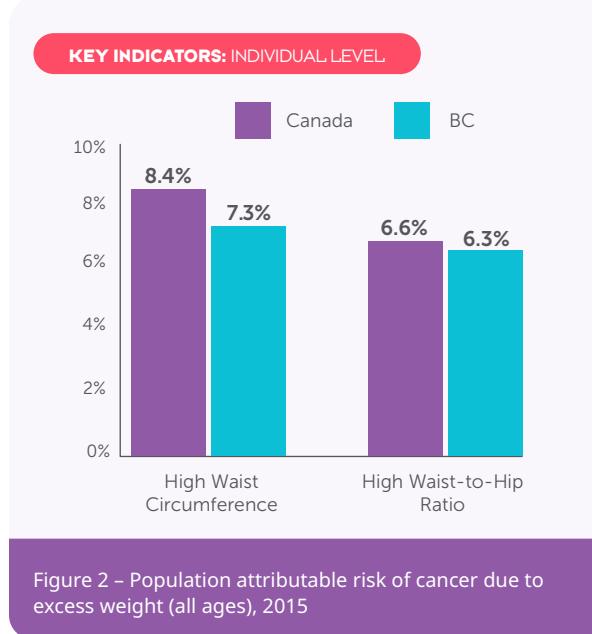


What impact does nutrition and body weight have on cancer risk?

Quantitative Indicators of Cancer Risk Attributable to Dietary Intake in BC



Source [ComPARe, 2015](#)



Source [ComPARe, 2015](#)

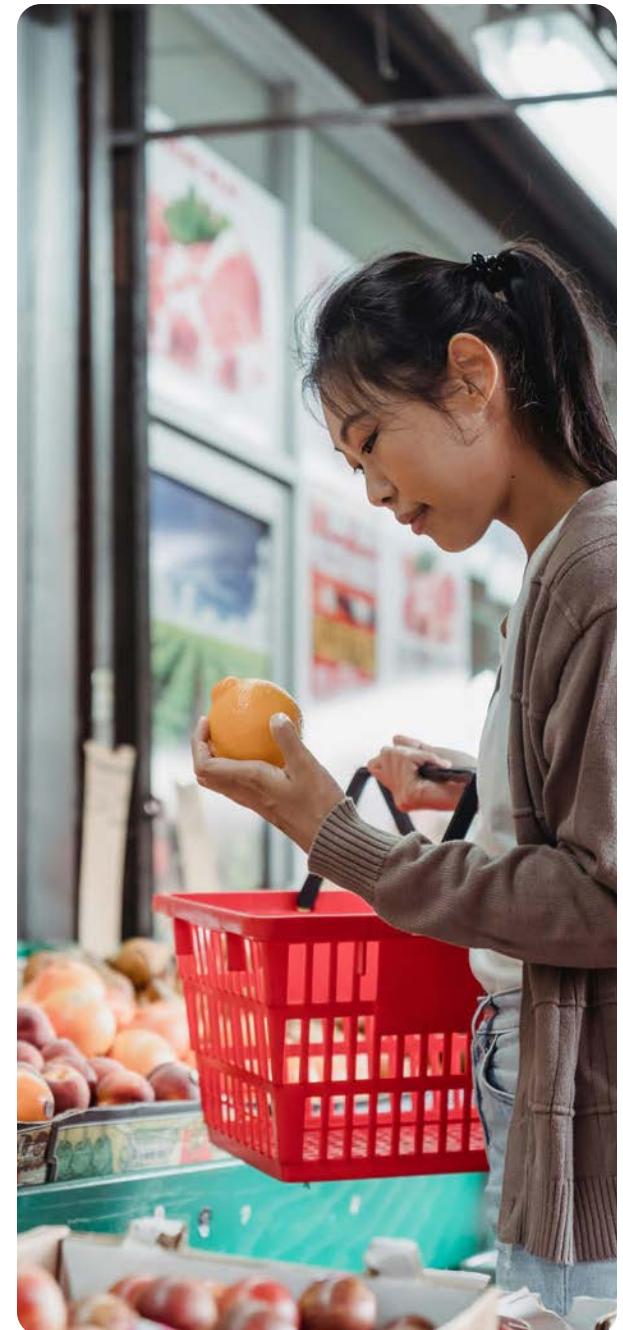


Table 1 – Number of cancer cases attributable to low fruit intake in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL			
Cancer Type	Males (n)	Females (n)	Males and Females (n)
Lung	204	154	358
Colorectal	117	80	197
Breast	..	190	190
Pancreas	30	31	61
Bladder	41	10	51
Esophagus	20	13	33
Stomach	8	2	11
All Associated	420	480	901

Table 2 – Percentage of cancer cases attributable (PAR) to low fruit intake in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL			
Cancer Type	Males (%)	Females (%)	Males and Females (%)
Lung	13	9.6	11.3
Colorectal	6.6	5.8	6.3
Breast	..	6.1	6.1
Pancreas	9	9.7	9.4
Bladder	4.4	3.8	4.2
Esophagus	9.4	16.3	11.3
Stomach	3.2	2	2.8
All Associated	8.3	7	7.5

Table 3 – Number of cancer cases attributable to low vegetable intake in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL			
Cancer Type	Males (n)	Females (n)	Males and Females (n)
Lung	79	61	139
Head and Neck	48	13	61
Colorectal	36	21	57
Bladder	35	7	42
Pancreas	22	16	39
Esophagus	17	3	20
Liver	16	3	19
Ovarian	..	7	7
All Associated	254	132	386

Table 4 – Percentage of cancer cases attributable (PAR) to low vegetable intake in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL			
Cancer Type	Males (%)	Females (%)	Males and Females (%)
Lung	5.0	3.8	4.4
Head and Neck	8.7	6.6	8.2
Colorectal	2.0	1.5	1.8
Bladder	3.7	2.8	3.5
Pancreas	6.8	5.1	6.0
Esophagus	8.2	3.9	7.0
Liver	6.2	4.6	5.8
Ovarian	..	2.2	2.2
All Associated	4.5	3.1	3.9

Table 5 – Number of cancer cases attributable to processed meat consumption in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Colorectal	83	47	129
Pancreas	18	n/a	18
Stomach	6	3	10
Esophagus	5	3	7
All Associated	112	52	164

Table 6 – Percentage of cancer cases attributable (PAR) to processed meat consumption intake in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Colorectal	4.7	3.4	4.1
Pancreas	5.3	n/a	2.7
Stomach	2.5	2.5	2.5
Esophagus	2.3	3.2	2.5
All Associated	4.3	3.3	3.7

Table 7 – Number of cancer cases attributable to red meat consumption in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Colorectal	105	66	171
Pancreas	43	n/a	43
Stomach	15	6	21
All Associated	163	72	235

Table 8 – Percentage of cancer cases attributable (PAR) to red meat consumption in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Colorectal	5.9	4.8	5.4
Pancreas	13	n/a	6.6
Stomach	5.9	4.8	5.5
All Associated	6.9	4.8	5.6

Table 9 - Number of cancer cases attributable to excess weight (high waist circumference) in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Colorectal	108	111	223
Breast	..	157	157
Endometrium	..	97	97
Pancreas	27	34	62
Kidney	33	23	58
Prostate	47	..	47
Thyroid	8	27	33
All Associated	222	449	671

Table 10 – Percentage of cancer cases attributable (PAR) to excess weight (high waist circumference) in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Colorectal	6.1	8.0	7.1
Breast	..	5.0	5.0
Endometrium	..	12.6	12.6
Pancreas	8.1	10.8	9.5
Kidney	8.1	10.8	9.5
Prostate	8.9	..	8.9
Thyroid	10.1	7.6	8.9
All Associated	7.1	7.4	7.3

Table 11 – Number of cancer cases attributable to excess weight (high waist-to-hip ratio) in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Colorectal	167	78	246
Breast	..	89	89
Kidney	55	18	73
Pancreas	34	20	55
Endometrium	..	53	53
Prostate	44	..	44
Thyroid	8	13	21
All Associated	310	271	581

Table 12 - Percentage of cancer cases attributable (PAR) to excess weight (high waist-to-hip ratio) in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Colorectal	9.4	5.7	7.8
Breast	..	2.9	2.9
Kidney	13.9	8.4	12.0
Pancreas	10.5	6.3	8.4
Endometrium	..	6.9	6.9
Prostate	8.4	..	8.4
Thyroid	7.9	4.7	5.6
All Associated	9.9	4.5	6.3

How does BC measure in terms of nutrition?

Quantitative Indicators of Dietary Intake in BC

In 2021, 21.2% of British Columbians, aged 18 years or older, reported consuming fruit and/or vegetables at least five times a day, comparable to the rest of Canada (21.8%). This represents a significant decline from 2017, when 28.8% of adults in BC reported meeting this level of consumption. The decrease was seen across all age groups, with the sharpest drop among adults aged 18-34, falling from 27.3% in 2017 to 14.5% in 2021⁶.

A study evaluating cancer prevention recommendations within a BC cohort of adults found varying levels of adherence. Participants were least likely to meet fruit and vegetable consumption recommendations (66.7%)⁷. In contrast, adherence was highest for non-smoking behaviours (94.8%), followed by regular physical activity (88.9%) and minimal alcohol use (86.6%)⁷.

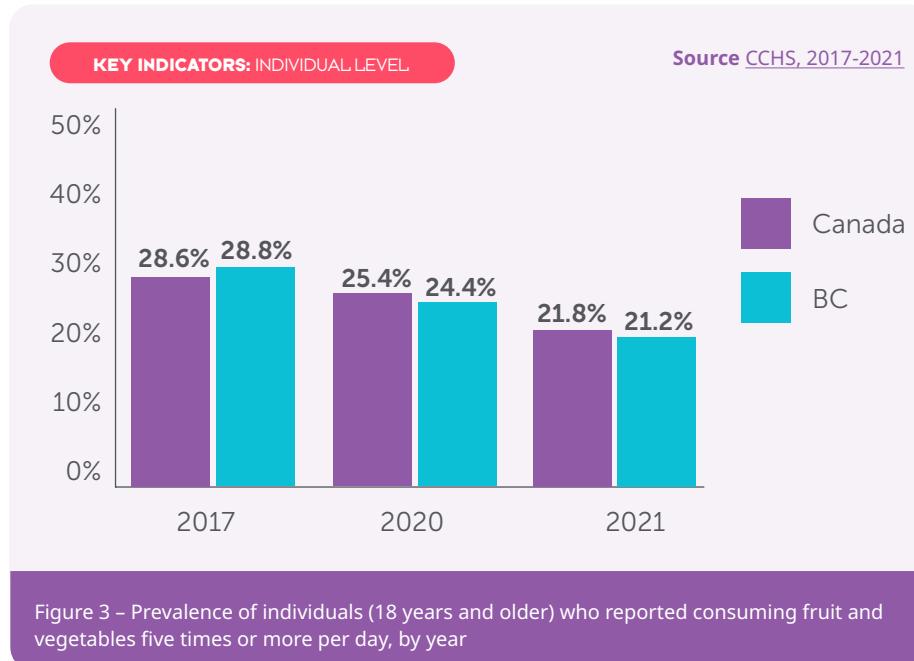


Table 13 – Prevalence of individuals (18 years and older) who reported consuming fruit and vegetables five times or more per day, by sex, 2021

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2021](#)

Male (%)	Female (%)	Males and Females (%)
16.8	25.4	21.2

Table 14 – Prevalence of individuals who reported consuming fruit and vegetables five times or more per day, by age group, 2021

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2021](#)

Age	Males and Females (%)
12-17	21.6
18-34	14.5
35-49	24.5
50-64	20.4
65+	26.8
Total	21.2



Table 15 – Prevalence of individuals (18 years and older) who reported consuming fruit and vegetables five times or more per day, by household income quintile, 2021

KEY INDICATORS: INTERPERSONAL LEVEL

Source [CCHS, 2021](#)

Household Income	Males and Females (%)
First Quintile (Lowest)	15.9
Second Quintile	21.0
Third Quintile	20.0
Fourth Quintile	24.7
Fifth Quintile (Highest)	23.8

Table 17 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, 18 years and over, by year

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2019-2022](#)

	Obese or Overweight		Obese		Overweight	
	2022	2019	2022	2019	2022	2019
Canada	64.7	63.5	30.0	27.7	34.7	35.8
BC	60.3	57.6	25.5	22.2	34.7	35.4

Table 16 – Prevalence of individuals (18 years and older) who reported consuming fruit and vegetables five times or more per day, by household education level, 2021

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2021](#)

Education Level	Males and Females (%)
Less than secondary education	15.9 (E)
Post-secondary certificate/diploma/university degree	21.8

(E) Interpret with caution

Table 18 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by age group, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Age	Males and Females (%)
12-17	30.7
18-34	48.6
35-49	65.8
50-64	67.1
65+	60.4
Total	60.3

Table 19 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by sex, 18 years and over, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Male (%)	Female (%)	Males and Females (%)
67.2	53.3	60.3

Table 21 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by household education level, 18 years and over, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Education Level	Males and Females (%)
No post-secondary education	65.7
Post-secondary certificate/diploma/university degree	59.4



Table 20 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by household income, 18 years and over, 2022

KEY INDICATORS: INTERPERSONAL LEVEL

Source [CCHS, 2022](#)

Household Income	Males and Females (%)
No income or less than \$40,000	55.7
\$40,000-\$59,999	60.4
\$60,000-\$79,999	62.0
More than \$80,000	60.6

Table 22 – Prevalence of overweight/obesity (using BMI WHO classification), by health authority in BC, 18 years and over, 2022

KEY INDICATORS: COMMUNITY LEVEL

Source [CCHS, 2022](#)

Health Authority	Males and Females (%)
Fraser Health	62.6
Interior Health	62.8
Island Health	68.2
Northern Health	69.7
Vancouver Coastal Health	47.9

What are the dietary intake patterns among youth?

Quantitative Indicators of Dietary Intake Among Youth in BC

Almost eight in 10 (78%) youth in BC (aged 12-17) do not consume the recommended number of fruits and vegetables per day⁶. Over half of parents (57%) reported that their children currently do not get enough fruits and vegetables in their diet, one-third of children eat processed snacks most days per week, and 15% drink sugar-sweetened beverages almost every day⁸.

There is strong support for policies and programs that aim to increase access to nutritious, local food. For example, 82% of British Columbians support the idea of providing nutritious meals to students in schools. Women (86%), people from low-income households (92%) and of South Asian (90%) and Southeast Asian (92%) backgrounds were most enthusiastic about this potential intervention⁸. Through the Feeding Futures program, BC provides guidance and funding to help school districts create and expand school food programs, with a focus on reducing stigma and ensuring access to culturally preferred foods⁹.

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2017-2021](#)

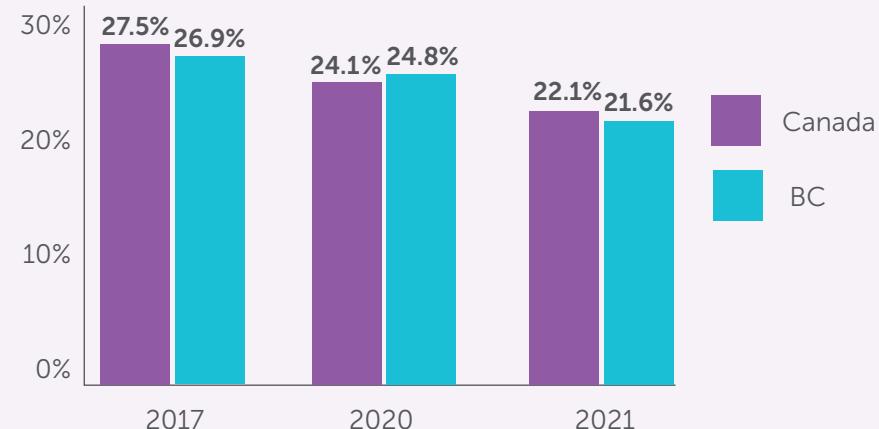


Figure 4 – Prevalence of individuals (12-17 years) who reported consuming fruit and vegetables five times or more per day, by year

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2015-2022](#)



Figure 5 – Prevalence of overweight/obesity (using BMI WHO classification) among individuals aged 12-17 years, by year

Table 23 – Prevalence of overweight/obesity (using BMI WHO classification) among individuals aged 12-17 years, by health authority in BC, 2022

KEY INDICATORS: COMMUNITY LEVEL

Source [CCHS, 2022](#)

Health Authority	Males and Females (%)
Fraser Health	31.8 (E)
Interior Health	F
Island Health	36.9 (E)
Northern Health	F
Vancouver Coastal Health	23.0 (E)

(E) Interpret with caution

(F) Too unreliable to be published

How does BC measure in terms of food insecurity?

Quantitative Indicators of Food Insecurity in BC

Food insecurity is the strongest predictor of nutritional inadequacies. As discussed in the [BCCDC Priority Health Equity Indicators for British Columbia: Household Food Security Update Report \(2023\)](#), household food insecurity occurs when a household lacks the economic means to access safe, nutritious food that meets their dietary needs and preferences. It is disproportionately experienced by equity-deserving groups, particularly Black and Indigenous people, lower income groups, as well as households with children, female lone-parent families, and new immigrants^{10,11}.

The cost of nutritious foods is a critical barrier to having a healthy diet for many British Columbians¹². Compared to adults in food secure households, adults living in households experiencing food insecurity eat significantly less vegetables and fruit¹⁰. In BC, the percentage of people living in moderately or severely food-insecure households increased from 10% in 2020 to 18.5% in 2023¹³.

KEY INDICATORS: PUBLIC POLICY LEVEL



Figure 6 – Prevalence of households experiencing food insecurity (moderate or severe), by year

As well, the [Canadian Food Environment Dataset \(Can-FED\)](#) is a geographic-based dataset that provides measures of the retail food environment in Canadian communities, focusing on access to various food outlets. It supports research into how local food environments influence dietary intake and health outcomes by linking Can-FED measures with national-level health surveys. This data can be accessed by researchers and public health practitioners.

Table 24 – Prevalence of households experiencing food insecurity (marginal, moderate or severe), by sex, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Male (%)	Female (%)	Males and Females (%)
14.2	16.9	15.6

Table 25 – Prevalence of households experiencing food insecurity (marginal, moderate or severe), by household income level, 2022

KEY INDICATORS: INTERPERSONAL LEVEL

Source [CCHS, 2022](#)

Household Income	Males and Females (%)
No income or less than \$40,000	27.9
\$40,000-\$59,999	19.4
\$60,000-\$79,999	17.2
More than \$80,000	13.1

Table 26 – Prevalence of households experiencing food insecurity (marginal, moderate or severe), by household education level, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Education Level	Males and Females (%)
No post-secondary education	19.1
Post-secondary certificate/diploma/university degree	14.7

Table 27 – Prevalence of households experiencing food insecurity (marginal, moderate or severe), by health authority, 2022

KEY INDICATORS: COMMUNITY LEVEL

Source [CCHS, 2022](#)

Health Authority	Males and Females (%)
Fraser Health	14.9
Interior Health	16.1
Island Health	17.6
Northern Health	17.9
Vancouver Coastal Health	14.5

Health equity considerations of nutrition

Health inequities, driven by structural determinants like systemic racism, colonialism, and commercial food systems shape access to resources and opportunities, ultimately influencing dietary habits and cancer risks.

Limited access to fresh, affordable, and culturally appropriate foods disproportionately affects equity-deserving communities, contributing to disparities in food security and diet quality. Effective cancer prevention requires addressing these structural determinants through equity-focused policies and programs that promote food security, reduce systemic barriers to food access, and ensure all people and communities have access to nutritious and culturally relevant foods.



PART 2 EXAMPLES OF NUTRITION PROGRAMS AND POLICIES IN BRITISH COLUMBIA

INDIVIDUAL

- [Dietary Recommendations for Cancer Prevention](#)

INTERPERSONAL

- [Generation Health Clinic](#)
- [Food Skills for Families \(BCCDC\)](#)

ORGANIZATIONAL

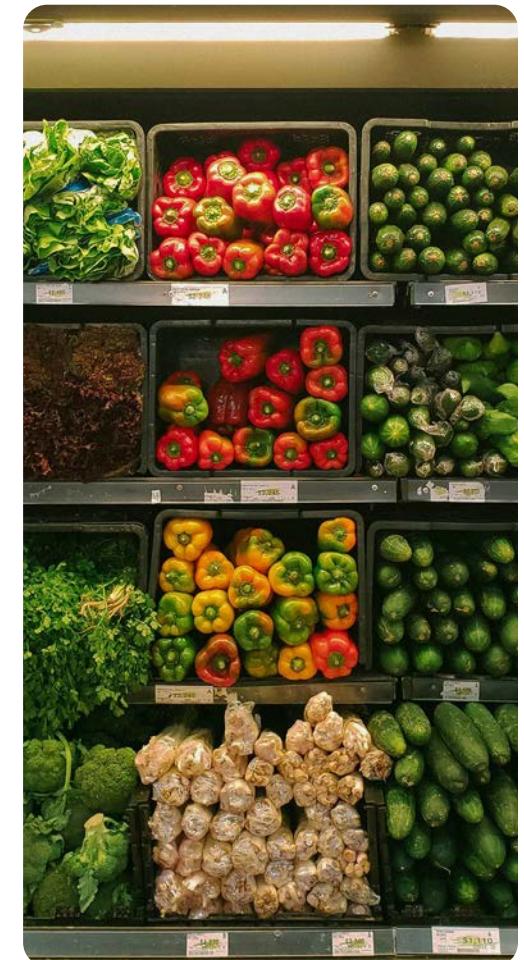
- [Feeding Futures](#)
- [BC School Food Toolkit](#)

COMMUNITY

- [Local Produce Subsidization \(BC Farmer's Market Nutrition Coupon Program\)](#)
- [Food is Medicine Recipe Book \(First Nations Health Authority\)](#)
- [I·SPARC Food Systems Program](#)

PUBLIC POLICY

- [Food Labelling](#)
- [BC School Food Toolkit Vending Machines](#)
- [Food Provision Policies In Schools, Childcare Facilities and LTC](#)



INDIVIDUAL LEVEL

Dietary Recommendations for Cancer Prevention

The following are part of World Cancer Research Fund International's cancer prevention recommendations, and align with Health Canada's Healthy Eating Strategy.

- Consume 30 g of fibre or more per day.
- Incorporate whole-grains, non-starchy vegetables, fruit, and different coloured legumes into meals.
- Eat a diet high in a variety of plant foods (at least five servings or 400 g in total) every day.
- Choose food as the main source of vitamins and minerals over supplements for cancer prevention.
- Limit consumption of: Processed foods high in fat, starches, or sugars, red and processed meat, sugar sweetened drinks and alcohol.



INTERPERSONAL LEVEL

Generation Health Clinic

Generation Health Clinic is a pediatric weight management program in British Columbia focused on helping children and adolescents with higher weights. The program uses a multi-disciplinary approach with experts in pediatric obesity, nutrition and physical activity to provide support to participants and their families.

Food Skills for Families

Food Skills for Families is a BCCDC-developed program aimed at promoting food literacy, cooking skills and healthy eating habits. The program provides practical knowledge and resources to help people and families make healthier and more economical food purchasing, preparation, and eating choices. This program is offered in partnership with community organizations across the province and is typically delivered through hands-on workshops.

ORGANIZATIONAL LEVEL

Feeding Futures

Launched in 2023, this initiative (led by the Ministry of Education and Child Care) provides dedicated funding to all school districts in BC to create or expand school food programs. The goal is to ensure food is served in a stigma-free, equitable, and accessible way, with priority given to students who need it most. Each school district designs programs based on local needs, meaning the types of meals offered, frequency of programs, and delivery models may vary. Funding is primarily used to buy meals and snacks for students, but can also support partnerships with community organizations, equipment, supplies, and staff.

BC School Food Toolkit

This online resource is designed to assist schools in creating and maintaining healthy and inclusive food environments. It offers guidance on meal planning, nutrition, and diverse food needs, aiming to support students in developing positive relationships with food. The toolkit provides flexible options tailored to each school's unique circumstances, including sample menu plans for various program models such as Grab N'Go, Assemble-and-Serve, and Cooked-from-Scratch. Additionally, it addresses topics like food safety, cultural inclusivity, and strategies to incorporate Indigenous foods into school programs. nutritional quality due to high fat content, calories, sugar, or salt).



COMMUNITY LEVEL

BC Farmer's Market Nutrition Coupon Program

This initiative aims to improve access to locally grown, fresh and nutritious food for low-income families, pregnant people and seniors, while supporting local farmers and producers. The program is typically offered during the farmers' market season which runs from May to October in most BC locations. Participants receive vouchers or coupons they can use to purchase eligible foods at authorized farmers' markets across the province.

I-SPARC Food Systems Program

Part of the Indigenous Sport, Physical Activity and Recreation Council (I-SPARC) Healthy Living Programming, this program supports Indigenous communities in achieving food security and sovereignty through grants, capacity building, technical training, networking, and cultural sharing. The program is offered in-person, through online events, and by resource sharing. It is funded in partnership with the First Nations Health Authority.

Food is Medicine Recipe Book (First Nations Health Authority)

In 2023, this recipe book was created with I-SPARC, based on the Food is Medicine YouTube series featuring dietitians. The cookbook was incorporated into FNHA's "Food is Medicine" Wellness Challenge in March, as part of National Nutrition Month. Each year, FNHA invites other First Nations people across BC to engage in harvesting activities with traditional foods and food preparations, as well as trying healthy recipes from the cookbook. The challenge is an opportunity for First Nations people to share about foods and food practices that support holistic well-being.



PUBLIC POLICY LEVEL

Food Labelling

Health Canada's front-of-package nutrition symbol is a mandatory label designed to help Canadians quickly identify prepackaged foods that meet or exceed certain levels for saturated fat, sugars and/or sodium. The black-and-white symbol features a magnifying glass highlighting the specific nutrient(s) the product is high in. Some foods are exempt, including plain milk, eggs, fresh vegetables, and single ingredient whole meats due to their recognized health benefits, as well as foods with naturally occurring saturated fat and sugars, like many cheeses and yogurts.

BC School Food Toolkit Vending Machines

This resource provides guidance on offering healthier options in school vending machines and stores. Schools can work with their vendors to find food and beverages that are more nutritious, aiming for products that contain less than 15% Daily Value (DV) of saturated fat, sugars, and sodium per serving. Some flexibility is allowed for nutrient-rich foods like those high in fibre and protein (e.g., fig and oat bars, mixed nuts). Schools are also encouraged to source locally when possible, using tools like the [BC Food Directory](#) to find suitable options.

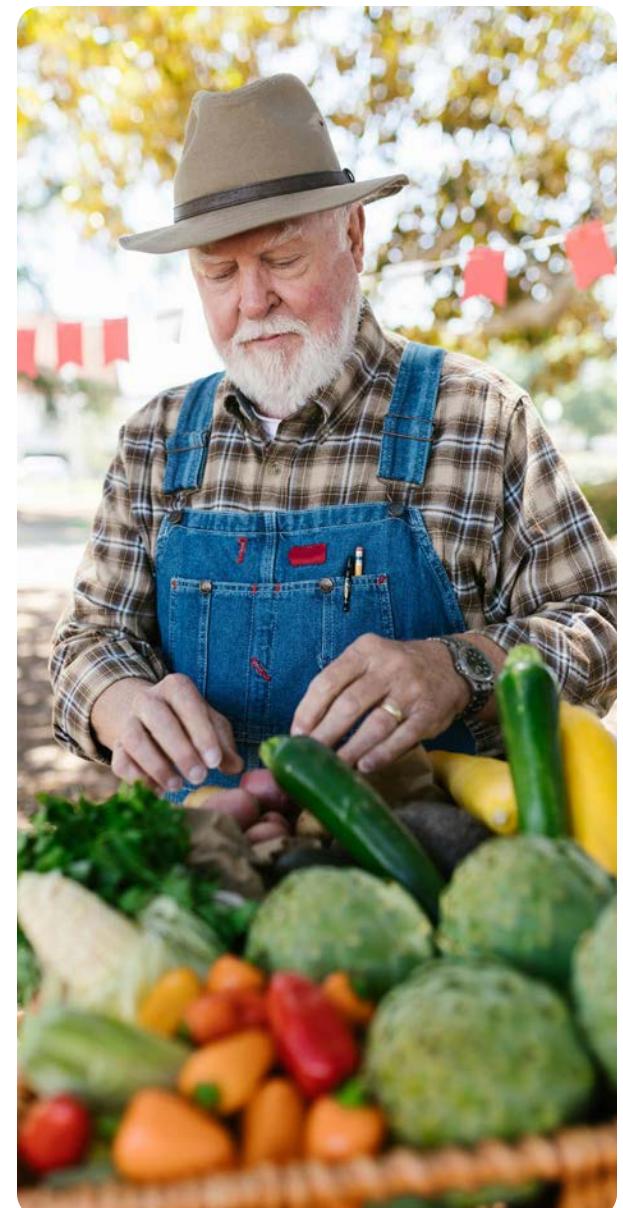
Food Provision

The most consistent food provision programs and policies exist in schools and childcare centres. Eight provinces and territories ban the sale of junk food in schools (foods considered to be of low nutritional quality due to high fat content, calories, sugar, or salt). 11 provinces and territories have policies directing nutritious food choices in childcare centres following Canada's Food Guide. As well, six provinces require residential care facilities (LTC, personal care homes, addiction centres, and foster/group homes) to provide food following Canada's Food Guide, though BC is not included.



Table 28 – Presence of food provision policies among provinces and territories, by policy example and facility type

	AB	BC	MB	NB	NL	NS	ON	PE	QC	SK	NT	NU	YT
Restricting sales of unhealthy food in school cafeterias and vending machines		✓	✓	✓	✓	✓		✓		✓			✓
Directing healthy food choices following Canada's Food Guide in childcare centres	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Provision of food following Canada's Food Guide in residential care facilities	✓			✓		✓	✓	✓	✓				



PART 3 ACTIONABLE AREAS

INDIVIDUAL

- Continual surveillance of dietary intake and food security to establish baseline data and track trends.
- Continuous evaluation, monitoring and research of the effectiveness of programs and policies aimed to improve individual behaviours, such as food labelling.

COMMUNITY

- Strengthen local food literacy and promotion of healthy eating in schools, childcare centres, long-term and community care centres by collaborating with municipalities, health care professionals, educators, parents, youth, and community members in ways that foster equitable environments for healthy eating behaviours.
- Promote intergenerational cooking and nutrition programs that encourage shared learning between children, youth, adults, and Elders.

PUBLIC POLICY

- Address food insecurity by increasing access to affordable, nutritious and culturally relevant foods through community-based programs and economic policies. Efforts should explicitly address the impacts of systemic racism and colonization, focusing on subpopulations that disproportionately experience the highest rates of food insecurity.
- Enhance data collection on barriers to healthy eating to guide policies that promote equitable access to nutritious foods in ways that reflect individual or cultural food preferences¹⁴.
- Continued regulation of healthy food and beverage standards and incentives to create healthier retail and food service environments, including in schools, hospitals, childcare centres, and residential care facilities.

REFERENCES

1. World Cancer Research Fund International. (2025). *Dietary and lifestyle patterns for cancer prevention: evidence and recommendations from CUP Global*. Retrieved from www.wcrf.org/DLP
2. World Cancer Research Fund International. (2022). *Cancer Prevention Recommendations - Eat whole grains, vegetables, fruit and beans*. <https://www.wcrf.org/diet-activity-and-cancer/cancer-prevention-recommendations/eat-wholegrains-vegetables-fruit-and-beans/>
3. Murphy, R. A. (2022). Diet, Physical Activity, and Cancer Prevention. In *Nutrition Guide for Physicians and Related Healthcare Professions* (pp. 149-158). https://link.springer.com/chapter/10.1007/978-3-030-82515-7_14
4. BC Cancer. (2022). *Healthy food choices for cancer prevention*. <http://www.bccancer.bc.ca/prevent/nutrition-exercise/healthy-eating/the-science>
5. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/phph-framework/bc_population_and_public_health_framework.pdf
6. Statistics Canada. *Table 13-10-0096-12 Fruit and vegetable consumption, 5 times or more per day, by age group*. <https://doi.org/10.25318/1310009601-eng>
7. Sweeney-Magee, M., Gotay, C., Karim, M. E., Telford, J., & Dummer, T. (2022). Patterns and determinants of adherence to colorectal cancer primary and secondary prevention recommendations in the BC Generations Project. *Health promotion and chronic disease prevention in Canada : research, policy and practice*, 42(2), 79–93. <https://doi.org/10.24095/hpcdp.42.2.04>
8. BC Alliance for Healthy Living. (2022). *A Healthier Recovery for BC*. <https://www.bchealthyliving.ca/wp-content/uploads/2021/11/21-11-15-Healthy-Recovery-FINAL.pdf>
9. Government of British Columbia (2025, June 26). *Create or expand a school food program*. <https://www2.gov.bc.ca/gov/content/education-training/k-12/administration/program-management/feeding-futures/create>
10. BC Centre for Disease Control. (2023). *Priority Health Equity Indicators for British Columbia: Household Food Insecurity Update Report*. Vancouver, B.C.: BC Centre for Disease Control, Population Public Health. http://www.bccdc.ca/Documents/2023-10-18_HouseholdFoodInsecurityReport_ExecutiveSummary.pdf
11. Statistics Canada (2024). *Canadians are facing higher levels of food insecurity*. <https://www.statcan.gc.ca/o1/en/plus/6257-canadians-are-facing-higher-levels-food-insecurity>
12. BC Centre for Disease Control. (2018). *Food Costing in BC 2017: Assessing the affordability of healthy eating*. Vancouver, B.C.: BC Centre for Disease Control, Population and Public Health Program. <http://www.bccdc.ca/pop-public-health/Documents/food-costing-BC-2017.pdf>
13. Statistics Canada. *Table 13-10-0835-01 Food insecurity by selected demographic characteristics*. <https://doi.org/10.25318/1310083501-eng>
14. Canadian Partnership Against Cancer. (2023, March 9). *Food provision*. <https://www.partnershipagainstcancer.ca/topics/healthy-eating-and-cancer/food-provision/>



CHAPTER 4

ALCOHOL AND CANCER RISK

Part 1 Alcohol and Cancer Risk

Part 2 Examples of Alcohol Guidance and Policies in British Columbia

Part 3 Actionable Areas

PART 1 ALCOHOL AND CANCER RISK

Alcohol use is linked to approximately 7,000 new cancer cases in Canada each year and is associated with at least nine cancer types¹.

The percentage of new cancer cases caused by alcohol in 2015 was 5.3% in BC compared to 5.1% in Canada².

There is no safe level of alcohol use for cancer risk. All types of alcoholic products—including wine, beer, cider, and spirits—are causally linked to cancer. While zero consumption is considered the most effective way to reduce cancer according to the World Cancer Research Fund International, not consuming any alcohol may not be feasible.

Many cancer prevention organizations endorse Canada's Guidance on Alcohol and Health, which includes a continuum of risk associated with weekly alcohol use³. The lifetime risk for health issues, injuries, social issues, and premature deaths increases as the amount of alcohol consumed increases. The main recommendation of the guidance is for people to consider drinking less, defining low-risk (one to two standard drinks per week), moderate-risk (three to six drinks per week) and increasingly high-risk (seven or more drinks per week) zones for alcohol-related harms³. Any reduction in alcohol use has benefits.

People have the right to know about the risks and harms of alcohol and to make informed decisions about their health. Many Canadians

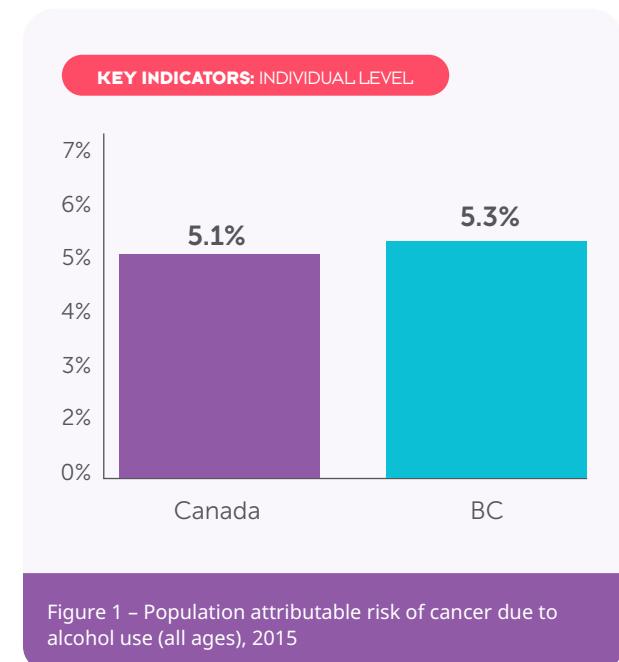
do not perceive alcohol to be a cause of cancer, and the more informed the public is, the more they support alcohol-limiting policies⁴. The most cost-effective interventions, as recommended by the World Health Organization, to reduce alcohol related harm, including cancer, are strengthening restrictions on alcohol availability, advertising, sponsorship and promotion, advancing and enforcing drink-driving countermeasures, facilitating access to screening, brief interventions and treatment, and raising prices on alcohol⁵.

Cancer risk associated with alcohol use and the success of programs to reduce or eliminate drinking are heavily influenced by health inequities, which are unfair, unjust, and preventable health disparities⁶.

Structural determinants, such as systemic racism, colonialism, discrimination, cultural norms, and economic policies shape access to and engagement in opportunities, such as community supports. Social determinants, including income, education, employment, and housing, also act as upstream factors⁶. Together, these determinants of health ultimately affect alcohol use patterns and cancer risks.

What impact does alcohol use have on cancer risk?

Quantitative Indicators of Cancer Risk Attributable to Alcohol Use in BC



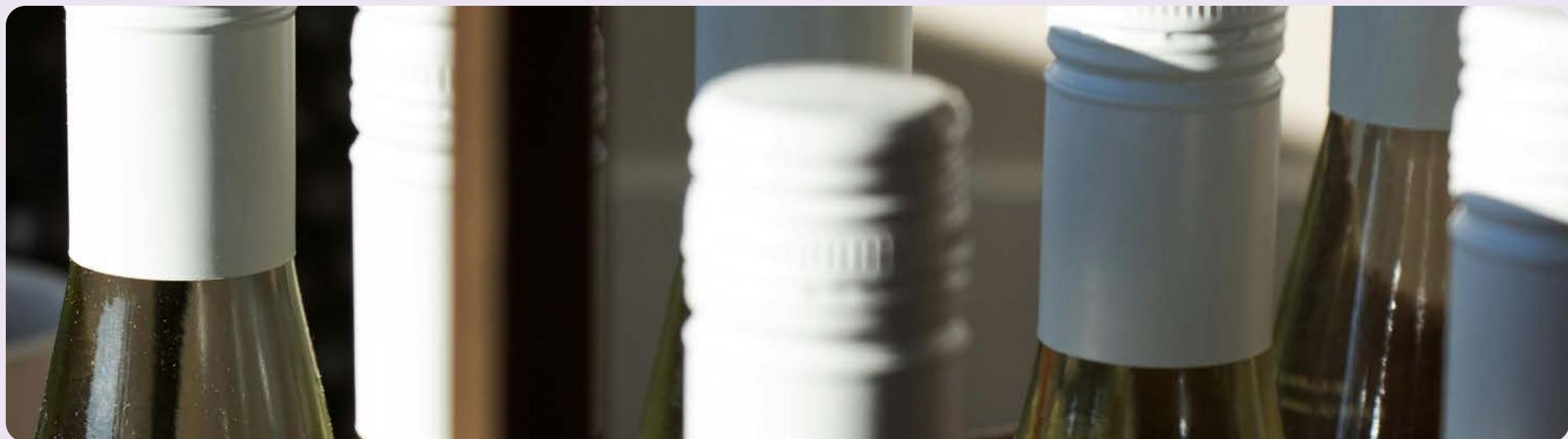
Source ComPARe, 2015

Table 1 – Number of cancer cases attributable to alcohol use in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL			
Cancer Type	Males (n)	Females (n)	Males and Females (n)
Oral	97	18	115
Breast	..	110	110
Colon	89	12	100
Rectum	56	16	72
Esophagus	12	4	16
Larynx	11	1	12
Liver	7	6	12
Pancreas	7	3	10
Stomach	6	1	7
All Associated	285	171	456

Table 2 – Percentage of cancer cases attributable (PAR) to alcohol use in 2015, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL			
Cancer Type	Males (%)	Females (%)	Males and Females (%)
Oral	21.0	10.1	18.0
Breast	..	3.5	3.5
Colon	8.2	1.2	4.9
Rectum	8.3	3.8	6.5
Esophagus	5.8	5.3	5.7
Larynx	12.0	5.7	11.1
Liver	2.5	7.7	3.7
Pancreas	2.1	1.1	1.6
Stomach	2.4	0.8	1.9
All Associated	8.5	3.2	5.3



How does BC measure in terms of alcohol use?

Quantitative Indicators of Alcohol Use in BC

In BC, annual per capita alcohol use, measured in standard drinks per week per person, has decreased significantly from record highs reported during the first year of the COVID-19 pandemic⁷. Since then, alcohol consumption fell from 10.6 standard drinks in 2020 to 9.2 in 2023⁸. This equals about 469 standard drinks per person aged 15 and older, including those who do not drink. Despite these declines, BC adults continue to consume more alcohol than recommended in Canada's Guidance on Alcohol and Health, and remain above the national average of 428 standard drinks per year (8.7 per week)⁹.

KEY INDICATORS: INDIVIDUAL LEVEL

Source [Sherk, A., 2024](#)



Figure 2 – Average number of standard drinks consumed per week per person who drinks, by province and territory, 15 years and over, 2020

KEY INDICATORS: INDIVIDUAL LEVEL

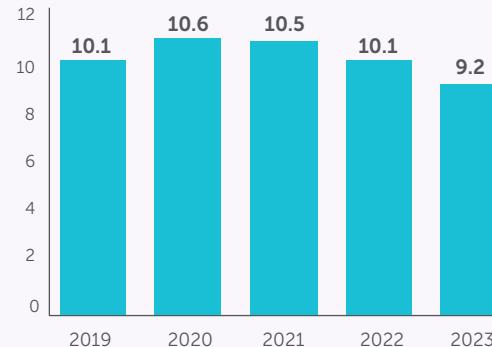


Figure 3 – Per capita alcohol use in BC (Standard Drinks per week, per person), 15 years and over, by year

Note: 1 L of absolute alcohol = 58.65 Standard Drinks

Source [BC Per Capita Alcohol Consumption Tool, 2019-2023](#)



Table 3 – Prevalence of heavy drinking at least once a month in the past year in BC, by age group, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Age	Males and Females (%)
12-17	..
18-34	25.9
35-49	24.9
50-64	19.4
65+	9.3
Total	20.1

Table 5 – Prevalence of heavy drinking at least once per month in BC, by household income, 18 years and over, 2022

KEY INDICATORS: INTERPERSONAL LEVEL

Source [CCHS, 2022](#)

Household Income	Males and Females (%)
No income or less than \$40,000	17.0
\$40,000-\$59,999	14.4
\$60,000-\$79,999	17.2
More than \$80,000	21.7

Table 4 – Prevalence of heavy drinking at least once per month in BC, by sex, 18 years and over, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Male (%)	Female (%)	Males and Females (%)
23.2	17.1	20.1

Table 6 – Prevalence of heavy drinking at least once a month in the past year in BC, by household education level, 18 years and over, 2022

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2022](#)

Educational Level	Males and Females (%)
No post-secondary education	19.6
Post-secondary certificate/diploma/university degree	20.0

Note: In the context of the Canadian Community Health Survey, “heavy drinking” refers to males who reported having five or more drinks or females who reported having four or more drinks, on one occasion, at least once a month in the past year.



Table 7 – Prevalence of heavy drinking at least once a month in the past year, by health authority in BC, 18 years and over, 2022

KEY INDICATORS: COMMUNITY LEVEL

Source [CCHS, 2022](#)

Health Authority	Males and Females (%)
Fraser Health	16.9
Interior Health	26.4
Island Health	21.9
Northern Health	25.0
Vancouver Coastal Health	18.6

KEY INDICATORS: COMMUNITY LEVEL

Source [CISUR BC Alcohol and Other Drugs Monitoring Project, 2023/24](#)



Figure 4 – Per capita alcohol use by health authority in BC (Standard Drinks per person), 15 years and over, 2023/2024

Note: 1 Standard Drink = 17.05mL of pure ethanol, or a 341mL (12oz) serving of a 5% beer, cider or cooler; 142mL (5oz) serving of 12% wine; or 43mL (1.5oz) serving of 40% spirits.



Figure 5 – Per capita alcohol use by Health Service Delivery Area in BC (Standard Drinks per person), 15 years and over, 2023/2024

Note: 1 Standard Drink = 17.05mL of pure ethanol, or a 341mL (12oz) serving of a 5% beer, cider or cooler; 142mL (5oz) serving of 12% wine; or 43mL (1.5oz) serving of 40% spirits.

How are youth consuming alcohol?

Studies have shown that adolescent alcohol use negatively affects physical and psychological development, and can influence drinking patterns later in life¹⁰.

A high proportion of alcohol consumed by youth is through binge drinking, which increases the risk of injuries, aggression, violence, and academic challenges³. Additionally, youth face greater risks of adverse outcomes from alcohol consumption compared to adults, even when consuming the same amounts. This heightened risk is linked to factors such as greater impulsivity, less emotional maturity, lower average body mass, faster drinking speeds, and less experience with tasks made more dangerous by alcohol, like driving³. For these reasons, youth are advised to delay drinking for as long as possible, and follow their local legal drinking age³.

The BC Adolescent Health Survey (2023) of youth aged 12-19 shows¹¹:

- 38% of youth had tried alcohol, with males being less likely to report trying it compared to females and non-binary youth.
- The most common first age to have tried alcohol is 14 years old.
- Among youth who had tried alcohol, 60% had at least one drink in the past month, 3% drank on at least 10 days in the past month and 1% drank daily.
- 34% of youth had five or more drinks in a single setting at least once in the past month, and 1% reported drinking this heavily on 20 or more days.
- Among youth who had drank alcohol, females were the least likely to have done so to excess, with 1% drinking on 20 or more days in the past month, compared to 2% of males and 5% of non-binary youth.

KEY INDICATORS: INDIVIDUAL LEVEL

Source BC AHS, 2008-2023

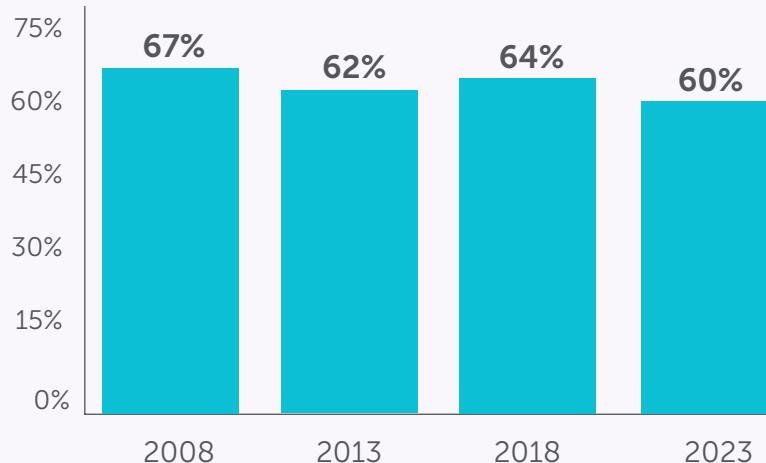


Figure 6 – Prevalence of youth (among those who tried alcohol), aged 12-19, having ≥ 1 drink in the past month in BC, by year



Health equity considerations of alcohol use

Health inequities, driven by structural determinants like systemic racism, colonialism, and economic policies shape access to resources and opportunities, ultimately influencing alcohol use patterns and cancer risks.

Targeted alcohol marketing disproportionately affects equity-deserving communities, while systemic barriers limit access to prevention and support programs. Use of alcoholic products and barriers to resources vary across genders, age, Indigenous groups, and the 2SLGBTQI+ community.

Alcohol was introduced to Indigenous peoples in Canada during colonization, disrupting traditional ways of life and producing cycles of addiction and trauma³. It has led to stigma, negative stereotypes, and unequal access to resources to address alcohol use that still affect First Nations, Métis and Inuit communities today³.

The Canadian Partnership Against Cancer highlights key alcohol-related risks and inequities:

- Men drink about twice as much as women on average, and females who consume more than four drinks per week are at greater risk for alcohol-related cancers than males who drink the same volume^{12,13}.
- However, lifetime risk increases more steeply for females than males

above low-risk thresholds, while men are more likely to experience and cause injuries and perpetuate violence, and experience death from alcohol use³. At low levels of consumption, the physiological differences between males and females are negligible³.

- Indigenous youth report higher odds of past-year drinking and start drinking earlier compared to non-Indigenous youth¹⁴.
- One in three 2SLGBTQI+ members report problematic alcohol use, and two in five 2SLGBTQI+ members with low-income report problematic alcohol use, where problematic alcohol use is defined as a pattern of use that might affect a person's health and safety and increase the risk of other problems related to alcohol use¹⁵.
- Canadians of high socio-economic status (SES) drink more and engage in more risky drinking behaviours than Canadians of low SES¹⁶.
- Low SES Canadians have greater access to alcohol outlets and are more frequently and more severely harmed by alcohol use than high SES Canadians¹⁶.

Tailored approaches are essential to address the distinct needs of men, women, and gender-diverse populations. Effective cancer prevention requires addressing these structural determinants through equity-focused policies that regulate alcohol marketing, improve access to prevention and intervention services, and create supportive environments for reducing alcohol use.



PART 2 EXAMPLES OF ALCOHOL GUIDANCE AND POLICIES IN BRITISH COLUMBIA

- INDIVIDUAL**
 - [Canada's Guidance on Alcohol and Health](#)
- INTERPERSONAL**
 - [Here to Help](#)
 - [HelpStartsHere](#)
- ORGANIZATIONAL**
 - [WorkSafeBC – Substance and Impairment Management](#)
 - [Construction Industry of British Columbia Substance Use Testing and Treatment Program Policy](#)
 - [Alcohol Use: Screening, Determining Risk, and Evidence-Based Treatment Course](#)
- COMMUNITY**
 - [Population-Specific Mental Health and Substance Use Resources and Services](#)
- PUBLIC POLICY**
 - [Proposed Cancer Warning Labels on Alcohol](#)
 - [Regulations on Alcohol Pricing, Taxation, and Physical Availability](#)
 - [Canadian Alcohol Policy Evaluation](#)



INDIVIDUAL LEVEL

Canada's Guidance on Alcohol and Health

According to the 2023 Public Awareness of Alcohol-related Harms Survey¹⁷:

- Over one-third of Canadians (35%) are unaware of the alcohol drinking guidelines (either the 2011 Low-Risk Drinking Guidelines and/or 2023 Guidance on Alcohol and Health).
- Awareness was lowest among youth aged 16 to 19, with only 40% familiar.
- Over one-third of those who ever consumed alcohol are unfamiliar with the concept of a standard drink. Among those who are, 70% incorrectly estimated the number of standard drinks in their typical alcoholic beverage.

The current guidance advises that if you drink, it's better to drink less to lower your health risks, including cancer³. The percentage of British Columbians above the low-risk level of two standard drinks per week was 48.6 compared to 48.1 in Canada¹⁸.

Standard Drink Measurements:

- 341 mL (12 oz.) Beer/Cider/Cooler (5% pure alcohol)
- 142 mL (5 oz.) Wine (12% pure alcohol)
- 43 mL (1.5 oz.) Spirits (rum, gin, whiskey, etc.) (40% pure alcohol)



INDIVIDUAL LEVEL

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CADS, 2019](#)

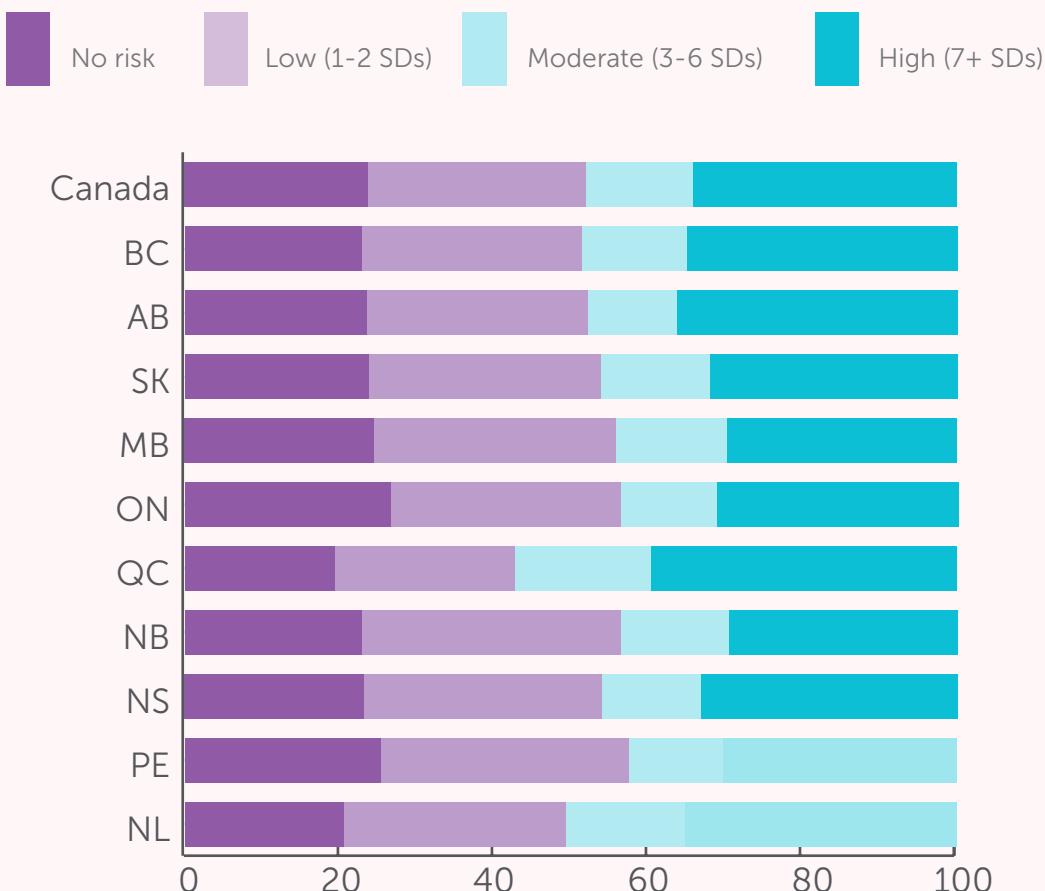
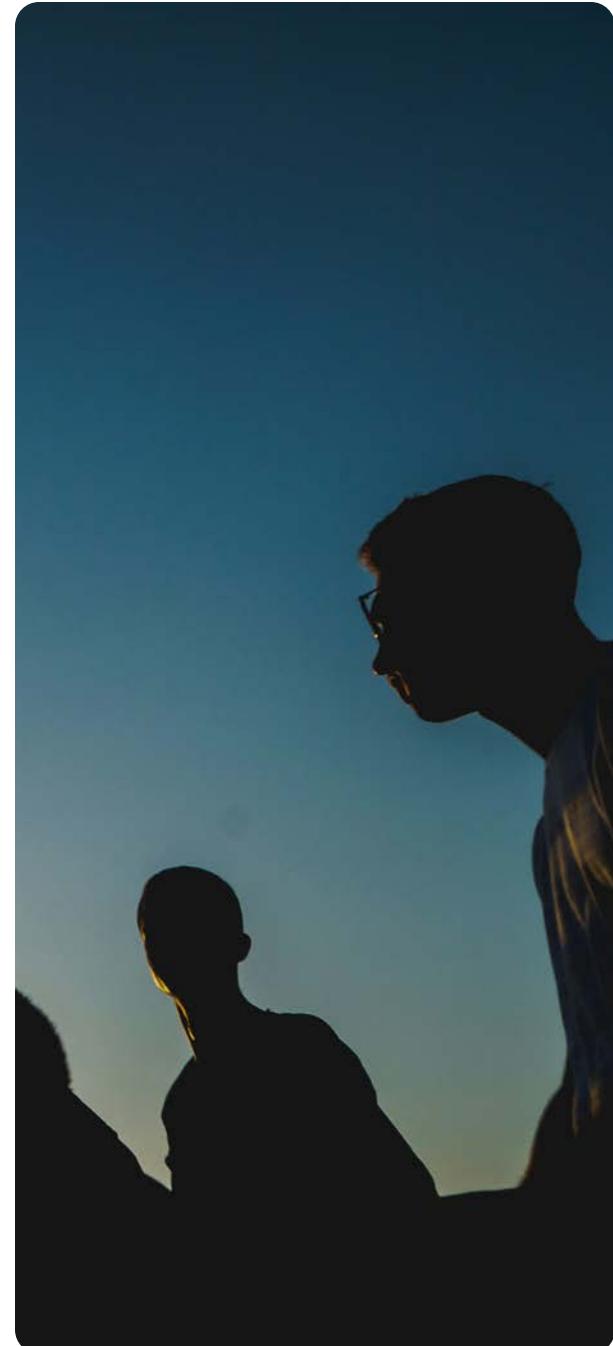


Figure 7 – Adherence to Canada's Guidance on Alcohol and Health, by province, 2019

***Note:** Based on 2019 Canadian Alcohol and Drug Survey, and corrected by using Statistic Canada's per capita alcohol sales figures.



INTERPERSONAL LEVEL

Here to Help

This project by the BC Partners for Mental Health and Substance Use Information aims to help people live well and better prevent and manage mental health and substance use problems. The website includes evidence-based information and skills for mental health management for people experiencing substance use problems and for those who want to support a loved one.

HelpStartsHere

Managed by the BC Ministry of Mental Health and Addictions, HelpStartsHere provides free, confidential support for mental health and substance use concerns. It features a directory of publicly funded and not-for-profit services, accessible articles, and tools to help programs refer clients to care. It also offers program navigation services, self-help, and crisis support.



ORGANIZATIONAL LEVEL

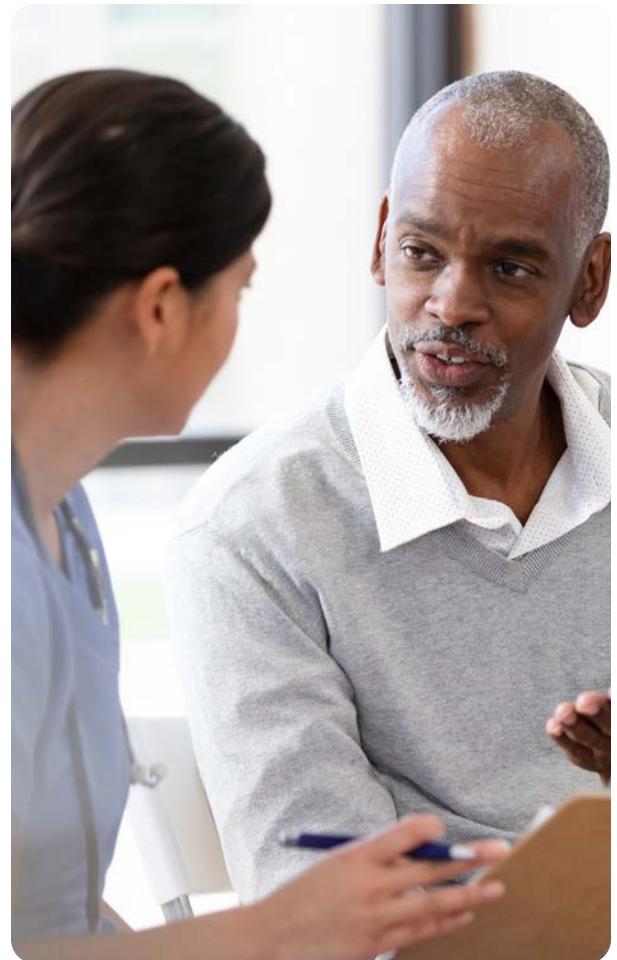
Workplace Guidelines for Alcohol and Drug Impairment

Resources from WorkSafeBC encourage employers to develop policies and procedures to protect workers from harm caused by alcohol and drug impairment in the workplace. An example of occupation specific policies for drugs and alcohol is The Construction Industry of British Columbia Substance Use Testing and Treatment Program Policy. The policy outlines safety strategies for union workers on site, and treatment and rehabilitation approaches for workers with substance use problems.

ORGANIZATIONAL LEVEL

Alcohol Use: Screening, Determining Risk, and Evidence-Based Treatment Course

Offered by the Division of Continuing Professional Development at the University of British Columbia (UBC CPD), "Alcohol Use: Screening, Determining Risk, and Evidence-Based Treatment" is an eLearning course that provides training for physicians to improve care for high-risk drinking and alcohol use disorder (AUD). The course covers provincial and national guidelines, teaches trauma-informed and culturally safe screening and treatment approaches, and promotes evidence-based interventions. Participants can earn CPD credits while gaining practical skills to enhance alcohol-related outcomes in their practice.



COMMUNITY LEVEL

Population-Specific Mental Health and Substance Use Supports

The BC Ministry of Health website offers resources in BC offer counselling and support services to families, couples, and people experiencing the negative impacts of alcohol and other substance use. Resources can be filtered by region.

PUBLIC POLICY LEVEL

Cancer Warning Labels

Alcohol labels with cancer warnings and national drinking guidelines are an effective way to convey risk information and promote reduced consumption¹⁹. Evidence from a real-world alcohol labelling intervention study in Yukon showed that adding alcohol warning labels increased public understanding of the link between alcohol and cancer, decreased intentions to consume alcohol, and improved public support for effective alcohol control policies^{4, 19}.

Regulations on Alcohol Pricing, Control, and Physical Availability

Distribution and sales of alcohol in BC is a partial government monopoly. Alcohol Policy and Cancer in Canada (2021) outlines BC regulations on minimum pricing, taxation and physical availability. Since COVID-19, BC has seen an expansion in alcohol delivery and pick-up²⁰. BC has set minimum prices for all alcoholic beverage categories sold in retail outlets, however minimum prices are not currently linked to percentage of alcohol by volume, which would more effectively support public health. Hours of operation for outlets are provincially regulated, and permanently extended during COVID-19. BC's provincial marketing regulations include restrictions on placements of advertisements, such as where minors commonly spend their time.

KEY INDICATORS: PUBLIC POLICY LEVEL

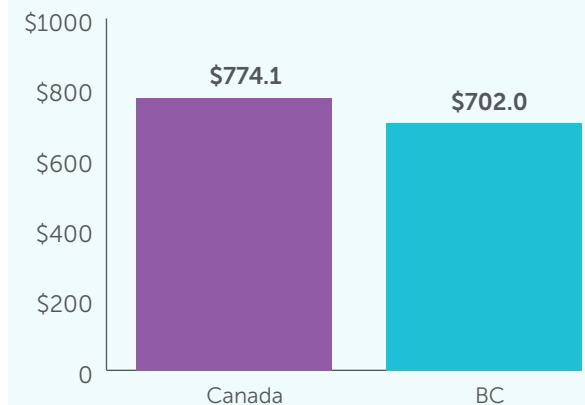


Figure 8 – Total per capita alcohol sales, in Canadian dollars, 2023/2024

Source [Control and Sale of Alcoholic Beverages in Canada, 2023/24](#)



PUBLIC POLICY LEVEL

Canada Alcohol Policy Evaluation

The Canadian Alcohol Policy Evaluation (CAPE) evaluates the implementation of evidence-based alcohol policies across Canada at provincial, territorial, and federal levels, focusing on areas like pricing and taxation, availability, advertising, health and safety messaging, and screening and treatment interventions. CAPE Project offers specific recommendations to improve alcohol policies in each jurisdiction.

In the 2023 CAPE report, BC received a failing grade of 36%, indicating significant room for improvement in its alcohol policies²¹. One area where BC performs relatively well is in maintaining a moratorium (temporary prohibition) on new licenses for off-premise retail outlets until 2032, helping control the physical availability of alcohol. However, BC falls short in pricing and taxation policies. For example, minimum pricing for alcohol remains below recommended levels. Recommendations for BC include increasing minimum prices tied to ethanol content and inflation, reducing outlet density, appointing a health and safety-focused ministry to oversee alcohol distribution and retail, and implementing marketing restrictions.

Table 8 – Minimum pricing of standard drinks in BC, by beverage type and premise, 2021/2022

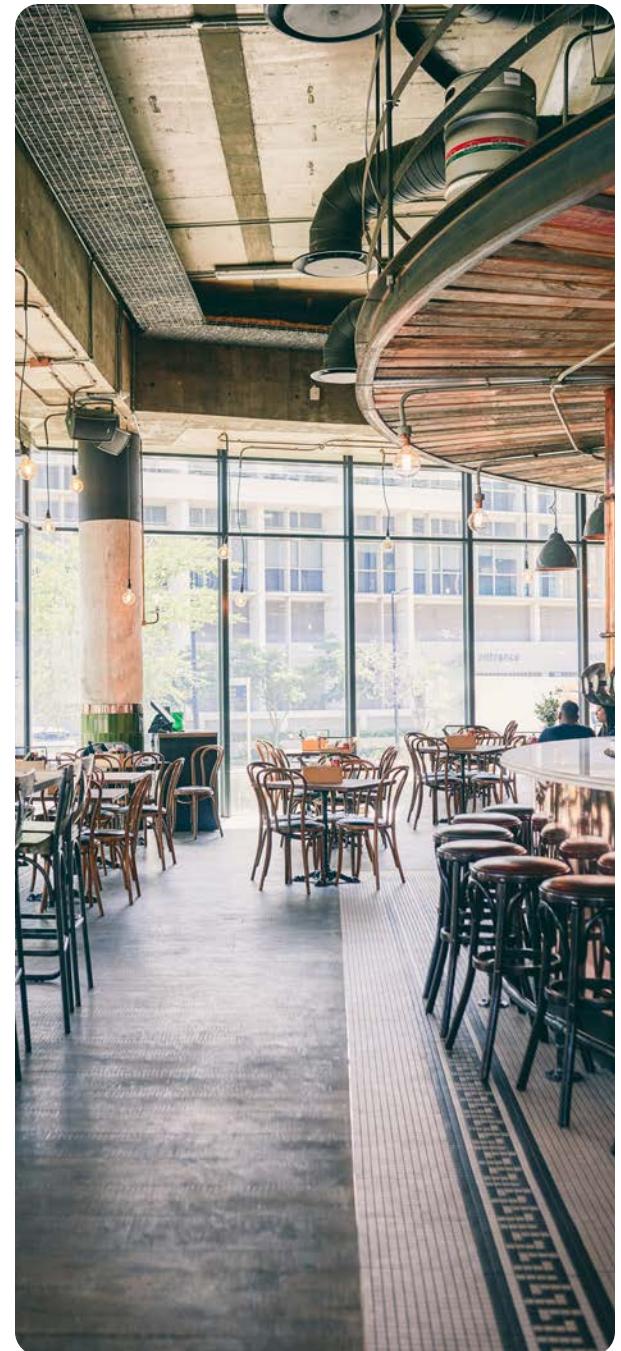
KEY INDICATORS: PUBLIC POLICY LEVEL

Source [Naimi et al., 2023](#)

	Off-premise (liquor stores)		On-premise (restaurants, bars, etc.)	
	Actual	Recommended*	Actual	Recommended*
Beer	\$1.35	\$1.83	\$2.76**	\$3.66
Wine	\$1.03	\$1.83	\$3.45	\$3.66
Spirits	\$1.37	\$1.83	\$5.18	\$3.66
Coolers	\$1.12	\$1.83	\$2.47	\$3.66

*Price per standard drink for a common container size and beverage strength, expressed in 2021 dollars

**For draft beer in serving sizes greater than 1.42 L (50 oz.)



PART 3 ACTIONABLE AREAS

INDIVIDUAL

- Increase awareness about the link between alcohol and cancer through health promotion initiatives, educational resources, and advocate for alcohol warning labels.
- Encourage partnerships with public health authorities and community organizations in the development of resources, including youth-focused alcohol literacy.

ORGANIZATIONAL

- Enhance monitoring and reporting to track alcohol-related harms, including data on alcohol-related cancer cases, and use this information to inform policy and organizational strategies.
- Maintain regular training programs for industry workers (e.g., in hospitality, entertainment, and tourism sectors) to promote service practices and reduce alcohol-related harms.

COMMUNITY

- Tailor alcohol and cancer prevention programs to specific at-risk populations, such as developing culturally safe and appropriate programs for Indigenous youth, and targeted interventions for the 2SLGBTQI+ community.
- Improve accessibility to resources about the risks of alcohol to those who currently consume alcohol.

PUBLIC POLICY

- Advocate for policy reform focused on pricing, reduced physical availability of alcohol, and restricting alcohol marketing based on scientific research and population-level data.
- Examples of policy improvements to address alcohol use and cancer prevention include raising minimum prices based on alcohol content, indexing prices to inflation, and reducing outlet density and hours of sale for both on-premise establishments (e.g., bars, restaurants) and off-premise retail stores²¹.

REFERENCES

1. BC Cancer. *Preventing cancer. Reduce Your Risk*. Accessed October 10, 2023. <http://www.bccancer.bc.ca/prevent/alcohol/reduce-your-risk>.
2. *Compare study on preventable cancers in Canada*. ComPARe. July 11, 2022. Accessed October 10, 2023. <https://preventcancer.ca/>.
3. Canadian Centre on Substance Use and Addiction. *Canada's guidance on alcohol and health*. Accessed October 10, 2023. <https://www.ccsa.ca/canadas-guidance-alcohol-and-health>.
4. Weerasinghe, A., Schoueri-Mychasiw, N., Vallance, K., et al. (2020). Improving knowledge that alcohol can cause cancer is associated with consumer support for alcohol policies: Findings from a real-world alcohol labelling study. *International Journal of Environmental Research and Public Health*, 17(2), Article 398. <https://doi.org/10.3390/ijerph17020398>
5. World Health Organization. *The SAFER Interventions – Alcohol Control Initiative*. Accessed January 7, 2025. <https://www.who.int/initiatives/SAFER>
6. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/pph-framework/bc_population_and_public_health_framework.pdf
7. Sherk, A. (2024). Canada's Alcohol Deficit, 2007–2020: Social Cost, Public Revenue, Magnitudes of Alcohol Use, and the Per-Drink Net Deficit for a Fourteen-Year Period. *Journal of studies on alcohol and drugs*, 85(3), 306-311. <https://doi.org/10.15288/jsad.23-00241>
8. University of Victoria, CISUR. *BC Per Capita Alcohol Consumption Tool*. Accessed October 10, 2023. <http://aodtool.cfar.uvic.ca/pca/tool.php>.
9. Statistics Canada. *Sales of alcoholic beverages types by liquor authorities and other retail outlets, by value, volume, and absolute volume*. Accessed October 22, 2024. <https://doi.org/10.25318/1010001001-eng>
10. McCambridge J, McAlaney J, Rowe R. (2011). Adult Consequences of Late Adolescent Alcohol Consumption: A Systematic Review of Cohort Studies. *PLoS Med*, 8(2): e1000413. <https://doi.org/10.1371/journal.pmed.1000413>
11. Smith, A., Poon, C., Peled, M., Forsyth, K., Saewyc, E., & McCreary Centre Society. (2024). *The Big Picture: An overview of the 2023 BC Adolescent Health Survey provincial results*. McCreary Centre Society. https://mcs.bc.ca/pdf/2023_bcahs_the_big_picture.pdf
12. Hydes TJ, Burton R, Inskip H, Bellis MA, Sheron N. (2019). A comparison of gender-linked population cancer risks between alcohol and tobacco: How many cigarettes are there in a bottle of wine? *BMC Public Health*, 19(1). [doi:10.1186/s12889-019-6576-9](https://doi.org/10.1186/s12889-019-6576-9)
13. Sherk, A., Churchill, S., Cukier, S., et al. (2024). Distributions of alcohol use and alcohol caused death and disability in Canada: Defining alcohol harm density functions and new perspectives on the prevention paradox. *Addiction*, 119(4), 696-705. <https://doi.org/10.1111/add.16414>

REFERENCES

14. Sikorski C, Leatherdale S, Cooke M. (2019). Tobacco, alcohol and marijuana use among indigenous youth attending off-reserve schools in Canada: Cross-sectional results from the Canadian student tobacco, alcohol and drugs survey. *Health Promotion and Chronic Disease Prevention in Canada*, 39(6/7):207-215. [doi:10.24095/hpcdp.39.6/7.01](https://doi.org/10.24095/hpcdp.39.6/7.01)
15. Canadian Centre on Substance Use and Addiction and the Mental Health Commission of Canada. *Mental Health and Substance Use During COVID-19 Summary Report 6: Spotlight On 2SLGBTQ+ Communities in Canada*. Accessed October 10, 2023. <https://mentalhealthcommission.ca/wp-content/uploads/2022/06/Leger-Poll-Spotlight-On-2SLGBTQ-Communities-in-Canada-1.pdf>.
16. Public Health Agency of Canada. (2016). *The Chief Public Health Officer's Report on the State of Public Health in Canada, 2015: Alcohol Consumption in Canada*. Canada.ca. Accessed October 10, 2023. <https://www.canada.ca/en/public-health/news/2016/02/chief-public-health-officer-s-annual-report.html>
17. Health Canada. (2024). *Public awareness of alcohol-related harms survey 2023 [Web Summary]*. Health Infobase. Accessed October 23, 2024. <https://health-infobase.canada.ca/alcohol-related-harms-survey/>.
18. Sherk, A. (2024). *Adherence to Canada's Guidance on Alcohol and Health [unpublished analysis]*, based on data from 2019 Canadian Alcohol and Drugs Survey (CADS) and Statistics Canada Table: 10-10-0010-01.
19. Hobin E, Shokar S, Vallance K, et al. (2020). Communicating risks to drinkers: Testing alcohol labels with a cancer warning and national drinking guidelines in Canada. *Canadian Journal of Public Health*, 111(5):716-725. <https://link.springer.com/article/10.17269/s41997-020-00320-7>
20. Government of British Columbia. (February 16, 2023). *LCRB frequently asked questions*. Province of British Columbia. Accessed October 10, 2023. <https://www2.gov.bc.ca/gov/content/employment-business/business/licor-regulation-licensing/licor-licence-permits/licor-resources-information/lcrb-faq>.
21. Naimi, T., Stockwell, T., Giesbrecht, N. et al. (2023). *Canadian Alcohol Policy Evaluation 3.0: Results from British Columbia*. Victoria, BC: Canadian Institute for Substance Use Research, University of Victoria. <https://www.uvic.ca/research/centres/cisur/assets/docs/cape/cape3/bc-results-en.pdf>



CHAPTER 5

UV RADIATION AND CANCER RISK

Part 1 UV Radiation and Cancer Risk

Part 2 Examples of Sun Safety Programs and Policies in British Columbia

Part 3 Actionable Areas

PART 1 UV RADIATION AND CANCER RISK

Skin cancer is the most common type of cancer in North America, with approximately one Canadian dying of skin cancer every seven hours¹.

The largest contributing risk factor for all skin cancer is exposure to UV radiation from the sun and tanning beds².

Skin damage due to UV radiation accumulates over time, and the amount of UV exposure a person receives is linked to developing skin cancer later in life³. This emphasizes the importance of early and lifelong sun protection to prevent new UV-induced skin damage⁴.

Accumulation of UV exposure can occur during outdoor activities such as entertainment, hiking, swimming, and for those that vacation in warmer climates⁵. One study found that 64% of Canadian adults rarely or never used sunscreen on their body and 58% did not use it on their face, alongside a steady increase in the proportion spending two or more hours in the sun⁶. Use of sun protective clothing remained low, with about 29% of adults wearing a hat and 35% wearing long pants or skirts often or always, compared to nearly 65% who reported frequent use of sunglasses⁶.

As well, sun safety recommendation adherence differs among sexes and age groups. For example,

young adults (18-29 years) reported significantly more sun exposure and sunburn than older adults and were far less likely to wear hats, long sleeves/skirts and sunglasses⁶.

According to the ComPARe study, attributable skin cancer cases due to UV radiation is 54% in BC⁷.

The risk of skin cancer from UV radiation exposure, and the effectiveness of programs aimed at reducing harmful exposure from the sun or tanning beds, is significantly influenced by health inequities. These are unfair, unjust, and preventable health disparities⁸.

Structural determinants, such as colonialism, discrimination, economic policies, cultural norms, and urban design shape access to and engagement in opportunities for health, safety and education. Social determinants, including income, education, employment, and housing, also act as upstream factors⁸. Together, these interconnected determinants influence patterns of UV exposure and contribute to disparities in skin cancer risk.



What impact does UV radiation have on cancer risk?

Quantitative Indicators of Cancer Risk Attributable to UV Radiation in BC

KEY INDICATORS: INDIVIDUAL LEVEL

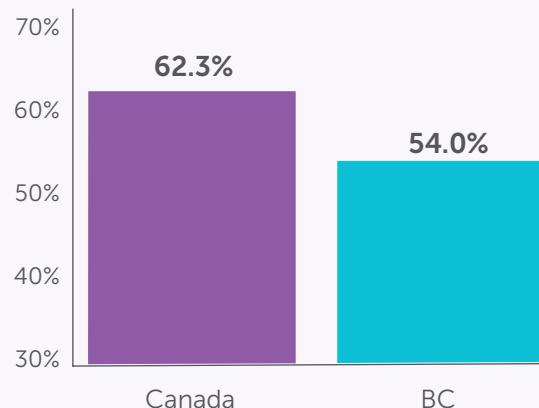


Figure 1 – Population attributable risk of skin cancer due to UV risk behaviours (all ages), 2015

Source [ComPARe, 2015](#)

KEY INDICATORS: INDIVIDUAL LEVEL

Note: Statistics Canada 2019 cancer incidence estimates exclude both Quebec and Nova Scotia, therefore incidence rates are unavailable for Canada as a geographical category for comparison.

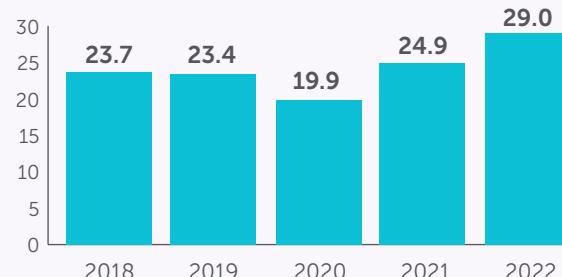


Figure 2 – Age-standardized incidence rate (per 100,000 people) of melanoma in BC, by year*

Source [Canadian Cancer Registry, 2018-2022](#)



Table 1 – Number of melanoma cases attributable to UV risk behaviours in 2015, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Melanoma	295	223	518

Table 2 – Percentage of melanoma cases attributable (PAR) to UV risk behaviours in 2015, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Melanoma	56.7	50.7	54.0

How does BC measure in terms of UV risk behaviours?

Quantitative Indicators of UV Risk Behaviours in BC

The primary mode of skin cancer prevention is adopting personal protective behaviours, including limiting time spent in the sun³. Up-to-date information on time spent in the sun by British Columbians is limited. For example, the Canadian Community Health Survey (2016) data on sun safety behaviours is presented for only six provinces excluding BC (NB, QC, ON, MB, SK).

In 2006, 10 years after the first iteration, the Second National Sun Survey was conducted to evaluate current sun exposure rates and protective behaviours amongst Canadians, by region. It was found that 28% of adults in BC spent at least two hours in the sun on a typical summer day⁹.

In a separate analysis of Canadian Community Health Survey data from 2011 to 2018, 33% of Canadian adults reported having had a sunburn in the past 12 months, though this data did not include BC⁶. Sunburns are more common among men, young people, those who are not visible minorities, high-income households, and employed people⁶.

The strongest risk factor for the development of keratinocyte carcinomas (the most common forms of skin cancer) is having an outdoor job; according to CAREX Canada, approximately 238,000 workers in BC are exposed to solar UV radiation on the job¹⁰.

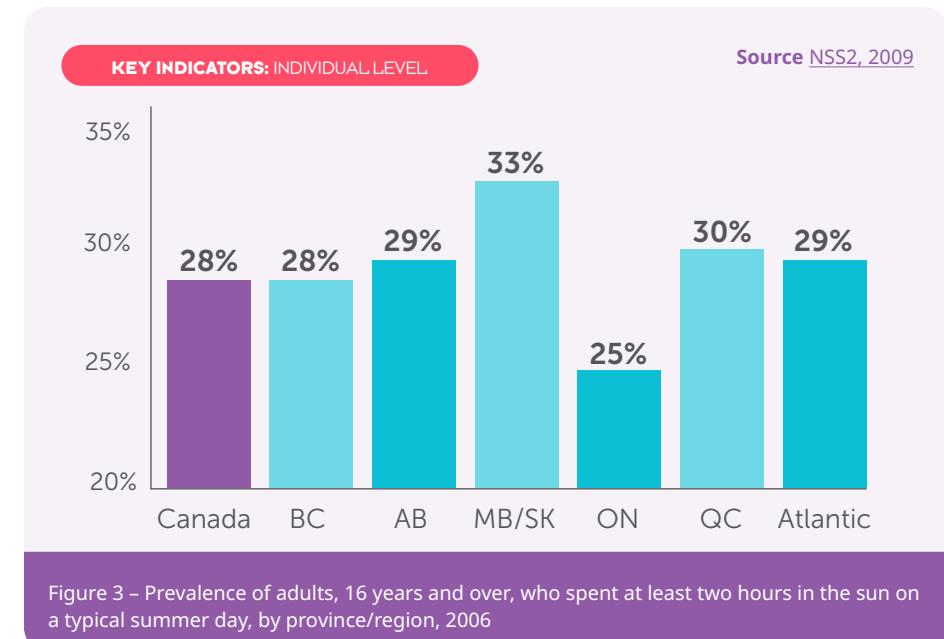


Figure 3 – Prevalence of adults, 16 years and over, who spent at least two hours in the sun on a typical summer day, by province/region, 2006

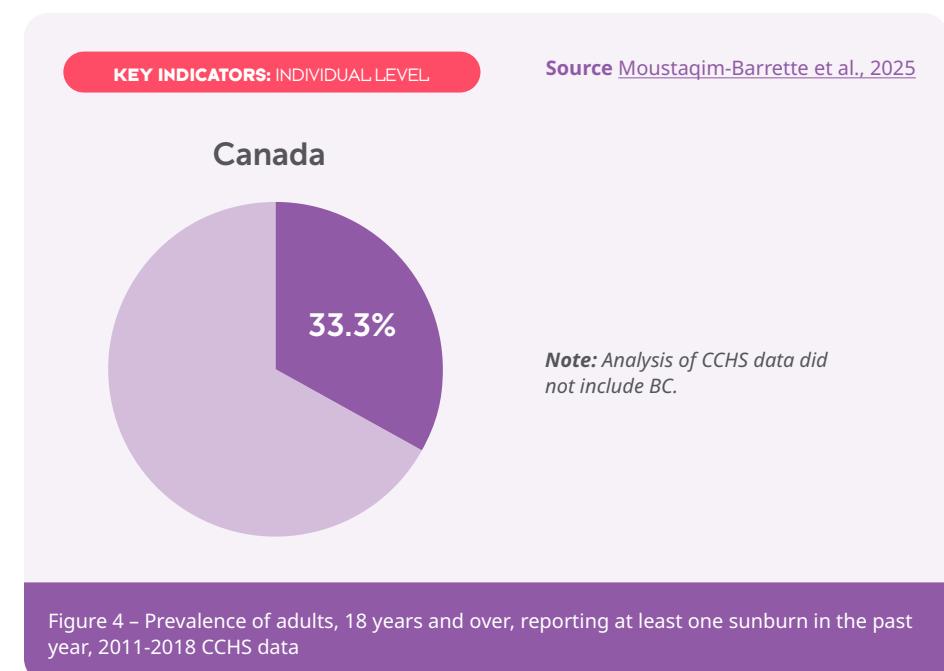


Figure 4 – Prevalence of adults, 18 years and over, reporting at least one sunburn in the past year, 2011-2018 CCHS data

How sun safe are youth?

Skin cancer control is a top priority for young children, as risks for melanoma arise as early as infancy.

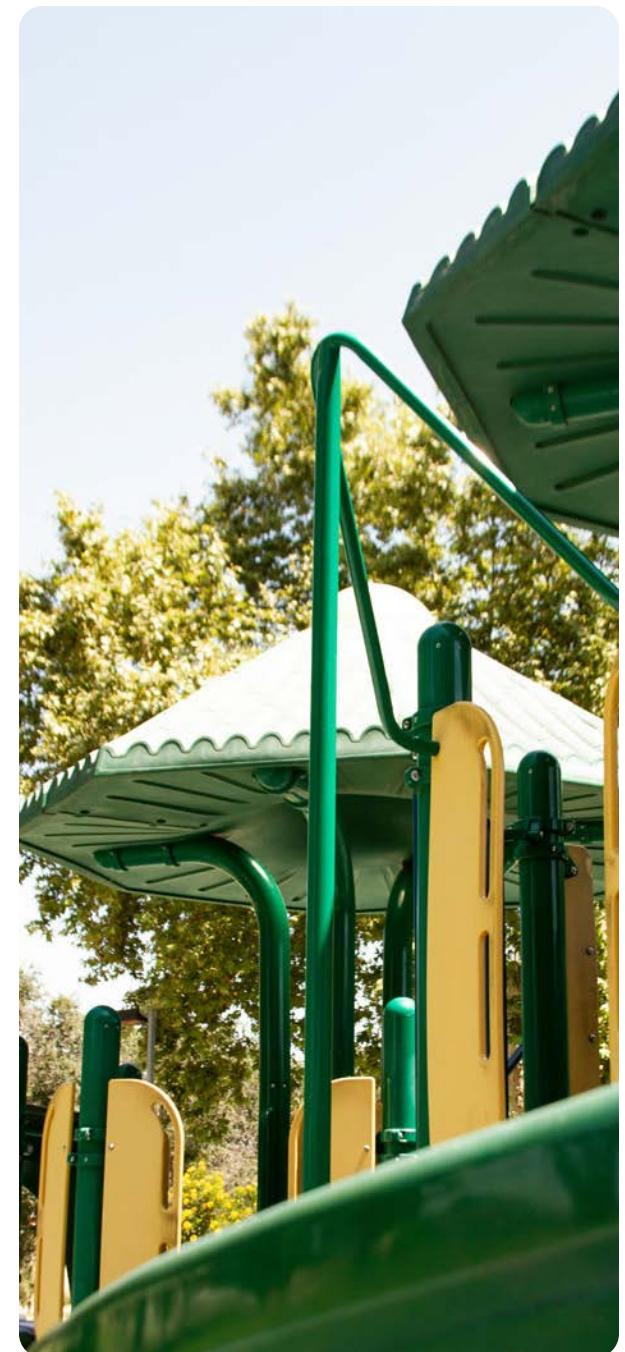
Serious sunburn during childhood can increase the risk of melanoma later in life, with as few as five sunburns in childhood doubling the risk¹¹. As of 2019, sun protection policies in childcare settings vary among provinces regarding comprehensiveness of prevention measures.

Seven provinces, including BC and two territories, require the provision of shade in outdoor public play areas. In particular, BC explicitly includes shade as a design consideration for childcare play spaces¹¹. However, BC has not yet adopted certain legislated guidelines for children and early childhood educators in licensed childcare facilities, such as sunscreen and sun safe clothing use, even as several other provinces and territories have¹¹.

Table 3 – Presence of sun safety policies among provinces and territories, by policy example, 2019

	AB	BC	MB	NB	NL	NS	ON	PE	QC	SK	NT	NU	YT
Protective clothing for outdoor play			✓		✓	✓	✓				✓	✓	
Application of sunscreen for outdoor play			✓		✓	✓	✓		✓		✓	✓	
Modelling of sun protective behaviours by staff			✓	✓		✓					✓	✓	
Provision of shade in outdoor play space		✓	✓	✓		✓	✓		✓	✓	✓	✓	
Scheduling of recess based on sunshine and UV index			✓	✓	✓	✓					✓	✓	

Source [CPAC, 2019](#)



How common is tanning bed use?

Quantitative Indicators of UV Risk Behaviours in BC

Up-to-date data on tanning bed use in BC is limited. The Canadian Community Health Survey has captured data on the use of tanning beds in only four provinces across Canada, excluding BC (QC, ON, MB, SK).

The World Health Organization indicates that the risk of skin cancer increases by 75% when the use of tanning beds start prior to age 35¹². As of October 2012, tanning bed usage by minors under 18 years old has been banned in BC and across Canada, unless a medical prescription has been issued. Prevalence of tanning equipment use in 2019 was 3.1% in Western Canada, comparable to the national average. In 2014, 80.2% of Canadian adults reported that they followed a suggested tanning bed exposure schedule¹³.

The BC Indoor Tanning Working Group notes that “young adults are the most likely to try to get a tan, either from the sun or by using tanning equipment”¹⁴. Indoor tanning is more common among young people identifying as women compared to those identifying as men and older adults, with 27% of young women (ages 16-24) using tanning equipment¹⁴.

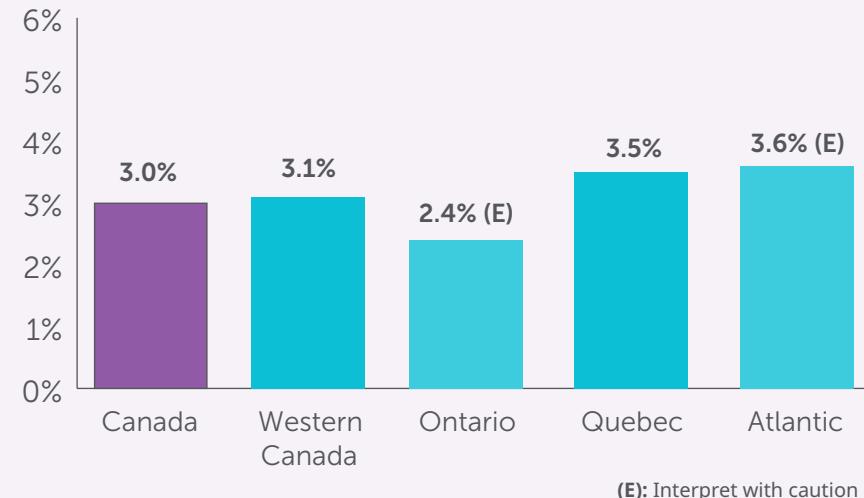
Health equity considerations of UV radiation exposure

Health inequities, driven by structural determinants like colonialism, discrimination, and urban design shape access to resources and opportunities, ultimately influencing UV exposure and skin cancer risks.

Limited access to sunscreen, protective clothing, and shaded public spaces disproportionately impacts equity-deserving communities, while gaps in health literacy contribute to disparities in awareness of UV-related risks. Effective cancer prevention requires addressing these structural determinants through equity-focused policies that improve access to sun protection resources, enhance public education, and promote the creation of shaded environments for all.

KEY INDICATORS: INDIVIDUAL LEVEL

Source [Qutob et al., 2021](#)



(E): Interpret with caution

Figure 5 – Prevalence of tanning equipment use in the past year, by region, 12 years and over, 2019

KEY INDICATORS: INDIVIDUAL LEVEL

Source [CCHS, 2014](#)

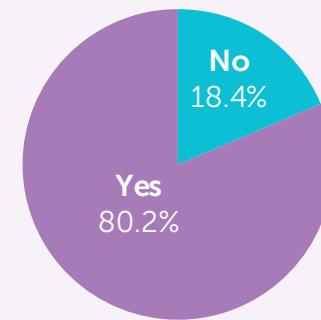


Figure 6 – Prevalence of Canadian tanning bed users who followed an exposure schedule in past year, 12 years and over, 2014

PART 2 EXAMPLES OF SUN SAFETY PROGRAMS AND POLICIES IN BRITISH COLUMBIA

INDIVIDUAL

- [StriveForFive Personal Sun Protection Campaign](#)

INTERPERSONAL

- [HealthLink BC Sun Safety Resources](#)

ORGANIZATIONAL

- [Occupational Health and Safety Regulations \(CAREX and WorkSafeBC\)](#)

COMMUNITY

- [SunSense Programs](#)
- [Childcare Shade Pilot Studies](#)
- [Sunscreen Dispenser Pilot](#)
- [Shade Lookbook](#)
- [Sun Aware Camp Certification Program](#)

PUBLIC POLICY

- [SunSafeBC](#)
- [Sun Safety at Work \(CAREX\)](#)
- [Province-Wide Banning of Tanning Bed Use by Minors](#)



INDIVIDUAL LEVEL

StriveForFive

This sun safety campaign aimed to promote awareness and education about the importance of sun protection to reduce the risk of skin cancer and other harmful effects of UV radiation among British Columbians. The campaign focused on encouraging people to adopt five sun-safe behaviours when spending time outdoors including seeking shade, wearing protective clothing, applying sunscreen, wearing sunglasses and checking the UV index.

Note: The campaign landing page is no longer active. See messaging from the campaign in the BC Cancer Prevention link provided.

INTERPERSONAL LEVEL

HealthLink BC Sun Safety Resources

HealthLink BC's web page on sun protection includes advice on how to minimize UV exposure for adults, children and infants. Additional information includes skin change assessment and how to treat sunburns.



ORGANIZATIONAL LEVEL

Occupational Health and Safety Regulations (CAREX and WorkSafeBC)

Approximately 1.7 million Canadians are exposed to UV radiation from the sun during work, and particularly those who have outdoor occupations. Online resources are provided by WorkSafeBC for employers and workers regarding sun safety practices for working outdoors. Evidence-based information and recommendations come from CAREX Canada, a multi-institution team of researchers and specialists with expertise in environmental risk factors and cancer.

KEY INDICATORS: ORGANIZATIONAL LEVEL

Source [CAREX Canada, 2016](#)



Figure 7 – Workers exposed to solar UV radiation, per-capita (10,000 workers), by province and territory, 2016



COMMUNITY LEVEL

SunSense Programs

SunSense is a national sun safety program developed by the Canadian Cancer Society, with the goal of reducing skin cancer incidence in Canada. The program supports schools and daycares to create a sun safe environment by providing free tools and resources to enable comprehensive sun safety plans. In addition to accessing resources, registered schools can participate in a SunSense Challenge (held during Melanoma Awareness Month in May) and daycare centres can earn a SunSense Certificate.

Childcare Shade Studies

A series of scientific studies and pilot projects by BC Cancer has investigated the impact of installing shade sails in toddler playgrounds at various childcare facilities in Vancouver. The results will contribute to policy reform in standardization of shade at childcare facilities across the province.

Sunscreen Dispenser Pilot

Since 2022, Save Your Skin Foundation, supported by Health Canada, has provided sunscreen dispensers to various municipalities in BC and other regions in Canada to be placed in public areas such as parks and beaches. The dispensers are automatic, touchless, and contain SPF 30 mineral sunscreen.

Shade Lookbook

Created by BC Cancer and the UBC School of Architecture and Landscape Architecture, the Shade Lookbook is a comprehensive resource designed to assist designers, urban planners, and policymakers in implementing effective shade solutions in parks, playgrounds, and public settings. It offers practical design options for every budget, taking into account considerations such as maintenance and care. Both natural shade and built shade options are provided.



COMMUNITY LEVEL

Sun Aware Camp Certification Program

Developed by Melanoma Canada, this program provides free and easy-to-follow sun safety training for summer camp owners, directors, and staff. Summer camps are equipped with best practices in sun safety, along with benefits such as free UV bracelets for campers and staff and recognition as a Sun Aware camp on a list of certified camps distributed by Melanoma Canada to various parenting magazines and blogs.

PUBLIC POLICY LEVEL

SunSafeBC

SunSafeBC conducts a variety of projects such as online training for early childhood educators, shade pilot studies at elementary schools and sunscreen dispenser programming. Sun Safe BC facilitates a coalition of contact experts working to reduce UV exposure, with priority areas being: policy reform, health protection measures, health promotion, health literacy, infants, children, and youth.

Sun Safety at Work (CAREX)

This working group is dedicated to improving sun safety in Canadian workplaces. They raise awareness and offering resources for sun exposure risks at work, and help integrate sun safety programs into occupational health and safety management systems.

Province-Wide Banning of Tanning Bed Use by Minors

People under 18 years of age have been prohibited from using tanning bed facilities, unless advised by a health care provider. Approved signage for this restriction must be made visible in all facilities, with a \$345 fine to be issued if regulations are not followed. The ban was developed in consultation with the Indoor Tanning Working Group.



PART 3 ACTIONABLE AREAS

INDIVIDUAL

- Increase data on up-to-date, evidence-based indicators to support the monitoring and evaluation of progress on sun-safe behaviours in British Columbia.
- Establish a comprehensive monitoring framework to assess sun safety policies and programs, gathering region-specific quantitative indicators on sun exposure, sun safety practices and indoor tanning behaviours.

COMMUNITY

- Strengthen sun safety education and practices for children and youth by integrating sun safety education into school curricula.
- Provide sun safety training for teachers and early childhood educators and increase provision of shade in childcare settings.

PUBLIC POLICY

- Collaborate with local and regional governments and outdoor recreational organizations to implement sun safety programs.
- Enhance existing measures such as shaded areas and sunscreen dispensers in public areas like parks, beaches, multi-use pathways, and sports fields.

REFERENCES

1. Government of British Columbia. *Health Impacts of Exposure to Ultraviolet (UV) Radiation*. <https://www2.gov.bc.ca/gov/content/health/keeping-bc-healthy-safe/radiation/ultraviolet-uv-radiation/health-impacts-of-exposure-to-ultraviolet-uv-radiation>
2. Andrews, H. (2012). Skin and sun awareness and skin cancer prevention. *British Journal of Healthcare Assistants*, 6(12), 582-588. <https://doi.org/10.12968/bjha.2012.6.12.582>
3. *Skin cancer*. (2023, August 11). Canada.ca. <https://www.canada.ca/en/public-health/services/sun-safety/skin-cancer.html>
4. Barber, K., Searles, G. E., Vender, R., Teoh, H., Ashkenas, J., & Canadian Non-melanoma Skin Cancer Guidelines Committee (2015). Non-melanoma Skin Cancer in Canada Chapter 2: Primary Prevention of Non-melanoma Skin Cancer. *Journal of cutaneous medicine and surgery*, 19(3), 216-226. <https://doi.org/10.1177/1203475415576465>
5. Buller, D. B., Andersen, P. A., Walkosz, B. J., Scott, M. D., Beck, L., & Cutter, G. R. (2016). Rationale, design, samples, and baseline sun protection in a randomized trial on a skin cancer prevention intervention in resort environments. *Contemporary clinical trials*, 46, 67-76. <https://doi.org/10.1016/j.cct.2015.11.015>
6. Moustaqim-Barrette A, Rijal H, Conte S, Maazi M, Hanna J, Kelly ASV, et al. (2025). Evaluating UV exposure and skin cancer prevention behaviours in Canada: a national population-based cross-sectional study. *BMJ Public Health*, 3:e001983. <https://doi.org/10.1136/bmjph-2024-001983>
7. ComPARe. (2015). *Compare study on preventable cancers in Canada*. Retrieved July 27, 2022, from <https://prevent.cancer.ca/>
8. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/pph-framework/bc_population_and_public_health_framework.pdf
9. Waller, B., Pichora, E., & Marrett, L. (2008). The Second National Sun Survey: Workshop report. *Chronic Diseases in Canada*, 29(1), 39-42.
10. CAREX Canada. *eWORK | CAREX Canada's occupational exposure estimates*. (2022, November 14). <https://www.carexcanada.ca/ework/>
11. Canadian Partnership Against Cancer. (2019). *UVR regulations in child care settings: Sun safety policies*. Accessed November 30, 2021. <https://www.partnershipagainstcancer.ca/topics/summary-of-evidence-informed-uvr-policy-adoption-by-local-governments-across-canada/>
12. *Artificial tanning devices: public health interventions to manage sunbeds*. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO. <https://iris.who.int/bitstream/handle/10665/255695/9789241512596-eng.pdf>
13. Statistics Canada. (2017). *Tanning equipment use: 2014 Canadian Community Health Survey*. <https://www150.statcan.gc.ca/n1/pub/82-003-x/2017001/article/14696-eng.htm>
14. *Report of the Indoor Tanning Working Group (ITWG) – December 9, 2011*. <https://www2.gov.bc.ca/assets/gov/health/keeping-bc-healthy-safe/pses/itwg-report.pdf>



CHAPTER 6

ENVIRONMENTAL EXPOSURES AND CANCER RISK

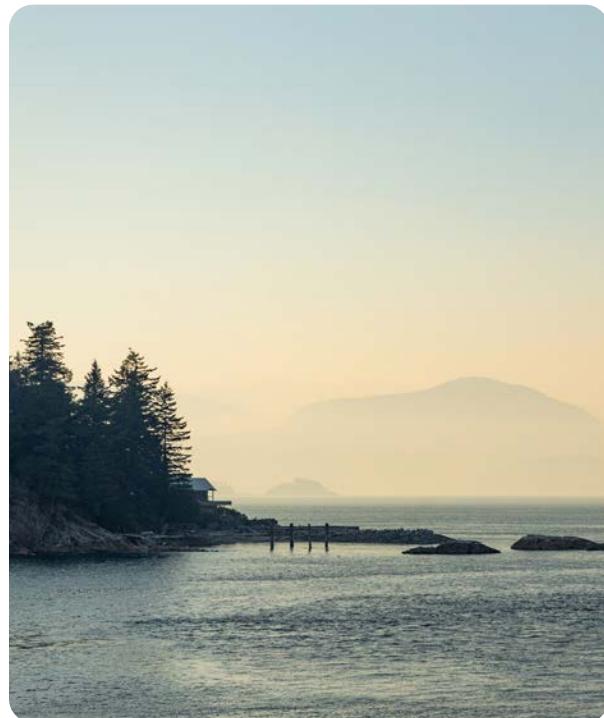
Part 1 Environmental Exposures and Cancer Risk

Part 2 Examples of Environmental Exposure Programs and Policies in British Columbia

Part 3 Actionable Areas

PART 1 ENVIRONMENTAL EXPOSURES AND CANCER RISK

Environmental exposure to carcinogens are present in outdoor and indoor air, water, and food¹.



This section covers radon found in indoor air, and fine particulate matter (PM_{2.5}) found in outdoor air pollution, which are both classified by the International Agency for Research on Cancer (IARC) as human carcinogens².

While other environmental carcinogens such as arsenic in food and water and environmental tobacco smoke also contribute to cancer risk, this chapter prioritizes radon and PM_{2.5} to provide a targeted examination of two leading air-based exposures impacting lung and other cancers in BC and Canada.

In Canada, outdoor air pollution, residential radon, and ultraviolet (UV) radiation combined are estimated to account for about 4% (7,500 cases) of cancers, and the burden from all environmental carcinogens is very likely to be higher than this³.

Further, estimates highlighted by Health Canada showcase that 16% of lung cancer deaths are attributable to radon⁴. Predictions suggest that bringing all residential radon exposures above Canadian policy guidelines (200 Bq/m³) to 50 Bq/m³ could prevent 2322 cumulative cancer cases between 2016 and 2042 in Canada⁵.

Radon, a colourless and odourless radioactive gas originating from soil and rocks, is the leading cause of lung cancer among people who do not smoke commercial tobacco⁶. People who smoke commercial tobacco are at even higher risk of lung cancer when exposed to radon⁶. Radon enters indoors through cracks, gaps, and building materials, and accumulates during prolonged periods of closed windows and doors, especially in winter.

Prolonged exposure to air pollution, consisting of particulate matter (PM_{2.5} and PM10), ground level ozone, carbon monoxide, sulphur dioxide, and nitrogen oxides, contributes to increased cancer risk⁷.

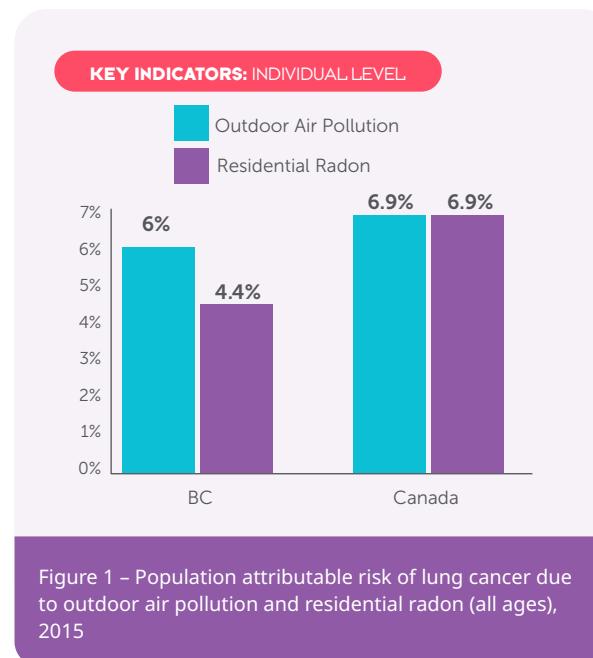
Fine particulate matter (PM_{2.5}) arises from both natural sources like volcanoes and wildfires, and human activities such as emissions from residential wood stoves, open burning, forestry operations, and transportation⁸.

Cancer risk associated with environmental exposures and the success of programs to reduce exposure to carcinogens in the environment are heavily influenced by health inequities, which are unfair, unjust, and preventable health disparities⁹.

Structural determinants, such as systemic racism, colonialism, discrimination, housing policies, and environmental regulations shape access to and engagement in opportunities. Social determinants, including income, education, employment, and housing, also act as upstream factors⁹. Together, these determinants of health ultimately impact exposure to environmental carcinogens.

What impact do environmental exposures have on cancer risk?

Quantitative Indicators of Cancer Risk Attributable to Air Pollution and Radon in BC



Source [ComPARe, 2015](#)



Table 1 – Number of lung cancer cases attributable to outdoor air pollution in 2015, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Lung	n/a	n/a	189

Table 2 – Percentage of lung cancer cases attributable (PAR) to outdoor air pollution in 2015, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Lung	n/a	n/a	6.0

Table 3 – Number of lung cancer cases attributable to residential radon in 2015, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (n)	Females (n)	Males and Females (n)
Lung	n/a	n/a	140

Table 4 – Percentage of lung cancer cases attributable (PAR) to residential radon in 2015, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Cancer Type	Males (%)	Females (%)	Males and Females (%)
Lung	n/a	n/a	4.4



Residential radon accounted for 4.4% of cancer cases in BC, lower than the national rate of 6.9%¹⁰.

The lower rate in BC may be due to the densely populated areas such as the Lower Mainland, where most residents live, being less likely to exceed Canadian radon guidelines. In contrast, homes in the less populated Interior region are known to have higher radon levels.

The BCCDC Radon Map provides data on indoor radon exposure levels and homes tested above the minimum guideline. Outdoor air pollution contributed to 6% of cancer cases in BC, slightly lower than the Canadian average of 6.9%¹⁰. The Air Quality Health Index (AQHI) for BC offers up-to-date air quality readings and associated levels of health risk. Wildfires can introduce carcinogens to indoor and outdoor environments, but current knowledge on the resulting impact on cancer risk is limited. Some evidence suggests a small increase in lung cancer and brain tumour risk associated with wildfire exposure¹¹.

Many other environmental carcinogens are present in BC; CAREX Canada provides estimates of the number of British Columbians exposed to a list of known and suspected carcinogens in community environments¹². These include the carcinogens already mentioned, but also diesel engine exhaust, asbestos, several pesticides, and many others.

How does BC measure in terms of monitoring environmental exposures?

Quantitative Indicators of Air Pollution and Radon Monitoring in BC

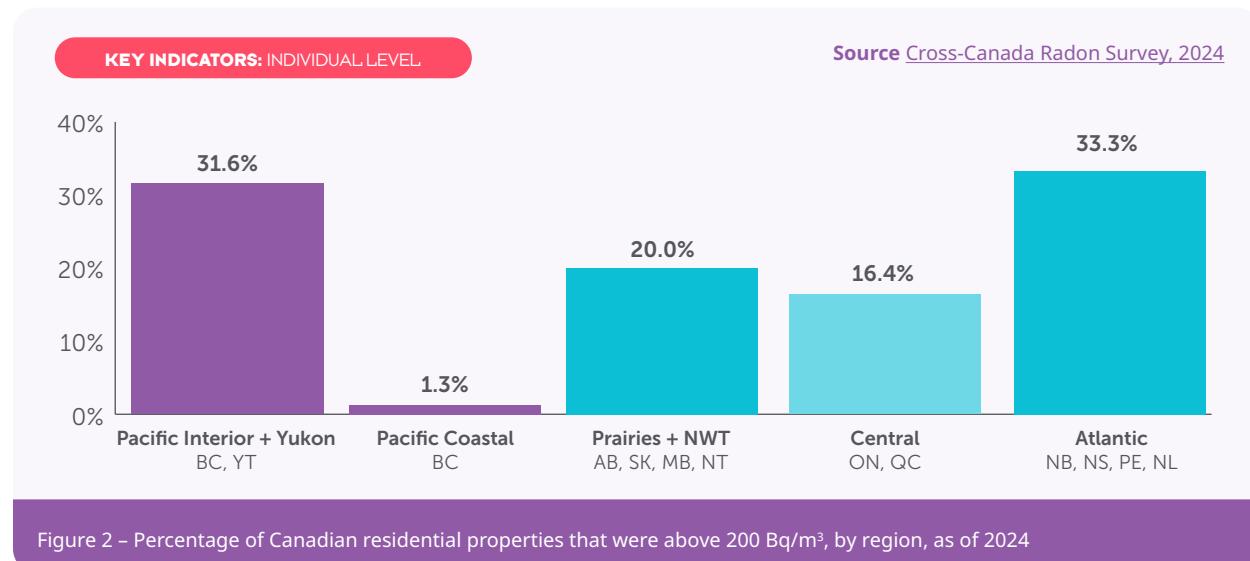
Radon in Homes

The WHO (2009) recommends improving indoor ventilation, reducing negative pressures in buildings to prevent radon inflow, and implementing national awareness and mitigation programs¹³. While there is no safe radon concentration, guidelines can help identify higher risk buildings. The Canadian guideline for radon is 200 becquerels per cubic metre of air (Bq/m³)¹⁴.

According to the 2024 Cross-Canada Radon Survey, approximately one in five Canadian homes (17.8%) have radon levels at or above the 200 Bq/m³ guideline, and 42% exceed the World Health Organization-recommended reference level of 100

Bq/m³⁽¹⁵⁾. Within BC, about one in three homes in the Pacific Interior and Yukon region had radon concentrations at or above 200 Bq/m³, with an average radon level of 126.9 Bq/m³—the highest in the country¹⁵. The Pacific Coastal region, including the Lower Mainland, Sunshine Coast, and Vancouver Island, had an average radon level of 20.4 Bq/m³, the lowest level observed nationally¹⁵.

It is important to note that comparing BC radon concentrations to those of other provinces does not reflect the significant variation within the province itself. Certain regions, notably the Interior and North, exhibit naturally elevated surface levels of radon due to geological factors¹⁶.



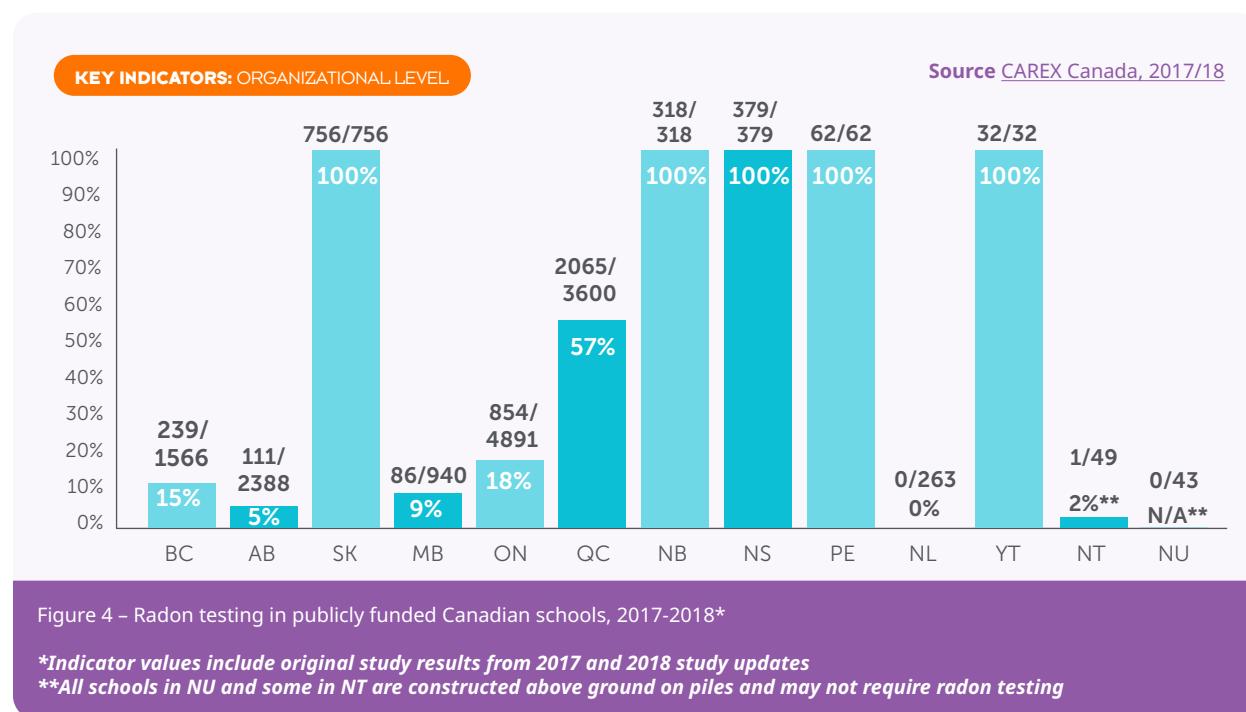
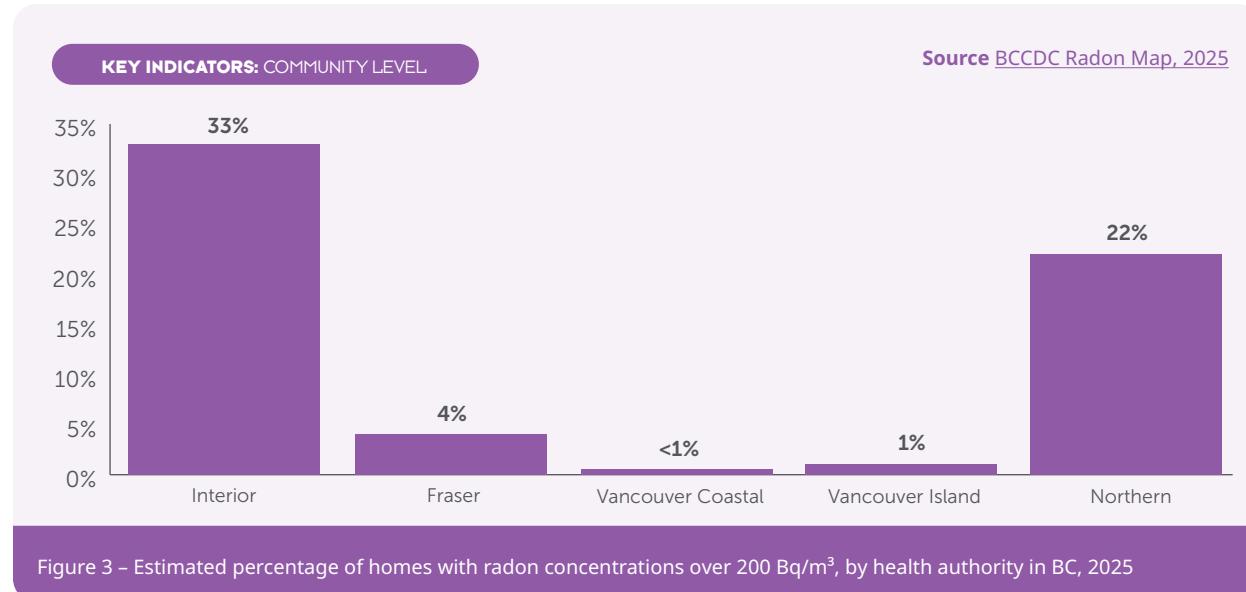
The BCCDC Radon Map displays indoor radon levels in homes across the province and estimates for the increase in lung cancer risk due to radon¹⁶.

This map utilizes data from the BC Radon Data Repository, offering detailed summary statistics by health area in BC¹⁷.



Radon in Schools

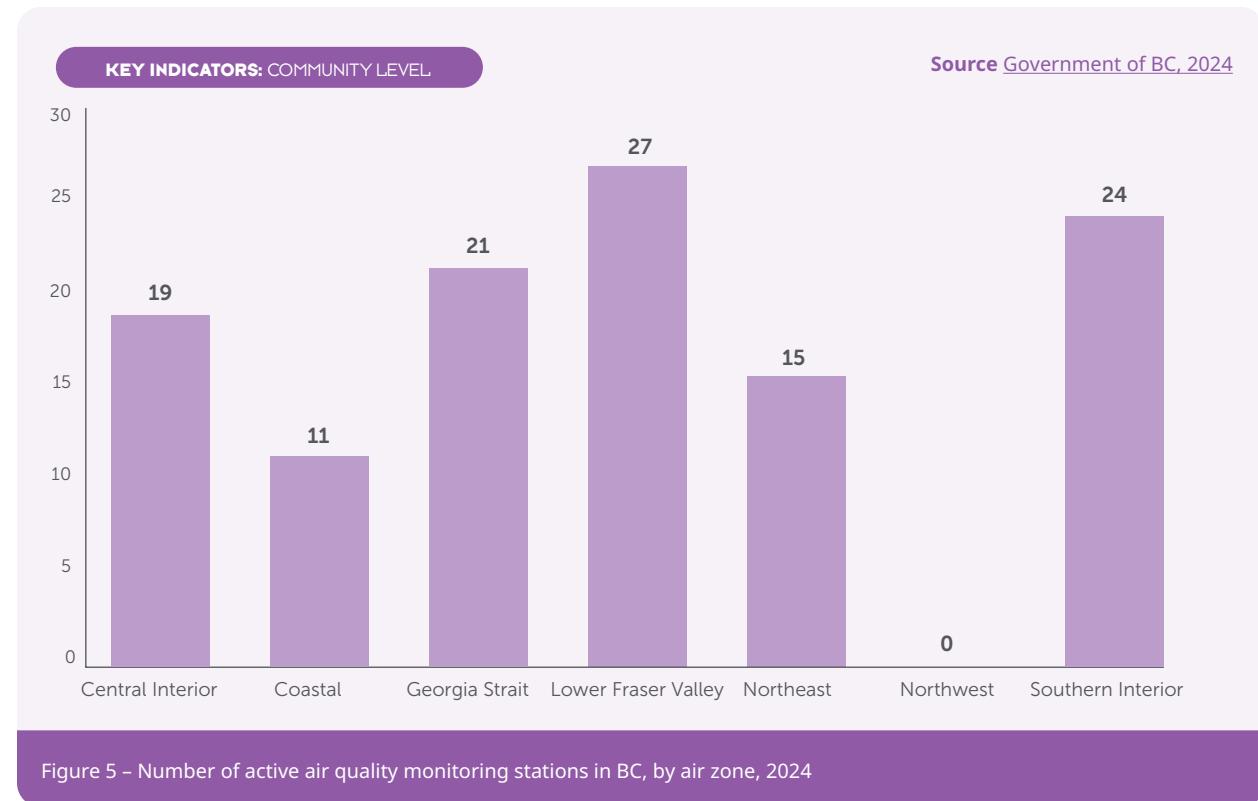
The British Columbia Teachers' Federation (BCTF) and its Health and Safety Committee advocate for radon testing in schools, such as through the development of a radon testing webinar¹⁸. While schools are not currently required to report radon levels, a study on radon testing efforts in schools found that, based on response rates, BC, AB, MB, ON, and NL had low rates of radon testing in schools, with BC ranking fifth lowest. BC has since increased testing, testing an additional 106 schools (totaling 239) in 2018. However, as of 2017, BC lacks a province-wide program for school testing. While most school districts in BC that reported testing had radon levels below 200 Bq/m³, only 8% of public schools had tested for radon, 18% had not, and 73% were unreported or data was unknown¹⁹.



Air Pollution (Fine Particulate Matter)

The Canadian Ambient Air Quality Standard (CAAQS) for PM_{2.5} include an annual average limit (8.8 µg/ m³) and a 24-hour (27 µg/m³) limit, meaning that the CAAQS are achieved when PM_{2.5} levels are kept below these limits²⁰.

BC operates an air monitoring network of tracking stations measuring PM_{2.5} and other pollutants. The National Air Pollution Surveillance (NAPS) Program plays a significant role in monitoring and assessment, as it is the primary source of ambient air quality data in Canada²¹. It consists of approximately 260 monitoring stations in 15 rural and urban communities across Canada, and collaborates with provincial, territorial, and regional governments to develop resources such as the AQHI, Canadian Environmental Sustainability Indicators (CESI) and others.



Between 2020 and 2022, fine particulate matter levels met both the annual and 24-hour metrics for CAAQS at 60% of BC monitoring stations that were assessed²⁰.

Four out of seven air zones (Coastal, Georgia Strait, Northeast, and Lower Fraser Valley) recorded fine particulate matter levels within the limits set by CAAQS for both daily and annual averages²⁰.

Annual and daily metrics are adjusted for transboundary flows (flow of pollutants occurring between countries, and as a result of international shipping) and events like wildfires. Wildfires are typically the main source of transboundary flows and exceptional events in BC. Between 2020 and 2022, 52 stations recorded days during wildfire season (May-October) where fine particulate matter levels, influenced by wildfire smoke, exceeded the 24-hour standard²⁰. Notably, the Northwest air zone lacks monitoring stations.



Table 5 – Assigned air quality management level, based on the highest PM_{2.5} metric value reported per monitoring station in BC, by air zone, 2020-2022

KEY INDICATORS: PUBLIC POLICY LEVEL		BC Air Zone**						
Air Zone Management Level*		Central Interior	Coastal	Georgia Strait	Lower Fraser Valley	North-east	North-west	Southern Interior
LOWEST Action for keeping clean areas clean								
2nd LOWEST Actions for preventing air quality deterioration			✓		✓	✓		
2nd HIGHEST Actions for preventing Canadians Ambient Air Quality Standard exceedance				✓				Currently no air quality monitoring stations
HIGHEST Actions for achieving air zone Canadian Ambient Air Quality Standard	✓							✓

*Management levels for PM_{2.5} based on 2022 data are:

Red: PM_{2.5} 24 hour = > 27 µg/m³, PM_{2.5} Annual = > 8.8 µg/m³

Orange: PM_{2.5} 24 hour = 20 to 27 µg/m³, Annual = 6.5 to 8.8 µg/m³

Yellow: PM_{2.5} 24 hour = 11 to 19 µg/m³, Annual = 4.1 to 6.4 µg/m³

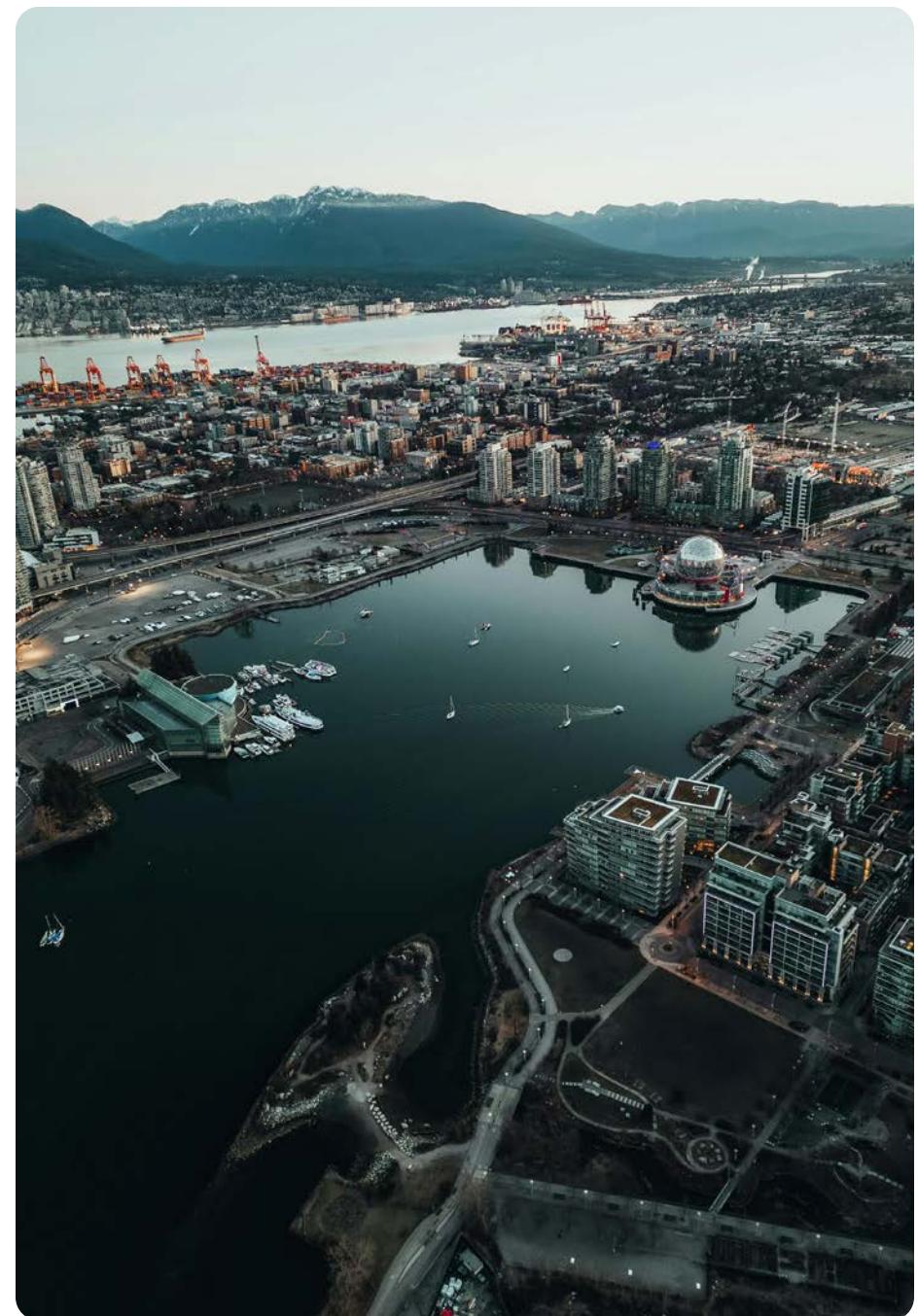
Green: PM_{2.5} 24 hour = ≤ 10 µg/m³, Annual = ≤ 4.0 µg/m³

**Air zones are areas with similar air quality characteristics, issues, and/or trends.

Health equity considerations of environmental exposure

Health inequities, driven by structural determinants like systemic racism, colonialism, and housing policies shape access to resources and opportunities, ultimately influencing exposure to environmental carcinogens.

Equity-deserving communities are often disproportionately affected by environmental carcinogens, such as air pollution and radon, due to inequitable housing policies and insufficient environmental protections. Effective cancer prevention requires addressing these structural determinants through equity-focused policies that enforce environmental protections, remedy issues in high-risk areas, and ensure all communities are safe from harmful exposures. This includes zoning and planning housing developments to minimize exposure to air pollution, noise and radon, and incorporating thoughtful planning and building design to mitigate these risks.



PART 2 EXAMPLES OF ENVIRONMENTAL EXPOSURE PROGRAMS AND POLICIES IN BRITISH COLUMBIA

INDIVIDUAL

- [Air Quality Health Index](#)
- [BCCDC Wildfire Smoke](#)
- [BC Radon Map](#)
- [Home Radon Test Kits](#)
- [Evict Radon – A Canadian Cancer Prevention Study](#)

INTERPERSONAL

- [HealthLink BC Child Safety – Air Pollution](#)
- [Radon: A Guide for Renters](#)

ORGANIZATIONAL

- [WorkSafeBC – Indoor Air Quality: A Guide for Building Owners, Managers, and Occupants](#)
- [Take Action on Radon School Resources](#)
- [Radon in BC: Employers' Duties Worker Strategies and WorkSafeBC Policies](#)

COMMUNITY

- [Community Wood Smoke Reduction Program](#)
- [Radon Detector Library Lending Program](#)

PUBLIC POLICY

- [Provincial Air Quality Objectives and Standards](#)
- [Health Canada Indoor Air Quality Resources for Professionals](#)
- [BCCDC Healthy Built Environment Linkages Toolkit](#)
- [BC Building Code: Radon Provisions](#)



INDIVIDUAL LEVEL

Air Quality Health Index (AQHI)

The AQHI offers hourly air quality readings and health risk assessments for pollutants like particulate matter, ozone, and nitrogen dioxide. It shows the level of health risk with a number and colour scale from 1-10+, labelling the health risk as low (1-3), moderate (4-6), high (7-10), or very high (over 10). The AQHI is available for 80% of BC's population in 25 communities. To account for elevated smoke concentrations from events such as wildfires, BC improved the accuracy of reported health risk from smoke with an adjustment called AQHI-Plus, adopted in 2021.

BCCDC Wildfire Smoke Fact Sheets

The BCCDC provides downloadable resources outlining the impact of wildfire smoke on health. Resources include guidance on preparedness, outdoor exercise during wildfire season, and the use of face masks. Translated resources are accessible.

BCCDC British Columbia Radon Map

An interactive map showcasing indoor radon levels and associated lung cancer risk estimates for both people who smoke and those who do not. Data is sourced from the British Columbia Radon Data Repository (BCRDR), covering various building types beyond residential spaces.

Home Radon Test Kits

Kits are available for purchase online, with options for both long-term and short-term testing. Long-term test kits are recommended for a more accurate measurement of average radon levels over time. Short-term testing can sometimes detect seriously high levels that may prompt immediate action to reduce exposure. However, a low short-term test should be interpreted with caution, and always confirmed by a long-term test (minimum 91 days) during the cold season. Various health organizations conduct awareness campaigns and free testing initiatives, like the [100 Radon Test Kit Challenge](#) by Take Action on Radon.



INDIVIDUAL LEVEL

Evict Radon: A Canadian Cancer Prevention Study

Evict Radon is a publicly funded national study examining the link between Canadian radon exposure and lung cancers, and how to prevent it. The study provides enrolled participants at-cost radon test kits, raises awareness about the dangers of radon through the Cross Canada Radon Survey, and offers education on preventative measures and tools to help protect against radon.

INTERPERSONAL LEVEL

HealthLink BC Child Safety: Air Pollution

An online resource guiding parents on safeguarding children against air pollution. It offers advice on outdoor physical activity and utilizing the AQHI for risk assessment.

Radon: A Guide for Renters

Endorsed by the Tenants Resource and Advisory Centre (TRAC), this guide by the BC Lung Foundation outlines renter rights and landlord obligations regarding radon testing and mitigation. It describes steps that landlords and renters can take if levels are over the Canadian guideline.



ORGANIZATIONAL LEVEL

[WorkSafeBC Indoor Air Quality: A Guide for Building Owners, Managers, and Occupants](#)

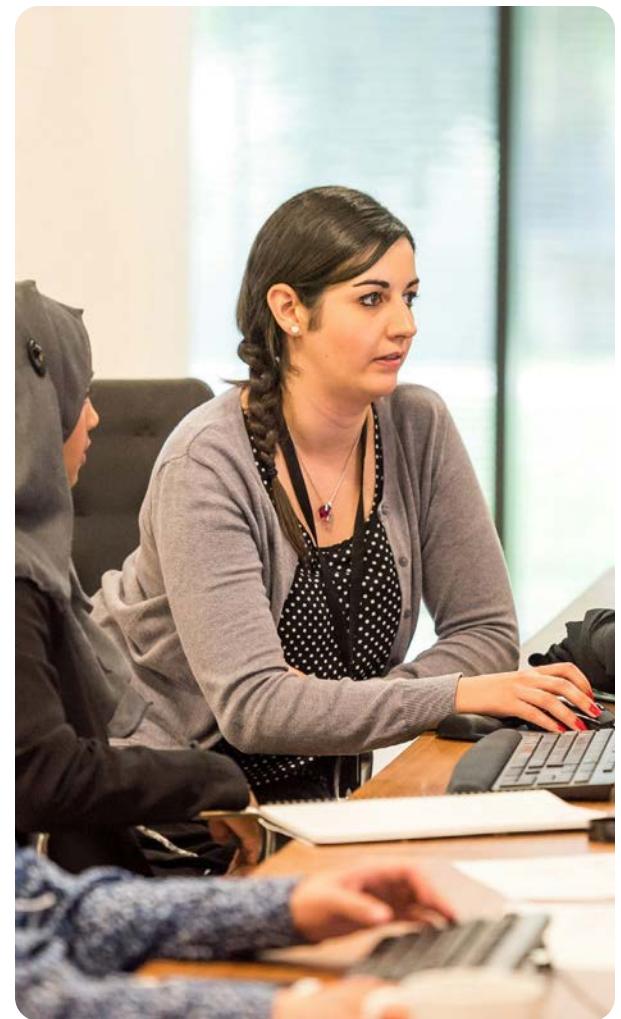
Intended for owners, managers and operators of buildings and facilities in BC, this resource provides guidance on how to maintain good air quality and prevent or correct indoor air quality issues in buildings. It also includes forms and checklists to document reported air quality issues, ventilation inspections, and walk-through evaluations.

[Take Action on Radon School Resources](#)

Take Action on Radon provides event materials and supports engagement initiatives for radon mitigation in schools. Outreach activities included the [Student Radon Skill Testing Contest](#) completed in 2024, that was held by BC Lung and Interior Health. It was available to all students in the region from grades 4-12. As well, the British Columbia Teachers' Federation (BCTF) has collaborated with CAREX Canada to develop webinars on radon testing in schools.

[Radon in BC: Employers' Duties Worker Strategies and WorkSafeBC Policies](#)

This report by the BC Lung Foundation offers insights into radon exposure at workplaces, worker exposure levels, and legal limits of exposure. It also includes recommendations for how WorkSafeBC can improve their policies for testing and mitigation within workplaces.



COMMUNITY LEVEL

Community Wood Smoke Reduction Program

Formerly called the Wood Stove Exchange Program (WSEP), the program aims to swap old wood stoves for cleaner options, educate on proper burning practices, and raise awareness about wood smoke effects. Over 10,000 stoves have been replaced since 2008, reducing approximately 300 tonnes of particulate matter annually across 20 programs, in partnership with regional districts and municipalities. The program provides incentives for replacing old wood stoves, support for educational initiatives, and funding for local administration and promotion in communities.

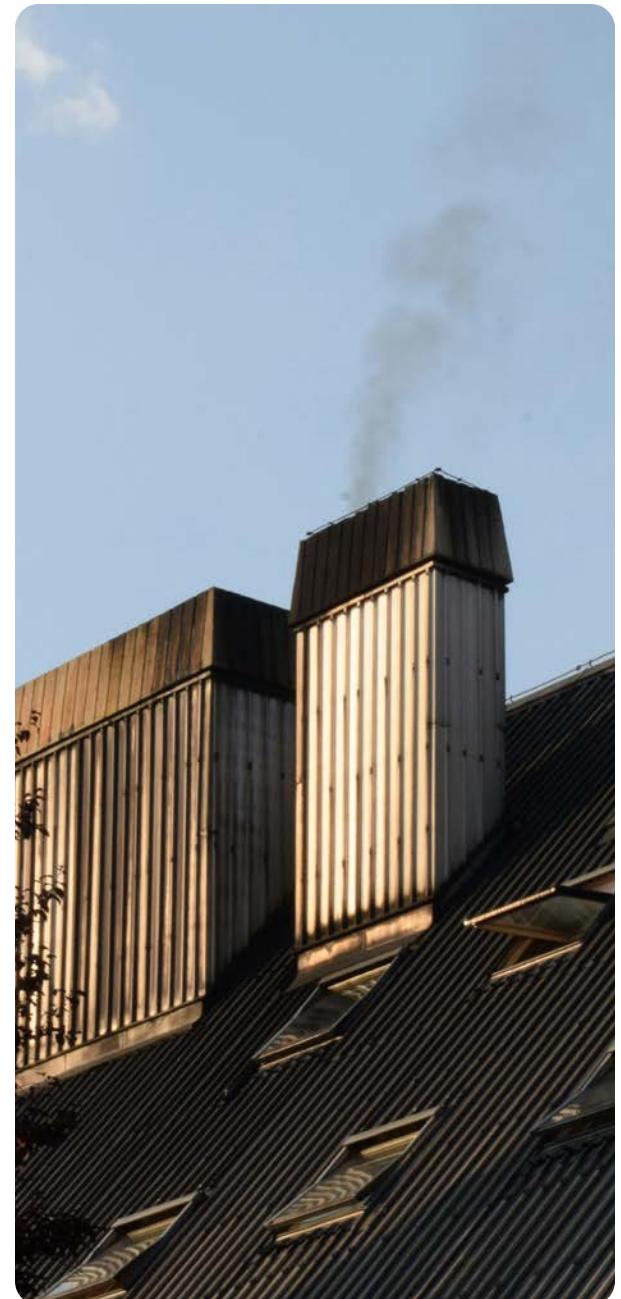
Radon Detector Library Lending Program

The program allows borrowing of digital continuous radon monitor (CRM) units from local libraries for free. It currently operates in several regions in BC (North Shore/ Sunshine Coast/ Sea-to-Sky Region, the Kootenay Region, the Okanagan Region, the Thompson-Nicola Region, and Coquitlam). Health Canada is piloting a discount code program to encourage patrons to purchase long-term CRM units at a reduced price.

PUBLIC POLICY LEVEL

Provincial Air Quality Objectives and Standards

Air quality objectives are non-statutory limits of the acceptable concentration of air contaminates, aimed at protecting human health and the environment. BC has adopted air quality objectives and standards for Particulate Matter (PM_{10} and $PM_{2.5}$), ozone, sulphur dioxide, nitrogen dioxide, carbon monoxide and formaldehyde. These criteria help evaluate current conditions, support environmental impact assessments, inform regulatory development, and shape airshed planning and advisory actions.

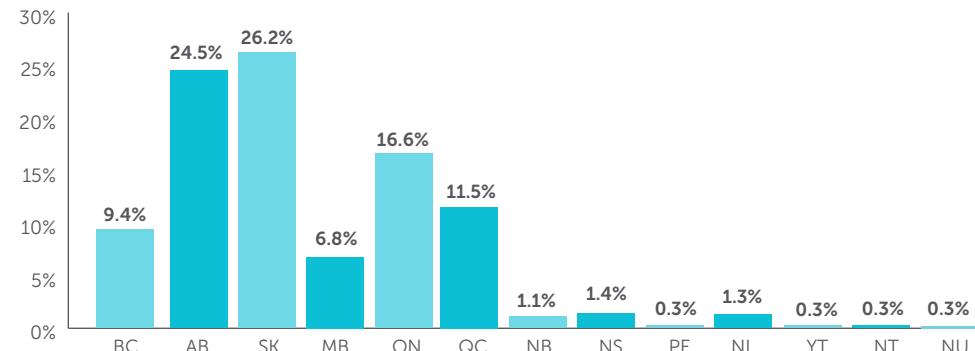


PUBLIC POLICY LEVEL

Health Canada Indoor Air Quality Resources for Professionals

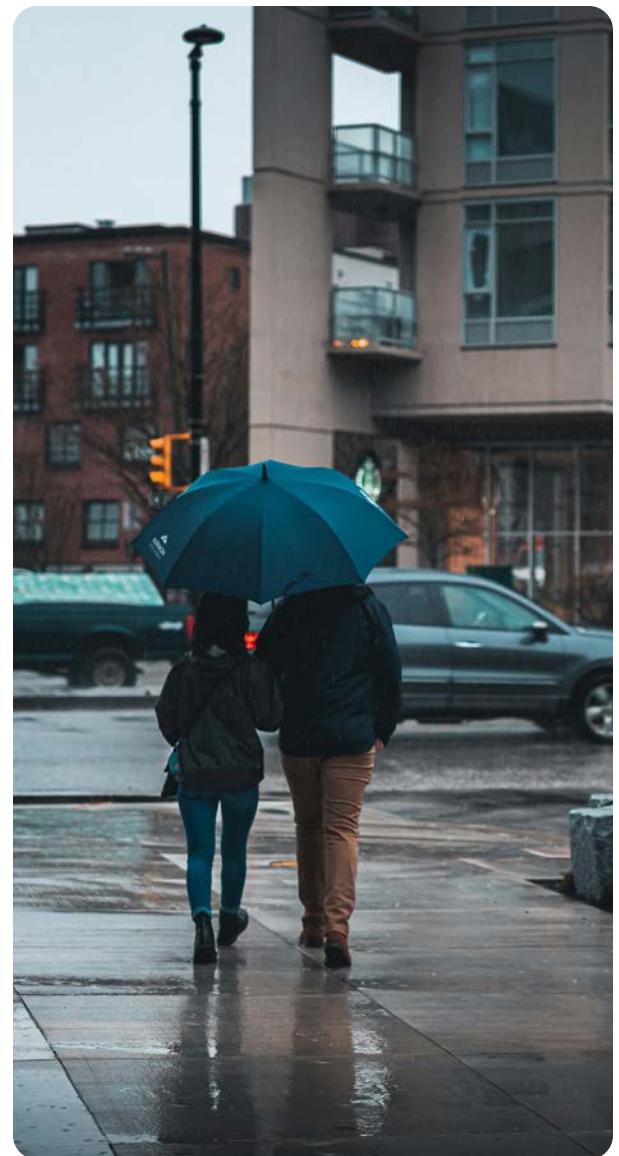
Health Canada provides guiding documents aimed at local jurisdictions, public policymakers, and workers looking to improve air quality in non-residential (public) indoor spaces. Examples of resources include guidance for cleaner air spaces during wildfire smoke events, and best practices for improving air quality in ice arenas. Additional resources on how to effectively use ventilation to protect indoor air quality is also available.

KEY INDICATORS: PUBLIC POLICY LEVEL



Source [Environmental and Climate Change Canada, 2023](#)

Figure 6 – Distribution of PM_{2.5} air pollutant emissions among provinces and territories (as a percentage of national emissions), 2023 *Note: The indicator reports emissions of six key air pollutants from human activities only. It does not include emissions from natural sources such as forest fires and from vegetation. Emissions from black carbon, a component of PM_{2.5}, are also not included. Consult the black carbon section for a detailed analysis of the pollutant.



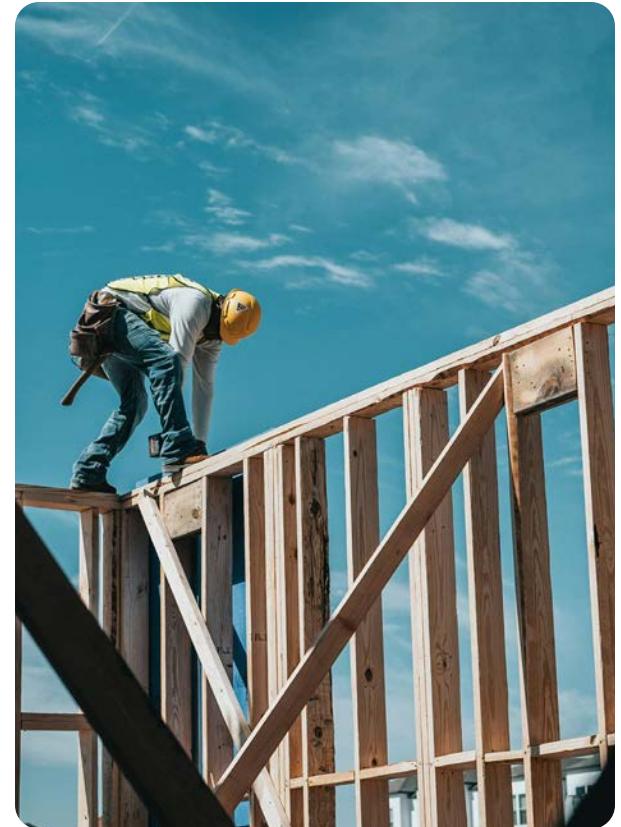
PUBLIC POLICY LEVEL

BCCDC Healthy Built Environment Linkages Toolkit

The toolkit outlines how neighbourhood design, transportation networks, natural environments, food systems, and housing influence outcomes related to social well-being, economic co-benefits, and communities of various sizes in BC²². It includes community planning and design recommendations for reducing environmental hazard exposures²².

BC Building Code: Radon Provisions

Effective March 2024, the BC Building Code introduces mandatory province-wide “rough-in” requirements for radon mitigation (subfloor depressurization) systems in all new single family and low-rise residential buildings. Under the new standards, builders must install a gas-permeable layer beneath the foundation and provide a radon vent pipe to allow for future active mitigation, if needed²³. This change eliminates previous regional exemptions for radon rough-ins, and aligns BC's requirements with the National Building Code of Canada, ensuring all small residential buildings include provisions for radon mitigation²³.



PART 3 ACTIONABLE AREAS

INTERPERSONAL

- Sustain public awareness efforts on radon and fine particulate matter risks.
- Promote informative resources such as fact sheets and multimedia tools to educate people, families, and communities about specific health risks and protective measures.

COMMUNITY

- Expand air monitoring coverage, focusing on under-resourced regions like the Northwest.
- Strengthen community programs to minimize fine particulate matter emissions and reduce air pollution sources.

ORGANIZATIONAL

- Develop province-wide radon testing and mitigation programs for schools, homes, workplaces, and leisure indoor environments, particularly in areas with naturally higher radon levels like the Interior and North.
- Prioritize increasing testing rates in schools to protect staff and students' health.

PUBLIC POLICY

- Allocate resources for research and evaluation of environmental exposures and key indicators to better understand the impact of cancer risks.
- Investigate links, like wildfire exposure and cancer incidence, to guide future policies and interventions.
- Utilize evidence linking environmental exposures and cancer risk to develop strategies and partnerships to prevent exposure, support earlier diagnosis, and decreasing barriers to testing, such as radon testing in basement rental suites²⁴.

REFERENCES

1. Setton, E., Hystad, P., Poplawski, K., Cheasley, R., Cervantes-Larios, A., Keller, C. P., & Demers, P. A. (2013). Risk-based indicators of Canadians' exposures to environmental carcinogens. *Environmental health: a global access science source*, 12, 15. <https://doi.org/10.1186/1476-069X-12-15>
2. CAREX Canada. (2022, May 26). *Carcinogen Profiles & Estimates - CAREX Canada*. <https://www.carexcanada.ca/carcinogen-profiles/>
3. Poirier, A. E., Ruan, Y., Volesky, K. D., King, W. D., O'Sullivan, D. E., Gogna, P., Walter, S. D., Villeneuve, P. J., Friedenreich, C. M., Brenner, D. R., & ComPARe Study Team (2019). The current and future burden of cancer attributable to modifiable risk factors in Canada: Summary of results. *Preventive medicine*, 122, 140-147. <https://doi.org/10.1016/j.ypmed.2019.04.007>
4. Chen, J., Moir, D., & Whyte, J. (2012). Canadian population risk of radon induced lung cancer: a re-assessment based on the recent cross-Canada radon survey. *Radiation protection dosimetry*, 152(1-3), 9-13. <https://doi.org/10.1093/rpd/ncs147>
5. Gogna, P., Narain, T. A., O'Sullivan, D. E., Villeneuve, P. J., Demers, P. A., Hystad, P., Brenner, D. R., Friedenreich, C. M., King, W. D., & ComPARe Study Team (2019). Estimates of the current and future burden of lung cancer attributable to residential radon exposure in Canada. *Preventive medicine*, 122, 100-108. <https://doi.org/10.1016/j.ypmed.2019.04.005>
6. CAREX Canada. (2023, January 24). *Radon - CAREX Canada*. <https://www.carexcanada.ca/profile/radon/>
7. Pader, J., Ruan, Y., Poirier, A. E., Asakawa, K., Lu, C., Memon, S., Miller, A., Walter, S., Villeneuve, P. J., King, W. D., Volesky, K. D., Smith, L., De, P., Friedenreich, C. M., & Brenner, D. R. (2021). Estimates of future cancer mortality attributable to modifiable risk factors in Canada. *Canadian Journal of Public Health*, 112(6), 1069-1082. <https://doi.org/10.17269/s41997-020-00455-7>
8. Environmental Reporting BC. (2024). *Status of Fine Particulate Matter in B.C. (2019-2021)*. State of Environment Reporting, Ministry of Environment and Climate Change Strategy, British Columbia, Canada. <https://www.env.gov.bc.ca/soe/indicators/air/fine-pm.html>
9. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/pph-framework/bc_population_and_public_health_framework.pdf
10. ComPARe. (2015). *Compare study on preventable cancers in Canada*. Retrieved July 27, 2022, from <https://prevent.cancer.ca/>
11. Korsiak, J., Pinault, L., Christidis, T., Burnett, R. T., Abrahamowicz, M., & Weichenthal, S. (2022). Long-term exposure to wildfires and cancer incidence in Canada: a population-based observational cohort study. *The Lancet. Planetary health*, 6(5), e400-e409. [https://doi.org/10.1016/S2542-5196\(22\)00067-5](https://doi.org/10.1016/S2542-5196(22)00067-5)
12. CAREX Canada. (2022, May 26). *Carcinogen Profiles & Estimates - CAREX Canada*. <https://www.carexcanada.ca/carcinogen-profiles/>
13. Espina, C., Porta, M., Schüz, J., et al. (2013). Environmental and occupational interventions for primary prevention of cancer: a cross-sectoral policy framework. *Environmental health perspectives*, 121(4), 420-426. <https://ehp.niehs.nih.gov/doi/10.1289/ehp.1205897>
14. Health Canada. (2009, November 24). *Radon guideline*. <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/government-canada-radon-guideline.html>

REFERENCES

15. Cross-Canada Survey of Radon working group: a collaboration between the Evict Radon National Study, BC Centre for Disease Control and Health Canada. (2024). *Cross-Canada Survey of Radon Exposure in the Residential Buildings of Urban and Rural Communities*. Canada. Cross Canada Radon Survey. 2024. Version 1.1. Available at: www.crosscanadaradon.ca.
16. BC Centre for Disease Control. (n.d.) *Radon*. <http://www.bccdc.ca/health-info/prevention-public-health/radon>
17. BC Centre for Disease Control. (2021). *The BC Radon Data Repository (BCRDR): Developing a provincially integrated database*. www.bccdc.ca/Health-Info-Site/Documents/BCRDR_HC_report.pdf
18. CAREX Canada. (2021, September 4). *Radon In Buildings - CAREX Resources on Exposure*. <https://www.carexcanada.ca/special-topics/radon-in-buildings/>
19. Shergill, S., Forsman-Phillips, L., & Nicol, A. M. (2021). Radon in Schools: A Review of Radon Testing Efforts in Canadian Schools. *International journal of environmental research and public health*, 18(10), 5469. <https://doi.org/10.3390/ijerph18105469>
20. Environmental Reporting BC. (2025). *Status of Fine Particulate Matter in B.C. (2020-2022)*. State of Environment Reporting, Ministry of Environment and Climate Change Strategy, British Columbia, Canada. <https://www.env.gov.bc.ca/soe/indicators/air/fine-pm.html>
21. National Air Pollution Surveillance (NAPS) Program - Open Government Portal. (n.d.). <https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b>
22. BC Centre for Disease Control. (2018). *Healthy Built Environment Linkages Toolkit: making the links between design, planning and health, Version 2.0*. Vancouver, B.C. Provincial Health Services Authority. http://www.bccdc.ca/pop-public-health/Documents/HBE_linkages_toolkit_2018-compressed.pdf
23. Government of British Columbia. (2024, March 8). *Radon Rough-in Requirements. Information Bulletin*. Building and Safety Standards Branch. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/bulletins/2024-code/b24-03_radon.pdf
24. Government of British Columbia. (2024, July 26). *Small-scale, multi-unit housing*. Province of British Columbia. <https://www2.gov.bc.ca/gov/content/housing-tenancy/local-governments-and-housing/housing-initiatives/small-scale-multi-unit-housing>



CHAPTER 7

OCCUPATIONAL EXPOSURES AND CANCER RISK

Part 1 Occupational Exposures and Cancer Risk

Part 2 Examples of Occupational Exposures
Programs and Policies in British Columbia

Part 3 Actionable Areas

PART 1 OCCUPATIONAL EXPOSURES AND CANCER RISK

Canadians spend a significant portion of their waking hours at work, making workplaces crucial for addressing cancer prevention.

Work-related exposures tend to be higher than those in the general environment, contributing to the cancer burden in Canada¹.

CAREX Canada has developed estimates of the prevalence of exposure to 51 known and suspected carcinogens in occupational settings, including workplace exposure levels for 23 of these agents^{2,3}. The agents included in the analysis were selected based on their availability and the practicality of assessing them in Canadian workplaces.

Annually, an estimated 10,000 cancer cases in Canada result from exposure to workplace carcinogens⁴. Among these, solar UV radiation, asbestos, night shift work, crystalline silica, and diesel engine exhaust contribute to the highest burden of cancer⁴. In 2011, occupational exposures accounted for between 3.9% and 4.2% of all incident cancers in Canada, such as the skin, lungs, breast, and bladder¹.

Cancer risk associated with occupational exposures and the success of programs to reduce workplace carcinogen exposure are heavily influenced by health inequities, which are unfair and unjust health disparities⁵.

Structural determinants, such as systemic racism, colonialism, discrimination, labour policies, and workplace safety standards shape access to and engagement in opportunities. Social determinants, including income, job security, and working conditions, also act as upstream factors⁵. Together, these determinants of health ultimately impact occupational cancer risks.



What impact do occupational exposures have on cancer risk?

Quantitative Indicators of Cancer Risk Attributable to Occupational Exposures in BC

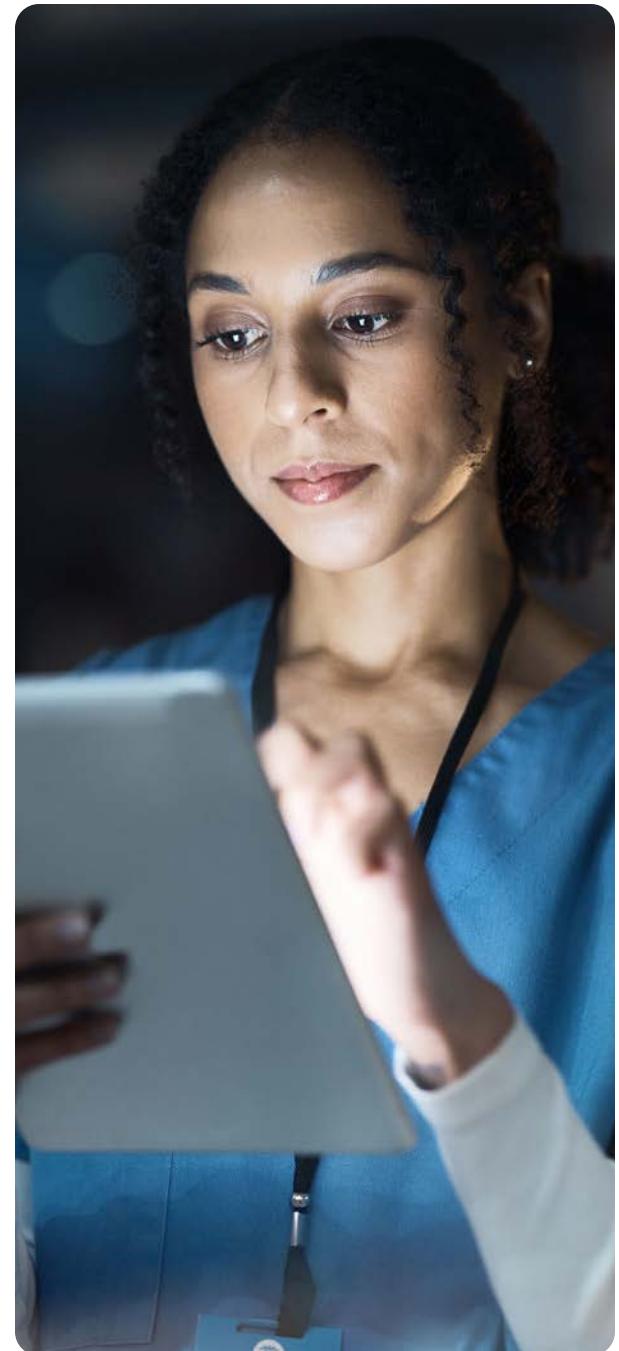
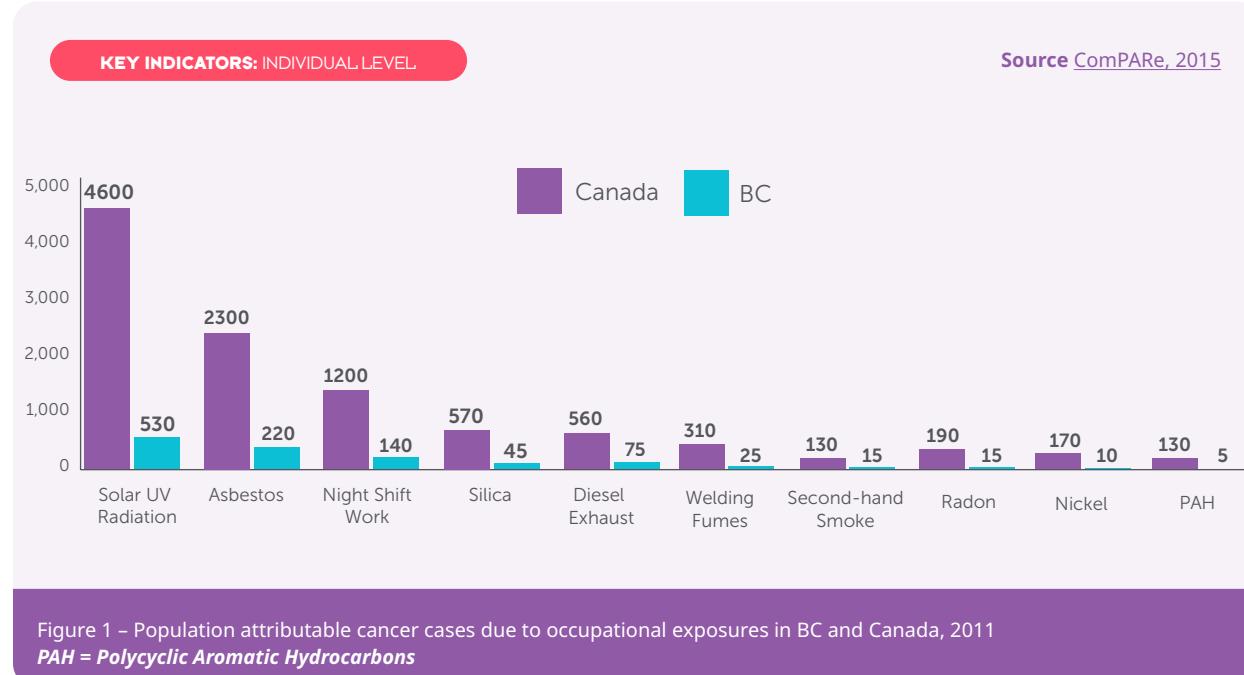


Table 1 – Number of cancer cases attributable to various occupational exposure risks in 2011, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Risk Factor	Cancer Type	Males (n)	Females (n)	Males and Females (n)
Solar UV Radiation	Non-Melanoma Skin	n/a	n/a	530
Asbestos	Lung	n/a	n/a	180
Asbestos	Mesothelioma	n/a	n/a	40
Shift Work	Breast	n/a	n/a	60–140
Diesel Engine Exhaust	Lung	n/a	n/a	50
Diesel Engine Exhaust	Bladder	n/a	n/a	25
Silica	Lung	n/a	n/a	45
Welding Fumes	Lung	n/a	n/a	25
Residential Radon	Lung	n/a	n/a	15
Environmental Second-Hand Smoke	Lung	n/a	n/a	15
Nickel	Lung	n/a	n/a	10
Polycyclic Aromatic Hydrocarbons (PAH)	Lung	n/a	n/a	5

Table 2 – Percentage of cancer cases attributable (PAR) to various occupational exposure risks in 2011, by cancer site, in BC (all ages)

KEY INDICATORS: INDIVIDUAL LEVEL

Source [ComPARe, 2015](#)

Risk Factor	Cancer Type	Males (%)	Females (%)	Males and Females (%)
Solar UV Radiation	Non-Melanoma Skin	n/a	n/a	5.2
Asbestos	Lung	n/a	n/a	6.4
Asbestos	Mesothelioma	n/a	n/a	88.9
Shift Work	Breast	n/a	n/a	1.7-4.4
Diesel Engine Exhaust	Lung	n/a	n/a	1.8
Diesel Engine Exhaust	Bladder	n/a	n/a	2.2
Silica	Lung	n/a	n/a	1.7
Welding Fumes	Lung	n/a	n/a	0.9
Residential Radon	Lung	n/a	n/a	0.6
Environmental Second-Hand Smoke	Lung	n/a	n/a	0.6
Nickel	Lung	n/a	n/a	0.4
Polycyclic Aromatic Hydrocarbons (PAH)	Lung	n/a	n/a	0.3

How does BC compare in terms of occupational exposures?

Quantitative Indicators of Occupational Exposures in BC

In BC, the most prevalent occupational exposures include solar UV radiation, night shift work, gasoline and diesel engine exhausts, polycyclic aromatic hydrocarbons (PAHs), crystalline silica, wood dust, second-hand smoke, benzene, and welding fumes³. The industries with the highest number of workers exposed to carcinogens are construction, transportation and warehousing, and manufacturing³. Specifically, solar UV radiation, night shift work, and engine exhausts are common exposures in agriculture, trades, construction, and manufacturing industries in BC^{6,7,8}.



KEY INDICATORS: INDIVIDUAL LEVEL

Canada BC

Source [CAREX Canada, 2022](#)

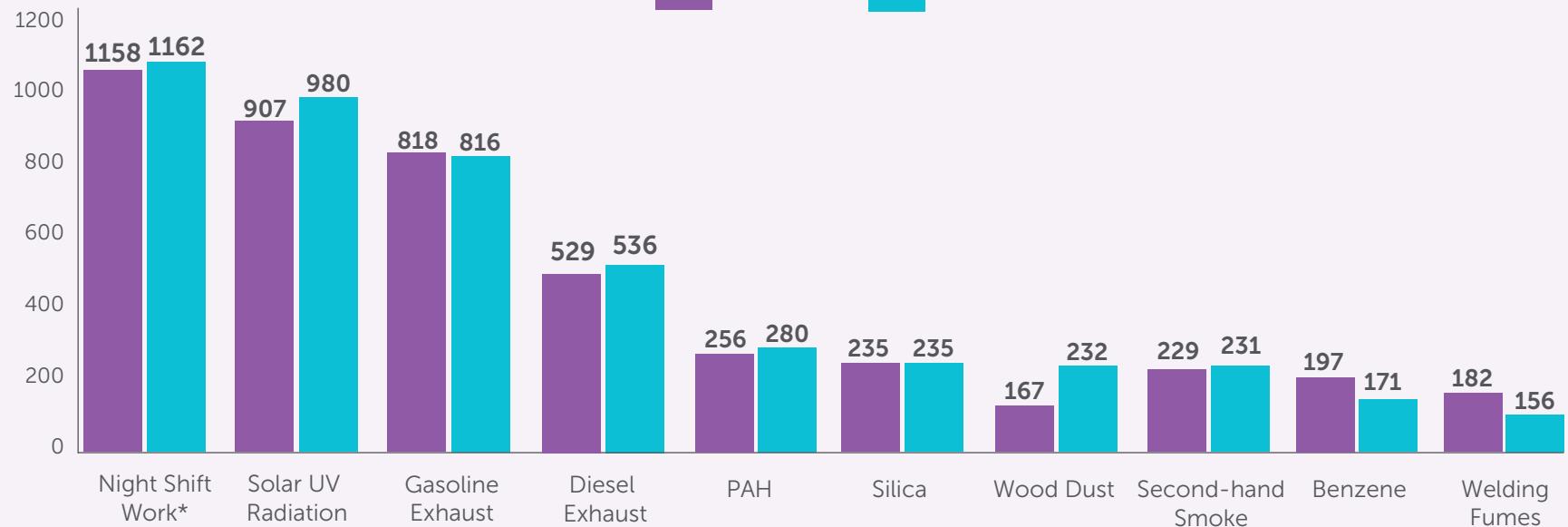


Figure 2 – Total number of workers (per 10,000) exposed to the top 10 carcinogen exposures in BC and Canada, 2016

*Using 2011 data

What are occupational exposure levels among workers in BC?

Solar UV Radiation

Solar UV radiation poses a significant health risk to workers, ranking as the second most prevalent carcinogenic exposure in Canada (after shift work) and the primary cause of skin cancer in the country⁹. Annually, approximately 6.3% of all skin cancer cases, totaling 4,600 cases, are attributable to occupational solar radiation⁹. Over 75% of outdoor workers operate within the highest exposure category (meaning they spend at least six hours outdoors per workday), with the largest proportion of exposed workers in BC engaged in the construction sector^{3,10}.



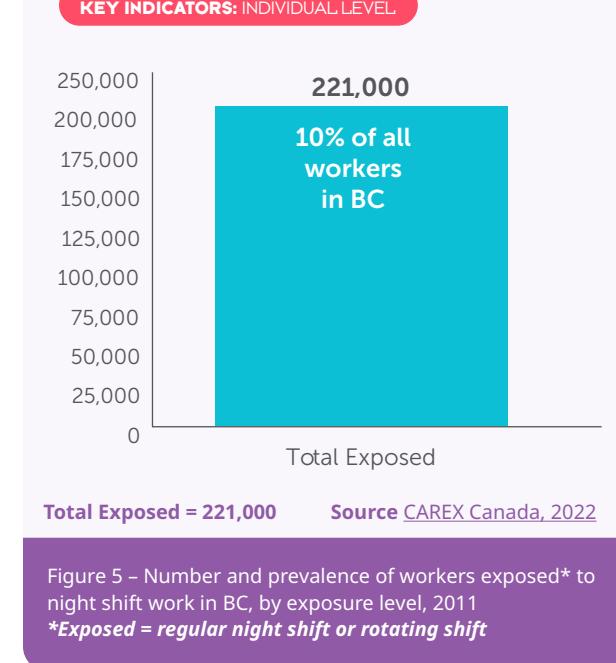
Asbestos

Asbestos, in all its forms, presents severe health hazards, notably causing lung cancer and mesothelioma among other cancers⁹. An estimated 8% of annual lung cancer cases in Canada, accounting for 1,900 cases, result from occupational exposure to asbestos⁹. More than half of the cancers associated with asbestos exposure occur among workers in manufacturing and construction industries⁹. Although asbestos was banned in 2018 by the Canadian government, it remains in some older building materials and legacy products used in manufacturing and construction, indicating the continuing potential for exposure within these sectors⁹.



Night Shift Work

Approximately 221,000 workers in BC work night shifts³. Night shift work is suspected of causing prostate and colorectal cancers⁹. The International Agency for Research on Cancer (IARC) classifies night shift work as Group 2A (probably carcinogenic to humans)⁹. It has been estimated that night shift work may contribute to 470-1,200 new breast cancer diagnoses annually⁹. This encompasses 2.0-5.2% of all reported breast cancers. Among these cases, 43% are diagnosed among workers in health care and social assistance sectors.



Crystalline Silica

Crystalline silica exposure predominantly affects workers in construction, manufacturing, and mining industries, with the majority of associated lung cancers diagnosed in these sectors⁹. Approximately 2.4% (570 cases) of all lung cancer diagnoses in Canada annually are attributed to occupational silica exposure, with most workers exposed at high levels and a significant number at low and moderate levels of exposure⁹.



Diesel Engine Exhaust

Roughly 2.4% (560 cases) of total annual lung cancer diagnoses are linked to exposure to diesel engine exhaust. The majority of this cancer burden occurs among those in mining, where workers are exposed to high levels. Transportation and warehousing also contributes significantly to lung cancer burden⁹. Among any industry, transportation and warehousing has the largest number of workers exposed, though at lower levels than mining^{7,9}.



Health equity considerations of occupational exposure

Health inequities, driven by structural determinants like systemic racism, colonialism, and inadequate labour policies shape access to resources and opportunities, ultimately influencing occupational cancer risks.

Workers from equity-deserving communities are often overrepresented in high-risk industries and may have inadequate protections against exposure to carcinogens like UV radiation, asbestos, and diesel exhaust. Effective cancer prevention requires addressing these structural determinants through equity-focused policies that strengthen workplace safety regulations, improve access to protective equipment and training, and ensure all workers are safe from hazardous exposures.



PART 2 EXAMPLES OF OCCUPATIONAL EXPOSURES PROGRAMS AND POLICIES IN BRITISH COLUMBIA

INDIVIDUAL

- [WorkSafe BC – Hazard and Exposure Resources](#)
- [Canadian Centre for Occupational Health and Safety – Occupational Cancer Resources](#)
- [Occupational Cancer Research Centre](#)

INTERPERSONAL

- [Healthy Workplaces – Smoke-Free Workplaces](#)
- [Healthy Workplaces – Sun Safety at Work](#)

ORGANIZATIONAL

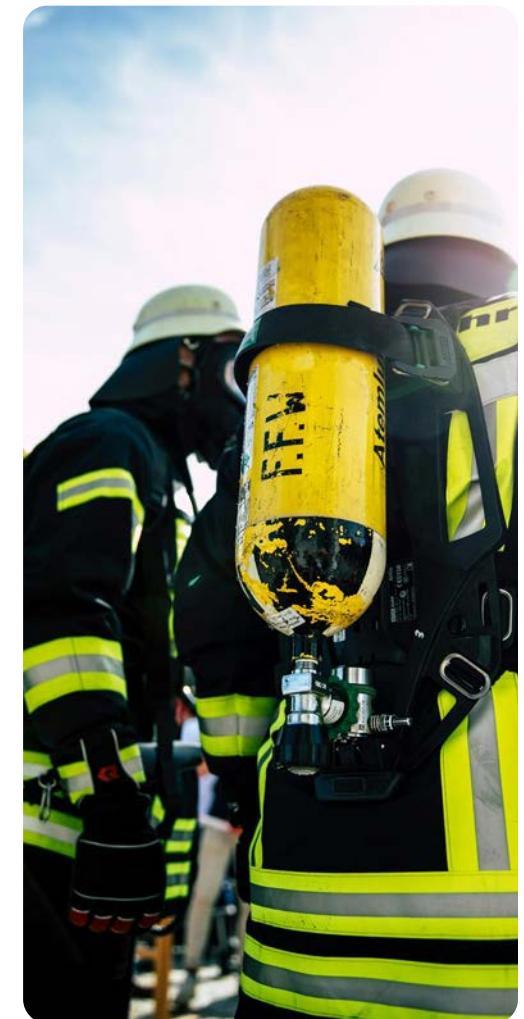
- [Radon in BC – Employers' Duties Worker Strategies and WorkSafe BC Policies](#)
- [Smoke Free Environment Signage](#)

COMMUNITY

- [CAREX Canada – Tailored Sun Safety Messaging for Outdoor Workers](#)
- [BC Lung Foundation – Healthy Indoor Environments Program](#)

PUBLIC POLICY

- [Hierarchy of Controls](#)
- [PPE in the Workplace – Occupational Health and Safety Regulation](#)
- [Sun Safety at Work](#)



INDIVIDUAL LEVEL

WorkSafe BC: Hazard and Exposure Resources

Online resources on occupational cancer for workers and family members, outlining hazards and cancer types associated with various occupations and how to reduce risks.

CCOHS: Occupational Cancer Resources

The Canadian Centre for Occupational Health and Safety (CCOHS) offers an online fact sheet and mobile app detailing occupational cancer. It includes information on exposure paths for carcinogens and workplace regulations. Additionally, they provide Safety InfoLine, a toll-free hotline accessible in Canada and the US.

Occupational Cancer Research Centre

The Occupational Cancer Research Centre is the first research organization in Canada focusing solely on cancer burden associated with work. The research program consists of developing methods to identify workers who are at-risk of occupational exposure and disease (surveillance), identifying and assessing occupational exposures and sources (exposure), and understanding the causes of occupational disease through evidence-based techniques, in order to predict the impact of exposures and prevent disease (epidemiology).



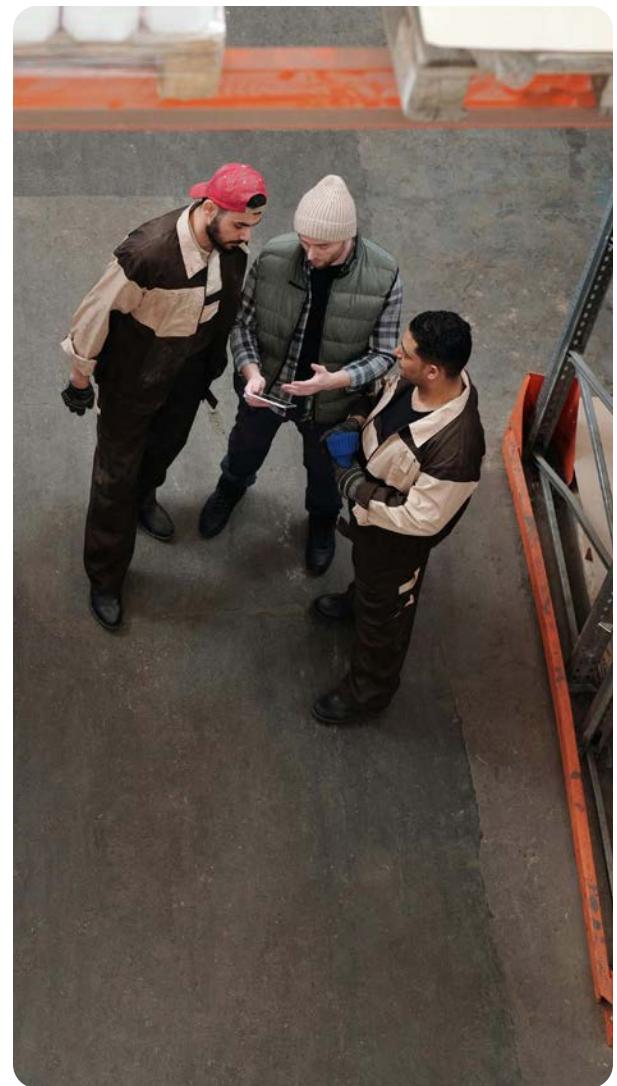
INTERPERSONAL LEVEL

Healthy Workplaces: Smoke-Free Workplaces

The Healthy Workplaces Program was a partnership between the Canadian Cancer Society BC and Yukon Division and the BC Ministry of Health. It offered guidance for creating healthier workplaces and has been utilized by over 750 businesses. Among its initiatives was “Smoke-Free Workplaces,” providing educational materials, fact sheets, tips, and health benefits for employers to share with employees or among co-workers as part of Workplace Wellness Challenges.

Healthy Workplaces: Sun Safety at Work

This challenge was also part of the Healthy Workplaces Program by the Canadian Cancer Society and BC Ministry of Health. It consisted of an education module with posters and internal communication resources, as well as fact sheets, sun safety tips, shade guidelines for outdoor workers, and tips for developing sun safety policy.



ORGANIZATIONAL LEVEL

Radon in BC: Employers' Duties Worker Strategies and WorkSafe BC Policies

This report offers insights into radon exposure at workplaces, worker exposure levels, and legal limits of exposure. It also includes recommendations for how WorkSafe BC can improve their policies for testing and mitigation within workplaces.

Smoke Free Environment Signage

BC Lung Foundation offers provincial and municipal signage compliant with the BC Tobacco and Vapour Control Act. They currently collaborate with BC health authorities and municipalities to update signage resources. Regional signage is presently accessible for Burnaby, Chilliwack, Coquitlam, New Westminster, Port Moody, Surrey, and Vancouver.

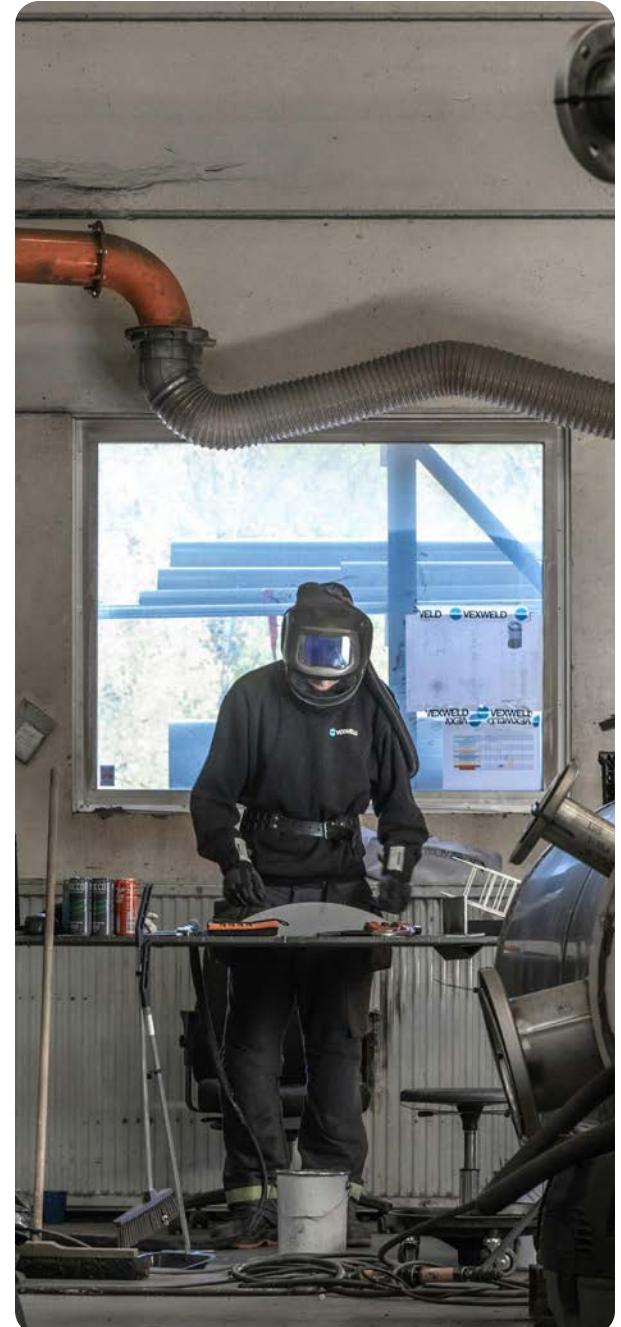
COMMUNITY LEVEL

CAREX Canada: Tailored sun safety messaging for outdoor workers

Health promotion messages often concentrate on general public sun safety and cancer prevention, lacking specific recommendations for outdoor workers. To fill this gap, CAREX Canada has created evidence-based, harm-reducing messages tailored for outdoor workers and employers regarding sun safety.

BC Lung Foundation: Healthy Indoor Environments Program

This initiative aims to educate about indoor air pollutants in BC, offering resources and policy suggestions. Its current focus involves radon projects like "Radon in the Workplace" detailing radon knowledge in BC workplaces and providing testing and mitigation recommendations for both traditional and work-from-home settings.



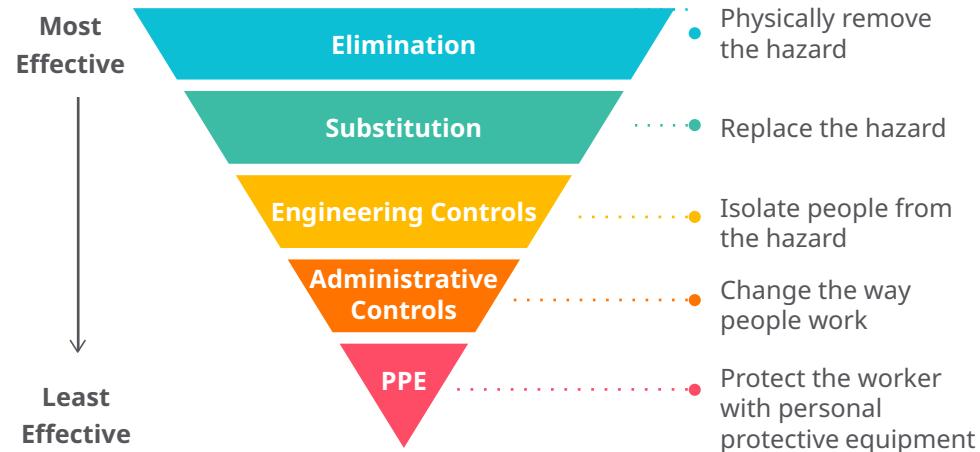
PUBLIC POLICY LEVEL

Hierarchy of Controls

As outlined by the CCOHS, a variety of strategies can help protect workers from exposures to harmful substances such as carcinogens. These strategies are listed in order of effectiveness in controlling a risk³:

- Elimination (of the hazard from the workplace)
- Substitution (to replace the hazard)
- Engineering controls (to create physical and design modifications to minimize exposure)
- Administrative controls (through policies and changes to daily working routines)
- Personal protective equipment (to provide a barrier between the worker and hazard)

Source [WorkSafe BC](#)

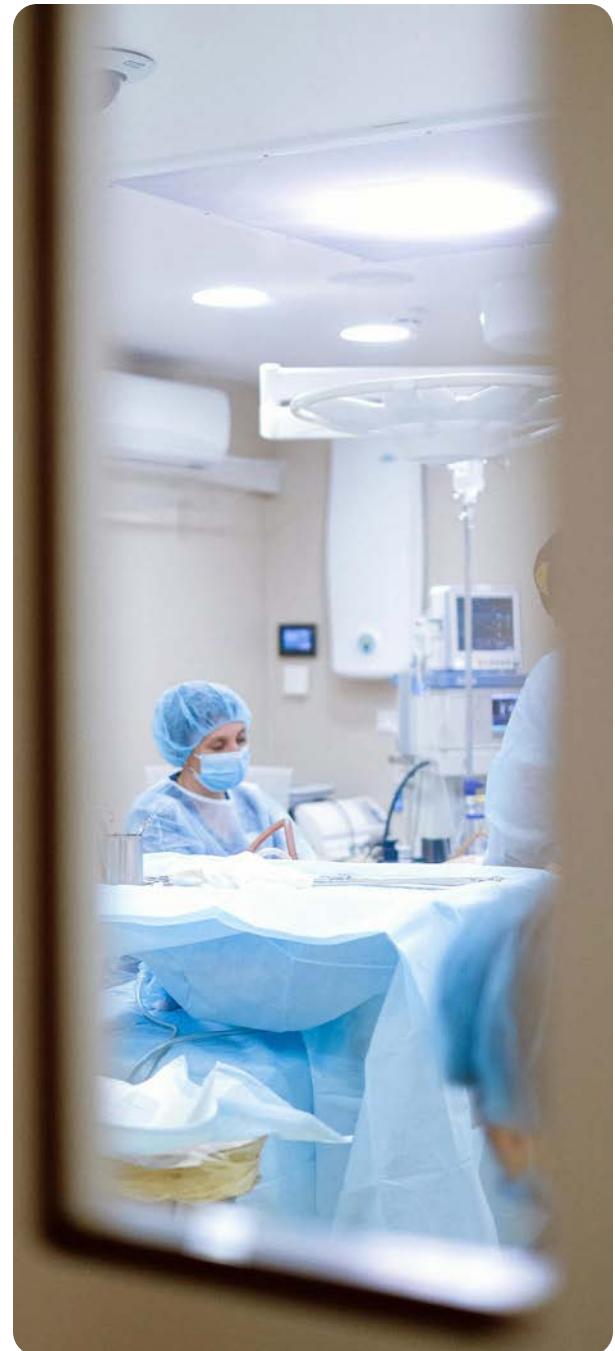


PPE in the Workplace: Occupational Health and Safety Regulation

The Occupational Health and Safety Regulation by WorkSafeBC, ensures worker safety by setting safety standards to prevent workplace accidents and injuries. The Federal Canada Labour Code guides employers on mitigating workplace hazards by supplying personal protective equipment (PPE) and necessary clothing. In BC, workers are accountable for obtaining protective clothing like work gloves, suitable footwear, and a hard hat, while the employer must supply any additional required PPE.

Table 3 – Personal protective equipment legal requirements for workers and employers, by jurisdiction, 2021

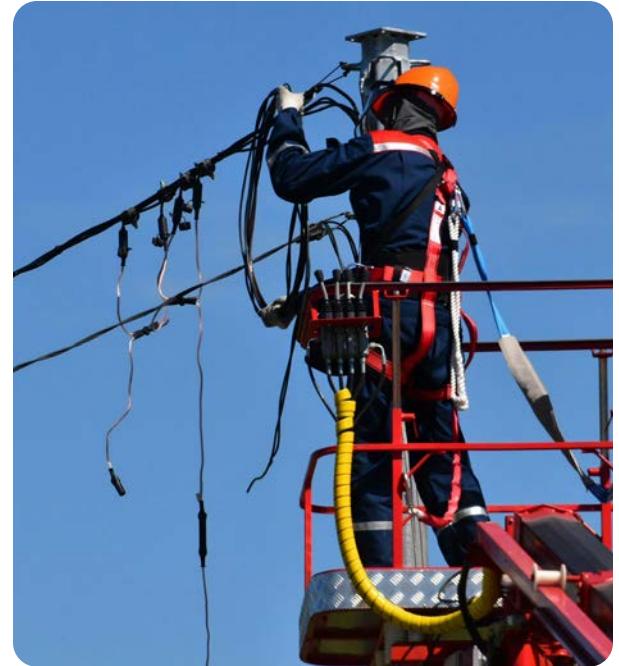
KEY INDICATORS: PUBLIC POLICY LEVEL			Source CCOHS, 2021
Jurisdictions where legislation specifically state employers are to provide required PPE at no cost to workers	Jurisdictions where guidance is stated or where either party must pay for specified types of PPE:	Jurisdictions that state “provide”, specify use only, or not specific about who purchases	
NT	AB Employer required to pay or provide respiratory PPE when needed, other PPE types not specified. BC Worker is responsible for protective clothing, work gloves, footwear and hard hat, employer provides equipment appropriate for risks associated with work.		Canada
NU	MB Worker is responsible for headwear and footwear, employer provides equipment appropriate for risks associated with work.		NL
QC	NB Position of deciding who pays for PPE is best made by the workplace parties.		ON
SK	NS Employer and workers generally decide who pays for PPE and if cost is shared, employers are required to provide certain devices like respiratory equipment, personal flotation device, work clothes, PPE associated with rechargeable storage batteries, energized electrical installations and confined space entry. YK Workers are expected to have basic PPE like appropriate clothing for weather, work gloves and footwear, and employer will provide other PPE and specialty clothing as required.		PE



PUBLIC POLICY LEVEL

Sun Safety at Work

Sun Safety at Work Canada (SSAWC) focuses on enhancing sun safety in workplaces, addressing sun-related hazards like skin cancer. The primary goal is to raise awareness about sun safety and assist workplaces in implementing effective sun safety programs within their existing occupational health and safety management systems. Collaborating initially with 17 workplaces across Canada, SSAWC gathers best practices from various countries to develop online resources.



PART 3 ACTIONABLE AREAS

INDIVIDUAL

- Expand quantitative data collection on occupational exposures and cancer risks in BC.
- Conduct further research to identify emerging trends, industries that are at high risk for occupational exposures to carcinogens, and exposure levels across sectors.

COMMUNITY

- Continue developing industry-specific interventions for workers exposed to carcinogens in sectors like construction, transportation, manufacturing, health care, and wildland fire management.
- Foster collaboration among employers, employees, and industry partners to adopt tailored guidelines and resources.

ORGANIZATIONAL

- Advocate for comprehensive policies that foster healthy workplaces.
- Improve measurement data of occupational exposures within workplaces.
- Implement engaging programs and challenges emphasizing risk-reducing behaviours related to sun safety, night shifts, asbestos, silica, diesel exhaust, and other occupational carcinogens.

PUBLIC POLICY

- Collaborate and share knowledge among government bodies, research institutions, and industries.
- Facilitate sharing of best practices, resources, and research findings to establish effective preventive measures and policies in occupational settings.

REFERENCES

1. Labrèche, F., Kim, J., Song, C., Pahwa, M., Ge, C. B., Arrandale, V. H., McLeod, C. B., Peters, C. E., Lavoué, J., Davies, H. W., Nicol, A. M., & Demers, P. A. (2019). The current burden of cancer attributable to occupational exposures in Canada. *Preventive medicine*, 122, 128–139. <https://doi.org/10.1016/j.ypmed.2019.03.016>
2. Peters, C. E., Ge, C. B., Hall, A. L., Davies, H. W., & Demers, P. A. (2015). CAREX Canada: an enhanced model for assessing occupational carcinogen exposure. *Occupational and environmental medicine*, 72(1), 64–71. <https://doi.org/10.1136/oemed-2014-102286>
3. CAREX Canada. (2021). *Occupational Exposure Summary – British Columbia*. <https://www.carexcanada.ca/CAREX-exposure-summary-BC.pdf>
4. Canadian Cancer Society. (2023). *Occupation statistics*. <https://cancer.ca/en/research/cancer-statistics/occupation-statistics>
5. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. <https://www2.gov.bc.ca/gov/content/health/about-bc-s-health-care-system/health-priorities/pph-framework>
6. Peters, C. E., Kim, J., Song, C., Heer, E., Arrandale, V. H., Pahwa, M., Labrèche, F., McLeod, C. B., Davies, H. W., Ge, C. B., & Demers, P. A. (2019). Burden of non-melanoma skin cancer attributable to occupational sun exposure in Canada. *International archives of occupational and environmental health*, 92(8), 1151–1157. <https://doi.org/10.1007/s00420-019-01454-z>
7. Kim, J., Peters, C. E., Arrandale, V. H., Labrèche, F., Ge, C. B., McLeod, C. B., Song, C., Lavoué, J., Davies, H. W., Nicol, A. M., Pahwa, M., & Demers, P. A. (2018). Burden of lung cancer attributable to occupational diesel engine exhaust exposure in Canada. *Occupational and environmental medicine*, 75(9), 617–622. <https://doi.org/10.1136/oemed-2017-104950>
8. Rydz, E., Arrandale, V. H., & Peters, C. E. (2020). Population-level estimates of workplace exposure to secondhand smoke in Canada. *Canadian journal of public health*, 111(1), 125–133. <https://doi.org/10.17269/s41997-019-00252-x>
9. Occupational Cancer Research Centre. (2019). *Burden of occupational cancer in Canada: Major workplace carcinogens and prevention of exposure*. <https://www.occupationalcancer.ca/wp-content/uploads/2019/09/OCRCNational-Burden-Report-2019.pdf>
10. Kramer, D. M., Tenkate, T., Strahlendorf, P., Kushner, R., Gardner, A., & Holness, D. L. (2015). Sun Safety at Work Canada: a multiple case-study protocol to develop sun safety and heat protection programs and policies for outdoor workers. *Implementation science : IS*, 10, 97. <https://doi.org/10.1186/s13012-015-0277-2>



CHAPTER 8

INFECTIONS AND CANCER RISK

Part 1 Infections and Cancer Risk

Part 2 Examples of Infection Prevention
Programs and Policies in British Columbia

Part 3 Actionable Areas

PART 1 INFECTIONS AND CANCER RISK

Some infectious agents, including viruses, bacteria, and parasites, are known to cause, or increase risk for, certain cancer types¹.

Examples include certain types of human papillomavirus (HPV) that can lead to cervical cancer, and chronic infection with hepatitis B that can lead to liver cancer.

In 2015, infections accounted for 3.7% of the total cancer burden among Canadian adults¹. Among all viruses and bacteria linked to cancer, HPV and hepatitis B contribute most significantly to infection-attributable cancer cases. There are also many other viruses, bacteria, and parasitic infections that can increase the risk of certain cancers. These include human immunodeficiency virus (HIV), hepatitis C, H. pylori, Epstein-Barr virus (EBV), and streptococcus bovis, among others².

HPV is associated with 99% of the cervical cancer burden in Canada, and is linked to a variety of other cancers including cancers of the penis, anus, vagina, vulva, oral cavity, larynx, and oropharynx.

Liver cancer burden due to hepatitis B is 8.8%³.

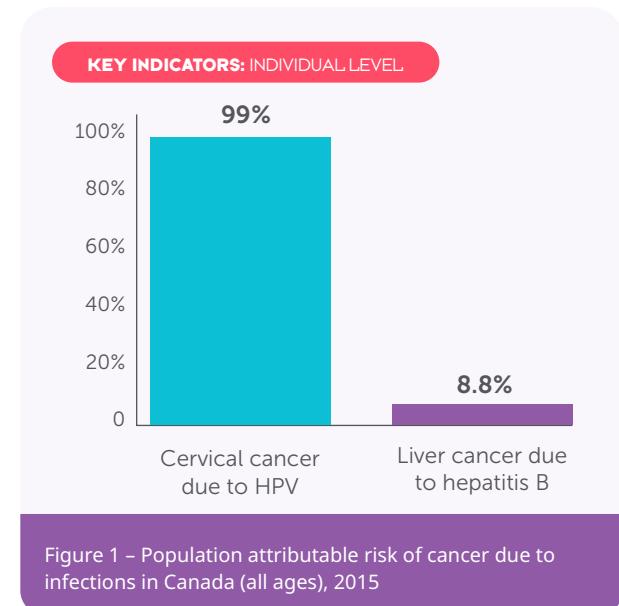
Highly effective prevention methods include vaccination and safe sex practices to reduce the risk of both hepatitis B and HPV infections¹.

Cervical, liver, and other cancer types associated with infections like HPV and hepatitis B, and the success of programs to prevent these infections, are heavily influenced by health inequities, which are unfair, unjust, and preventable health disparities⁴.

Structural determinants, such as systemic racism, colonialism, discrimination, economic barriers, and cultural norms shape access to and engagement in opportunities. Social determinants, including income, education, and health care access, also act as upstream factors⁴. Together, these determinants of health ultimately affect disease transmission, vaccination and screening rates.

What impact do infections have on cancer risk?

Quantitative Indicators of Cancer Risk
Attributable to Infections in Canada



Source [ComPARe, 2015](#)

Table 1 – Number of cancer cases attributable to human papillomavirus (HPV) in 2015, by cancer site, in Canada (all ages) *BC-specific data not available from ComPARe

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (n)	Females (n)	Males and Females (n)	
Cervix	..	1375	1375	
Oropharynx	830	253	1083	
Anus	197	392	589	
Vulva	..	301	301	
Vagina	..	130	130	
Oral Cavity	77	51	127	
Larynx	118	24	142	
Penis	81	..	81	
All Associated	1303	2526	3829	

Table 2 – Percentage of cancer cases attributable (PAR) to human papillomavirus (HPV) in 2015, by cancer site, in Canada (all ages) *BC-specific data not available from ComPARe

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (%)	Females (%)	Males and Females (%)	
Cervix	..	100	100	
Oropharynx	60.2	60.2	60.2	
Anus	87.6	94.5	92	
Vulva	..	47.4	47.4	
Vagina	..	72.2	72.2	
Oral Cavity	8.2	8.2	8.2	
Larynx	12.7	12.7	12.7	
Penis	39.3	..	39.3	
All Associated	35.5	65.9	51.0	

Table 3 – Number of hepatocellular carcinoma cases attributable to hepatitis B virus in 2015, in Canada (all ages) *BC-specific data not available from ComPARe

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (n)	Females (n)	Males and Females (n)	
Hepatocellular Carcinoma	131	19	150	

Table 4 – Percentage of hepatocellular carcinoma cases attributable (PAR) to hepatitis B virus in 2015, in Canada (all ages) *BC-specific data not available from ComPARe

KEY INDICATORS: INDIVIDUAL LEVEL				Source ComPARe, 2015
Cancer Type	Males (%)	Females (%)	Males and Females (%)	
Hepatocellular Carcinoma	9.8	4.7	8.8	

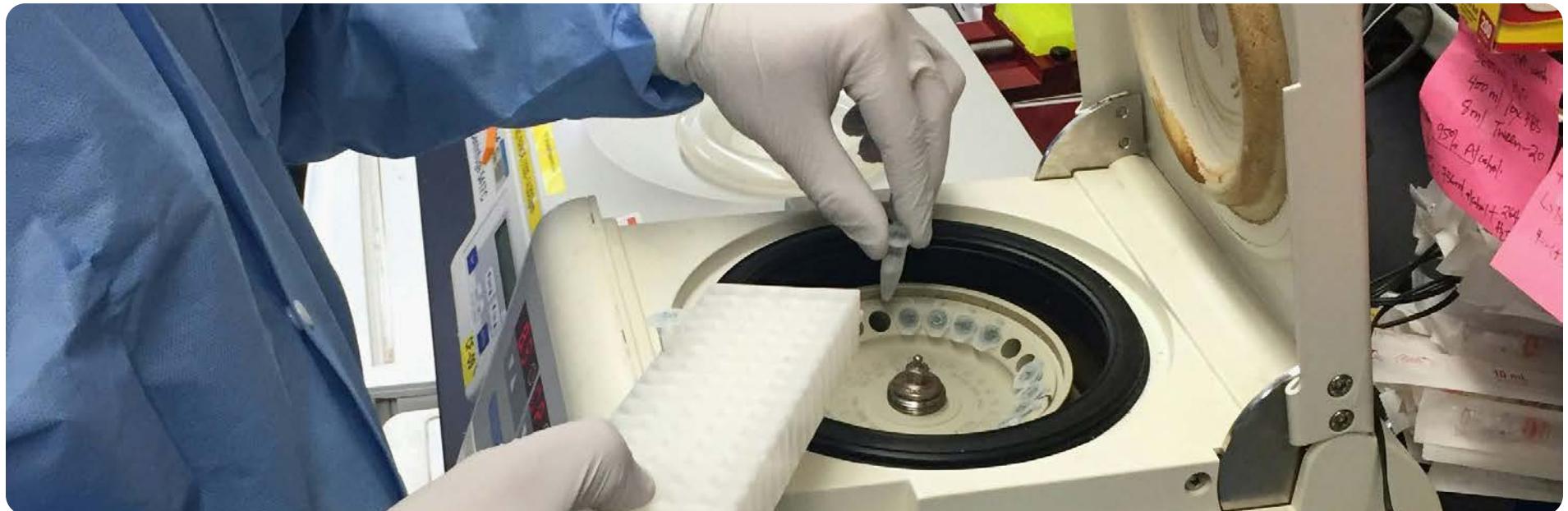
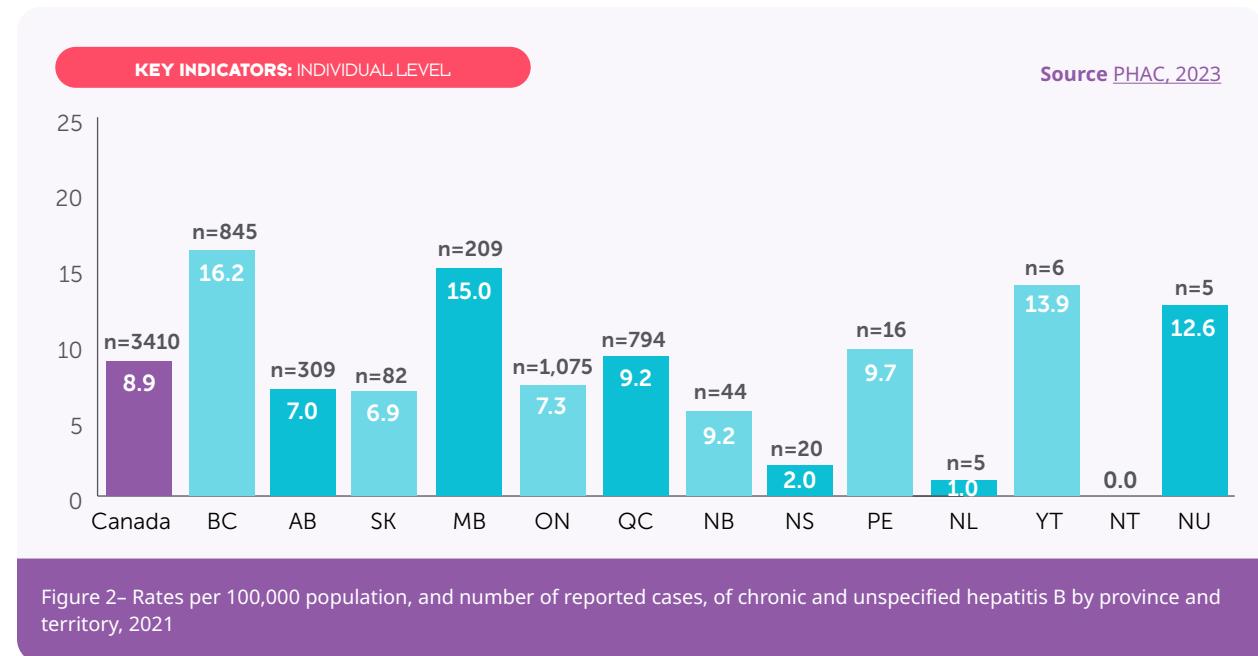
How does BC measure in terms of infections that are associated with cancers?

Quantitative Indicators of Infections in BC

Each year, approximately 200 cervical cancer cases are reported in BC¹.

In 2023, 560 new liver cancer cases were diagnosed in BC⁵.

According to the Public Health Agency of Canada, reported rates for chronic hepatitis B in BC were 16.2 per 100,000 individuals in 2021⁶. This was the second highest proportion of reported chronic and unspecified hepatitis B among all provinces and territories.



KEY INDICATORS: INDIVIDUAL LEVEL

Source [BC Cancer Registry, 2018-2023](#)

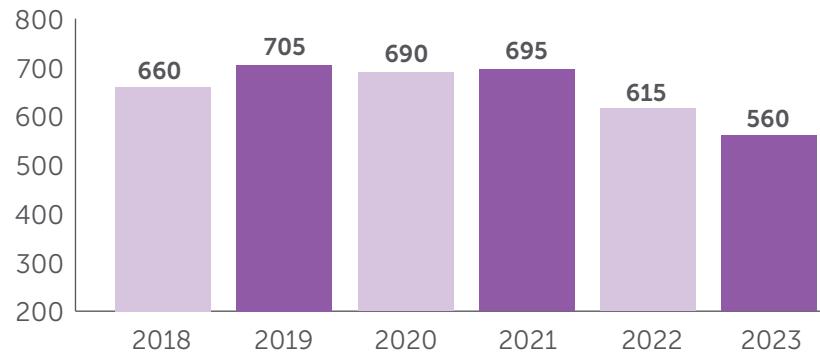


Figure 3 – Number of new liver cancer cases reported in BC, by year, all ages

KEY INDICATORS: INDIVIDUAL LEVEL

Source [BC Cancer Registry, 2018-2023](#)

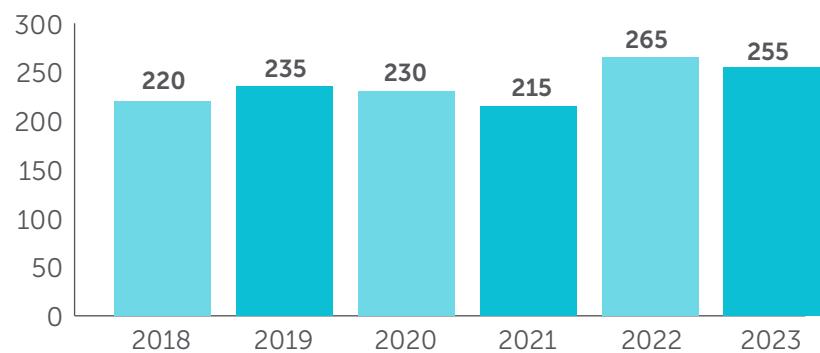


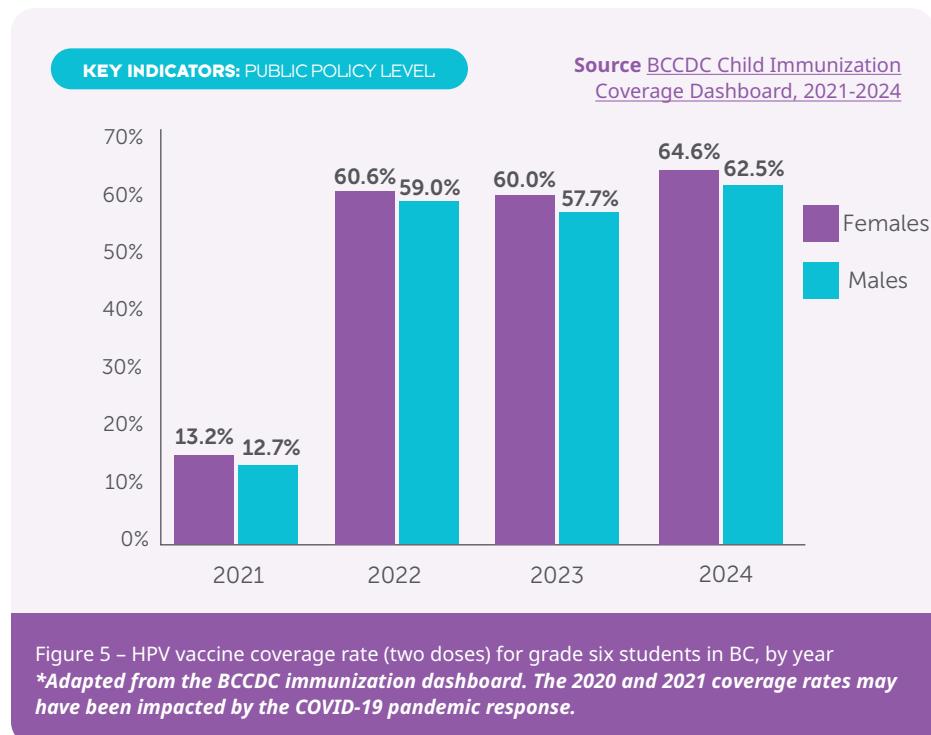
Figure 4 – Number of new cervical cancer cases reported in BC, by year, all ages



What infection prevention measures are in BC?

Quantitative Indicators of Infection Prevention Measures in BC

Immunization data in BC is captured by the BCCDC Reportable Diseases Dashboard which contains summary statistics and data visualizations sorted by health region. BC Immunization Coverage Reports also provide annual immunization rates for each health authority.



HPV Immunization

Across Canada, the primary method for HPV vaccine delivery is through publicly funded, school-based programs. Programs were implemented in 2007 for females and by 2017 has been extended to males⁷.

In 2025, BC updated its HPV immunization program to expand eligibility and simplify the immunization schedule, following guidance from the National Advisory Committee on Immunization. Among some of the changes, the vaccine schedule shifts from two doses to one dose for people ages nine to 20. People 21 and older are eligible for a two-dose series, with six-months between doses⁸.

HPV vaccination coverage rates in BC were significantly lower during the COVID-19 pandemic, when routine-based school immunization programs were disrupted⁹. Coverage for grade six students has been gradually increasing since then, with notable variation across health authorities⁹. However, resulting catch-up vaccinations in grades seven and older yielded completion rates higher than pre-pandemic grade six levels in half of the health service delivery areas in BC¹⁰.

The most recent 2023/24 coverage report shows continued progress, with 64.6% of female students and 62.5% of male students in grade six having completed the two-dose series¹¹. When including students who received at least one dose, coverage rises to 76.5% for females and 74.3% for males¹¹.

Canada's target for provincial and territorial HPV immunization rates is 90% full vaccination coverage of 17-year-olds by 2025⁷. Cervical cancer prevention approaches occur at the provincial level in Canada, with HPV vaccination being the main approach for primary prevention¹².

The two prophylactic HPV vaccines utilized in BC are:

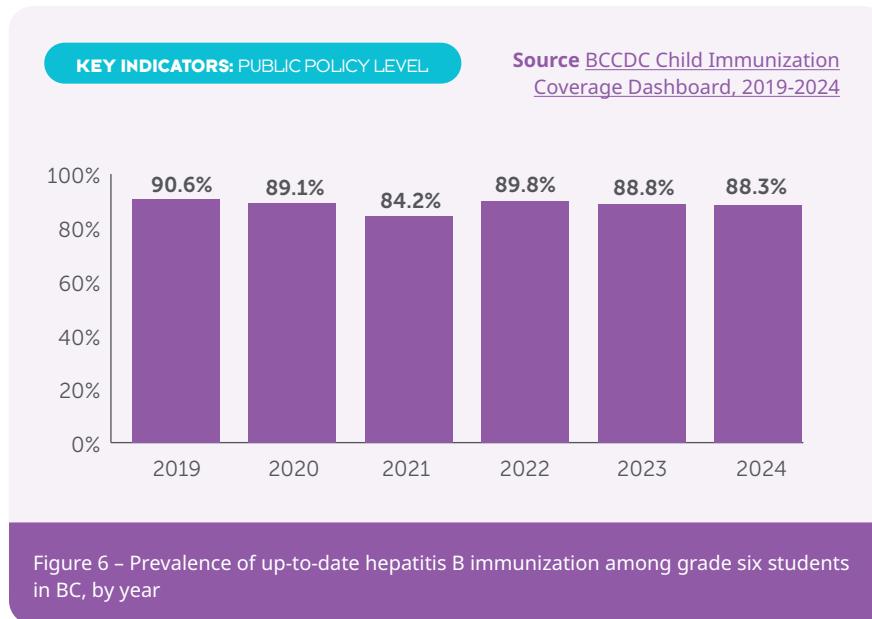
- Gardasil (HPV9) (approved for use in both males and females)
- Cervarix (HPV2) (only approved for use in females)

In addition to vaccination, routine cervix screening is recommended for anyone with a cervix between the ages of 25 and 69. The vaccine protects against most, but not all, types of HPV that cause cervical cancer.

Hepatitis B Immunization

Primary prevention of hepatitis B virus infection is achieved through universal vaccination during infancy¹³.

The BC Centre for Disease Control reports hepatitis B vaccination coverage across all health authorities using registry data of students recorded in Panorama as attending grade six within each region's service area.



Safer Sex Practices

Sexual contact can expose anyone to HPV, hepatitis B and other STIs, but the risk increases with multiple sexual partners or having a partner with a history of multiple partners.

While condoms reduce the risk of HPV exposure, they don't offer complete protection since they may not cover all potentially infected genital areas. However, condoms remain highly effective against other sexually transmitted infections (STIs). Regular testing for STIs is crucial after unprotected sex, with new partners, or in cases of multiple partners, even without symptoms. In addition to vaccination, the following STI prevention practices from the BCCDC and HealthLink BC are provided:

- Barriers – Condoms (external and internal), dental dams, and gloves, etc.¹⁴
- Medication – Highly active antiretroviral therapy (HAART) for people living with HIV reduces the viral load in the body, lowering the risk of transmitting HIV to partners. People who are HIV negative can take pre-exposure prophylaxis (before exposure) or post-exposure prophylaxis (after exposure) to prevent getting HIV¹⁴.
- Talking with sexual partners – Recommendations and tips on how to have important discussions about STIs and safe sex practices with sexual partners¹⁵.

Health equity considerations of infections

Health inequities, driven by structural determinants like systemic racism, colonialism, and economic barriers shape access to resources and opportunities, ultimately influencing disease transmission, vaccination, and screening rates.

Equity-deserving communities often face systemic barriers to accessing preventive care, including vaccines and screening programs, contributing to higher rates of infection-related cancers such as cervical and liver cancer. Effective cancer prevention requires addressing these structural determinants through equity-focused policies that expand access to culturally appropriate care, ensure the availability of preventive services, and remove systemic barriers to health care for all.

PART 2 EXAMPLES OF INFECTION PREVENTION PROGRAMS AND POLICIES IN BRITISH COLUMBIA

INDIVIDUAL

- [HealthLink BC HPV and hepatitis B Vaccine Advice and Eligibility Resources](#)
- [HealthLink BC HPV and Genital Warts Resources](#)
- [BCCDC Smart Sex – Clinic Finder](#)
- [BCCDC Downloadable Brochures, Fact Sheets, and Posters](#)

INTERPERSONAL

- [Kids Boost Immunity Lessons – Curriculum for Teachers](#)
- [BCCDC Smart Sex – Talking To Your Partners](#)

ORGANIZATIONAL

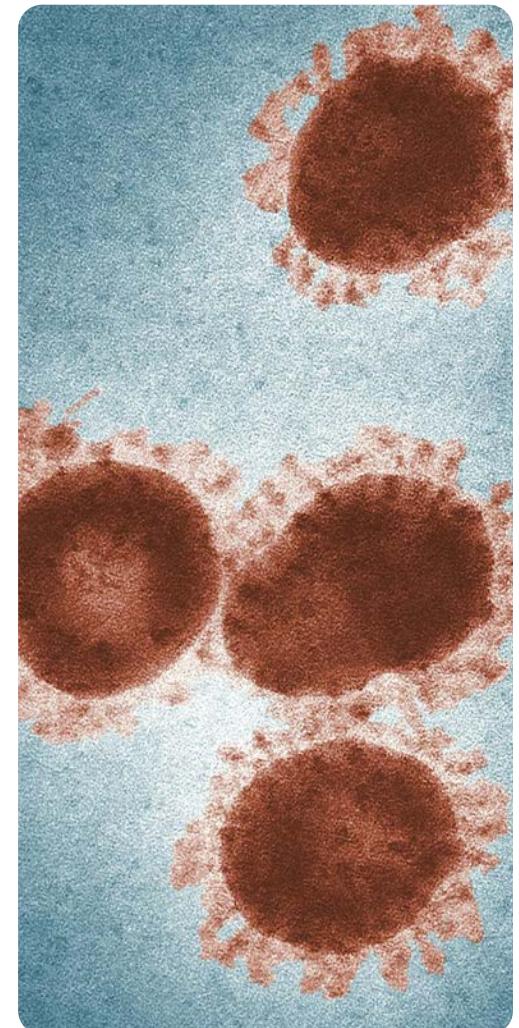
- [Bio-Hazards, Occupational Diseases and hepatitis B](#)
- [WorkSafeBC – Infectious Diseases Resource](#)
- [Occupational Health and Safety Regulation](#)

COMMUNITY

- [Viral Hepatitis Testing Resource](#)
- [ImmunizeBC – Health Promotion Resources \(Print, Web, Video\)](#)
- [First Nations Health Authority \(FNHA\) – HPV Prevention, Screening, and Resources](#)

PUBLIC POLICY

- [HPV Vaccination Program \(School-based, Publicly Funded\)](#)
- [Hepatitis B Vaccination Program \(School-based, Publicly Funded\)](#)



INDIVIDUAL LEVEL

[HealthLink BC HPV and Hepatitis B Vaccine Advice and Eligibility Resources](#)

HealthLink BC provides comprehensive and province-specific information on their website regarding HPV and Hepatitis B vaccine efficacy, eligibility and possible side effects.

[HealthLink BC HPV and Genital Warts Resources](#)

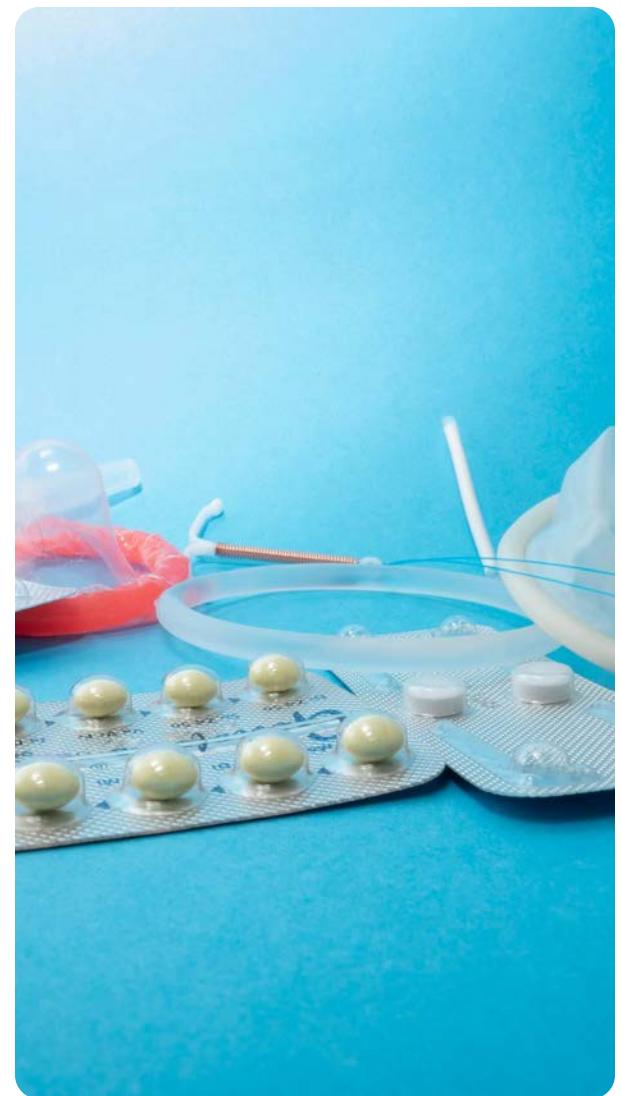
This HealthLink BC online resource provides information on HPV infection, spread, symptoms, risks, how to treat genital warts, HPV vaccination, and safer sex recommendations. The resource is translated into English, Chinese, Farsi, French, Korean, Punjabi, Spanish and Vietnamese. It is available in digital and print versions.

[BCCDC Smart Sex – Clinic Finder](#)

The BCCDC Clinic Finder is an up-to-date directory for sexual health clinics in British Columbia. Readers can filter by date and time, coverage requirements, and services including vaccines (hepatitis B, HPV), STI testing and treatment, HIV testing, free condoms, cervix screening, HIV medication prescriptions, and more.

[BCCDC Downloadable Brochures, Fact Sheets, and Posters](#)

Health promotion strategies for infection-related cancer prevention include informational pamphlets, fact sheets and posters available in print and digital forms through the BCCDC and ImmunizeBC websites.



INTERPERSONAL LEVEL

Kids Boost Immunity Lessons – Curriculum for Teachers

Kids Boost Immunity, a collaboration by the Public Health Association of BC and UNICEF, produces 200+ free curriculum-linked lessons for teachers. Kids Boost offers programs for grades 4-12¹⁶.

BCCDC Smart Sex – Talking to Your Partners

This online resource shares tips and advice on how to communicate with sexual partners about STIs and safe sex. Detailed methods on how to navigate conversations such as when to discuss, talking points and evidence- based information for referencing is provided.



ORGANIZATIONAL LEVEL

Bio-Hazards, Occupational Diseases, and Hepatitis B

This Government of BC resource provides information to managers on occupational disease exposures including HIV, hepatitis B and others. The web page refers to the "[Guide to the Prevention and Control of Infectious Diseases in the Workplace \(2007\)](#)", which explains when and how to create an exposure and control plan for employers and employees.

WorkSafeBC – Infectious Diseases Resource

WorkSafeBC provides information on communicable disease prevention, including the risks and how to reduce them for various diseases including HIV and hepatitis B. Risk-reducing practices include getting vaccinated, washing hands, handling sharps properly, cleaning and disinfecting spills, and use of PPE.

ORGANIZATIONAL LEVEL

Occupational Health and Safety Regulation

The Occupational Health and Safety Regulation sets legal requirements for workplaces under the jurisdiction of WorkSafeBC. It aims to promote occupational health and safety, providing a foundation for collaborative problem-solving between workers and employers, with specific core, general hazard, and industry/activity-specific requirements.

COMMUNITY LEVEL

Viral Hepatitis Testing Resource

Intended for health care professionals, this Government of BC and BC Guidelines online resource is a guideline for the use of laboratory tests to diagnose viral hepatitis in adults within primary care.

ImmunizeBC Health Promotion Resources (Print, Web, Video)

Available in 14 languages, ImmunizeBC provides a comprehensive online resource for HPV vaccine information, intended for a general audience, and for children and adults, respectively. Resources include frequently asked questions about HPV, vaccine eligibility, animated videos, patient and provider experience videos, and a poster on how parents can protect their children.

First Nations Health Authority (FNHA) – HPV Prevention, Screening, and Resources

FNHA launched an HPV vaccine awareness campaign in October 2023, aimed at HPV health promotion for First Nations communities throughout BC. Their website provides accessible information on HPV vaccination, cancer screening, and additional resources for cervical health.



PUBLIC POLICY LEVEL

HPV Vaccination Program (School-based, Publicly Funded)

HPV vaccination programs are primarily school-based and publicly funded for the intended age groups, resulting in higher coverage¹². School aged students are routinely offered the HPV vaccine starting in grade six, with catch-ups in later grades for those who missed getting the vaccine. The vaccine is also available in several community settings, such as pharmacies, public health units and community health centres.

Effective July 2025, the HPV vaccine schedule in BC shifts from two doses to one dose for people ages nine to 20. The vaccine is free for all people ages 9 to 26, plus people 27 to 45 who are living with HIV or who self-identify as belonging to the gay, bisexual, questioning, Two-Spirit, transgender and non-binary communities⁸.

Hepatitis B Vaccination Program (School-based, Publicly Funded)

Hepatitis B vaccine is provided in BC for free for the following:

- Infants (as part of a routine vaccination schedule)
- Children in grade six (through catch-up programs)
- Families immigrating from regions at high-risk for hepatitis B
- People who may have had sexual contact with someone with hepatitis B
- People with chronic liver and/or kidney disease



PART 3 ACTIONABLE AREAS

INDIVIDUAL

- Support and expand existing health promotion initiatives like HealthLink BC, BCCDC/ImmunizeBC and Kids Boost Immunity, ensuring adequate resources and capacity building to strengthen their impact.

COMMUNITY

- Review the hepatitis B immunization program comprehensively to pinpoint coverage gaps and areas for improvement.
- Strengthen communication with service providers to increase awareness among priority populations, including immigrants from regions with a high-risk of hepatitis B, people with chronic liver and kidney disease, and those who may have had sexual contact with someone with hepatitis B.

INTERPERSONAL

- Enhance HPV vaccination coverage by launching targeted awareness campaigns involving parents, caregivers, and communities, with a focus on youth and eligible groups.
- Collaborate with schools to prioritize vaccination during disruptions like the COVID-19 pandemic and explore innovative methods like mobile clinics and community outreach for under-resourced populations.

PUBLIC POLICY

- Improve policy and program effectiveness by regularly surveying and studying reasons for low vaccination rates.
- Address barriers through evidence based research on vaccine hesitancy and misinformation, ensuring ongoing enhancement of cancer prevention efforts.

REFERENCES

1. Volesky, K. D., El-Zein, M., Franco, E. L., Brenner, D. R., Friedenreich, C. M., Ruan, Y., & ComPARe Study Team. (2019). Cancers attributable to infections in Canada. *Preventive medicine*, 122, 109-117. <https://doi.org/10.1016/j.ypmed.2019.03.035>
2. Masrour-Roudsari, J., & Ebrahimpour, S. (2017). Causal role of infectious agents in cancer: An overview. *Caspian journal of internal medicine*, 8(3), 153-158. <https://pmc.ncbi.nlm.nih.gov/articles/PMC5596184/>
3. ComPARe. (2015). *Compare study on preventable cancers in Canada*. Retrieved July 27, 2022, from <https://prevent.cancer.ca/>
4. BC Ministry of Health. *British Columbia's Population and Public Health Framework: Strengthening Public Health*. Victoria, BC: BC Ministry of Health; 2024 September. https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/public-health/pph-framework/bc_population_and_public_health_framework.pdf
5. BC Cancer. (2025, May 30). *Cancer Surveillance and Outcomes, Data and Analytics*. <https://bccandataanalytics.shinyapps.io/BCSummary/>
6. Public Health Agency of Canada. (2023, December 20) *Hepatitis B in Canada: 2021 surveillance data update*. Canada.ca. Retrieved from <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/hepatitis-b-canada-2021-surveillance-data-update.html>
7. Canadian Partnership Against Cancer. (2023, November 23). *HPV immunization for cancer prevention*. <https://www.partnershipagainstcancer.ca/topics/hpv-immunization-policies/>
8. Government of British Columbia, Ministry of Health. (2025, July 31). *Expanded, streamlined HPV vaccine program protects more people against cancers*. [News Release]. <https://news.gov.bc.ca/releases/2025HLTH0076-000739>
9. BC Centre for Disease Control. (n.d.). *Childhood immunization coverage dashboard*. Retrieved July 27, 2022, from <http://www.bccdc.ca/health-professionals/data-reports/childhood-immunization-coverage-Dashboard>
10. Peters, E., Ogilvie, & Naus. (2023). Cancer prevention in BC's 10-year cancer action plan: Spotlight on HPV vaccination from a public health lens. *Journal of Family Practice Oncology*, 41. <http://www.bccancer.bc.ca/family-oncology-network-site/Documents/2023%20Fall%20FPONjournal%20Sep29.pdf>
11. BC Centre for Disease Control. (2025). *Immunization Coverage in Grade 6 Students, 2015-2024*. Retrieved from <https://www.bccdc.ca/health-professionals/data-reports/immunizations>
12. Saraiya, M., Steben, M., Watson, M., & Markowitz, L. (2013). Evolution of cervical cancer screening and prevention in United States and Canada: implications for public health practitioners and clinicians. *Preventive medicine*, 57(5), 426-433. <https://doi.org/10.1016/j.ypmed.2013.01.020>
13. Chang M. H. (2014). Prevention of hepatitis B virus infection and liver cancer. Recent results in cancer research. *Fortschritte der Krebsforschung. Progrès dans les recherches sur le cancer*, 193, 75-95. <https://pubmed.ncbi.nlm.nih.gov/24008294/>
14. SmartSex Resource. (2023, October 10). *Preventing STIs | SmartSex Resource*. <https://smartsexresource.com/sexually-transmitted-infections/sti-basics/preventing-stis/>
15. HealthLink BC. (2022, August 2). *Healthlink Safer Sex | HealthLink BC*. <https://www.healthlinkbc.ca/healthwise/safer-sex>
16. Kids Boost Immunity. (n.d.). Retrieved July 27, 2022 from <https://kidsboostimmunity.com/>

TECHNICAL APPENDIX

This section provides technical details for specific indicators in the *British Columbia Cancer Prevention Indicator Report: Indicators and Policies* that feature data from:

1. The Canadian Population Attributable Risk of Cancer (ComPARe) Study (2015) and
2. The Canadian Community Health Survey (CCHS) PUMF (2019/2020, 2022)

Where relevant, the section includes additional notes and/or weblinks for:

- Terminology clarification,
- Further details on survey methodology,
- Supplemental data and calculations (e.g., confidence intervals), and
- Calculation methods.

The Canadian Population Attributable Risk of Cancer (ComPARe) Study (2015)

Description:

The Canadian Population Attributable Risk of Cancer (ComPARe) study estimated the current and future cancer burden from modifiable risk factors. Using population attributable risk (PAR), it calculated cancer cases linked to each risk factor, while the statistical measure, potential impact fraction (PIF), estimated the avoidable future cancer burden if these exposures were reduced.

For this report, pre-calculated data from the ComPARe study dashboard was used, with no additional calculations performed on raw data.

Population attributable risk (PAR) = the measure used to estimate both the current and future burden of cancer attributed to a risk factor for cancer.

Read more about ComPARe (2015): <https://cancer.ca/en/research/cancer-statistics/prevention-statistics/about-this-research>

Full PDF reports of ComPARe (2015) data, by risk factor: <https://data.prevent.cancer.ca/current/risk-factors>

Summary of Methods

ComPARe statistical methods – An overview <https://cancer.ca/en/research/cancer-statistics/prevention-statistics/cancer.ca-/media/files/research/cancer-statistics/compare/compare-methods-overview-eng-final-04092019.pdf>

See document for methodology and use of:

- Population attributable risk estimate
- Relative risks and odds ratio
- Exposure prevalence
- Cancer incidence

Detailed description of methodological framework:

Brenner, D. R., Poirier, A. E., Walter, S. D., King, W. D., Franco, E. L., Demers, P. A., ... & Friedenreich, C. M. (2018). Estimating the current and future cancer burden in Canada: methodological framework of the Canadian population attributable risk of cancer (ComPARe) study. *BMJ open*, 8(7), e022378. <https://bmjopen.bmj.com/content/8/7/e022378.abstract>

Chapters that use ComPARe (2015) data:

- Chapter 1: Smoking and Cancer Risk
- Chapter 2: Physical Activity and Cancer Risk
- Chapter 3: Nutrition and Cancer Risk
- Chapter 4: Alcohol and Cancer Risk
- Chapter 5: UV Radiation and Cancer Risk
- Chapter 6: Environmental Exposures and Cancer Risk
- Chapter 7: Occupational Exposures and Cancer Risk
- Chapter 8: Infections and Cancer Risk

Exposure definitions used in ComPARe:

	Risk Factor	Exposure Definition
SMOKING	Second-hand smoking (also called passive smoking)	Regularly exposed to tobacco smoke in their home, a vehicle or a public place
	Tobacco smoking (also called active smoking)	Current smoker (smoked cigarettes daily or occasionally at the time of the interview) or former smoker (did not smoke at the time of the interview and had smoked more than 100 cigarettes in lifetime)
PHYSICAL ACTIVITY	Risk Factor	Exposure Definition
	Physical inactivity	Moderately inactive: daily energy expenditure based on leisure time physical activity is ≥ 1.5 and < 3.0 kcal/kg/day Inactive: daily energy expenditure based on leisure time physical activity is < 1.5 kcal/kg/day
NUTRITION	Risk Factor	Exposure Definition
	Excess weight (overweight and obese)	Body mass index (BMI) ≥ 25 kg/m ²
	Low calcium	Less than 1000 mg per day (calcium intake from food in 24 hours)
	Low fruit	Less than 4 servings a day
	Low vitamin D	Serum concentration of 25-hydroxy vitamin D is ≤ 50 nmol/L
ALCOHOL	Risk Factor	Exposure Definition
	Alcohol use	Having any number of standard drinks per day (13.5 g of ethanol per drink)

	Risk Factor	Exposure Definition
UV RADIATION	Risk Factor	Exposure Definition
	Indoor tanning	Ever use (lifetime)
	Sunburn	Ever (adult)
	Sunbathing	Ever (adult)
ENVIRONMENTAL EXPOSURES	Risk Factor	Exposure Definition
	Outdoor air pollution (PM2.5)	Any exposure (risk per 10 µg/m ³)
	Residential radon	Any exposure (risk per 100 Bq/m ³)
OCCUPATIONAL EXPOSURES	Risk Factor	Exposure Definition
	Solar radiation	Low, moderate or high exposure as defined and estimated by CAREX Canada https://www.carexcanada.ca/profile/uv_radiation_solar-occupational-exposures/#data_sources_and_methods
	Silica (crystalline)	Low, moderate or high exposure as defined and estimated by CAREX Canada https://www.carexcanada.ca/profile/silica_crystalline-occupational-exposures/#data_sources_and_methods
	Asbestos	Ever exposed
	Diesel engine exhaust	Low, moderate or high exposure as defined and estimated by CAREX Canada https://www.carexcanada.ca/profile/diesel_engine_exhaust-occupational-exposures/#data_sources_and_methods
	Shift work	Having a work schedule of rotating shifts (including nights) or of permanent night shifts, as defined by CAREX Canada estimated based on the Survey of Labour and Income Dynamics (SLID) 1996 https://www.carexcanada.ca/profile/shiftwork/
INFECTIONS	Risk Factor	Exposure Definition
	Hepatitis B virus (HBV)	Having the virus
	Human papillomavirus (HPV)	Having the virus

Canadian Community Health Survey (CCHS) PUMF (2019/2020, 2022)

Description:

The Canadian Community Health Survey (CCHS) public use microdata file (PUMF) includes data on health regions across Canada, based on interviews with about 130,000 respondents aged 12 and older over two years. It covers topics such as physical activity, body mass index (BMI), smoking, second-hand smoke exposure, alcohol use, general and chronic health conditions, injuries, health care use, as well as socio-demographic, income, and labour force characteristics. The CCHS also produces an annual microdata file.

For this report, several variables (see tables below) were cross tabulated using the PUMF, with support from BCCDC, with the following stratifications:

Read more about CCHS PUMF:

<https://www150.statcan.gc.ca/n1/en/catalogue/82M0013X>

Chapter that uses CCHS PUMF (2019/2020) data:

- Chapter 1: Smoking and Cancer Risk

Chapters that use CCHS PUMF (2022) data:

- Chapter 1: Smoking and Cancer Risk
- Chapter 3: Nutrition and Cancer Risk
- Chapter 4: Alcohol and Cancer Risk

Age group:

- 18-34
- 35-49
- 50-64
- 65+

Analysis by age category was restricted to respondents aged 18 and older.

Household income:

- No income or less than \$20,000
- \$20,000 - \$39,999
- \$40,000 - 59,999
- \$60,000 - \$79,999
- More than \$80,000

The lowest two household income categories were collapsed into < \$40,000 due to small sample size within the 'No income or less than \$20,000' category.

Highest level of education in the household:

- No post-secondary education
- Post-secondary certificate/diploma/ university degree

The highest level of education attained in the household is based on educational attainments of all household members. Post-secondary includes those with a trade, college, or CEGEP certificate or diploma. Estimates based on the highest level of education exclude non-respondents.

Health authority:

- Interior Health Authority
- Fraser Health Authority
- Vancouver Coastal Health Authority
- Vancouver Island Health Authority
- Northern Health Authority

The CCHS PUMF can provide estimates down to health service delivery area (HSDA). However, this level may provide sample sizes that are too small to provide reliable estimates for some indicators. It is unlikely that reliable estimates can be obtained for many HSDAs stratified by income, education, or age group. Therefore, CCHS data was stratified at the health authority level only.

CCHS PUMF (2019/2020, 2022) Cross-Tabulation Notes 1/3

- In addition to the previous 2015 redesign, the CCHS underwent a second major redesign in 2022. This redesign centered on a collection mode change from computer-assisted telephone interview (CATI)/computer-assisted personal interview (CAPI) to an electronic questionnaire (EQ) format with CATI and CAPI follow-up for non-response. As a result, caution should be used when comparing data between various cycles (i.e., pre-2015 data, 2015-2021 data, 2022-present data).
- Not stated (did not provide the answer) and valid skips (question not applicable to the respondent) were excluded from the denominator when calculating the proportions.
- Since the estimates obtained from the survey are based on a sample, there is variability in the values obtained in the sense that a different sample could produce different results. To take this into consideration, it is important to ensure that there are enough observations in the sample to produce reliable estimates. Proportions with less than 30 observations with the characteristics of interest were suppressed. The coefficient of variation (CV) was calculated using bootstrap weights to assess the reliability of proportions due to sampling variability. The CV along with estimated proportions were used to compute the effective sample size. This measure along with the sample size were used to flag instances where the estimate contains a high level of instability, making them unreliable and potentially misleading. The estimates were suppressed and identified with an 'F' in the Suppress variable. Estimates flagged with 'E' in the Suppress variable indicate moderate/high sampling variability, the estimate should be used with caution. Data users should use the 95% confidence interval to assess whether the quality of the estimate is sufficient.
- The confidence interval illustrates the degree of variability associated with a rate. Wide confidence intervals indicate high variability and rates should be interpreted with due caution. When comparing estimates, it is important to use confidence intervals to determine if differences between values are statistically significant.
- **Smoking Status** - Population aged 18 and older who reported being a current smoker (daily or occasional). This does not consider the number of cigarettes smoked. Data collected for this indicator is based on the question referring to smoking of cigarettes only. Occasional smoker refers to those who reported smoking cigarettes occasionally. This includes former daily smokers who now smoke occasionally.
- Due to a change in the content and flows in 2022, the current smoking status cannot be identified for respondents who reported having smoked at least one whole cigarette but less than 100 cigarettes in their lifetime. For this derived variable in the 2022 PUMF, these respondents are categorized as experimental smokers. This may result in an undercounting for current smoker. In 2022, respondents who have not smoked more than 100 cigarettes skipped the question about current smoking status and instead, would go to the end of the smoking module and were coded as experimental smokers. As a result, estimates of current smoking generated from the 2022 PUMF are not directly comparable to those from previous PUMF cycles and differ from the published Statistics Canada tables, available at <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009601>.
- In 2019/20, respondents were first asked 'at the present time do you smoke everyday, occasionally or not at all and later asked whether they smoked at least 100 cigarettes. Those who indicated they were current smokers but did not smoke at least 100 cigarettes were categorized as current daily or occasional smokers.

- **Exposure to Second-Hand Smoke (ETS)** - The estimate provided is derived from four questions:
 1. Including both household members and regular visitors, does anyone smoke inside your home, every day or almost every day?
 2. In the past month, were you exposed to second-hand smoke, every day or almost every day, at your workplace or at school?
 3. In the past month, were you exposed to second-hand smoke, every day or almost every day, in a car or other private vehicle?
 4. In the past month, were you exposed to second-hand smoke, every day or almost every day, in public places (such as bars, restaurants, shopping malls, arenas, bingo halls, bowling alleys)?
- The question used to determine exposure at home does not address second-hand smoke directly, but rather asks about the smoking habits of other household members. It is possible that people who smoke at home do so only in the absence of those who do not smoke, or in isolated areas, such as the garage. Because the CCHS covers only the population aged 12 or older, this analysis could not examine exposure to second-hand smoke among children younger than 12 years of age. The questions were asked in the 2019 and 2020 CCHS questionnaire but were not included in the 2022 questionnaire.
- Self-reported information surveys are commonly used to assess the prevalence of second hand smoke exposure; however, socially undesirable behaviours are particularly prone to underreporting.
- **Body Mass Index (BMI) adult** - A systematic review of the literature concluded that the use of self-reported data among adults underestimates weight and overestimates height, resulting in lower estimates of obesity than those obtained from measured data. Using data from the 2005 Canadian Community Health Survey (CCHS) subsample, where both measured and self-reported height and weight were collected, BMI correction equations have been developed. The table presents obesity estimates adjusted using these equations.
- **Heavy drinking** - Refers to males who reported having 5 or more drinks, or females who reported having 4 or more drinks, on one occasion, at least once a month in the past year.
- **Food insecurity** - Reflects the number of people living in the household with food insecurity. It is based on a set of 18 questions and describes the food security situation of the household in the previous 12 months. It captures four kinds of situations:
 1. Food secure: No indication of difficulty with income-related food access.
 2. Marginally insecure: Exactly one indication of difficulty with income-related food access.
 3. Moderately food insecure: Indication of compromise in quality and/or quantity of food consumed.
 4. Severely food insecure: Indication of reduced food intake and disrupted eating patterns.
- This variable is adopted from the Health Canada model of food security status. In 2020, Health Canada updated its recommended derivation of food insecurity measures to include the level 'marginal food insecurity'.

- **Fruit and vegetable consumption** - In 2018, questions regarding fruit and vegetable consumption were removed from the CCHS core content (asked to all CCHS respondents in 2019 and 2020). The module was included as a 1-year theme in 2017 and again in 2020 (all respondents were asked the questions in 2017 and 2020 only). BC provincial estimates are available on the Statistics Canada CANSIM Health Characteristics annual estimates website <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009601>. However, the module was not included in the 2017/2018 and 2019/2020 PUMF files because data for two years are required, and BC did not select fruit and vegetable consumption as an optional module in 2018 and 2019. Therefore, estimates for regional and socio-demographic strata are not available.
- The original Fruit and vegetable consumption (FVC) series of questions were replaced with a redesigned series of questions 'Eating Habit' in the 2022 CCHS. However, these questions were not asked to BC respondents.
- **Physical activity** - Questions regarding physical activities were part of CCHS core content (asked to all respondents) in 2017/2018 but this module was removed from core content in 2019. The module was included as a 1-year theme in 2020 (all respondents were asked the questions in 2020 only). BC provincial estimates are available on the Statistics Canada CANSIM Health Characteristics annual estimates website <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009601>. However, the module was not included in the 2019/2020 PUMF file because both years of data are required and BC did not select physical activities as an optional module in 2019. Therefore, estimates for regional and socio-demographic strata are not available in 2019/2020.
- Physical activity questions were not asked to BC respondents in the 2022 CCHS.
- **Physical activity** - Prior to 2015, Statistics Canada used the Minnesota Leisure Time Physical Activity Questionnaire in the CCHS. Respondents were classified as active, moderately active, or inactive based on an index of average daily physical activity over the past 3 months. For each leisure time physical activity engaged in by the respondent, an average daily energy expenditure was calculated by multiplying the number of times the activity was performed by the average duration of the activity by the energy cost (kilocalories per kilogram of body weight per hour) of the activity. The index was calculated as the sum of the average daily energy expenditures of all activities. Respondents were classified as follows with regards to physical activity:
 - 3.0 kcal/kg/day or more = active;
 - 1.5 to 2.9 kcal/kg/day = moderately active;
 - less than 1.5 kcal/kg/day = inactive.
- Revised Canadian Physical Activity Guidelines were published in 2011. The self-reported data collected by the physical activity questions in the CCHS meant it was not possible to determine whether respondents met the guidelines. To address this issue, Statistics Canada developed two new sets of questions - the Physical Activity Adult Questionnaire (PAAQ) and the Physical Activity Youth Questionnaire (PAYQ) - and implemented them in the CCHS beginning in 2015. Physical activity is now measured in terms of whether the respondent meets the guidelines.

Chapter 1: Smoking and Cancer Risk

Table 3 – Prevalence of current cigarette smoking, daily or occasional, in BC, by age group, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Smoking Status	Current smoking	BC Total	BC Total	7.7	6.8	8.7
Smoking Status	Former smoking	BC Total	BC Total	23.5	22.2	24.9
Smoking Status	Never smoking	BC Total	BC Total	68.7	67.1	70.3
Smoking Status	Current smoking	Age Group	18 to 34 years	7.7	5.5	10.0
Smoking Status	Former smoking	Age Group	18 to 34 years	9.1	7.0	11.2
Smoking Status	Never smoking	Age Group	18 to 34 years	83.1	80.1	86.2
Smoking Status	Current smoking	Age Group	35 to 49 years	8.8	6.8	10.8
Smoking Status	Former smoking	Age Group	35 to 49 years	21.4	18.1	24.7
Smoking Status	Never smoking	Age Group	35 to 49 years	69.8	66.2	73.4
Smoking Status	Current smoking	Age Group	50 to 64 years	9.7	7.6	11.8
Smoking Status	Former smoking	Age Group	50 to 64 years	25.1	22.2	28.0
Smoking Status	Never smoking	Age Group	50 to 64 years	65.2	61.9	68.4
Smoking Status	Current smoking	Age Group	65 and older	4.7	3.7	5.7
Smoking Status	Former smoking	Age Group	65 and older	40.3	37.7	42.9
Smoking Status	Never smoking	Age Group	65 and older	55.0	52.4	57.7

Table 4 – Prevalence of current smoking, former smoking, and never smoking, referring to commercial tobacco smoking, in BC, by sex (all ages), 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Smoking Status	Current smoking	Sex	Female	5.6	4.5	6.6
Smoking Status	Former smoking	Sex	Female	21.9	20.0	23.7
Smoking Status	Never smoking	Sex	Female	72.5	70.5	74.6
Smoking Status	Current smoking	Sex	Male	10.0	8.3	11.6
Smoking Status	Former smoking	Sex	Male	25.3	23.3	27.3
Smoking Status	Never smoking	Sex	Male	64.8	62.4	67.1

Table 5 – Prevalence of current smoking, referring to commercial tobacco smoking, in BC, by household income (all ages), 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Smoking Status	Current smoking	Income Level (Household)	\$0 - \$39,999	9.8	6.9	12.6
Smoking Status	Former smoking	Income Level (Household)	\$0 - \$39,999	29.9	25.6	34.1
Smoking Status	Never smoking	Income Level (Household)	\$0 - \$39,999	60.4	55.5	65.2
Smoking Status	Current smoking	Income Level (Household)	\$40,000 - \$59,999	9.7	6.9	12.5
Smoking Status	Former smoking	Income Level (Household)	\$40,000 - \$59,999	28.5	24.4	32.6
Smoking Status	Never smoking	Income Level (Household)	\$40,000 - \$59,999	61.8	57.1	66.6
Smoking Status	Current smoking	Income Level (Household)	\$60,000 - \$79,999	8.8	5.9	11.7
Smoking Status	Former smoking	Income Level (Household)	\$60,000 - \$79,999	28.1	23.8	32.4
Smoking Status	Never smoking	Income Level (Household)	\$60,000 - \$79,999	63.1	58.0	68.1
Smoking Status	Current smoking	Income Level (Household)	\$80,000 and more	6.9	5.7	8.1
Smoking Status	Former smoking	Income Level (Household)	\$80,000 and more	21.3	19.6	23.0
Smoking Status	Never smoking	Income Level (Household)	\$80,000 and more	71.8	69.8	73.8

Table 6 – Prevalence of current smoking, referring to commercial tobacco smoking, in BC, by household education level (all ages), 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Smoking Status	Current smoking	Education Attainment (Household)	No post-secondary education	11.2	8.6	13.7
Smoking Status	Former smoking	Education Attainment (Household)	No post-secondary education	28.7	25.2	32.2
Smoking Status	Never smoking	Education Attainment (Household)	No post-secondary education	60.1	56.2	64.1
Smoking Status	Current smoking	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	6.7	5.6	7.7
Smoking Status	Former smoking	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	22.3	20.8	23.8
Smoking Status	Never smoking	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	71.0	69.3	72.8

Table 7 – Prevalence of current smoking, referring to commercial tobacco smoking, by health authority in BC (all ages), 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Smoking Status	Current smoking	Health Authority	Fraser Health	8.2	6.3	10.0
Smoking Status	Former smoking	Health Authority	Fraser Health	20.0	17.5	22.5
Smoking Status	Never smoking	Health Authority	Fraser Health	71.9	68.9	74.8
Smoking Status	Current smoking	Health Authority	Interior Health	10.2	7.8	12.5
Smoking Status	Former smoking	Health Authority	Interior Health	29.1	26.0	32.3
Smoking Status	Never smoking	Health Authority	Interior Health	60.7	57.0	64.3
Smoking Status	Current smoking	Health Authority	Island Health	7.3	5.4	9.2
Smoking Status	Former smoking	Health Authority	Island Health	32.1	28.8	35.3
Smoking Status	Never smoking	Health Authority	Island Health	60.7	57.4	63.9
Smoking Status	Current smoking	Health Authority	Northern Health	14.9	11.1	18.7
Smoking Status	Former smoking	Health Authority	Northern Health	27.7	23.3	32.0
Smoking Status	Never smoking	Health Authority	Northern Health	57.4	52.3	62.5
Smoking Status	Current smoking	Health Authority	Vancouver Coastal Health	4.4	2.6	6.1
Smoking Status	Former smoking	Health Authority	Vancouver Coastal Health	19.0	16.4	21.5
Smoking Status	Never smoking	Health Authority	Vancouver Coastal Health	76.6	73.7	79.5

Table 10 – Prevalence of second-hand smoke exposure in BC, by age group, 2019/2020

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Exposure to second hand smoke	Yes	British Columbia	BC Total	13.3	12.1	14.4
Exposure to second hand smoke	No	British Columbia	BC Total	86.7	85.6	87.9
Exposure to second hand smoke	Yes	Age Group	12 to 17 years	18.8	15.1	22.6
Exposure to second hand smoke	No	Age Group	12 to 17 years	81.2	77.4	84.9
Exposure to second hand smoke	Yes	Age Group	18 to 34 years	18.8	15.9	21.7
Exposure to second hand smoke	No	Age Group	18 to 34 years	81.2	78.3	84.1
Exposure to second hand smoke	Yes	Age Group	35 to 49 years	15.1	12.2	18.1
Exposure to second hand smoke	No	Age Group	35 to 49 years	84.9	81.9	87.8
Exposure to second hand smoke	Yes	Age Group	50 to 64 years	9.9	8.0	11.9
Exposure to second hand smoke	No	Age Group	50 to 64 years	90.1	88.1	92.0
Exposure to second hand smoke	Yes	Age Group	65 and older	6.2	5.0	7.5
Exposure to second hand smoke	No	Age Group	65 and older	93.8	92.5	95.0

Table 11 – Prevalence of second-hand smoke exposure in BC, by sex (all ages), 2019/2020

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Exposure to second hand smoke	Yes	Sex	Female	11.2	9.8	12.6
Exposure to second hand smoke	No	Sex	Female	88.8	87.4	90.2
Exposure to second hand smoke	Yes	Sex	Male	15.5	13.6	17.4
Exposure to second hand smoke	No	Sex	Male	84.5	82.6	86.4

Table 12 – Prevalence of second-hand smoke exposure in BC, by household income (all ages), 2019/2020

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Exposure to second hand smoke	Yes	Income Level (Household)	\$0 - \$39,999	14.6	11.7	17.6
Exposure to second hand smoke	No	Income Level (Household)	\$0 - \$39,999	85.4	82.4	88.3
Exposure to second hand smoke	Yes	Income Level (Household)	\$40,000 - \$59,999	12.4	9.6	15.2
Exposure to second hand smoke	No	Income Level (Household)	\$40,000 - \$59,999	87.6	84.8	90.4
Exposure to second hand smoke	Yes	Income Level (Household)	\$60,000 - \$79,999	15.3	11.8	18.8
Exposure to second hand smoke	No	Income Level (Household)	\$60,000 - \$79,999	84.7	81.2	88.2
Exposure to second hand smoke	Yes	Income Level (Household)	\$80,000 and more	12.6	11.1	14.1
Exposure to second hand smoke	No	Income Level (Household)	\$80,000 and more	87.4	85.9	88.9

Table 13 – Prevalence of second-hand smoke exposure in BC, by household educational level (all ages), 2019/2020

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Exposure to second hand smoke	Yes	Education Attainment (Household)	No post-secondary education	13.0	10.4	15.7
Exposure to second hand smoke	No	Education Attainment (Household)	No post-secondary education	87.0	84.3	89.6
Exposure to second hand smoke	Yes	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	13.1	11.8	14.4
Exposure to second hand smoke	No	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	86.9	85.6	88.2

Table 14 – Prevalence of second-hand smoke exposure, by health authority in BC, (all ages), 2019/2020

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Exposure to second hand smoke	Yes	Health Authority	Fraser Health	14.5	12.4	16.7
Exposure to second hand smoke	No	Health Authority	Fraser Health	85.5	83.3	87.6
Exposure to second hand smoke	Yes	Health Authority	Interior Health	11.9	9.6	14.1
Exposure to second hand smoke	No	Health Authority	Interior Health	88.1	85.9	90.4
Exposure to second hand smoke	Yes	Health Authority	Island Health	11.6	9.0	14.1
Exposure to second hand smoke	No	Health Authority	Island Health	88.4	85.9	91.0
Exposure to second hand smoke	Yes	Health Authority	Northern Health	14.4	11.2	17.6
Exposure to second hand smoke	No	Health Authority	Northern Health	85.6	82.4	88.8
Exposure to second hand smoke	Yes	Health Authority	Vancouver Coastal Health	13.0	10.7	15.3
Exposure to second hand smoke	No	Health Authority	Vancouver Coastal Health	87.0	84.7	89.3

Chapter 3: Nutrition and Cancer Risk

Table 18 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by age group, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
BMI adults aged 18 and over (adjusted)	Overweight/Obese	BC Total	BC Total	60.3	58.5	62.1
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Age Group	18 to 34 years	48.6	44.1	53.2
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Age Group	35 to 49 years	65.8	62.3	69.3
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Age Group	50 to 64 years	67.1	63.9	70.3
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Age Group	65 and older	60.4	57.9	63.0

Table 19 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by sex, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Sex	Female	53.3	50.8	55.9
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Sex	Male	67.2	64.7	69.8

Table 20 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by household income, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Income Level (Household)	\$0 - \$39,999	55.7	50.6	60.8
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Income Level (Household)	\$40,000 - \$59,999	60.4	55.6	65.2
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Income Level (Household)	\$60,000 - \$79,999	62.0	56.6	67.3
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Income Level (Household)	\$80,000 and more	60.6	58.3	62.8

Table 21 – Prevalence of overweight/obesity (using BMI WHO classification) in BC, by household education level, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Education Attainment (Household)	No post-secondary education	65.7	61.7	69.6
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	59.4	57.3	61.5

Table 22 – Prevalence of overweight/obesity (using BMI WHO classification), by health authority in BC, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Health Authority	Fraser Health	62.6	59.1	66.1
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Health Authority	Interior Health	62.8	58.9	66.8
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Health Authority	Island Health	68.2	65.1	71.3
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Health Authority	Northern Health	69.7	63.9	75.5
BMI adults aged 18 and over (adjusted)	Overweight/Obese	Health Authority	Vancouver Coastal Health	47.9	44.4	51.5

Table 23 – Prevalence of overweight/obesity (using BMI WHO classification) among individuals aged 12-17 years, by health authority in BC, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
BMI age 12 to 17 (self-reported) - WHO classification	Overweight/Obese	Health Authority	Fraser Health	31.8 ^E	19.3	44.3
BMI age 12 to 17 (self-reported) - WHO classification	Overweight/Obese	Health Authority	Interior Health	F	F	F
BMI age 12 to 17 (self-reported) - WHO classification	Overweight/Obese	Health Authority	Island Health	36.9 ^E	22.0	51.8
BMI age 12 to 17 (self-reported) - WHO classification	Overweight/Obese	Health Authority	Northern Health	F	F	F
BMI age 12 to 17 (self-reported) - WHO classification	Overweight/Obese	Health Authority	Vancouver Coastal Health	23.0 ^E	11.4	34.5

^E(superscript) = use with caution F = suppressed

Table 24 - Prevalence of households experiencing food insecurity (marginal, moderate or severe), by sex, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Household food security status (including marginally)	Marginally, moderately, severely food security	BC Total	BC Total	15.6	14.3	16.9
Household food security status (including marginally)	Marginally, moderately, severely food security	Sex	Female	16.9	15.2	18.7
Household food security status (including marginally)	Marginally, moderately, severely food security	Sex	Male	14.2	12.3	16.2

Table 25 - Prevalence of households experiencing food insecurity (marginal, moderate or severe), by household income level, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Household food security status (including marginally)	Marginally, moderately, severely food security	Income Level (Household)	\$0 - \$39,999	27.9	23.4	32.5
Household food security status (including marginally)	Marginally, moderately, severely food security	Income Level (Household)	\$40,000 - \$59,999	19.4	15.4	23.4
Household food security status (including marginally)	Marginally, moderately, severely food security	Income Level (Household)	\$60,000 - \$79,999	17.2	13.8	20.6
Household food security status (including marginally)	Marginally, moderately, severely food security	Income Level (Household)	\$80,000 and more	13.1	11.4	14.7

Table 26 - Prevalence of households experiencing food insecurity (marginal, moderate or severe), by household education level, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Household food security status (including marginally)	Marginally, moderately, severely food security	Education Attainment (Household)	No post-secondary education	19.1	15.8	22.4
Household food security status (including marginally)	Marginally, moderately, severely food security	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	14.7	13.2	16.1

Table 27 - Prevalence of households experiencing food insecurity (marginal, moderate or severe), by health authority, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Household food security status (including marginally)	Marginally, moderately, severely food security	Health Authority	Fraser Health	14.9	12.5	17.3
Household food security status (including marginally)	Marginally, moderately, severely food security	Health Authority	Interior Health	16.1	13.1	19.1
Household food security status (including marginally)	Marginally, moderately, severely food security	Health Authority	Island Health	17.6	14.7	20.6
Household food security status (including marginally)	Marginally, moderately, severely food security	Health Authority	Northern Health	17.9	14.4	21.4
Household food security status (including marginally)	Marginally, moderately, severely food security	Health Authority	Vancouver Coastal Health	14.5	12.0	17.0

Chapter 4: Alcohol and Cancer Risk

Table 3 – Prevalence of heavy drinking at least once a month in the past year in BC, by age group, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Heavy drinking at least once a month - past 12 months	Yes	BC Total	BC Total	20.1	18.5	21.6
Heavy drinking at least once a month - past 12 months	Yes	Age Group	18 to 34 years	25.9	22.2	29.6
Heavy drinking at least once a month - past 12 months	Yes	Age Group	35 to 49 years	24.9	21.3	28.5
Heavy drinking at least once a month - past 12 months	Yes	Age Group	50 to 64 years	19.4	16.6	22.2
Heavy drinking at least once a month - past 12 months	Yes	Age Group	65 and older	9.3	7.9	10.7

Table 4 – Prevalence of heavy drinking at least once a month in the past year in BC, by sex, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Heavy drinking at least once a month - past 12 months	Yes	Sex	Female	17.1	15.2	19
Heavy drinking at least once a month - past 12 months	Yes	Sex	Male	23.2	20.7	25.6

Note: In the context of the Canadian Community Health Survey, “heavy drinking” refers to males who reported having 5 or more drinks or females who reported having 4 or more drinks, on one occasion, at least once a month in the past year.

Table 5 – Prevalence of heavy drinking at least once a month in the past year in BC, by household income, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Heavy drinking at least once a month - past 12 months	Yes	Income Level (Household)	\$0 - \$39,999	17	12.7	21.4
Heavy drinking at least once a month - past 12 months	Yes	Income Level (Household)	\$40,000 - \$59,999	14.4	11.5	17.2
Heavy drinking at least once a month - past 12 months	Yes	Income Level (Household)	\$60,000 - \$79,999	17.2	13.5	20.8
Heavy drinking at least once a month - past 12 months	Yes	Income Level (Household)	\$80,000 and more	21.7	19.8	23.7

Table 6 – Prevalence of heavy drinking at least once a month in the past year in BC, by household education level, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Heavy drinking at least once a month - past 12 months	Yes	Education Attainment (Household)	No post-secondary education	19.6	15.9	23.3
Heavy drinking at least once a month - past 12 months	Yes	Education Attainment (Household)	Post-secondary certificate/diploma/university degree	20	18.3	21.8

Table 7 – Prevalence of heavy drinking at least once a month in the past year in BC, by health authority, 18 years and over, 2022

Variable	Variable Category	Stratifier	Stratifier Category	Percent	Low95CL	High95CL
Heavy drinking at least once a month - past 12 months	Yes	Health Authority	Fraser Health	16.9	14.1	19.8
Heavy drinking at least once a month - past 12 months	Yes	Health Authority	Interior Health	26.4	22.5	30.2
Heavy drinking at least once a month - past 12 months	Yes	Health Authority	Island Health	21.9	19	24.8
Heavy drinking at least once a month - past 12 months	Yes	Health Authority	Northern Health	25	20.2	29.8
Heavy drinking at least once a month - past 12 months	Yes	Health Authority	Vancouver Coastal Health	18.6	15.7	21.5

GLOSSARY

Term	Definition	Term	Definition
2SLGBTQI+ community	An inclusive term that encompasses people who identify as Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, Intersex, and other diverse sexual orientations and gender identities. 2S acknowledges the unique identities and experiences of Indigenous peoples.	Asbestos	A group of naturally occurring fibrous minerals that are known for their heat resistance and insulating properties. It has been widely used in construction and manufacturing but is now recognized as a significant health hazard due to its association with lung diseases, including asbestosis and lung cancer.
Active commuting/ Active transportation	Modes of transportation that involve physical activity, such as walking, cycling, or using public transit that requires some form of exercise, instead of relying solely on motor vehicles.	Attributable cases	As defined by the Canadian Population Attributable Risk of Cancer (ComPARe) study, it is the number of cancer cases caused by a risk factor; the number of cancer cases that would have been avoided if exposure to the risk factor did not exist. It is obtained by converting the population attributable risk (PAR) (%) into a count.
Adolescent	A person typically aged 10 and 19 years, during which they undergo significant physical, emotional, and social development. This period is critical for the formation of behaviours and habits, such as attitudes toward alcohol use.	Bacteria	A single-celled microorganisms that are prokaryotic in nature, meaning they lack a defined nucleus. Bacteria can be found in diverse environments, including soil, water, and within the human body. They can be beneficial, neutral, or harmful, depending on the species and context.
Air monitoring station	A facility equipped with instruments and technology to measure and analyze the concentration of air pollutants in the atmosphere. These stations collect data on various pollutants, including particulate matter, ozone, nitrogen dioxide, sulphur dioxide, and volatile organic compounds. This can help identify pollution sources and track trends over time.	Becquerels per cubic metre (Bq/m³)	A unit of measurement used to quantify the concentration of radioactive material in the air. It indicates the number of radioactive decays occurring in one cubic metre of air per second. It is commonly used in environmental health studies, such as in studies of radon exposure.
Air quality management level	A specified tier or degree of action and regulation taken to manage and improve air quality within a defined area. This level can vary based on the concentration of pollutants, public health standards, and regulatory frameworks. They help determine the appropriate strategies and policies needed to reduce pollution and meet environmental standards. These levels may be categorized from low to high, prompting different responses and mitigation measures.	Canadian Ambient Air Quality Standard (CAAQS)	A set of national standards established to protect the health of Canadians and the environment by setting limits on the concentration of specific air pollutants in ambient air. The CAAQS includes standards for pollutants such as particulate matter (PM2.5), ground-level ozone (O ₃), nitrogen dioxide (NO ₂), and sulphur dioxide (SO ₂).
Air zone	A designated geographic area classified based on the levels of air pollutants and the quality of the air within that region. Air zones help in assessing air quality and implementing regulations or management strategies tailored to specific environmental conditions. Different air zones may have varying standards and guidelines for pollutants, influenced by local sources of emissions, population density, and meteorological conditions. This classification aids in tracking air quality trends and ensuring compliance with environmental standards.	Cancer burden	The total impact of cancer on people, communities, and health care systems, including the incidence, prevalence, mortality, and economic costs associated with cancer diagnoses and treatments. This burden reflects both the physical and psychological effects of cancer on patients, families, and communities. It helps identify trends in cancer occurrence, assess the effectiveness of prevention and treatment strategies, and helps the creating and implementation of health policies.

Term	Definition	Term	Definition
Cancer incidence	The number of new cases of cancer diagnosed in a specific population during a defined time period, typically expressed per 100,000 individuals per year.	Carcinogen	Substances or agents that can cause cancer in living tissue. Carcinogens can be found in various forms, including chemicals, radiation, and biological agents, and are often linked to environmental exposures such as pollution, tobacco smoke, and certain industrial chemicals.
Commercial tobacco	Tobacco products that are grown, processed, and sold for profit, including cigarettes, cigars and smokeless tobacco. These products are typically produced by large companies and marketed to consumers.	Crystalline silica	A naturally occurring mineral found in various forms, including quartz, cristobalite, and tridymite. It is commonly used in construction, mining, and manufacturing processes. It becomes a health hazard when inhaled as fine dust, leading to respiratory diseases such as silicosis and lung cancer.
Cultural safety	An approach to health care and community services that respects the cultural identities of people and communities, ensuring that interactions are free from racism and discrimination, and promotes a sense of safety and belonging.	Diesel engine exhaust	A complex mixture of gases and particulate matter emitted from diesel engines during combustion. It contains a variety of harmful pollutants, including nitrogen oxides (NOx), particulate matter (PM), and carcinogenic compounds such as benzene and formaldehyde. Long-term exposure has been linked to respiratory diseases, cardiovascular issues, and an increased risk of lung cancer.
Digital continuous radon monitor (CRM) units	Devices designed to continuously measure and record radon levels in indoor environments. These monitors provide real-time data on radon concentration, typically displaying results in Becquerels per cubic metre (Bq/m ³) and allowing for immediate assessment of radon exposure.	Equity-deserving	Communities and groups that experience barriers to equal access, opportunities and resources due to historical disadvantages and discrimination. In Canada, equity-deserving groups include people who identify as Indigenous, Black, Person of Colour (IBPOC), 2SLGBTQI+, people with disabilities, low-income populations, and those living in rural and remote areas. This term emphasizes that equity is a right, not something to be requested, and places responsibility of equity on those with power (i.e., the dominant group).
		Exercise	Physical activity that is planned, structured, and repetitive for the purpose of improving or maintaining physical fitness, health, and overall well-being.
		Exposure	As defined by the Canadian Population Attributable Risk of Cancer (ComPARe) study, it is any agent (e.g. alcohol, air pollution, HPV) that a person may come into contact with. Sometimes a certain level of exposure is needed for the agent to be considered a risk factor (e.g. eating less than four servings of fruit per day is a risk factor for colorectal cancer).
		Exposure prevalence	As defined by the Canadian Population Attributable Risk of Cancer (ComPARe) study, it is the percentage of a population exposed to a given risk factor.
		Fine particulate matter (PM_{2.5})	An airborne particle with a diameter of 2.5 micrometres or smaller, which can be inhaled and penetrate deep into the respiratory system. PM _{2.5} includes a mixture of organic and inorganic substances, such as soot, smoke, and liquid droplets. Exposure is associated with various health issues, including respiratory diseases, cardiovascular problems, and increased risk of cancer. It is often generated from combustion processes, industrial emissions, and vehicular traffic.
		Food literacy	The knowledge and skills required to make informed food choices, including understanding nutrition, cooking skills, food safety, and the ability to navigate the food system effectively.

Term	Definition	Term	Definition
Food outlet	A retail establishment that sells food and beverages, which can include supermarkets, grocery stores, convenience stores, restaurants, cafes, and food trucks.	Food sovereignty	The right of peoples and communities to define their own food systems, including the production, distribution, and consumption of food, emphasizing sustainable practices, local resources, and cultural traditions.
Genital warts	Small, flesh-coloured or grey growths that appear on the genital area, caused by certain strains of the human papillomavirus (HPV). They are a common sexually transmitted infection (STI) and can be spread through direct skin-to-skin contact during sexual activity. They are generally not harmful and may resolve on their own but can be uncomfortable and may indicate the presence of HPV.	Heavy drinking	Activities that people engage in during their free time for enjoyment, relaxation, or recreation, which are not driven by work or obligations. Examples are hobbies, sports, reading, socializing, and outdoor activities.
Hepatitis B	A pattern of alcohol use characterized by drinking more than the recommended limits, typically defined as consuming 14 or more drinks per week for males and 7 or more drinks per week for females, or binge drinking (consuming 5 or more drinks on a single occasion for males, and 4 or more for females).	Moderate-to-vigorous-intensity aerobic physical activity	A viral infection caused by the hepatitis B virus (HBV) that affects the liver, leading to inflammation and potentially resulting in chronic liver disease, cirrhosis, and liver cancer. Hepatitis B is transmitted through contact with infectious body fluids, such as blood, semen, or vaginal secretions.
Human papillomavirus (HPV)	A group that includes more than 200 related viruses, some of which are sexually transmitted and can lead to various health issues, including genital warts and certain types of cancer, such as cervical, anal, and oropharyngeal cancers.	Modifiable risk factor	A category of physical activity that includes exercises performed at a level of intensity that raises heart rate and breathing, characterized by a range of effort from moderate (e.g., brisk walking, dancing) to vigorous (e.g., running, swimming laps).
Indigenous Peoples	A group that includes more than 200 related viruses, some of which are sexually transmitted and can lead to various health issues, including genital warts and certain types of cancer, such as cervical, anal, and oropharyngeal cancers.	Nicotine replacement therapy (NRT)	As defined by the Canadian Population Attributable Risk of Cancer (ComPARe) study, it is a risk factor that can be manipulated or changed to reduce its impact on developing disease. For example, age is not a modifiable risk factor, but tobacco smoking is a modifiable risk factor because the behaviour can be changed.
		Night shift work	Designed to help reduce withdrawal symptoms and cravings when quitting smoking, it is a medically approved way to deliver nicotine to the body without the harmful substances found in tobacco smoke. NRT products include patches, gum, lozenges, inhalers, and nasal sprays.
			A work schedule that requires people to perform their job duties during the night, typically outside of traditional daytime hours. This often includes shifts that start in the evening and extend into the early morning. Night shift work can disrupt natural circadian rhythms and has been associated with various health risks, including increased incidence of certain cancers, sleep disorders, and metabolic issues.

Term	Definition	Term	Definition
Non-binary	A gender identity that does not fit within the traditional binary understanding of male and female. Non-binary people may identify as both, neither, or a combination of genders, and their gender identity can be fluid. The recognition of non-binary identities challenges societal norms surrounding gender and emphasizes the importance of respecting a person's self-identifications and pronouns. Non-binary people may face unique social and health challenges, and awareness is growing regarding their rights and needs.	Processed food	Food that has been altered from its original form through various methods, including canning, freezing, refrigeration, dehydration, and the addition of ingredients such as preservatives, flavourings, and colourings.
Obesity	A condition characterized by an excessive amount of body fat, defined by a Body Mass Index (BMI) of 30 or greater. It increases the risk of numerous health problems, including heart disease, stroke, type 2 diabetes, and certain types of cancer.	Processed meat	Meat that has been preserved by smoking, curing, salting, or adding chemical preservatives. This includes products such as sausages, hot dogs, bacon, and deli meats.
Overweight	A Body Mass Index (BMI) of 25 to 29.9, indicating that a person has a higher body weight than is considered normal for their height. It is associated with increased risk of various health issues such as cardiovascular diseases, type 2 diabetes, and certain cancers.	Relative risk (RR) and Odds ratio (OR)	As defined by the Canadian Population Attributable Risk of Cancer (ComPARe) study, it is the measure of the extent to which an exposure is associated with an increased (or decreased) risk for cancer.
Quantitative indicator	A measurable value that demonstrates the extent or level of a particular phenomenon, often used to assess performance, trends, or changes over time, such as incidence rate.	Residential radon testing	The process of measuring radon levels in a home or residential building to determine the concentration of this radioactive gas, which can seep into buildings from the ground. Testing can be done using short-term or long-term radon detectors, and if elevated levels are found, mitigation measures can be implemented.
Parasite	An organism that lives on or in a host organism, deriving nutrients from the host. They can be classified into several types, including protozoa, helminths (worms), and ectoparasites (like fleas and ticks). They often have complex life cycles and can be transmitted through various ways, including contaminated food or water, insect bites, or direct contact.	Risk factor	As defined by the Canadian Population Attributable Risk of Cancer (ComPARe) study, it is anything that increases the chance of developing cancer.
Physical inactivity	A state characterized by insufficient physical activity to meet the recommended guidelines for health, often defined as engaging in less than 150 minutes of moderate-intensity aerobic activity per week.	Second-hand smoke	A mixture of smoke exhaled by a person that smokes tobacco and smoke emitted from the burning end of a tobacco product, containing harmful chemicals that can affect people within close range.
Population attributable risk	The proportion of incidence in the population that can be attributed to a specific risk factor, indicating the potential impact of that risk factor on public health. It reflects the percentage reduction in disease incidence that would occur if the risk factor were eliminated.	Sedentary behaviour	Any waking activity characterized by low energy expenditure, typically defined as sitting or lying down, with very little movement, such as watching television, using a computer, or reading. It is associated with various health risks, including obesity, cardiovascular disease, and type 2 diabetes.
		Sexually transmitted infection (STI)	Infections that are primarily spread through sexual contact (exchanging bodily fluids), including vaginal, anal, and oral sex. Common STIs include chlamydia, gonorrhea, syphilis, human immunodeficiency virus (HIV), and human papillomavirus (HPV). STIs can affect anyone who is or has been sexually active and they may not always present symptoms.

Term	Definition	Term	Definition
Shade sails	Fabric structures designed to provide shade and protection from harmful ultraviolet (UV) radiation. Typically made of durable, weather-resistant materials, shade sails are tensioned and anchored to posts or existing structures. They are often used in outdoor spaces such as parks, playgrounds, and patios to enhance comfort and safety by reducing sun exposure.	Social determinants of health	Conditions in which people are born, grow, live, work, and age that influence their health outcomes. These include socio-economic status, education, neighbourhood and physical environment, employment, and social support networks.
Solar ultraviolet (UV) radiation	Ultraviolet (UV) radiation emitted by the sun, which is classified into three types: UVA, UVB, and UVC. UVA and UVB are of particular concern for human health, as they can cause skin damage, increase the risk of skin cancer, and contribute to other health issues. Solar UV radiation exposure varies by geographic location, time of year, and time of day.	Tanning beds	Enclosed devices that emit ultraviolet (UV) radiation to induce tanning of the skin. Tanning beds typically use fluorescent lamps that produce UVA and UVB rays, similar to those from natural sunlight. The use of tanning beds is associated with an increased risk of skin damage and skin cancers, including melanoma.
Traditional tobacco	Sacred tobacco plant that is used in cultural and spiritual practices by Indigenous peoples, often grown and prepared in a way that differs significantly from commercial tobacco products.	Transboundary flows	The movement of pollutants, such as air or water contaminants, across national or regional borders. These flows can occur through natural processes like wind or water currents, as well as human activities, and can significantly impact air and water quality in different areas.
Ultraviolet (UV) bracelets	Wearable accessories designed to change colour in response to UV radiation exposure, providing a visual indicator of sun exposure levels. These bracelets help users monitor their time in the sun and encourage sun safety practices.	Ultraviolet (UV) radiation	A type of electromagnetic radiation emitted by the sun and artificial sources, such as tanning beds. Exposure to UV radiation can lead to skin damage, sunburn, and increased risk of skin cancers, including melanoma.
		Vaccine	A biological preparation that provides acquired immunity to a specific infectious disease. Vaccines typically contain antigens derived from the pathogen (live attenuated, inactivated, or subunit) that stimulate the immune system to recognize and combat the pathogen without causing the disease.
		Vapour product	A device that produces aerosol by heating a liquid solution containing nicotine, flavourings, and other chemicals, commonly used as an alternative to commercial tobacco smoking. Examples include e-cigarettes, vape pens, and mods.
		Viruse	A microscopic infectious agent that requires a living host cell to replicate and reproduce. Viruses consist of genetic material (either DNA or RNA) encased in a protein coat and can infect a wide range of organisms, including animals, plants, and bacteria. They are responsible for many diseases in humans, animals, and plants, ranging from the common cold and influenza to more severe illnesses like HIV/AIDS. They can spread through various routes, including direct contact, respiratory droplets, and contaminated surfaces.

