Priority health equity indicators for British Columbia:

Selected indicators report

January 2016

Provincial Health Services Authority

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Population and Public Health Program
Provincial Health Service Authority (PHSA)

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Foreword

Overall, British Columbians are among the healthiest people in the world yet good health is not evenly distributed across our province.

We know that about 75% of our overall health is determined by social factors such as working or living conditions, income, and educational opportunities. These factors affect the rates of chronic disease and injury, contributing to health inequity or unfair differences in health and well-being for people of different groups.

Research has shown that the lower a person's socio-economic position, the higher his or her risk of poor health. Early adversity may be overcome by later improvements in social circumstances, however early experiences can leave a person more vulnerable to poor health later in life.

Health inequities have significant social and economic costs to individuals and to society as a whole.

The direct health system costs associated with providing care to a sicker and more disadvantaged population are substantial. These costs are dwarfed by the indirect costs of health inequities, such as lost productivity, lost tax revenue, absenteeism, family leave, and disability or premature death.

We are putting forward a snapshot of some current health inequities in BC and hoping to spark conversation about the value of this kind of information and the information needed to inform policy and practice.

Through a consensus process 52 equity indicators were identified. This report analyzes data for 16 of the 52 equity-related indicators across various population groups and sociodemographic and geographic dimensions. Collectively, this data begins to show patterns of inequity across the lifecourse, from early childhood and adolescence through to adulthood. As these patterns begin to emerge over time, we can start to understand which groups of people are being left behind, even as the average British Columbian continues to live a longer and healthier life.

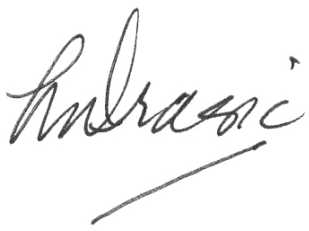
As you read this report, I hope you will consider:

- How you could use these findings in your work?
- What more is needed to monitor trends on health inequity?
- What would be helpful in creating action on promoting health equity?

Please send us your thoughts, ideas and perspectives on the questions we have posed. You can write to us directly at pph@phsa.ca.

Together, we all play a role in creating the right conditions and opportunities to support individuals and populations to reach their full potential for health.

Sincerely,



Lydia Drasic

Executive Director, British Columbia Centre for Disease Control (BCCDC) Operations and Chronic Disease Prevention, BCCDC and Provincial Health Services Authority

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Executive summary

British Columbia is one of the healthiest provinces in Canada, ranking favourably among provinces and territories on several population health indicators. Despite this overall success, there is considerable evidence that health status varies greatly depending on geography, demographics and socio-economic status (SES).[1] Moreover, Aboriginal peoples, women and those living in rural and remote areas of BC are at greater risk of experiencing health inequities than other BC residents.[2]

Since the 2008 release of *Health Inequities in BC* by the Health Officers Council of BC, Population and Public Health (PPH) has worked in partnership with the Ministry of Health, regional health authorities, and agencies and organizations within and outside of Provincial Health Services Authority (PHSA) on health promotion and chronic disease prevention strategies aimed at reducing health inequities. In 2011, PPH released *Towards reducing health inequities: A health system approach to chronic disease prevention* that focused on actions the health system can take to reduce health inequities.[3] In support of developing health equity targets, PPH collaborated with health sector partners to develop a prioritized suite of health equity indicators for BC. This suite of 52 priority health equity indicators, released in 2014, could be used to provide evidence of health inequities in BC across various geographic, demographic and socio-economic dimensions, as a first step towards setting targets and creating future action on equity.[4]

This report is intended to contribute to and complement provincial health status reporting of the *BC's Guiding Framework for Public Health.*[5] By analyzing current data, 16 health equity indicators drawn from the priority suite are examined across selected geographic, demographic and socio-economic dimensions. To keep the report timely, PPH analyzed indicators and equity dimensions for which data was accessible and available. With the exception of life expectancy at birth, these indicators are drawn from sources that do not include data from on-reserve BC Aboriginal populations (Appendix 2). The selected indicators are organized into four chapters: life expectancy, early childhood development, adolescent health and general population health.

Life expectancy

Life expectancy at birth is used worldwide as a general measure of a population's health. Life expectancy of population groups can also indicate social conditions such as wealth, economic opportunity, healthcare and education.[6]

Key findings

Life expectancy in BC varies by sex, geographic region, and socio-economic status:

- Females are generally expected to live longer than males (85 and 81 years, respectively in 2013).
- People in central and northern parts of the province have shorter life expectancies.
- People living in high SES local health areas are expected to live nearly four years longer than people living in low SES areas (82.2 vs. 78.6 years respectively).

Early childhood development

The early years of a child's life have strong influences on lifelong health and social outcomes, including school success, economic participation, social citizenship and health.[7] Three priority health equity indicators from the Early Development Instrument (EDI) were examined using data from 2011/12 to 2012/13.

Key findings

The rate of BC children who are developmentally vulnerable during early childhood varies significantly by geographic region, sex, and neighbourhood levels of unemployment and income:

- Rates of language and cognitive development vulnerability varied by Health Service Delivery Area (HSDA), ranging from a low of 5.8% to a high of 13.5%.
- The rate of vulnerability in one or more EDI areas was higher in boys (40.3%) than girls (24.5%), and was higher in regions with higher unemployment (35.4%) than lower unemployment (29.8%).
- The rate of vulnerability in one or more EDI areas was highest among children in regions with the lowest income (45.3%).

Adolescent health

Adolescence is an important stage for healthy adult development. Promoting healthy practices and taking steps to better protect young people from health risks can prevent or reduce the impact of health problems in adulthood.[8] Using BC's Adolescent Health Survey data collected in 2013, five priority health equity indicators for the BC youth in Grades 7 to 12 were examined across three equity dimensions, sex, geographic region, and neighbourhood income level.

Key findings

Several key indicators of adolescent health (prevalence of physical and sexual abuse, discrimination, smoking, and substance use before age 15) vary significantly by geographic region and sex:

- Rates of substance use before the age of 15 differed by HSDA, ranging from the lowest (22%) to the highest (50%), a difference of 28%.
- Females reported higher rates of abuse (22%) and discrimination (41%), and slightly lower rates of smoking (9%) than males (13%, 30% and 11%, respectively).

General population health

Measuring general health and mental health can reveal a population's overall health and well-being, resiliency and social environments. Adult health and well-being are influenced by a complex set of social and environmental factors that include current living and working conditions, as well as early life experiences. Seven general health status and outcome indicators, all based on self-reported data from the Canadian Community Health Survey from 2007/08 to 2011/12, were examined across various geographic, demographic and socio-economic dimensions.

Key findings

Among the general BC population, the rates of different health and well-being indicators vary significantly by geographic region, sex, education and income:

- Obesity rates were more than three times higher in the HSDA with the highest rate (22.4%) compared to the one with the lowest rate (6.9%).
- Significantly higher rates of females reported mood/anxiety disorder (13.7%) and adequate fruit and vegetable consumption (48.6%) than males (7.7% and 36.4% respectively).
- People with at least a high school diploma reported significantly more favourable rates for a number of indicators than those with less than a high school education: positive perceived health (62.5% vs. 45.3%), positive perceived mental health (72.0% vs. 59.0%), adequate fruit and vegetable consumption (42.9% vs. 34.8%), leisure time physical activity (59.5% vs. 51.3%), mood/anxiety disorder (10.2% vs. 16.4%), adult obesity (12.2% vs. 17.3%) and current smoking (16.6% vs. 39.8%).
- People in the highest income group reported significantly more favourable rates than those in the lowest income group for a number of indicators: positive perceived health (71.9% vs. 47.8%), positive perceived mental health (78.8% vs. 59.2%), adequate fruit and vegetable consumption (47.9% vs. 35.8%), leisure time physical activity (69.3% vs. 48.2%), mood/anxiety disorder (7.9% vs. 17.4%) and current smoking (12.0% vs. 26.5%).

Conclusions and next steps

The results of analyzing 16 indicators from BC's priority health equity indicator suite demonstrate that some groups of British Columbians are doing noticeably better than others. The evidence provided here reveals some of the inequities various populations groups may face across geographic, demographic and socio-economic dimensions. Application of similar approaches by others at the health system or program levels could reveal important health inequities in service delivery and utilization. This type of information can inform policies and programs to reduce inequitable gaps and improve opportunities for good health across all population groups.

As a next step, PHSA PPH intends to engage our partners to explore how these findings can inform monitoring trends on health inequity. Additionally, working with a variety of partners, PPH also hopes to begin exploring how equity surveillance of the prioritized suite of equity indicators can inform action on promoting health equity.

1.0 Introduction

1.1 Background

Canadians are among the healthiest people in the world, and British Columbians are among the healthiest in Canada. Although we are doing well overall, many of us do not have the same opportunities to be as healthy as others.

About 75% of our overall health is determined by social factors like working or living conditions, income, educational opportunities, as well as social support networks, and connections with others. These social factors strongly affect the rates of disease and injury, leading to different levels of health and well-being for people of different population groups. Health inequities are health differences between population groups that are systematic, avoidable and unfair. They are associated with significant and wide-reaching health, social and economic costs.

Some population groups are at greater risk of health inequities, such as Aboriginal peoples, women and those living in rural and remote areas.[11] In BC, and across Canada, Aboriginal people experience poorer health outcomes with higher mortality rates for all measures of premature mortality, during both infancy and later in life, for major chronic diseases and risk factors such as hazardous drinking, drugs or smoking.[12] While research shows that BC women have a longer life expectancy than men, they are more likely to have poorer health status and are less likely to report being in good or excellent health than the Canadian average.[13] Living in rural and remote areas also impacts the health of British Columbians as they are more likely to experience significant barriers to good health, including longer distances and poor transportation systems to access health care services.[14]

Health equity is when all people are able to reach their full health potential and are not prevented from doing so because of their race, ethnicity, religion, gender, age, social class, socio-economic status, sexual orientation or some other socially determined circumstance.

Health inequity is an avoidable or preventable health disparity that is considered unjust or unfair across one or more of these geographic, demographic and socio-economic dimensions.[9, 10]

Disparities in health status and health outcomes have been observed throughout BC, other provinces and territories in Canada, and in nations around the world for over a hundred years.[15,16] In recent years, health inequities have gained growing attention, starting with the Lalonde Report[17] and the Epp report in Canada,[18] the Black Report in the UK[19] and leading to a World Health Organization International Commission on the Social Determinants of Health.[20] Across Canada and around the world, there is now an increasing emphasis on adopting policies and taking actions that could narrow population health differences and reduce health inequities.[21, 22]

1.2 Health equity initiatives in British Columbia

During the planning phase for the 2010 Winter Olympic and Paralympic Games, BC set a goal to be "the healthiest jurisdiction to ever host an Olympic Games."[23] Leading up to the Games, health leaders and policy analysts began to scrutinize population health in pursuit of this goal and determined that health status was not evenly distributed among British Columbians. Since that time, several key surveillance reports have been developed to inform provincial action on health equity in BC (Table 1).

Table 1. Key health equity-related surveillance reports in British Columbia

Year	Organization	Title	Description
2008	Health Officers' Council of BC	Health inequities in BC[24]	■ Revealed a number of health inequities in BC (typically considered a very healthy province overall) ■ Presented various potentially effective policy options to address inequities
2009	PHSA BC Centre of Excellence for Women's Health	Taking a Second Look: Analyzing Health Inequities in British Columbia with a Sex, Gender and Diversity Lens[25]	■ Applies a sex- and gender-based analysis to BC data on life expectancy and poverty, including food insecurity and homelessness.
2011	PHSA Population and Public Health Program	Towards reducing health inequities: A health system approach to chronic disease prevention (RHI) [26]	■ Described health system actions that could reduce health inequities ■ One recommendation was to prioritize setting health equity targets
2013	Health Officers' Council of BC	Health inequities in BC (2013 update)[27]	■ Showed that health inequity in BC is increasing ■ Life expectancy increased by over 14 months in the highest socio-economic status regions (the top 20%), while life expectancy for the province as a whole increased by only six months
2014	PHSA Population and Public Health Program	Developing priority health equity indicators for BC: Process and outcome report [28]	■ Published a list of priority indicators for monitoring health equity in BC ■ Was prompted by 2011 RHI report recommendation to set health equity targets (first step required developing indicators)

Equity is also a key principle of *BC's Guiding Framework for Public Health.*[29] Released by the Ministry of Health in 2013, the framework specifies seven visionary goals for the public health system meant to achieve better health for all British Columbians, while also promoting improved health equity across all population groups. An important step for monitoring progress towards these goals over the next decade will be to apply an equity lens to the surveillance of indicators.

1.3 Report purpose

Acting on recommendations from past reports and discussions, the Population and Public Health Program of Provincial Health Services Authority (PHSA PPH), in consultation with the BC Ministry of Health, health authorities and other relevant stakeholders developed a priority suite of health equity indicators (Appendix 1). Initiated in 2012, developing this suite of priority indicators and providing evidence for all priority indicators was a first step towards setting health equity targets in BC and initiating future action on equity.

To achieve timely analysis for this report, PHSA PPH analyzed indicators for which data was accessible and available. Lack of data did not allow for analysis by a number of equity dimensions, especially for Aboriginal status, living with a chronic condition, or ethnicity. For as much as data access and availability allows, following this report, PHSA PPH intends to obtain and analyze data for all 52 health equity indicators in the priority suite by the equity dimensions listed in *Developing priority health equity indicators for BC: Process and outcome report.*

The purpose of this report is to begin exploring how monitoring and reporting on health inequities in BC using the priority suite of health equity indicators can inform action on promoting health equity. This data is intended to contribute towards provincial health status reporting of measures in *BC's Guiding Framework for Public Health*. The report presents current data for 16 health equity indicators drawn from the priority suite, and analyzes each indicator across the following equity dimensions as applicable and as data is available: BC geographic regions, urban and rural residence, sex, and neighbourhood level unemployment and income. The selected indicators are organized into four chapters: life expectancy, early childhood development, adolescent health, and general population health.

2.0 Life expectancy

Life expectancy in BC varies by sex, geographic region, and socio-economic status (SES):

- Females are generally expected to live longer than males (85 and 81 years, respectively in 2013).
- People in central and northern parts of the province have shorter life expectancies.
- People living in high SES Local Health Areas (LHAs) are expected to live nearly four years longer than people living in low SES areas (82.2 vs. 78.6 years).

2.1 Background

Life expectancy[i] is used worldwide as a general measure of a population's health, and is a useful indicator for comparing the overall health of different populations. Life expectancy of population groups can also indicate their social conditions such as wealth, economic opportunity, healthcare, and education. Disparities in life expectancy between groups of people usually signal inequities in other social, economic, and environmental conditions.[30]

Canadians enjoy one of the longest life expectancies in the world, and British Columbians have the longest life expectancy among the 13 Canadian provinces and territories. In 2013, life expectancy for BC residents was 83 years: 81 years for males and 85 years for females.[31]

Although British Columbians enjoy long lives overall, there are important differences in life expectancy between and among various groups that can signal the existence of health inequities. For example, although the population's life expectancy is getting narrower (from seven years in 1983 to four years in 2013), there is still a significant gap in life expectancy between males and females.[32] Past analyses have found that people living in the Lower Mainland, southern Vancouver Island, and those living in some specific LHAs in the southeastern interior of the province enjoy longer lives, while those in the central and northern parts of the province generally have lower life expectancy.[33] Evidence from Canada and around the world also suggests that lower income is associated with shorter life expectancy,[34, 35, 36] and one study showed that the gap in life expectancy between the sexes was wider for Canadian populations in the lowest income neighbourhoods compared to those in the highest income neighbourhoods.[37]

i Life expectancy can be measured at different ages and represents the average number of years a person at that age would live if current mortality trends in the population continue to apply. In this chapter, life expectancy refers to life expectancy at birth.

2.2 Indicator findings

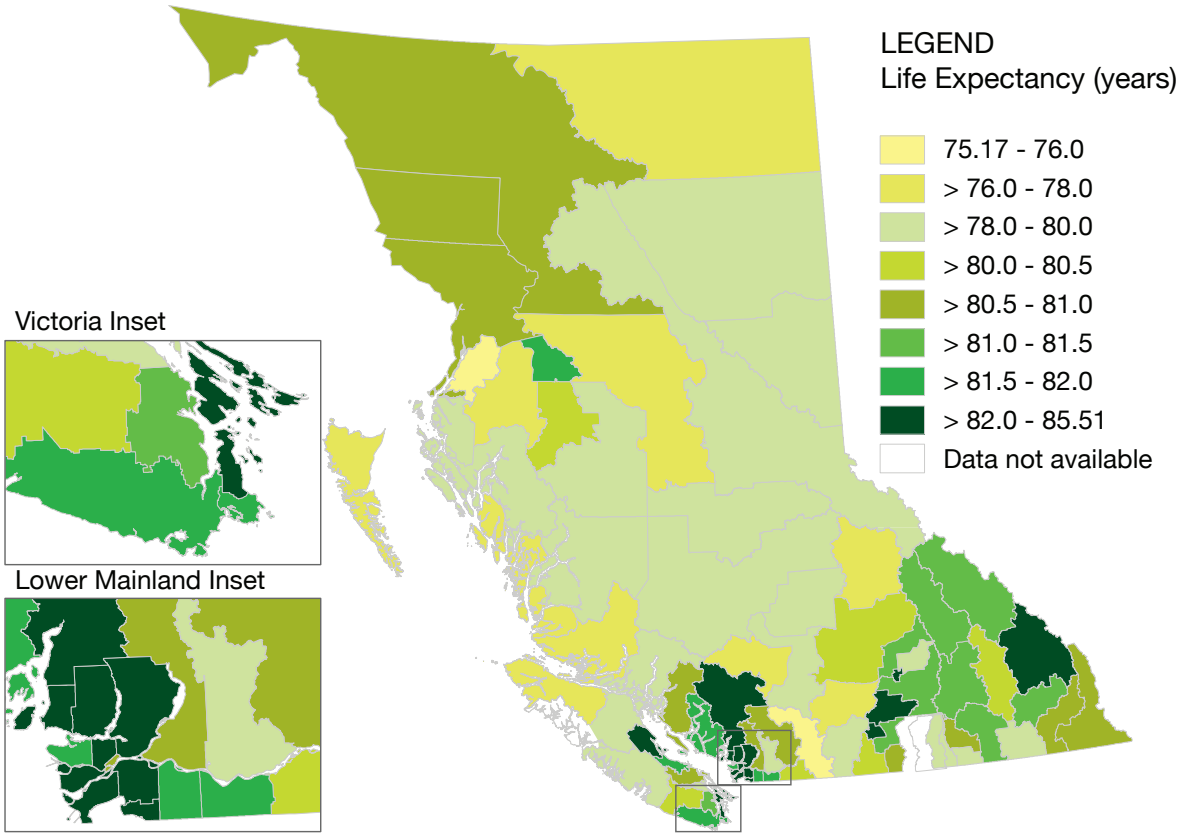
This chapter of the report explores geographic differences in life expectancy in BC as well as differences in life expectancy by socioeconomic status and sex.

Reducing the overall geographic disparity in life expectancy of British Columbians from 10 years in 2006-2010 to 6 years in 2023 is a target identified by the Ministry of Health in *BC's Guiding Framework for Public Health*.

2.2.1 Life expectancy at birth

Geographic region

Map 1. Life expectancy at birth for the total BC population, by LHA, 2007-2011



From 2007-2011, life expectancy varied geographically across LHAs in BC, with more than a 10-year gap between LHAs with the shortest and longest life expectancies.

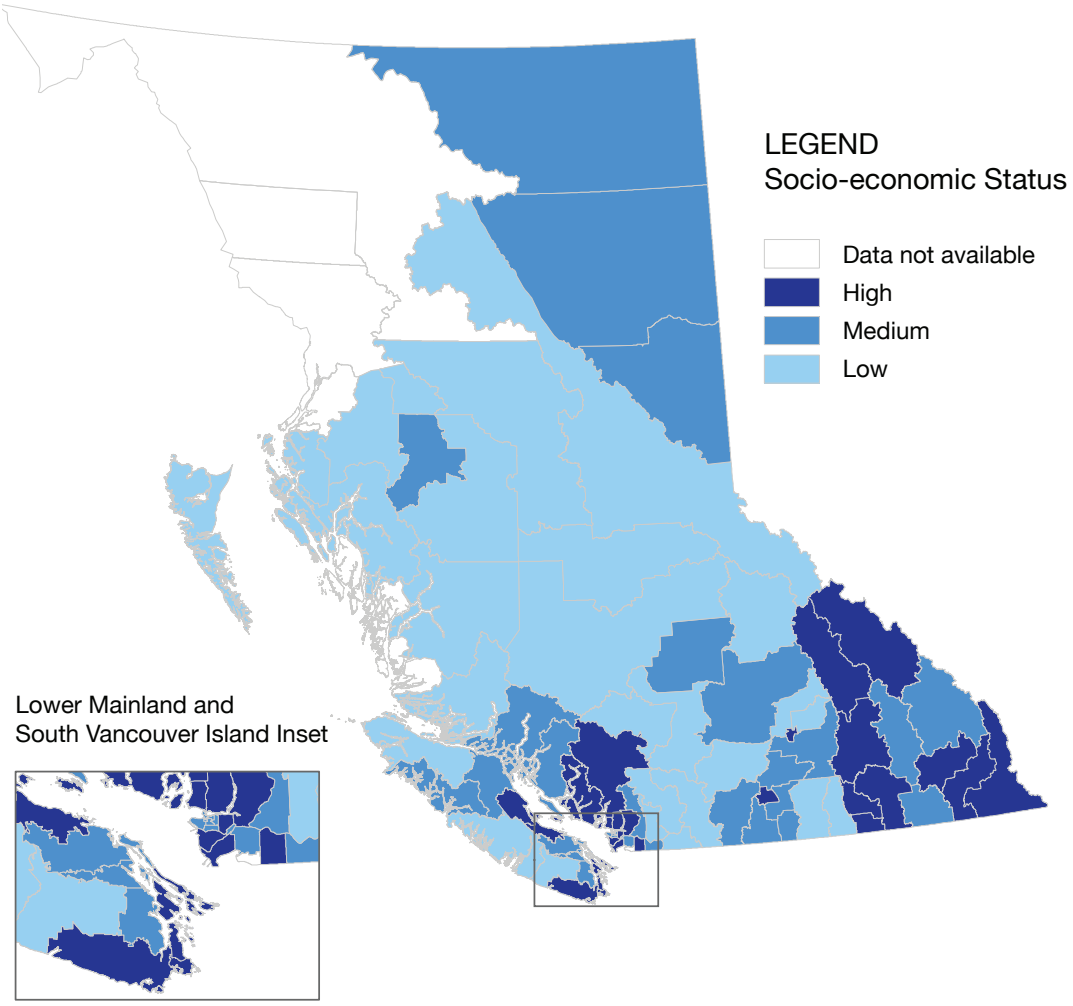
Populations in the southern coastal areas, southern Vancouver Island, and some LHAs in the interior of the province had longer life expectancy than LHAs in the central and northern parts of the province.

Socio-economic Index

The Socio-economic status (SES) of each Local Health Area (LHA) is defined by the overall socio-economic index score as developed by BC Stats.[38] This index is a weighted summary of six individual indices including four basic indicators of regional hardship (human economic hardship, crime, health problems and education concerns) and two additional indicators of children and youth at risk. LHAs were categorized into three SES groups (low, medium, and high) using tertiles of the overall socio-economic index scores as cut off points. BC Stats regularly updates this index.

Socio-economic status

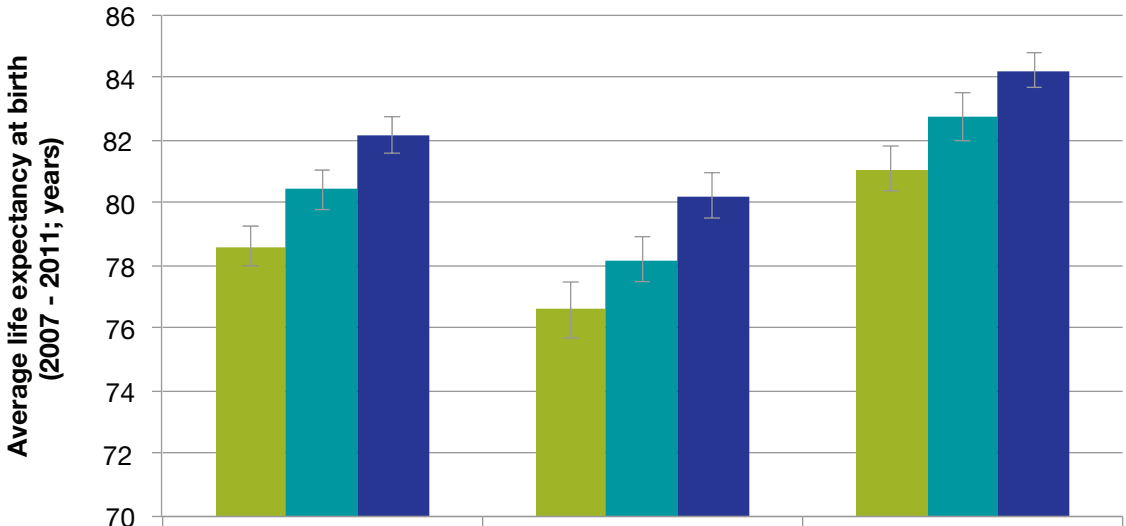
Map 2. Socio-economic status in BC, by LHA, 2011



Source: Zhang & Rasali, 2015[39]

In 2011, socio-economic status varied significantly by LHA. Higher SES was concentrated in southern areas of BC, specifically parts of the Lower Mainland and south Vancouver Island as well as parts of the southern interior. Central and northern regions of the province generally had medium and low SES.

Figure 1. Life expectancy at birth (2007-2011) by socio-economic status index (2011) for the total population in BC, and by sex



	Total	Male	Female
Low SES	78.6	76.6	81.1
Medium SES	80.5	78.2	82.8
High SES	82.2	80.2	84.2

Source: Zhang & Rasali, 2015[40]

Overall, LHAs with low SES had a life expectancy nearly four years shorter than LHAs with high SES.

Life expectancy in the low SES group (78.6 years) was significantly lower than those for LHAs in the middle (80.5 years) and the high SES group (82.2 years).

Life expectancy varied significantly by SES level among both males and females.

Within each SES group, males had a significantly lower life expectancy than females. For example, life expectancy for males in the low SES group was 4.5 years less than females in the same SES group.

Males in the high SES group had the highest life expectancy of all males (80.2 years), yet this figure is still lower than the life expectancy for females in all three SES groups (81.1, 82.8 and 84.2 years).

Key results

Differences in life expectancy between population groups can signal inequities in their social, economic and environmental conditions.

Overall, British Columbians enjoy a long life expectancy, and BC is top ranked among Canadian provinces and territories (81 years for males and 85 years for females in 2013). However, there are important disparities in life expectancy in BC:

- **Sex –** A significant gap in life expectancy remains between males and females in BC, though it has narrowed over time. Life expectancy is longer for females compared to males, whether they live in areas of the province with low, medium or high socio-economic status.
- **Geography –** Life expectancy varies geographically across local health areas. More than a 10-year difference in life expectancy is observed between the LHA with the shortest life expectancy and the LHA with the longest life expectancy.
- **Socio-economic status –** Life expectancy differs for BC populations living in LHAs with different socio-economic status. There is nearly a four year gap in average life expectancy between LHAs in the high vs. the low SES groups.

3.0 Early childhood development

The rate of BC children who are developmentally vulnerable during early childhood varies significantly by geographic region, sex, and neighbourhood levels of unemployment and income:

- Rates of language and cognitive development vulnerability varied by Health Service Delivery Area (HSDA), ranging from a low of 5.8% to a high of 13.5%.
- The rate of vulnerability in one or more EDI areas was higher in boys (40.3%) than girls (24.5%), and was higher in regions with higher unemployment (35.4%) than lower unemployment (29.8%).
- The rate of vulnerability in one or more EDI areas was highest among children in the lowest income group (45.3%).

3.1 Background

The first years of a child's life are crucial. Experiences from birth to school age set a foundation that affects many lifelong health and social outcomes.[41, 42, 43, 44] These early years strongly influence basic learning and school success, as well as economic participation, social citizenship and health.[45] Early experiences can also help children develop skills in emotional control, relationship building, self-esteem and health practices that last throughout their lives.[46]

> *"Giving every child the best start in life is crucial to reducing health inequalities across the life course."*
>
> Marmot Review, 2010
> http://www.instituteofhealthequity.org/Content/FileManager/pdf/fairsocietyhealthylives.pdf

Children learn and grow best in environments where they are nurtured by supportive parents, families and communities. Unfortunately, not all children have opportunities to develop under ideal conditions that set them up for future success. Parents and other caregivers who want to provide these opportunities can sometimes be limited by their own living and working conditions. For example, parental education and income can influence access to resources and supports that can help promote early childhood development.

Many reports from BC and other jurisdictions describe the impact of inequities on early childhood development.[47, 48, 49, 50] Researchers often use the Early Development Instrument (EDI) to assess the rates of children who "do not arrive at kindergarten meeting all of the developmental benchmarks they need to thrive both now and into the future."[51, 52] The reasons for these developmental deficiencies include the complex interaction of various social and environmental factors. For example, one study found that gender, mother's education and having English as a second language were important determinants of developmental outcomes.[53]

3.2 Indicator findings

This chapter examines three indicators of vulnerability in early childhood development among British Columbian kindergarten children:

- Vulnerability in one or more areas of the EDI
- Vulnerability in the physical health and well-being area of the EDI
- Vulnerability in the language and cognitive development area of the EDI

These indicators are drawn from the priority suite and analyzed by various equity dimensions: geographic region, urban and rural residence, sex, and neighbourhood-level unemployment and income. Data on early childhood development are taken from the EDI 2011/12-2012/13 and socio-economic data are taken from the National Household Survey 2011.

Early Development Instrument

The Early Development Instrument (EDI), a 104-item questionnaire developed by the Offord Centre for Child Studies at McMaster University, measures five core areas of early child development that are known to be good predictors of adult health, education and social outcomes: physical health and well-being; language and cognitive development; social competence; emotional maturity; and communication skills and general knowledge.[54] BC teachers complete the EDI questionnaire for all kindergarten children in February of each year, and the Human Early Learning Partnership at the University of British Columbia collects and holds this data.

3.2.1 Kindergarten children vulnerable in one or more EDI areas

The percentage of kindergarten children who are vulnerable in one or more of the five core areas as measured by the EDI[55] is an important indicator because these children are less likely to benefit from subsequent educational and social opportunities. The developmental trajectories of these children will likely be compromised, resulting in lifelong effects on their health and well-being.

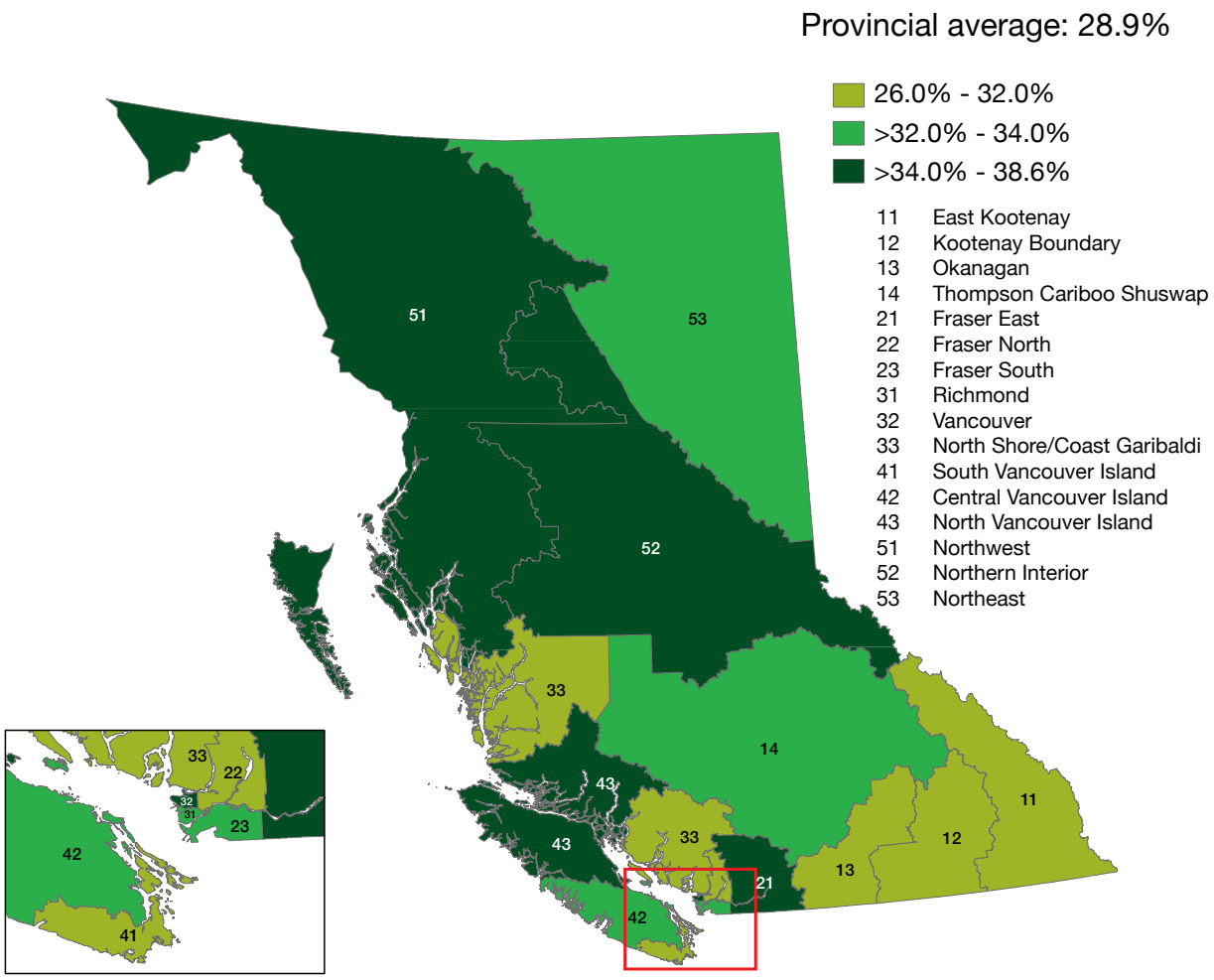
Increasing the overall percentage of BC children who are not vulnerable on any Early Development Indicator dimensions from 69% in 2009/10-2010/11 to 79% in 2023 is a target identified by the Ministry of Health in *BC's Guiding Framework for Public Health*.[56]

"The true measure of a nation's standing is how well it attends to its children – their health and safety, their material security, their education and socialization, and their sense of being loved, valued, and included in the families and societies into which they are born."

UNICEF, Innocenti Report Card 7, 2007
http://www.unicef-irc.org/publications/pdf/rc7_eng.pdf

Geographic region

Map 3. Prevalence of any developmental vulnerability in kindergarten children in BC, by Health Service Delivery Area (HSDA) 2011-2013



Data source: Early Development Instrument 2011/12-2012/13
Prepared by: Population and Public Health Program, Provincial Health Services Authority

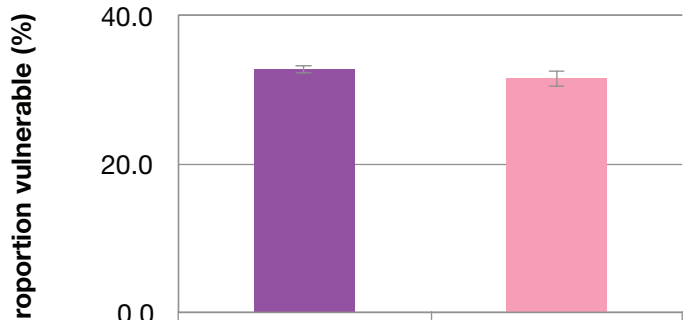
Among the HSDAs in BC, children's vulnerability rates in one or more EDI areas ranged from 26.0% to 38.6%, with an average of 28.9%.

Rates were lower in the southern interior, southern Vancouver Island, and parts of coastal BC. Rates were higher in some parts of the Lower Mainland, the upper Fraser Valley, northern Vancouver Island and northwestern regions of BC.

Kindergarten children vulnerable in one or more EDI areas (cont'd)

Urban and rural[ii]

Figure 2. Percentage of kindergarten children vulnerable in one or more EDI areas in BC, by urban/ rural residence, EDI 2011/12 - 2012/13

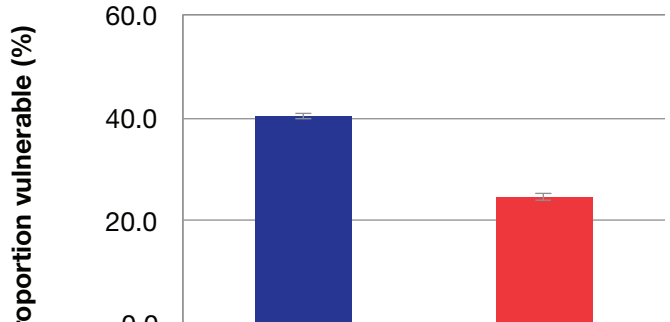


	Urban	Rural
% vulnerable	32.7	31.5

The percentage of children vulnerable in one or more EDI areas was comparable for those living in urban regions (32.7%) and those living in rural regions (31.5%).

Sex

Figure 3. Percentage of kindergarten children vulnerable in one or more EDI areas in BC, by sex, EDI 2011/12 - 2012/13



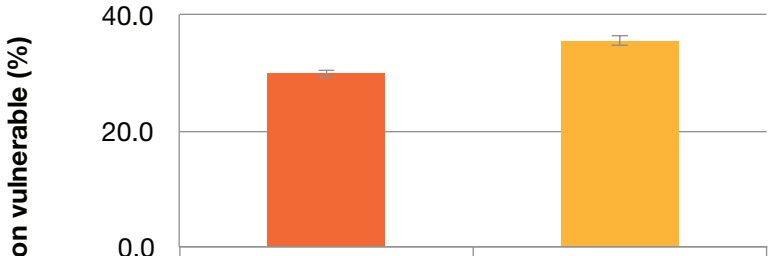
	Males	Females
% vulnerable	40.3	24.5

The rate of children vulnerable in one or more EDI areas was significantly different between boys (40.3%) and girls (24.5%).

ii Each record on the EDI data has a 6-digit postal code associated with the residence of the child. Postal codes were geocoded using PCCF+ Version 5K to indicate urban or rural residence by Human Early Learning Partnership, UBC.

Unemployment

Figure 4. Percentage of kindergarten children vulnerable in one or more EDI areas in BC, by neighbourhood unemployment rate measure, EDI 2011/12 - 2012/13, NHS 2011

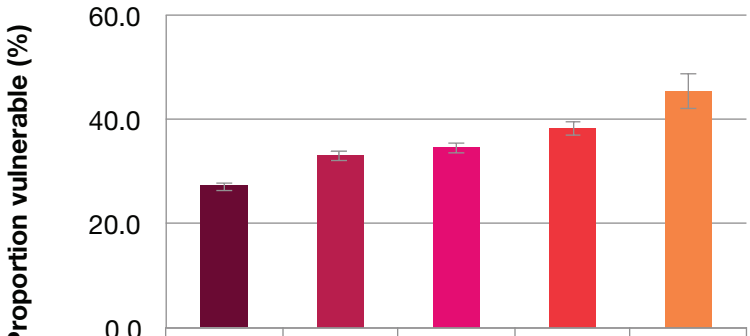


	Regions with lower unemployment rate (BC average or below)	Regions with higher unemployment rate (Above BC average)
% vulnerable	29.8	35.4

Regions with higher unemployment rate had higher rates of children vulnerable in one or more EDI areas (35.4%) compared to regions with lower unemployment rates (29.8%).

Income

Figure 5. Percentage of kindergarten children vulnerable in one or more EDI areas in BC, by neighbourhood income measure, EDI 2011/12 - 2012/13, NHS 2011



	Highest	Second highest	Middle	Second lowest	Lowest
% vulnerable	27.1	33.0	34.6	38.2	45.3

Income quintiles

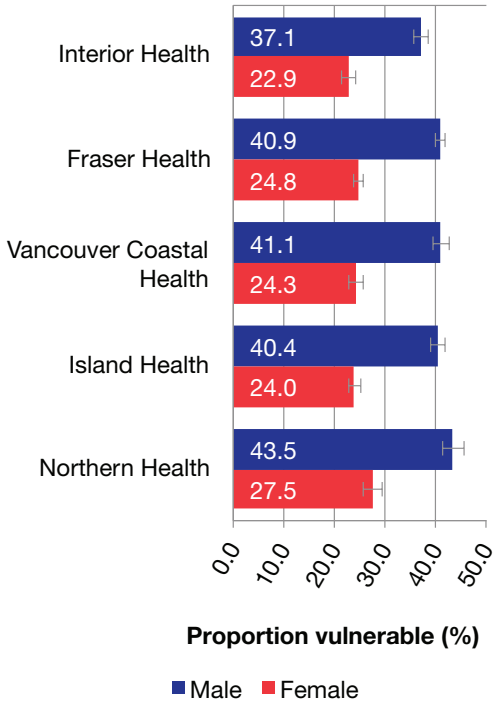
Regions with the lowest neighbourhood income had the highest rates of children vulnerable in one or more EDI areas (45.3%).

The rates of children vulnerable in one or more EDI areas decreased as neighbourhood income level increased: 18.2% fewer children were vulnerable in the highest income neighbourhoods (27.1%).

Kindergarten children vulnerable in one or more EDI areas (cont.)

Sex and health authorities

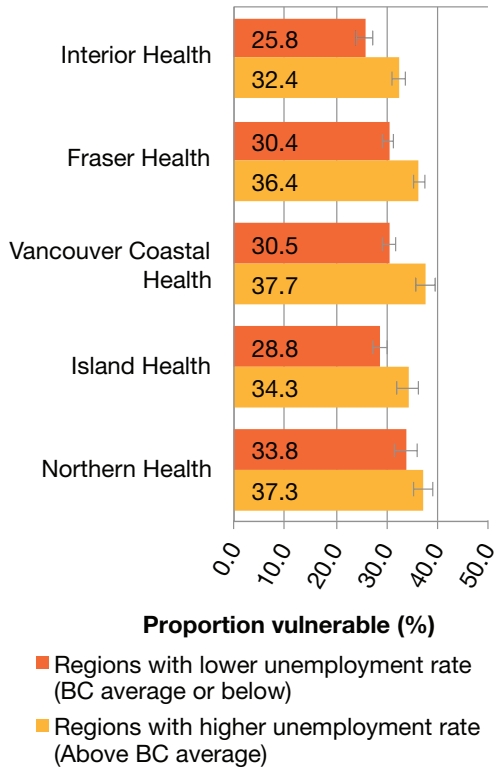
Figure 6. Percentage of kindergarten children vulnerable in one or more EDI areas in each health authority, by sex, EDI 2011/12 - 2012/13



Across BC health authorities, there is a consistent pattern in vulnerability rates between boys and girls.

Unemployment and health authorities

Figure 7. Percentage of kindergarten children vulnerable in one or more EDI areas in each health authority, by neighbourhood unemployment rate measure, EDI 2011/12 - 2012/13, NHS 2011



Across BC health authorities, there is a consistent pattern in vulnerability rates between regions with higher or lower unemployment.

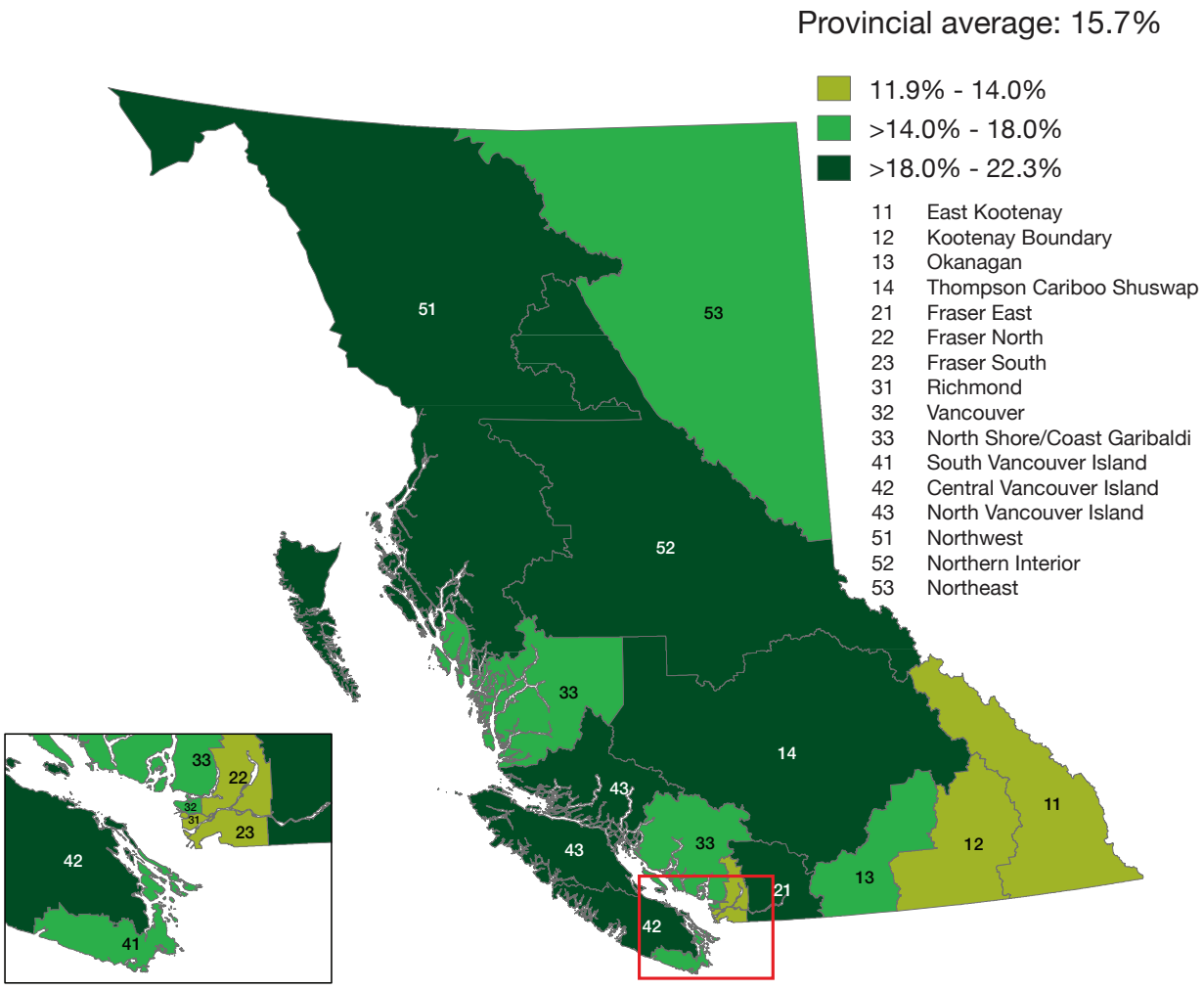
3.2.2 Physical health and well-being vulnerability among kindergarten children

The physical health and well-being EDI area includes measures for fine and gross motor development, levels of energy, daily preparedness for school, washroom independence and established handedness.

Physical health and well-being of children in the early years has major effects on physical and mental health, as well as learning and behaviour throughout the life course. Children found to be vulnerable in the physical health and well-being EDI area are less likely to benefit from subsequent educational and social opportunities. The developmental trajectories of these children will likely be compromised, resulting in lifelong effects on their health and well-being.

Geographic region

Map 4. Prevalence of physical health and well-being vulnerability in kindergarten children in BC, by HSDA, 2011-2013



Data source: Early Development Instrument 2011/12-2012/13
Prepared by: Population and Public Health Program, Provincial Health Services Authority

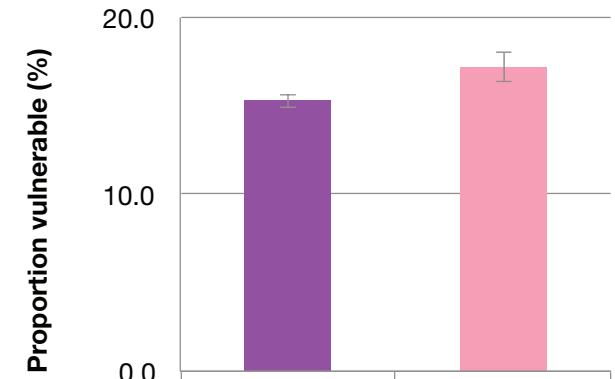
Among the HSDAs in BC, children's vulnerability rates in the physical health and well-being ranged from 11.9% to 22.3%, with an average of 15.7%.

Rates were lower in the BC southern interior, the Lower Mainland, and the Fraser Valley. Rates were higher in northwestern regions of the province as well as the central interior, the upper Fraser Valley and northern Vancouver Island.

Physical health and well-being vulnerability among kindergarten children (cont'd)

Urban and rural

Figure 8. Percentage of kindergarten children vulnerable in physical health and well-being in BC, by urban/rural residence, EDI 2011/12 - 2012/13

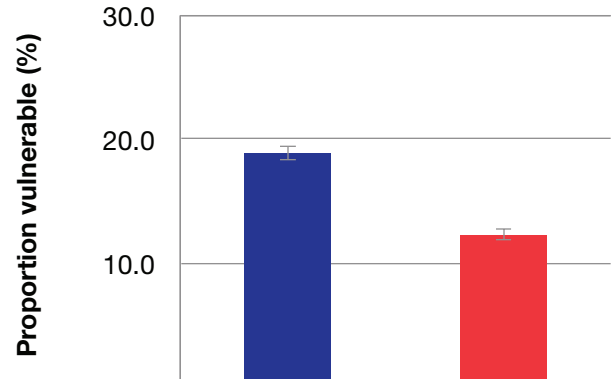


	Urban	Rural
% vulnerable	15.3	17.2

There is nearly a 2% difference in the percentage of children vulnerable in the physical health and well-being between those living in urban (15.3%) and rural (17.2%) regions of BC.

Sex

Figure 9. Percentage of kindergarten children vulnerable in physical health and well-being in BC, by sex, EDI 2011/12 - 2012/13

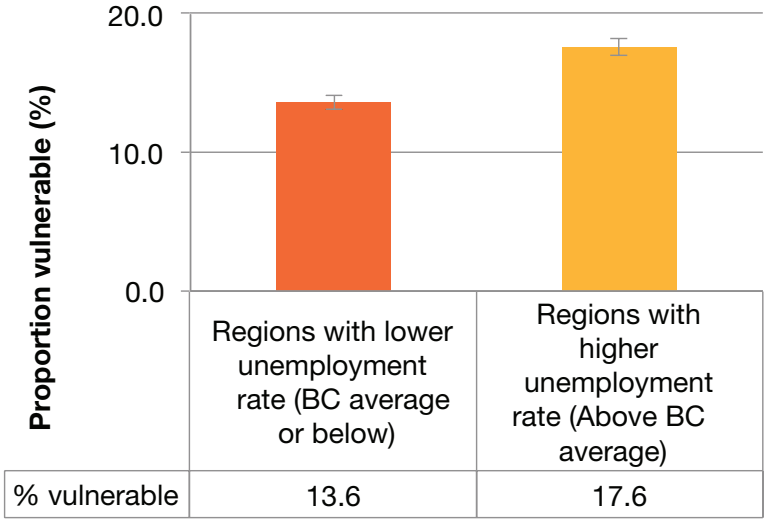


	Males	Females
% vulnerable	18.9	12.3

The rate of children vulnerable in the physical health and well-being was significantly different between boys (18.9%) and girls (12.3%).

Unemployment

Figure 10. Percentage of kindergarten children vulnerable in physical health and well-being in BC, by neighbourhood unemployment rate measure, EDI 2011/12 - 2012/13, NHS 2011

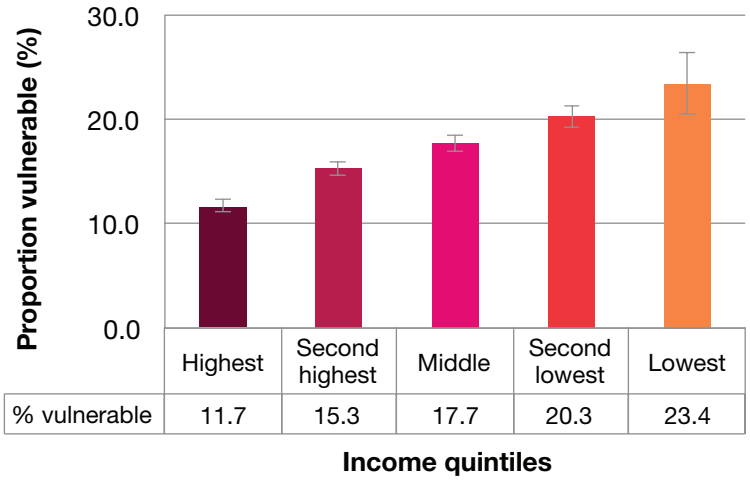


	Regions with lower unemployment rate (BC average or below)	Regions with higher unemployment rate (Above BC average)
% vulnerable	13.6	17.6

Regions with higher unemployment rates had higher rates of children vulnerable in physical health and well-being (17.6%) compared to regions with lower unemployment rates (13.6%).

Income

Figure 11. Percentage of kindergarten children vulnerable in physical health and well-being in BC, by neighbourhood income measure, EDI 2011/12 - 2012/13, NHS 2011



	Highest	Second highest	Middle	Second lowest	Lowest
% vulnerable	11.7	15.3	17.7	20.3	23.4

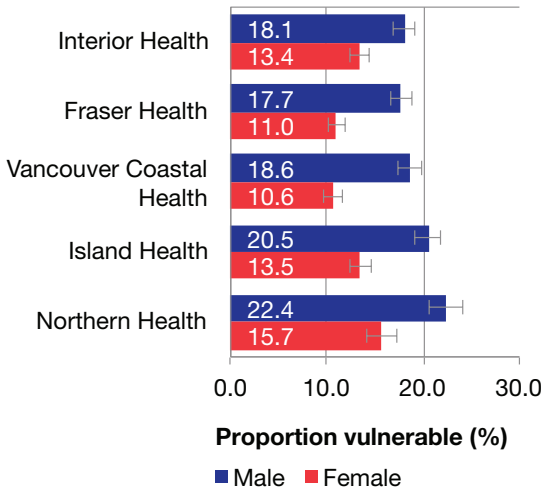
Regions with the lowest neighbourhood income had the highest rates of children vulnerable in physical and well-being (23.4%).

Smaller proportions of children were vulnerable as neighbourhood income levels increased: half as many children were vulnerable in highest income neighbourhoods (11.7%).

Physical health and well-being vulnerability among kindergarten children (cont'd)

Sex and health authorities

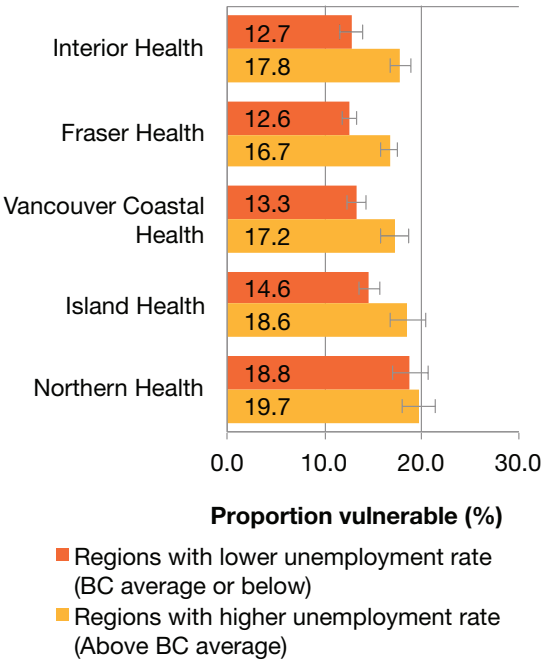
Figure 12. Percentage of kindergarten children vulnerable in physical health and well-being in each health authority, by sex, EDI 2011/12 - 2012/13



Across BC health authorities, there is a consistent pattern in children's vulnerability rates in physical health and well-being between boys and girls.

Unemployment and health authorities

Figure 13. Percentage of kindergarten children vulnerable in physical health and well-being in each health authority, by neighbourhood unemployment measure, EDI 2011/12 - 2012/13, NHS 2011



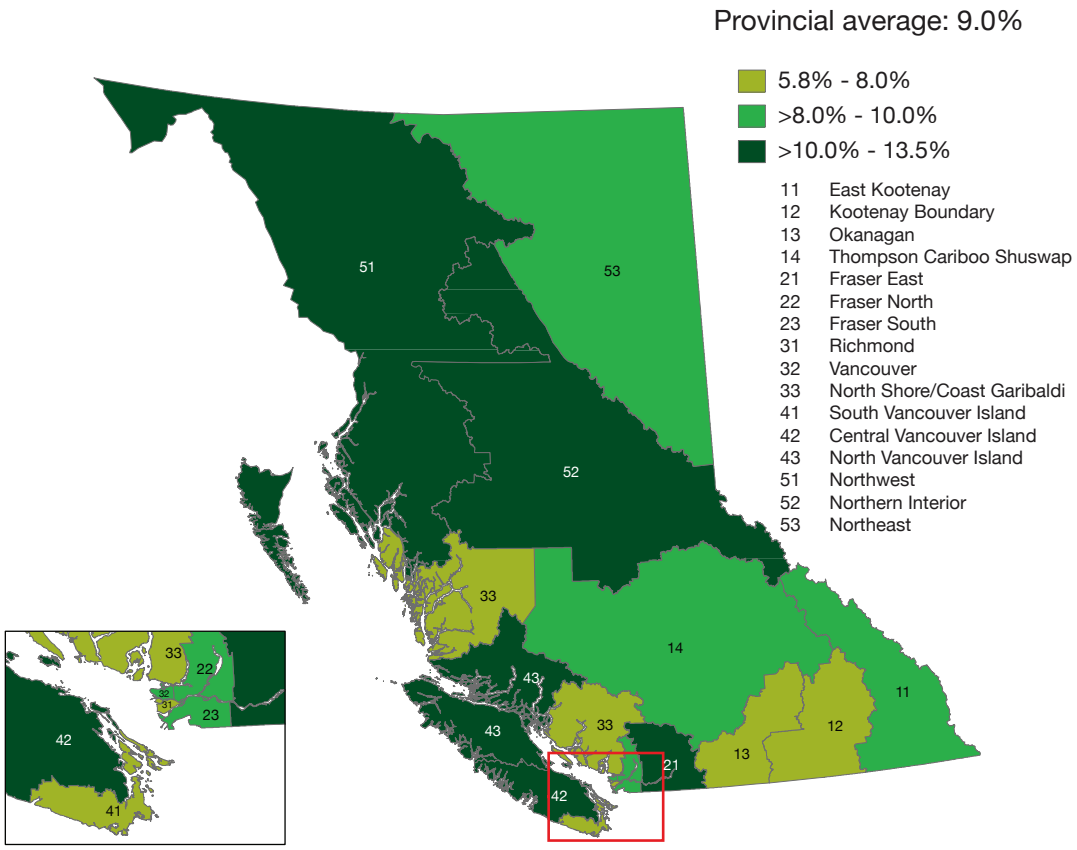
Across BC health authorities, there is a consistent pattern in children's vulnerability rates in physical health and well-being between regions with higher or lower unemployment rates.

3.2.3 Language and cognitive development vulnerability among kindergarten children

The language and cognitive development EDI area includes measures for basic literacy, interest in literacy/numeracy and memory, advanced literacy and basic numeracy.

A language-enriched environment profoundly influences a child's language and cognitive development, and overall developmental health. A child that is vulnerable in the language and cognitive development area can have problems in basic reading, writing and numeracy. As with children vulnerable in other areas of the EDI, the developmental trajectories of these children will likely be compromised, resulting in lifelong impacts on their health and well-being.

Map 5. Prevalence of language and cognitive development vulnerability in kindergarten children in BC, by HSDA, 2011-2013



Data source: Early Development Instrument 2011/12 - 2012/13
Prepared by: Population and Public Health Program, Provincial Health Servcies Authority

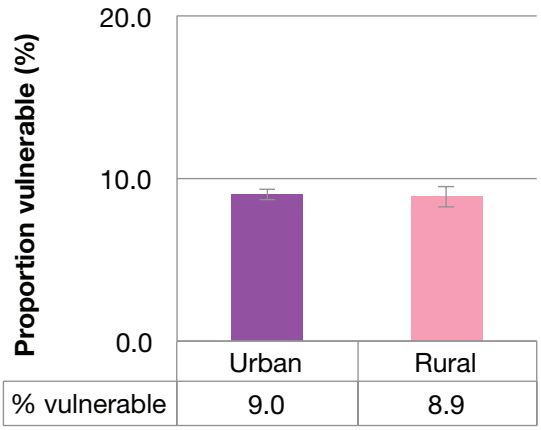
Among the HSDAs in BC, children's vulnerability rates in language and cognitive development ranged from 5.8% to 13.5%, with an average of 9.0%.

Rates were lower in southern Vancouver Island as well as parts of the Lower Mainland, coastal BC and the southern interior. Rates were higher in northern Vancouver Island, the upper Fraser Valley and parts of northern BC.

Language and cognitive development vulnerability among kindergarten children (cont'd)

Urban and rural

Figure 14. Percentage of kindergarten children vulnerable in language and cognitive development in BC, by urban/rural residence, EDI 2011/12 - 2012/13

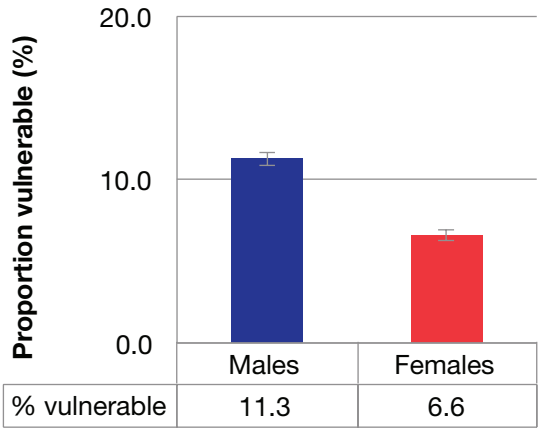


	Urban	Rural
% vulnerable	9.0	8.9

There was no significant difference in children's vulnerability rates in language and cognitive development between those living in urban or rural regions of BC.

Sex

Figure 15. Percentage of kindergarten children vulnerable in language and cognitive development in BC, by sex, EDI 2011/12 - 2012/13

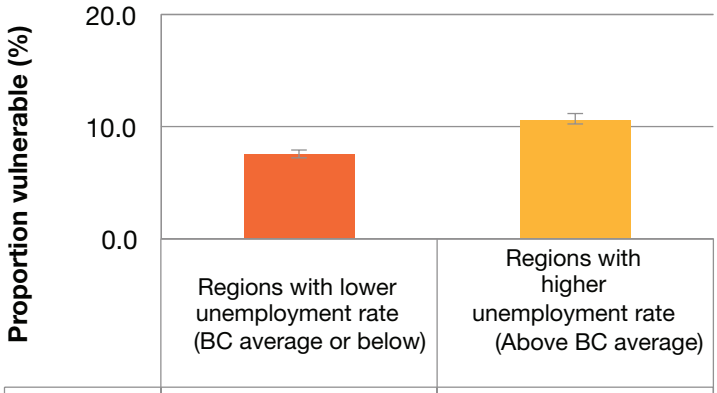


	Males	Females
% vulnerable	11.3	6.6

The rate of children vulnerable in language and cognitive development was significantly different between boys (11.3%) and girls (6.6%).

Unemployment

Figure 16. Percentage of kindergarten children vulnerable in language and cognitive development in BC, by neighbourhood unemployment rate measure, EDI 2011/12 - 2012/13, NHS 2011

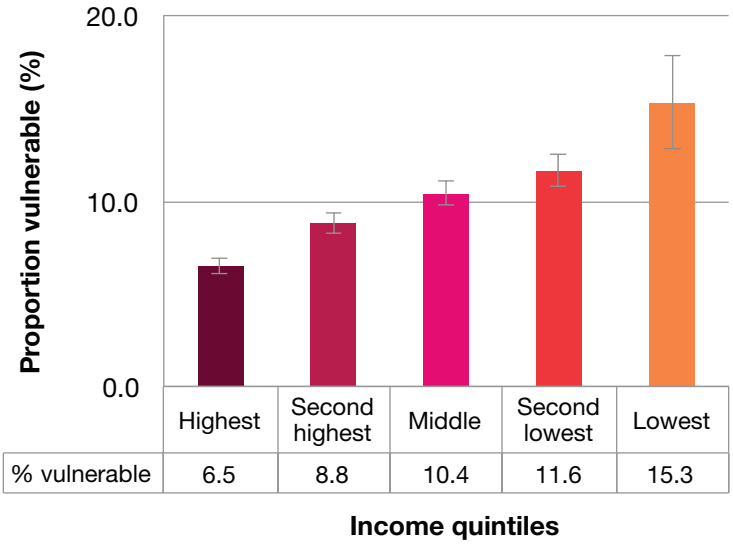


	Regions with lower unemployment rate (BC average or below)	Regions with higher unemployment rate (Above BC average)
% vulnerable	7.5	10.6

Regions with higher unemployment rates had higher rates of children vulnerable in language and cognitive development (10.6%) compared to regions with lower unemployment rates (7.5%).

Income

Figure 17. Percentage of kindergarten children vulnerable in language and cognitive development in BC, by neighbourhood income measure, EDI 2011/12 - 2012/13, NHS 2011



	Highest	Second highest	Middle	Second lowest	Lowest
% vulnerable	6.5	8.8	10.4	11.6	15.3

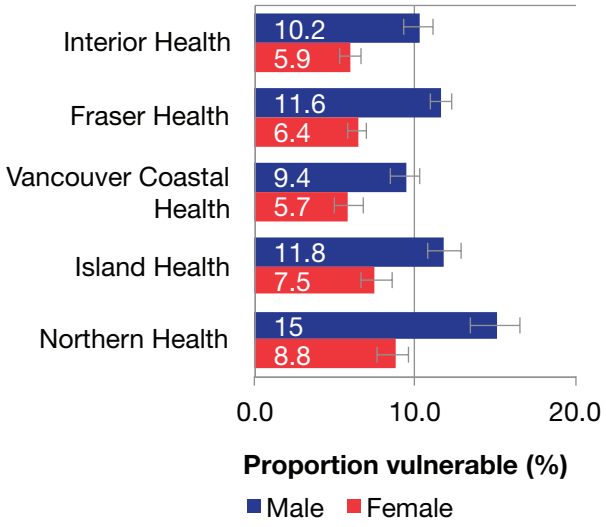
Regions with the lowest neighbourhood income showed the largest proportion of children vulnerable in language and cognitive development (15.3%). Smaller proportions of children were vulnerable in higher income regions.

Compared to the lowest income group, less than half as many children were vulnerable in the highest income neighbourhoods (6.5%).

Language and cognitive development vulnerability among kindergarten children (cont'd)

Sex and health authority

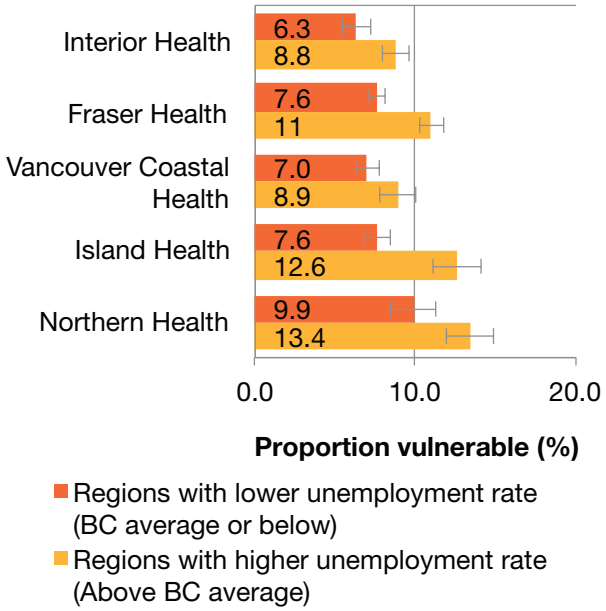
Figure 18. Percentage of kindergarten children vulnerable in language and cognitive development in each health authority, by sex, EDI 2011/12 - 2012/13



Across BC health authorities, there is a consistent pattern in children's vulnerability rates in language and cognitive development between boys and girls.

Unemployment and health authority

Figure 19. Percentage of kindergarten children vulnerable in language and cognitive development in each health authority, by neighbourhood unemployment measure, EDI 2011/12 - 2012/13, NHS 2011



Across BC health authorities, there is a consistent pattern in children's vulnerability rates in the language and cognitive development between regions with higher or lower unemployment rates.

Key results

The early years of life have a strong influence on adult development, affecting basic learning, school success, economic participation, social citizenship and health.

The quality of stimulation, support and nurturance experienced by children can vary substantially. This can create inequities in early childhood development outcomes.

There are measured differences in early childhood development in BC across demographic, geographic, and socio-economic dimensions:

- **Sex –** A higher percentage of vulnerability was observed among boys compared to girls for all indicators examined in this chapter: vulnerability in one or more EDI areas, physical health and well-being, and language and cognitive development.
- **Geography –** There were significant variations in the early development indicators across HSDAs in BC, with an approximately two-fold difference between HSDAs with the highest and lowest rates on two of the three indicators. There were also indications of disparity in the proportion of children vulnerable in physical health and well-being between urban and rural regions.
- **Employment –** Regions with higher unemployment rates showed significantly higher proportions of vulnerable children on all three measures, compared to regions with lower unemployment rates.
- **Income –** Income disparity was also significant for all three measures. The rates of vulnerability in children increased as average regional income levels decreased.

4.0 Adolescent health

Several key indicators of adolescent health (prevalence of physical and sexual abuse, discrimination, smoking, and substance use before age 15) vary significantly by geographic region and sex:

- Rates of substance use before the age of 15 differed by HSDA, ranging from the lowest (22%) to the highest (50%), a difference of 28%.
- Females reported higher rates of abuse (22%) and discrimination (41%), and slightly lower rates of smoking (9%) than males (13%, 30% and 11%, respectively).

4.1 Background

Adolescence is an important stage of life for healthy human development. A recent overview of adolescent health by the World Health Organization stated that "promoting healthy practices during adolescence and taking steps to better protect young people from health risks are critical for the prevention of health problems in adulthood."[57]

What happens in the early years of life can influence the health of adolescents, which in turn impacts adult health.[58] Many of the current and projected leading causes of death, disease and disability can be significantly reduced by preventing or minimizing various behavioural risk factors. These behavioural risk factors include tobacco use, alcohol and substance use, and those that result in injury and violence.[59] People tend to initiate many of these behaviours during adolescence, and socio-economic circumstances can influence the choices that people have or can make. Building resiliency and enhancing protective factors, such as family, school and cultural connectedness, can help youth overcome adversity and make healthier choices, thus increasing their likelihood to thrive in all aspects of life.

4.2 Indicator findings

This chapter examines five indicators that pertain to adolescent health that have short- and long-term consequences among BC youth in Grades 7 to 12:

- Teen current smoking rate
- Substance use before age 15
- Prevalence of discrimination
- Prevalence of physical and/or sexual abuse
- School connectedness

These indicators are drawn from the priority suite[60] and analyzed by equity dimensions: geographic region, sex and neighbourhood income. Indicator data on adolescent health are taken from the BC Adolescent Health Survey (BC AHS 2013) and socio-economic data are taken from the National Household Survey 2011.

BC Adolescent Health Survey

The McCreary Centre Society, a non-government organization, has monitored adolescent health in BC for decades, surveying thousands of students every five years.[61, 62, 63] In 2013, almost 30,000 students in Grades 7 to 12 completed the BC Adolescent Health Survey (BC AHS).[64] These students answered 130 questions about their health, the risks that they face and the things that protect them from those risks. Overall, the BC AHS provides a comprehensive look at the health of BC youth aged 12 to 17.

4.2.1 Teen current smoking rate

The Adolescent Health Survey measured the prevalence of smoking among teens as the percentage of BC students that reported smoking any cigarettes within the past 30 days.

Tobacco smoking is the leading cause of preventable death in Canada and has negative health impacts on people of all ages, including youth. Short-term health consequences of smoking among young people include respiratory and non-respiratory health conditions, addiction to nicotine and risk of other drug use. Longer-term health consequences of regular teen smokers are lower rates of lung growth and poorer lung function than those who have never smoked.[65] Most smokers begin smoking by age 19; if people have not started smoking by this age, they are less likely to smoke, while youth who smoke regularly typically continue to smoke throughout adulthood.[66, 67]

Table 2. Prevalence of teen smoking in BC by grade

Student grade	Prevalence rate of smoking (%)
Grade 7	1%
Grade 8	3%
Grade 9	7%
Grade 10	12%
Grade 11	14%
Grade 12	19%

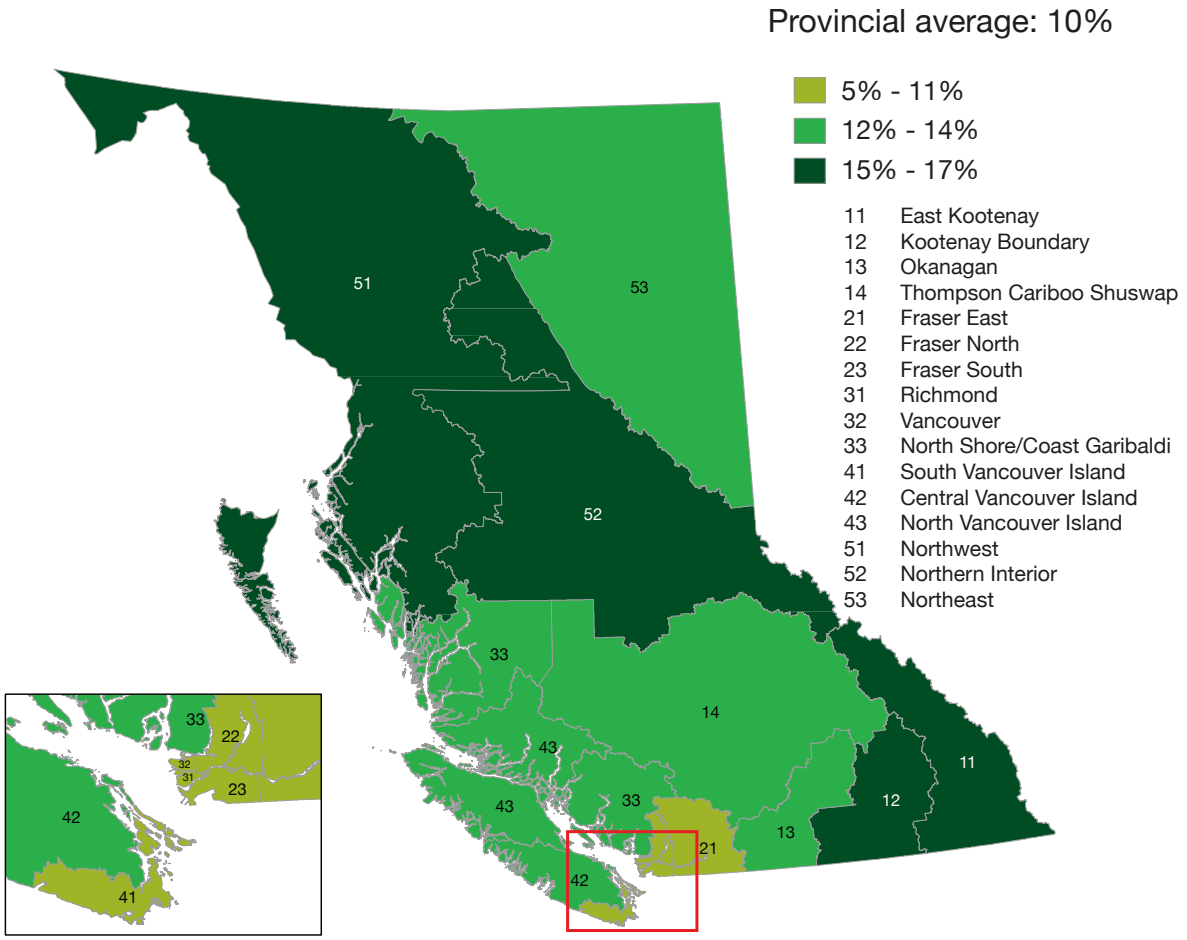
Source: AHS 2013

While smoking rates are generally declining, around one in four BC youth have tried smoking and one in five have smoked a whole cigarette.[68, 69] The McCreary Centre Society has reported that teen smoking rates vary between males and females and among different regions in the province, while Aboriginal youth have the highest smoking rates of any population group in BC.[70]

In 2013, smoking prevalence rates among students in BC increased sharply by Grade, ranging from 1% in Grade 7 to 19% in Grade 12.

Geographic region

Map 6. Prevalence of current smoking among students in Grades 7 to 12 in BC, by HSDA, AHS 2013



Data source: BC Adolescent Health Survey 2013
Prepared by: Population and Public Health Program, Provincial Health Services Authority

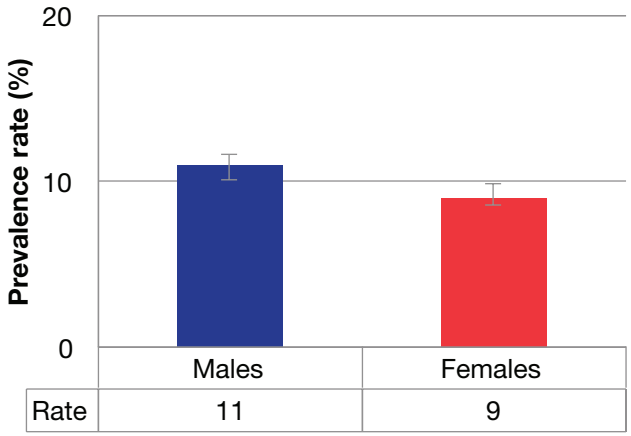
Across the HSDAs in BC, the rate of smoking ranged from 5% to 17%, with an average of 10%.

Rates were lower in the Lower Mainland, southern Vancouver Island, and Fraser Valley. Rates were higher in the north-western and the southern interior regions of BC.

Prevalence of current smoking (cont'd)

Sex

Figure 20. Prevalence of current smoking among students in Grades 7 to 12 in BC, by sex, AHS 2013

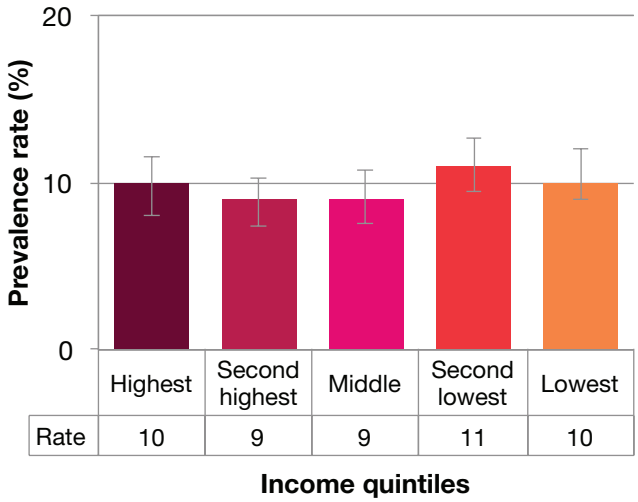


Current smoking rates were significantly higher among male students (11%) than female students (9%).

Across BC health authorities, there is a consistent pattern in smoking rates between males and females (data not shown here).

Income

Figure 21. Prevalence of current smoking among students in Grades 7 to 12 in BC, by neighbourhood income measure, AHS 2013, NHS 2011



The rates of current smoking were not significantly different across neighbourhood family income levels.

4.2.2 Substance use before age 15

For this report, substance use before age 15 was defined as the percentage of students who reported first trying alcohol, tobacco and/or marijuana before the age of 15.

Using alcohol or marijuana at a young age can affect cognitive development and can be associated with risky substance use behaviour in adulthood. The younger an individual is when they first use substances, the more likely that they will engage in other risky behaviours, such as smoking, other substance use and driving under the influence. Delaying the use of alcohol and other substances, even by one or two years, can significantly improve youths' short- and long-term health outcomes.[71] Past BC AHS results show that some youth are more vulnerable to early substance abuse than others.[72, 73] Protective factors (such as family, school and cultural connectedness) can help youth make healthier choices and improve their health outcomes.

Decreasing the overall percentage of BC youth who first use alcohol or cannabis before age 15 from 75% for alcohol and 67% for cannabis in 2008 to 60% for alcohol and 55% for cannabis in 2023 is a target identified in *BC's Guiding Framework for Public Health*.[74]

Table 3. Prevalence of substance use before age 15 in BC by grade

Student grade	Prevalence of substance use before age 15 (%)
Grade 7	10%
Grade 8	23%
Grade 9	39%
Grade 10	42%
Grade 11	37%
Grade 12	38%

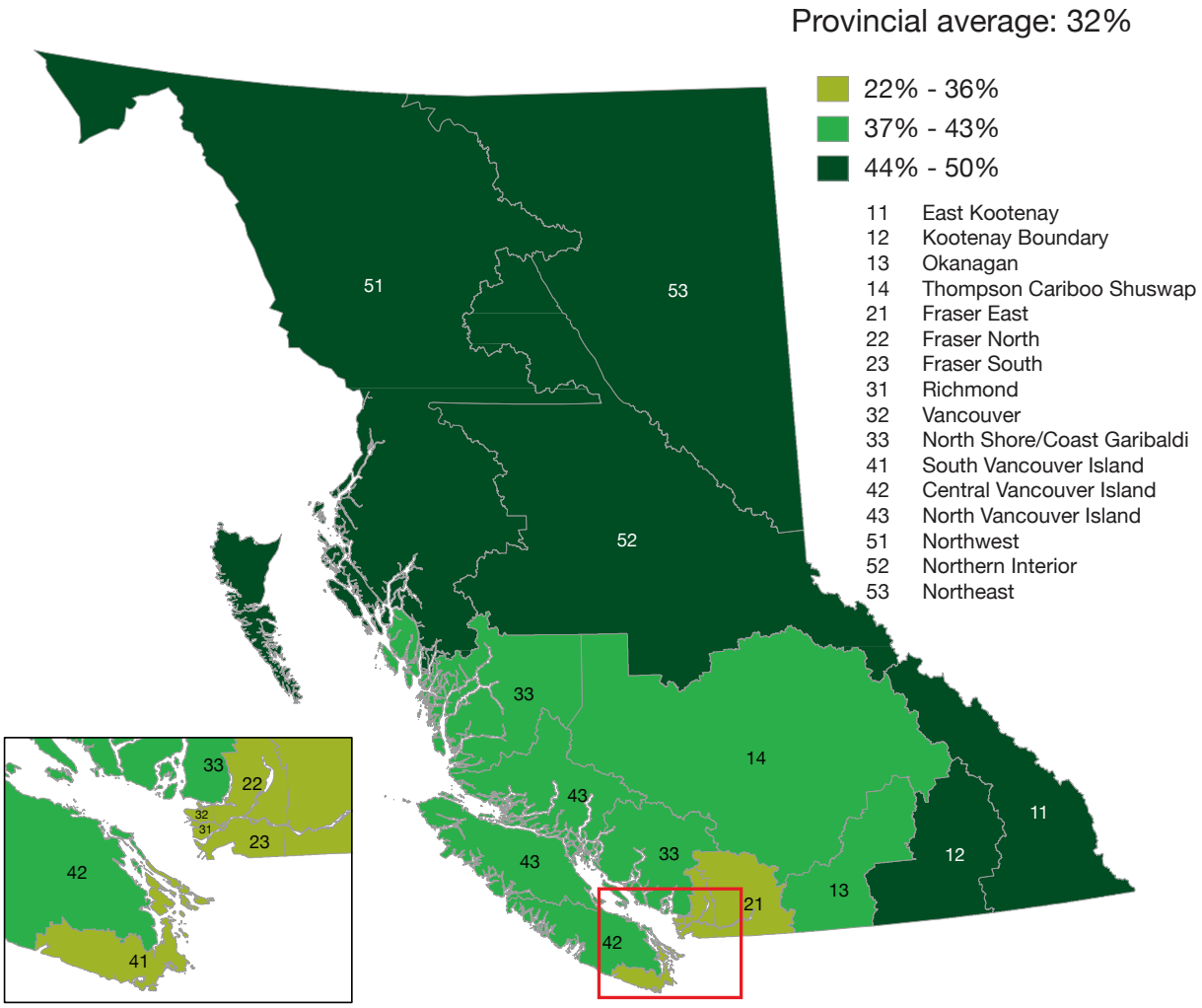
Source: AHS 2013

The rates of substance use before age 15 among BC students in Grades 7 and 8 were 10% and 23%, respectively. A much higher percentage (37% or more) of students in Grades 9 through 12 (who likely have reached age 15) reported substance use before age 15.

Substance use before age 15 (cont'd)

Geographic region

Map 7. Prevalence of substance use before age 15 among students in Grades 7 to 12 in BC, by HSDA, 2013



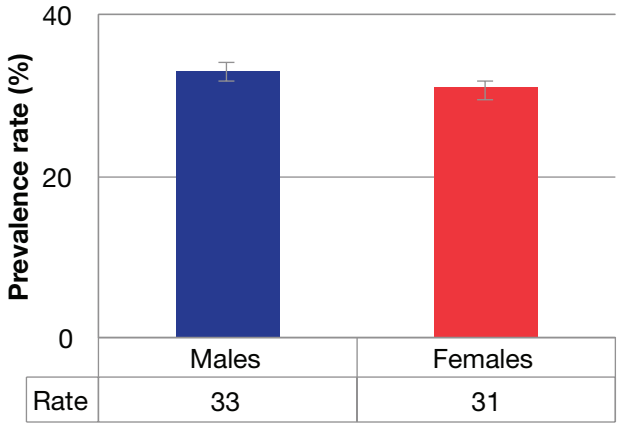
Data source: BC Adolescent Health Survey 2013
Prepared by: Population and Public Health Program, Provincial Health Services Authority

Among the HSDAs in BC, the rate of substance use before age 15 ranged from 22% to 50%, with an average of 32%.

Rates were lower in the Lower Mainland, southern Vancouver Island, and Fraser Valley. Rates were higher in the northern and southern interior regions of BC.

Sex

Figure 22. Prevalence of substance use before age 15 among students in Grades 7 to 12 in BC, by sex, AHS 2013

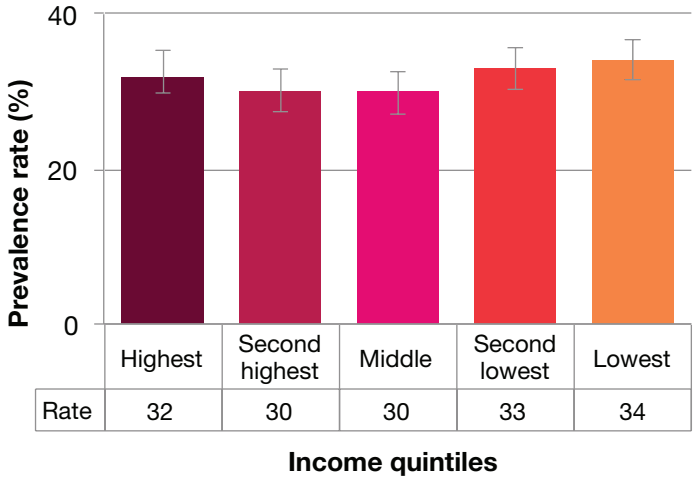


Slightly higher rates of male students reported using substances before age 15 (33%) than female students (31%).

Across BC health authorities, there is a consistent pattern in rates between male and female students (data not shown).

Income

Figure 23. Prevalence of substance use before age 15 among students in Grades 7 to 12 in BC, by neighbourhood income measure, AHS 2013, NHS 2011



The rates of substance use before age 15 were not significantly different across neighbourhood income levels.

4.2.3 Prevalence of discrimination

In this report, the prevalence of discrimination is defined as the percentage of students who reported experiencing any discrimination in the past year, based on their race or skin colour, their physical appearance or their sexual orientation.

Discrimination can affect youth in many ways and has been linked to emotional distress. Youth who experience discrimination are also more likely to report mental health effects in the preceding month (feeling extremely sad, discouraged or hopeless), not to like school, and to have seriously considered suicide in the past year.[75]

Certain characteristics can make youth more vulnerable to discrimination. In BC overall, around one in five youth reported being discriminated against because of their physical appearance.[76] If youth are overweight or obese, discrimination rates can double. Research by the McCreary Centre Society has shown that Aboriginal youth report experiencing discrimination based on physical appearance at higher rates than non-Aboriginal youth.[77]

Table 4. Prevalence of discrimination in BC by grade

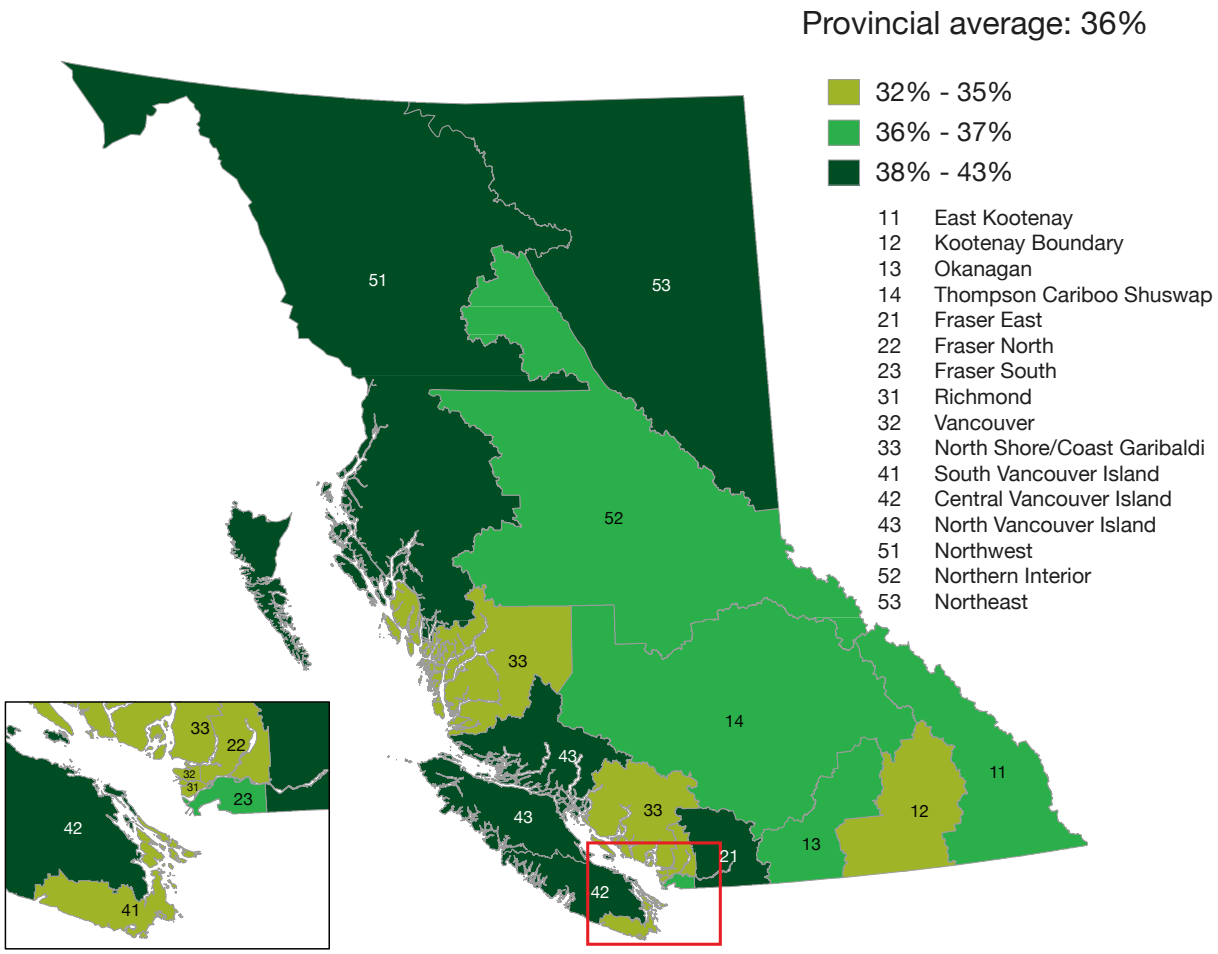
Student grade	Prevalence rate of discrimination (%)
Grade 7	29%
Grade 8	36%
Grade 9	39%
Grade 10	38%
Grade 11	36%
Grade 12	35%

Source: AHS 2013

Overall, 36% of BC students in Grades 7 to 12 reported discrimination in 2013. The lowest rate of discrimination was reported by students in Grade 7 (29%), while the highest rate was reported by those in Grade 9 (39%).

Geographic region

Map 8. Prevalence of discrimination among students in Grades 7 to12 in BC, by HSDA, 2013



Data source: BC Adolescent Health Survey 2013
Prepared by: Population and Public Health Program, Provincial Health Services Authority

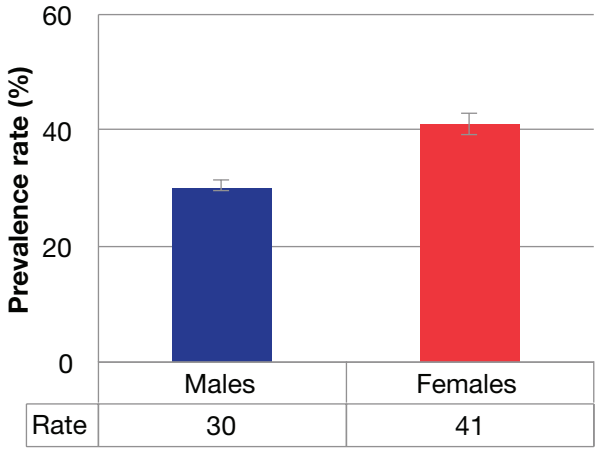
Across the HSDAs in BC, the rate of discrimination ranged from 32% to 43%, with an average of 36%.

Rates were lower in the Lower Mainland, southern Vancouver Island, and parts of coastal BC. Rates were higher in parts of northern BC and northern Vancouver Island.

Prevalence of discrimination (cont'd)

Sex

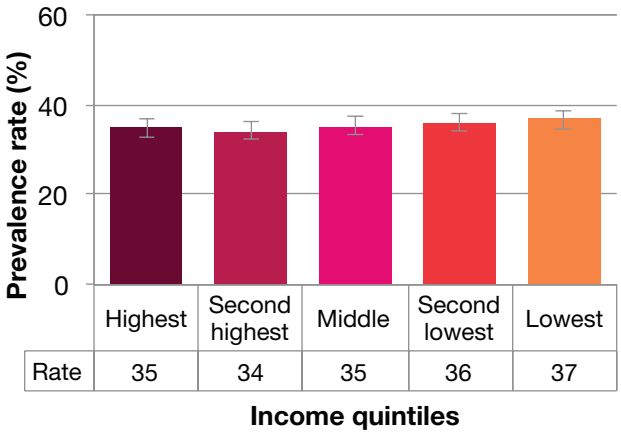
Figure 24. Prevalence of discrimination among students in Grades 7 to 12 in BC, by sex, AHS 2013



Significantly higher rates of female students reported discrimination (41%) than male students (30%) in Grade 7 through 12.

Income

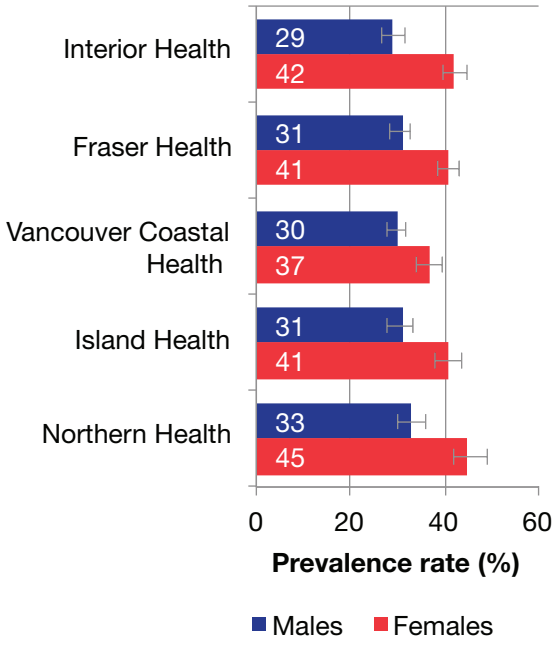
Figure 25. Prevalence of discrimination among students in Grades 7 to 12 in BC, by neighbourhood income measure, AHS 2013, NHS 2011



The rate of discrimination among students in Grades 7 to 12 in BC was similar in all neighbourhood family income levels.

Sex and health authorities

Figure 26. Prevalence of discrimination among students in Grades 7 to 12 in each health authority, by sex, AHS 2013



Across BC health authorities, there is a consistent pattern in the rates of discrimination by sex.

4.2.4 Prevalence of physical and/or sexual abuse

In this report, the prevalence of physical and/or sexual abuse is defined as the percentage of students who reported ever being physically or sexually abused. Sexual abuse included any indication of sexual abuse, forced sex, or being the younger sexual partner of someone who was not close in age at first sex. For the 2013 BC AHS, sex between youth who were both less than 12 years old was not considered abuse. Sex between a youth less than 12 years old and a partner who was 12 years old or older was considered abuse, however.[78]

Physical and/or sexual abuse can affect youth emotionally, behaviourally and physically. These effects can be made worse when youth are victims of both types of abuse. The experience of physical or sexual abuse is strongly related to poor health outcomes, including lower self-perceived health and consideration of suicide.[79]

Certain characteristics can make youth more vulnerable to physical or sexual abuse. In BC, youth with a limiting health condition or a disability report rates of abuse that are twice as high as those of other youth. Youth identifying as lesbian, gay or bisexual and Aboriginal youth also report higher rates of physical and sexual abuse compared to other youth.[80,81]

In BC, the percentage of students who reported ever experiencing abuse (physical and/or sexual) increased incrementally by grade in 2013. Abuse was reported by 10% of students in Grade 7, and increased to 22% for those in Grade 12.

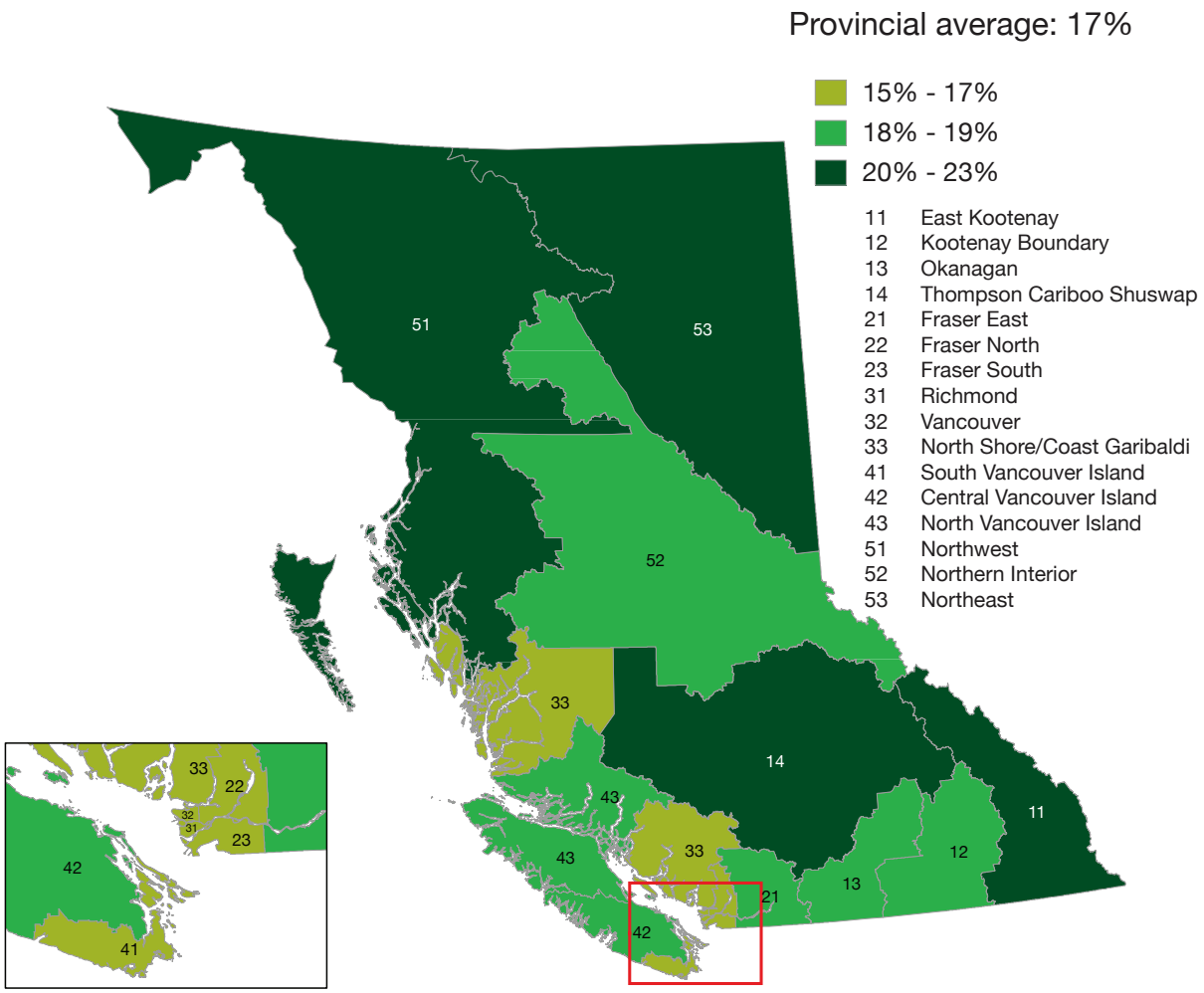
Table 5. Prevelance of physical and/or sexual abuse in BC by grade

Student grade	Prevalence rate of physical and/or sexual abuse (%)
Grade 7	10%
Grade 8	14%
Grade 9	18%
Grade 10	19%
Grade 11	20%
Grade 12	22%

Source: AHS 2013

Geographic region

Map 9. Prevalence of physical and/or sexual abuse among students in Grades 7 to 12 in BC, HSDA, 2013



Data source: BC Adolescent Health Survey 2013
Prepared by: Population and Public Health Program, Provincial Health Services Authority

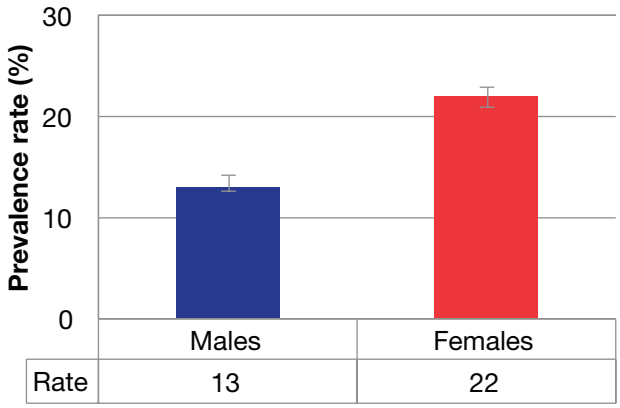
Across the HSDAs in BC, the rate of physical and/or sexual abuse ranged from 15% to 23%, with an average of 17%.

Rates were lower in the Lower Mainland, the southern coastal regions of the province as well as southern Vancouver Island. Rates were higher in parts of the interior and northern regions.

Prevalence of physical and/or sexual abuse (cont'd)

Sex

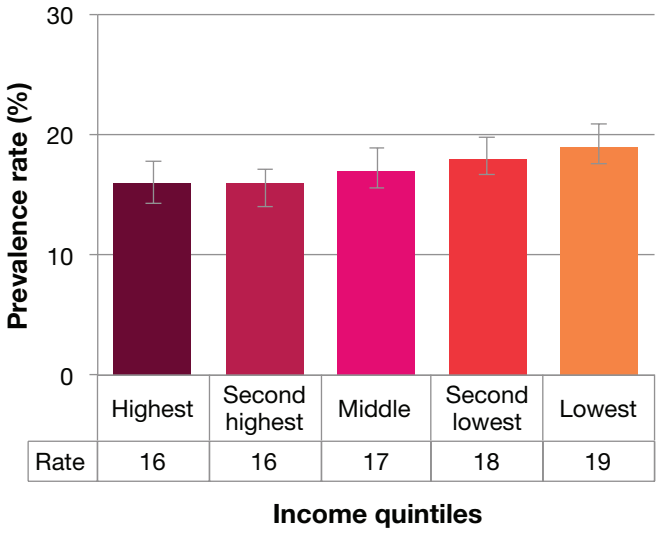
Figure 27. Prevalence of physical and/or sexual abuse among students in Grades 7 to 12 in BC, by sex, AHS 2013



A significantly higher rate of female youth (22%) than male youth (13%) reported ever experiencing physical and/or sexual abuse.

Income

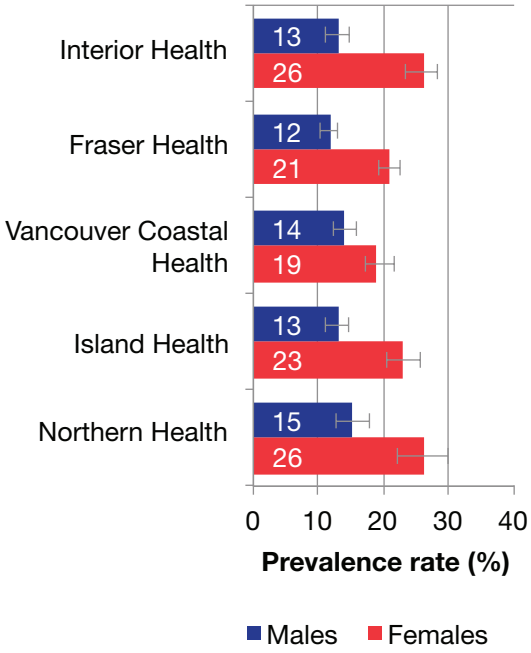
Figure 28. Prevalence of physical and/or sexual abuse among students in Grades 7 to 12 in BC, by neighbourhood income measure, AHS 2013, NHS 2011



Rates of physical and/or sexual abuse were not significantly different across neighbourhood family income levels.

Sex and health authority

Figure 29. Prevalence of physical and/or sexual abuse among students in Grades 7 to 12 in each health authority, by sex, AHS 2013



Across BC health authorities, there is a consistent pattern in the rates of physical and/or sexual abuse by sex.

The greatest difference was observed in the Interior Health Authority where twice as many female students reported abuse than male students (26% vs. 13%, respectively).

4.2.5 School connectedness

In this report, school connectedness is a combined measure created from the BC AHS questionnaire items asking youth:

- how much they felt being a part of their school,
- how well they got along with people at their school,
- how much they felt cared about at school by teachers and school staff,
- being happy at their school,
- school staff treating them fairly,
- getting along with teachers, and
- safety at school.

A higher score indicates higher connectedness to school.

Connections to family, school, friends, and community are important contributors to good health. They are a valuable resource in times of stress or in reaction to difficult experiences or decisions. School connectedness is associated with positive academic and health-related outcomes,[82] and is linked to reduced risk-taking.[83] Previous McCreary reports showed that youth who report higher school connectedness were more likely to describe their mental health as good or excellent and were more likely to expect to continue their education beyond high school.[84] In BC in 2013, students in Grade 7 had the highest school connectedness score (4.0) while those in Grade 10 had the lowest (3.6).

Table 6. School connectedness in BC, by grade

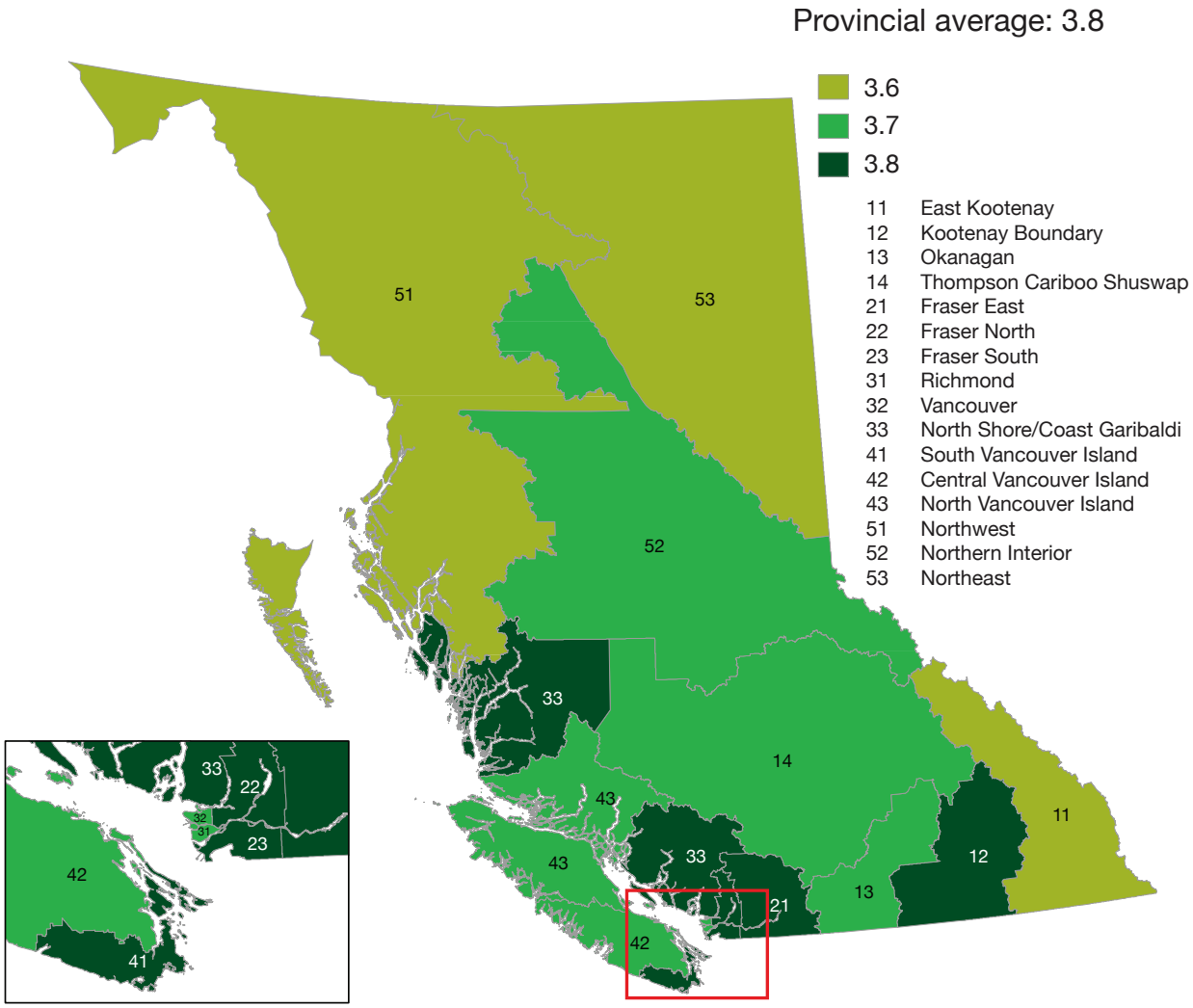
Student grade	School connectedness (score*)
Grade 7	4.0
Grade 8	3.8
Grade 9	3.7
Grade 10	3.6
Grade 11	3.7
Grade 12	3.7

Source: AHS 2013

* Mean score on a 5-point scale based on students' feelings about being a part of their school, being happy at their school, school staff treating them fairly, getting along with teachers and other people at school, safety at school, teachers caring about them, and other school staff caring about them. A higher score indicates higher connectedness to school.'

Geographic region

Map 10. School connectedness among students in Grades 7 to 12 in BC, by HSDA, AHS 2013



Data source: BC Adolescent Health Survey 2013
Prepared by: Population and Public Health Program, Provincial Health Services Authority

Among the HSDAs in BC, school connectedness scores ranged from 3.6 to 3.8, with an average of 3.8.

Scores were higher in the southern coastal regions, southern Vancouver Island, and parts of the southern interior. Scores were lower in parts of the northern and southern interior regions.

School connectedness (cont'd)

Sex and income

Table 7. School connectedness among students in Grades 7 to 12, by sex and neighbourhood income levels, AHS 2013, NHS 2011

School connectedness score	
Sex	
Male	3.7
Female	3.8
Neighbourhood income levels	
Lowest	3.8
Second lowest	3.8
Middle	3.7
Second highest	3.7
Highest	3.7

Male and female students had similar school connectedness scores (3.7 vs. 3.8, respectively)

School connectedness scores were similar across neighbourhood income levels.

Key results

Preventing exposure of youth to behavioural risk factors and enhancing protective factors can significantly reduce the incidence of many leading causes of death, disease and disability.

Behavioural risk factors in youth may be influenced by demographic, geographic and socio-economic factors:

- **Sex –** Females reported higher rates of abuse and discrimination as well as slightly lower rates of smoking than males.
- **Geography –** School connectedness as well as prevalence of abuse, discrimination, smoking, and substance use before age 15 varies across HSDAs in BC. Geographic disparity is most evident for the prevalence of using substances before age 15, with a difference of 28% between HSDAs of the lowest and highest rates.
- **Income –** No significant disparity was shown by neighbourhood income level for any of the indicators examined.

5.0 General population health

Among the general population in BC, the rates of different health and well-being indicators vary significantly by geographic region, sex, education and income:

- Obesity rates were more than three times higher in the HSDA with the highest rate (22.4%) compared to the one with the lowest rate (6.9%).
- Significantly higher rates of females reported mood/anxiety disorder (13.7%) and adequate fruit and vegetable consumption[i] (48.6%) than males (7.7% and 36.4%, respectively).
- People with at least a high school diploma reported significantly more favourable rates for a number of indicators compared to those with less than a high school education, including positive perceived health (62.5% vs. 45.3%), positive perceived mental health (72.0% vs. 59.0%), adequate fruit and vegetable consumption (42.9% vs. 34.8%), leisure time physical activity (59.5% vs. 51.3%), mood/anxiety disorder (10.2% vs. 16.4%), adult obesity (12.2% vs. 17.3%) and current smoking (16.6% vs. 39.8%).
- People in the highest income group reported significantly more favourable rates than those in the lowest income group for a number of indicators, including positive perceived health (71.9% vs. 47.8%), positive perceived mental health (78.8% vs. 59.2%), adequate fruit and vegetable consumption (47.9% vs. 35.8%), leisure time physical activity (69.3% vs. 48.2%), mood/anxiety disorder (7.9% vs. 17.4%) and current smoking (12.0% vs. 26.5%).

i Self-reported consumption of fruits and vegetables at least five times daily (indicator used by Statistics Canada)

5.1 Background

This chapter examines a subset of indicators from the priority suite [Appendix 1] that relate to health status, outcomes and behaviours among the general BC population (age 15+ unless otherwise specified).

Measuring general health and mental health can reflect the population's overall health and well-being, resiliency and social environments. These self-reported indicators generally coincide with health system data.[85] Measuring rates of adult health conditions can highlight important population and public health issues.[86, 87] For example, mood disorders can have significant economic costs, high risks of suicide and loss of quality of life; anxiety disorders can lead to more frequent use of costly emergency and primary care services.[88] Measuring behaviours related to nutrition, physical activity and smoking can give insight into current population health as well as the potential future chronic disease burden.[89, 90, 91, 92, 93]

Adult health and well-being are influenced by a complex set of social and environmental factors that include current living and working conditions. Adult health can also be influenced by experiences in the early years that contribute to school success, and then by behavioral risk and protective factors during adolescence. Past research and monitoring have shown that adult health status, health conditions and health behaviours can be significantly different between men and women, by geographic region and between socio-economic groups.[94, 95, 96, 97, 98, 99, 100] For example, research shows that while BC women have a longer life expectancy than men, they are more likely to have poorer health status and are less likely to report being in good or excellent health than the Canadian average.[101, 102] Additionally, women with lower income and less than high school education experience higher rates of chronic disease than women with higher income or more education. Geography (especially urban versus rural residence) also impacts the health of British Columbians. Those living in rural regions generally have poorer health than those in more urban settings, and are more likely to experience significant barriers to good health, including longer distances, poor transportation systems and fewer available health care services.[103]

5.2 Indicator findings

This chapter examines seven indicators of general population health among British Columbians:

- Positive perceived health
- Positive perceived mental health
- Mood or anxiety disorder
- Adult obesity rate
- Fruit and vegetable consumption
- Leisure time physical activity
- Current smoking rate

These indicators are drawn from the priority suite and analyzed by various equity dimensions: geographic region, sex, education and income. When possible, analysis has considered two equity dimensions at once. Self-reported data on general health status, health outcomes and health behaviours are from the Canadian Community Health Survey (CCHS), 2007/08-2011/12.

Canadian Community Health Survey

The Canadian Community Health Survey (CCHS) is a cross-sectional survey conducted by Statistics Canada that collects self-reported information related to health status, health care utilization, and health determinants for the Canadian population living in private occupied dwellings. The CCHS covers the Canadian population 12 years of age and over living in the ten provinces and the three territories. Excluded from the survey's coverage are: persons living on reserves and other Aboriginal settlements in the provinces; full-time members of the Canadian Forces; the institutionalized population and persons living in two Quebec health regions. Altogether, these exclusions represent less than 3% of the target population in Canada. Since 2007, data are collected annually. Analyses for this report were restricted to respondents from the province of British Columbia aged 15 and over where applicable.[i]

i 85.6% of British Columbians (aged 15+) have attained at least a high school diploma, CCHS, 2007-2012

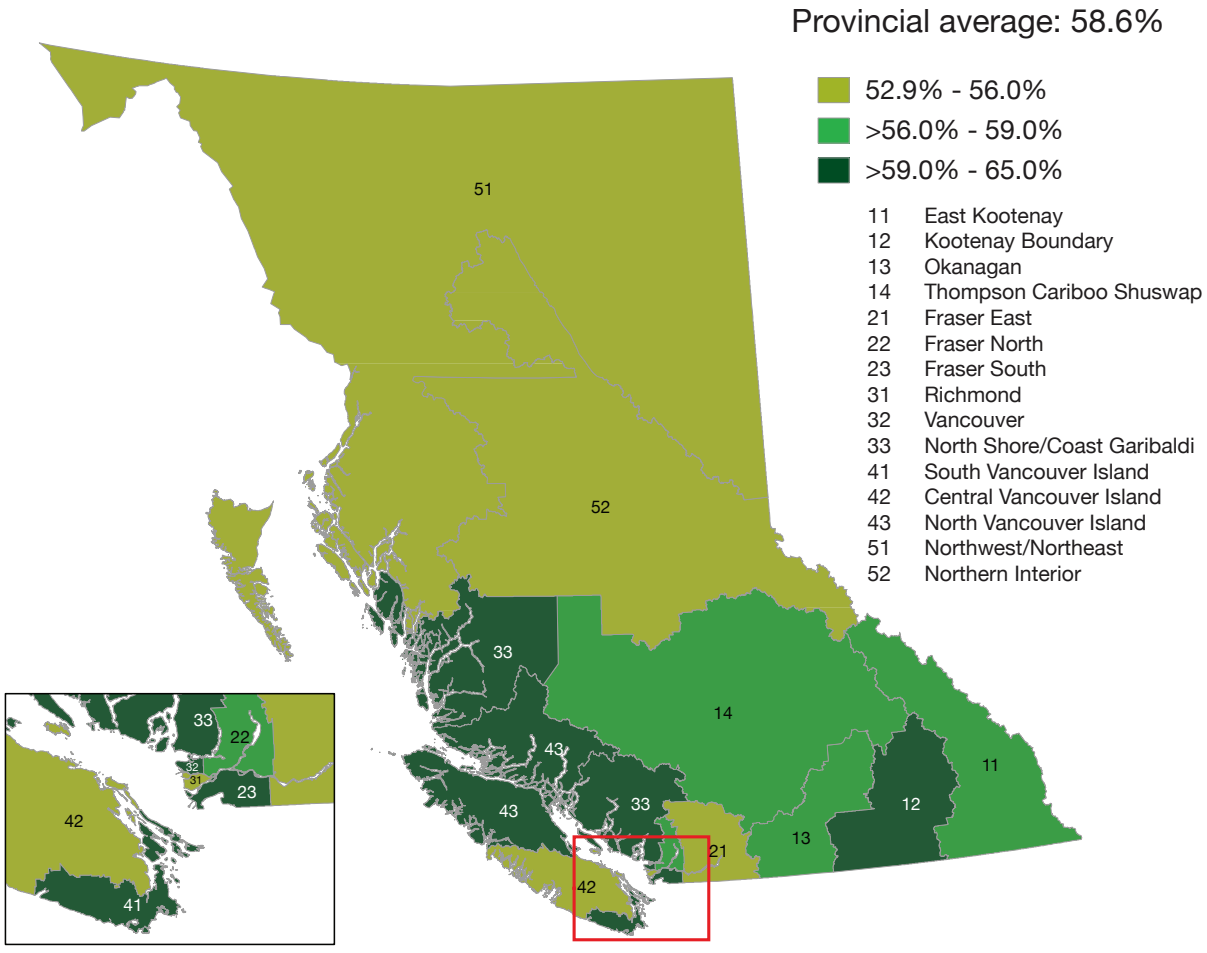
5.2.1 Positive perceived health

For this report, positive perceived health is defined as the percentage of the BC population aged 15 and over who report very good or excellent perceived health, based on CCHS data.

Perceived health can give insight into an individual's satisfaction with life and their overall well-being, which are measures identified in *BC's Guiding Framework for Public Health*. Additionally, perceived health is known to be a reliable and valid measure of health status associated with functional decline and morbidity.[104]

Geographic region

Map 11. Prevalence of positive perceived health (age 15+) in BC by HSDA, CCHS 2007/08-2011/12



Data source: Canadian Community Health Survey (2007/08, 2009/10, 2011/12)
Prepared by: Population and Public Health Program, Provincial Health Services Authority

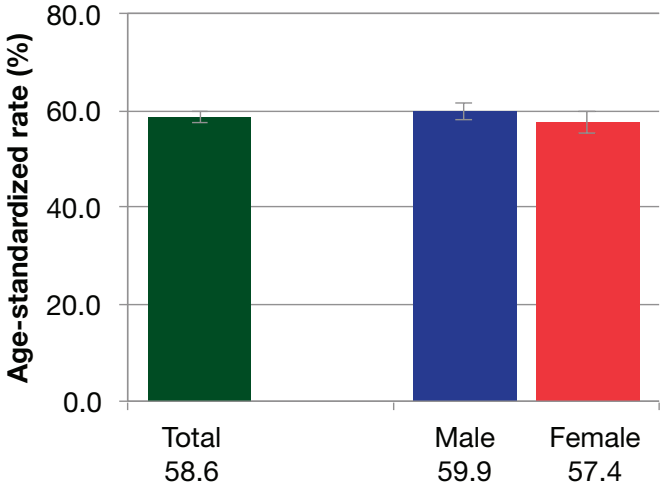
Among the HSDAs in BC, the rate of positive perceived health in the population (15+ years) ranged from 52.9% to 65.0%, with an average of 58.6%.

Rates were lower in the northern regions of the province and higher in parts of the interior and southwestern coastal regions.

Positive perceived health (cont'd)

Sex

Figure 30. Percentage of population (age 15+) with positive perceived health in BC, total and by sex, CCHS 2007/08 - 2011/12

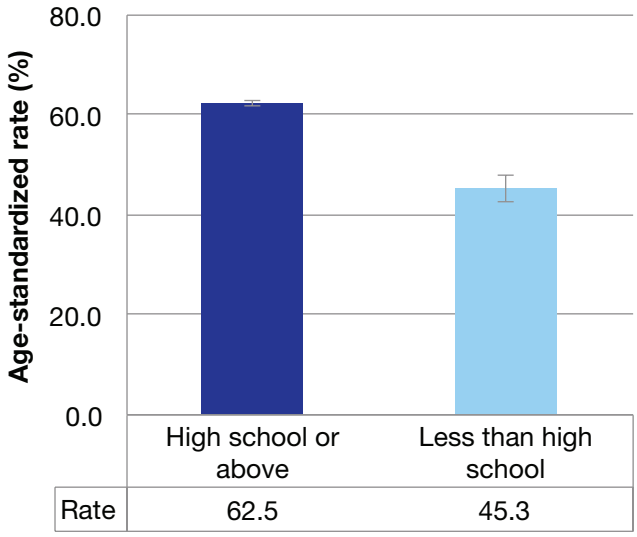


Slightly more males (59.9%) than females (57.4%) reported positive perceived health between 2007 and 2012.

Overall, 58.6% of British Columbians (age 15+) reported positive perceived health.

Education

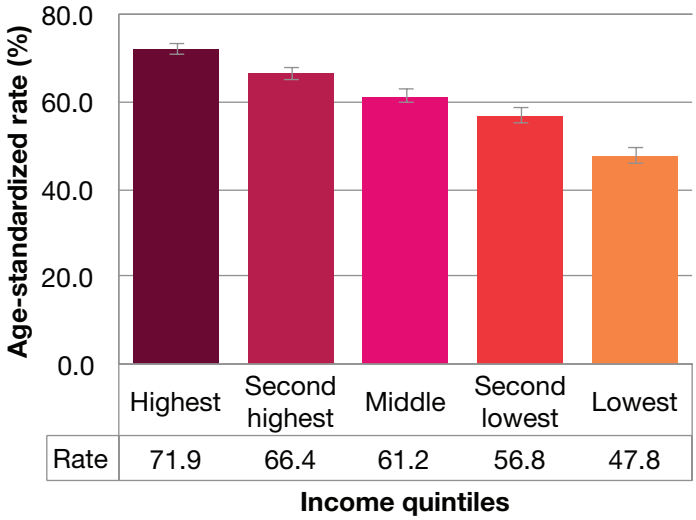
Figure 31. Percentage of population (age 15+) with positive perceived health in BC, by education, CCHS 2007/08 - 2011/12



People (age 15+) who have not completed high school reported significantly lower rates of positive perceived health (45.3%) than people with at least a high school diploma (62.5%).

Income

Figure 32. Percentage of population (age 15+) with positive perceived health in BC, both sexes by income, CCHS 2007/08 - 2011/12



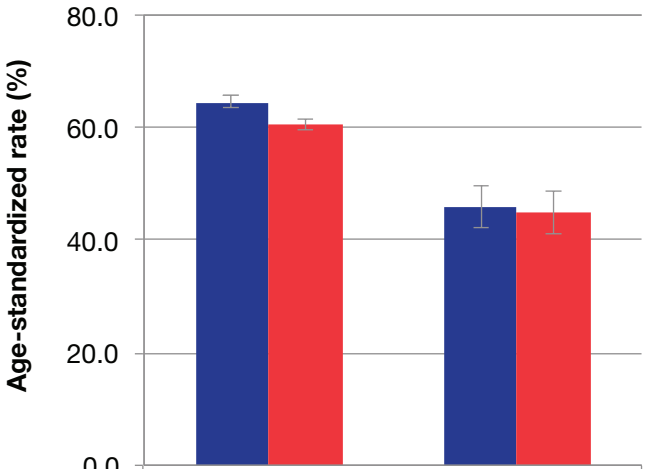
	Highest	Second highest	Middle	Second lowest	Lowest
Rate	71.9	66.4	61.2	56.8	47.8

People (age 15+) with the lowest income reported the lowest rate of positive perceived health (47.8%).

Rates of positive perceived health increased with income level, up to 71.9% among the highest income group.

Sex and education

Figure 33. Percentage of population (age 15+) with positive perceived health in BC, by sex and education, CCHS 2007/08 - 2011/12



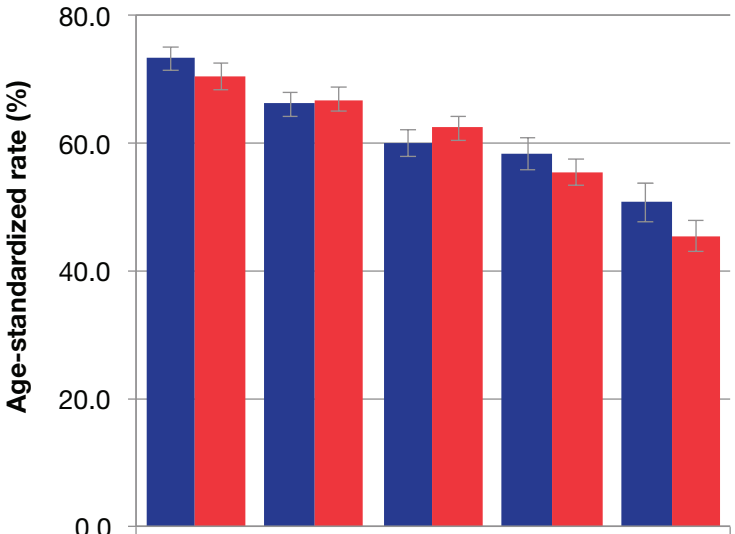
	High school or above	Less than high school
Males	64.6	45.8
Females	60.5	44.9

Among both males and females, those who have not completed high school reported significantly lower rates of positive perceived health than those with at least a high school diploma.

Males with at least a high school diploma reported the highest rates of positive perceived health (64.6%), whereas females who have not completed high school reported the lowest rates (44.9%).

Sex and income

Figure 34. Percentage of population (age 15+) with positive perceived health in BC, by sex and income, CCHS 2007/08 - 2011/12



	Highest	Second highest	Middle	Second lowest	Lowest
Males	73.1	66.0	60.0	58.3	50.6
Females	70.3	66.7	62.4	55.5	45.4

Among both males and females, those with the lowest income reported the lowest rates of positive perceived health.

Males with the highest income reported the highest rates of positive perceived health (73.1%), whereas females with the lowest income reported the lowest rates (45.4%).

5.2.2 Positive perceived mental health

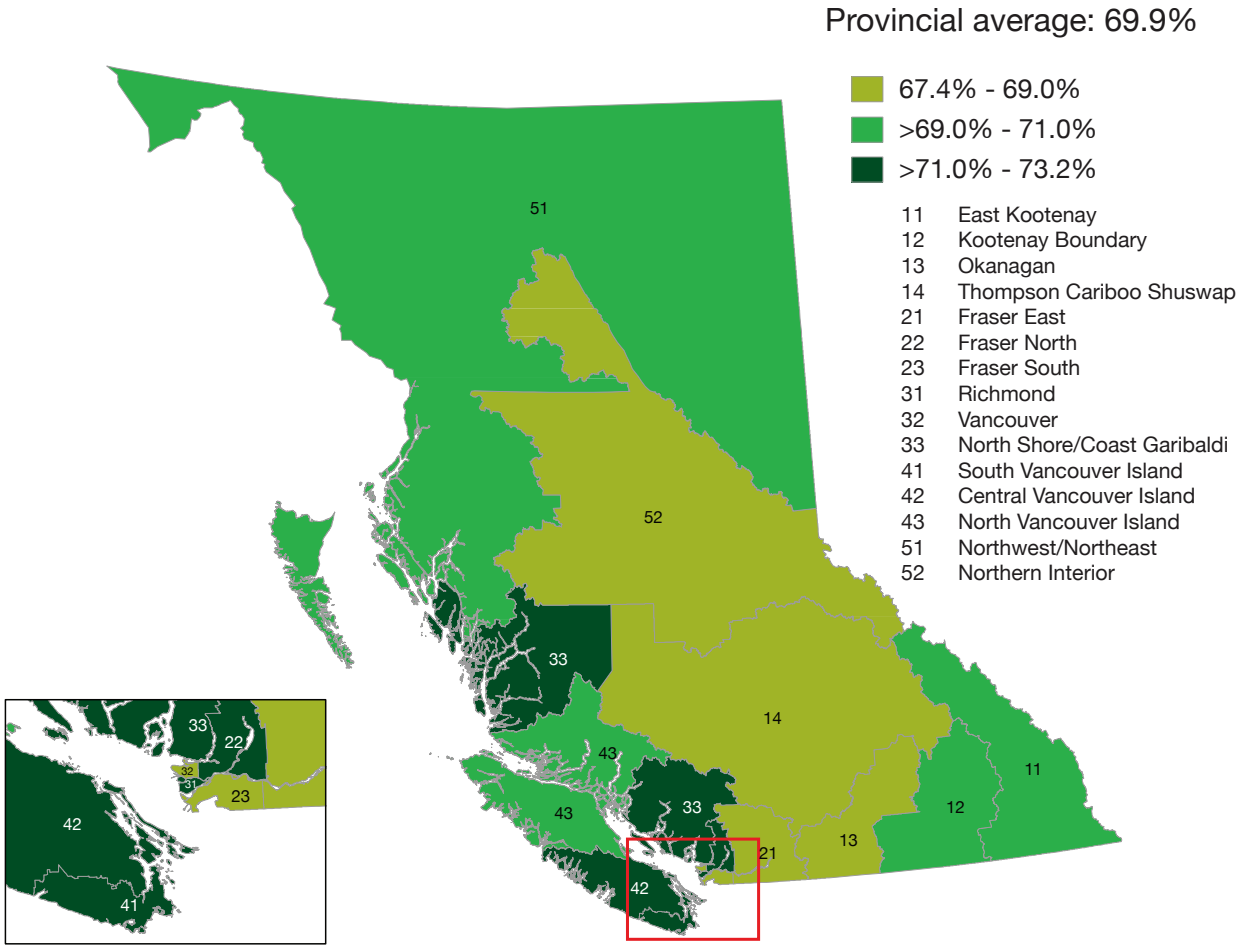
For this report, positive perceived mental health is defined as the percentage of the BC population aged 15 and over who report very good or excellent perceived mental health, based on CCHS data.

Socio-economic disadvantages such as low levels of education, low income and poor housing are recognized risk factors for poor mental health.[105]

Increasing the overall percentage of British Columbians who experience positive mental health from 71% in 2009/10 to 80% in 2023 is a target identified in *BC's Guiding Framework for Public Health*.

Geographic region

Map 12. Prevalence of positive perceived mental health (age 15+) in BC by HSDA, CCHS 2007/08-2011/12



Data source: Canadian Community Health Survey (2007/08, 2009/10, 2011/12)
Prepared by: Population and Public Health Program, Provincial Health Services Authority

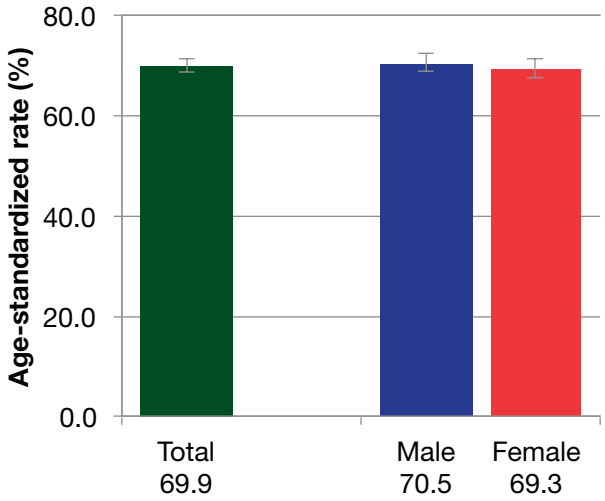
Among the HSDAs in BC, the rate of positive perceived mental health in the population (age 15+) ranged from 67.4% to 73.2%, with an average of 69.9%.

Rates were lower in the central interior, northern regions and parts of the Fraser Valley and Lower Mainland. Rates were higher in southern Vancouver Island, parts of the central coast and the North Shore.

Positive perceived mental health (cont'd)

Sex

Figure 35. Percentage of population (age 15+) with positive perceived mental health in BC, total and by sex, CCHS 2007/08 - 2011/12

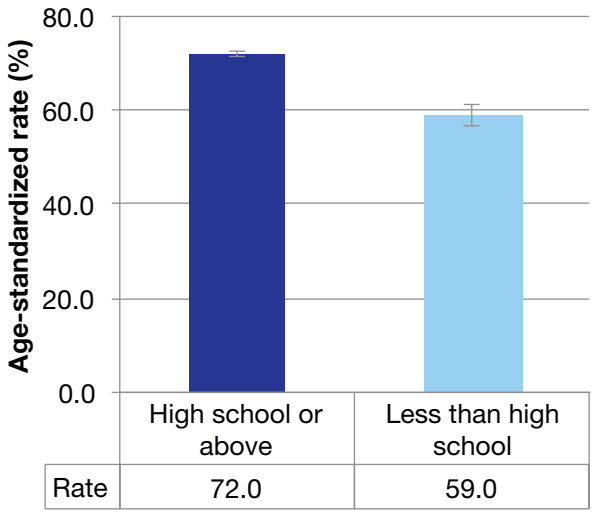


Slightly more males (70.5%) than females (69.3%) reported positive perceived mental health between 2007 and 2012.

Overall, 69.9% of the population (age 15+) reported positive perceived mental health.

Education

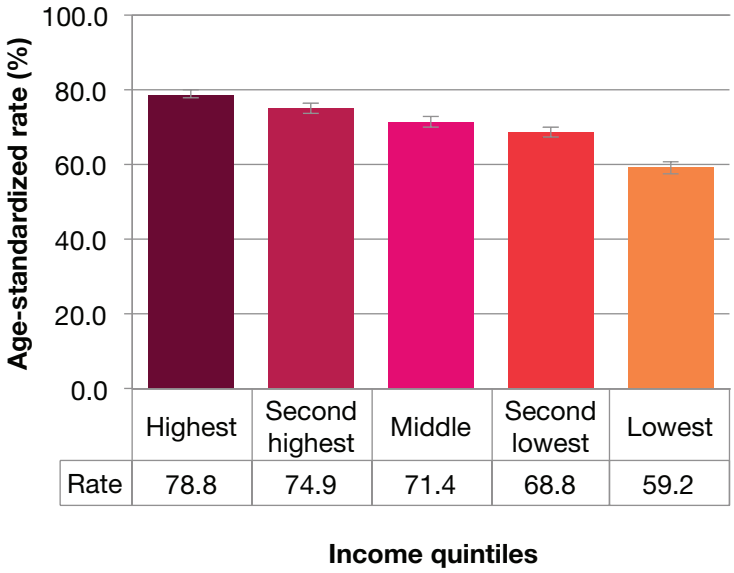
Figure 36. Percentage of population (age 15+) with positive perceived mental health in BC, by education, CCHS 2007/08 - 2011/12



People (age 15+) who have not completed high school reported significantly lower rates of positive perceived mental health (59.0%) than those with at least a high school diploma (72.0%).

Income

Figure 37. Percentage of population (age 15+) with positive perceived mental health in BC, by income, CCHS 2007/08 - 2011/12

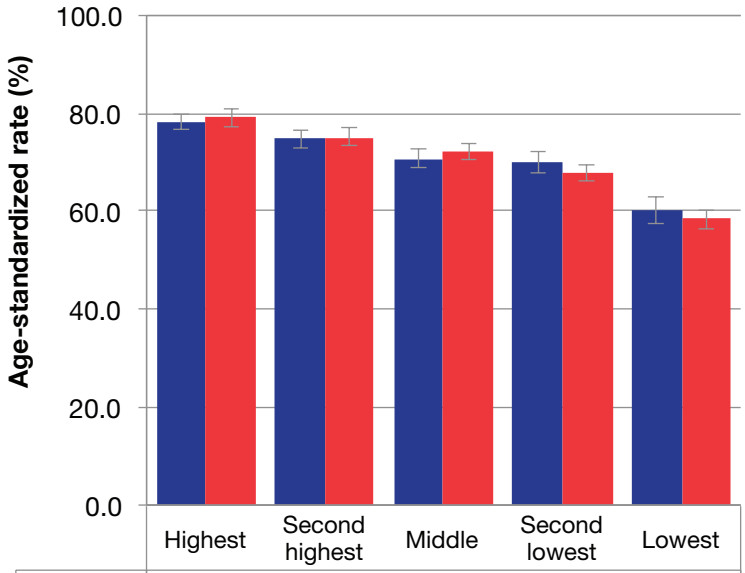


	Highest	Second highest	Middle	Second lowest	Lowest
Rate	78.8	74.9	71.4	68.8	59.2

Rates of people (age 15+) who reported positive perceived mental health declined with decreasing levels of income; 78.8% of those in the highest income group reported positive perceived mental health, compared to 59.2% of those in the lowest income group.

Sex and income

Figure 38. Percentage of population (age 15+) with positive perceived mental health in BC, by sex and income, CCHS 2007/08 - 2011/12



	Highest	Second highest	Middle	Second lowest	Lowest
Males	78.4	74.7	70.7	69.9	60.1
Females	79.1	75.2	72.1	67.9	58.4

Among both males and females, those with the lowest income reported the lowest rates of positive perceived mental health.

Females with the highest income reported the highest rates of positive perceived mental health (79.1%), whereas females with the lowest income reported the lowest rates (58.4%).

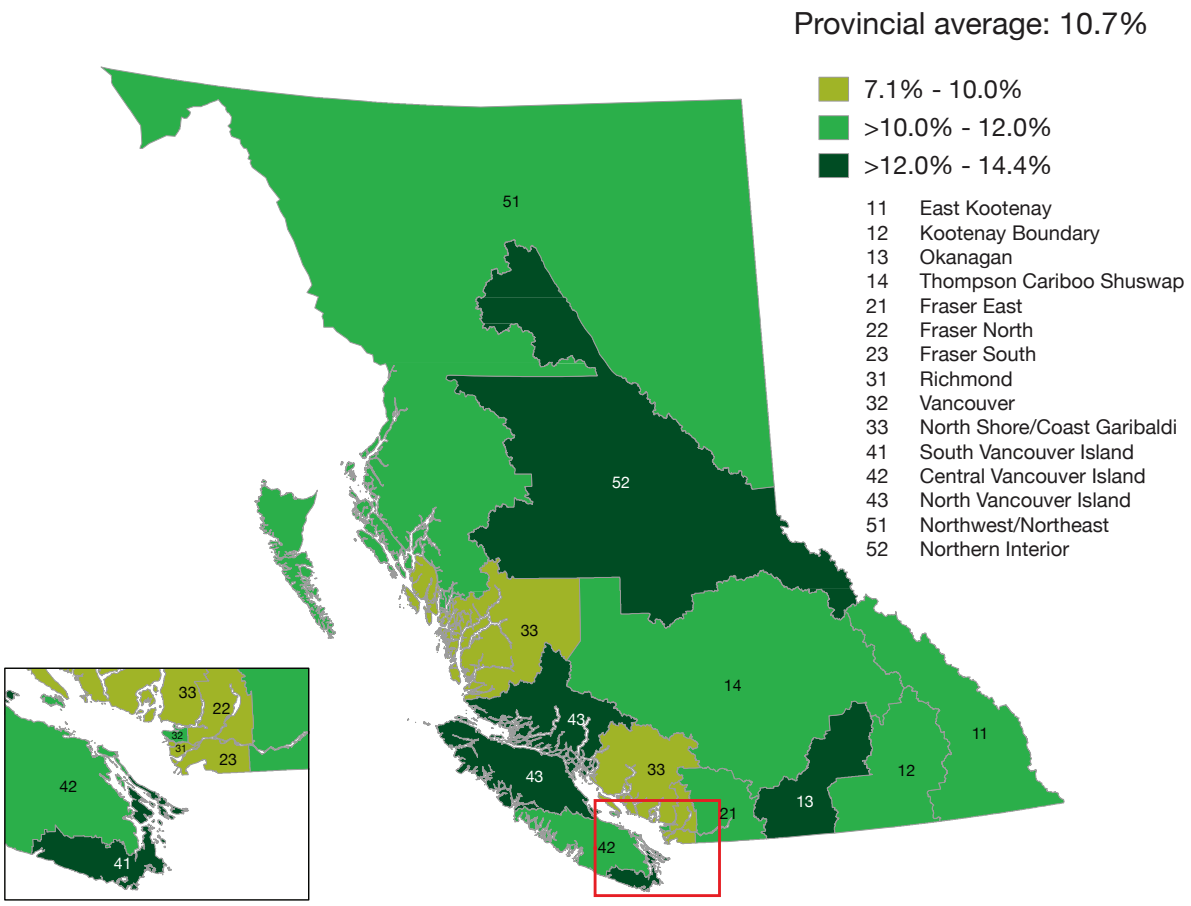
5.2.3 Mood/anxiety disorder

For this report, mood/anxiety disorder is defined as the percentage of the BC population aged 15 and over who report experiencing mood or anxiety disorder in the previous 12 months, based on CCHS data.

Anxiety disorders can be chronic and constitute a considerable social burden. A relatively small group of the Canadian population experiences anxiety disorders at serious and chronic levels that interfere significantly with quality of life and ability to function in academic, occupational and social contexts.[106] The high rate of co-morbidity of mood/anxiety disorder with other conditions can be burdensome, as people with multiple diagnoses require greater access to medical services than those without such concurrent disorders.

Geographic region

Map 13. Prevalence of mood/anxiety disorder (age 15+) in BC, by HSDA, 2007-2012



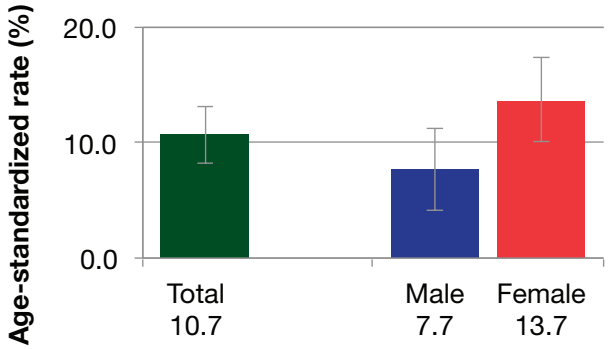
Data source: Canadian Community Health Survey (2007/08, 2009/10, 2011/12)
Prepared by: Population and Public Health Program, Provincial Health Services Authority

Among the HSDAs in BC, the rate of mood/anxiety disorder in the population (age 15+) ranged from 7.1% to 14.4%, with an average of 10.7%.

Rates were lower in the Lower Mainland and higher in northern BC, in parts of Vancouver Island, and the southern interior.

Sex

Figure 39. Mood/anxiety disorder prevalence of population (age 15+) in BC, by sex, CCHS 2007/08 - 2011/12

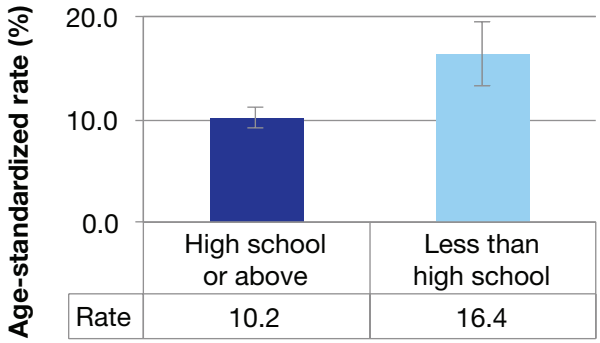


More females (13.7%) than males (7.7%) reported mood/anxiety disorder between 2007 and 2012.

Overall, 10.7% of British Columbians (age 15+) reported having mood/anxiety disorder in the previous 12 months.

Education

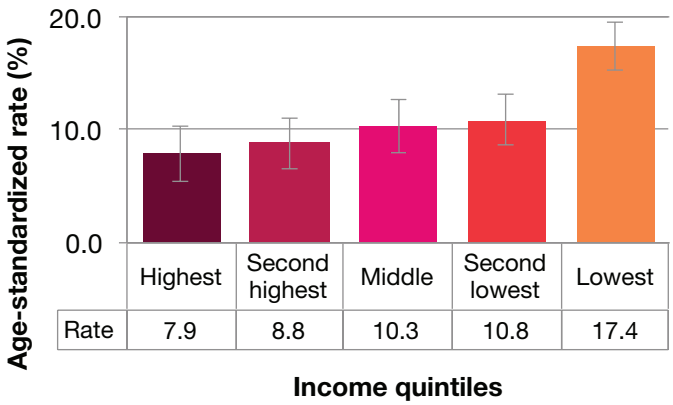
Figure 40. Mood/anxiety disorder prevalence of population (age 15+) in BC, by education, CCHS 2007/08 - 2011/12



People (age 15+) who have not completed high school reported significantly higher rates of mood/anxiety disorder (16.4%) than people with at least a high school diploma (10.2%).

Income

Figure 41. Mood/anxiety disorder prevalence of population (age 15+) in BC, by income, CCHS 2007/08 - 2011/12



People (age 15+) with the lowest income reported the highest rate of mood/anxiety disorder (17.4%), significantly higher than other income groups.

Rates of mood/anxiety disorders decreased as income level rose.

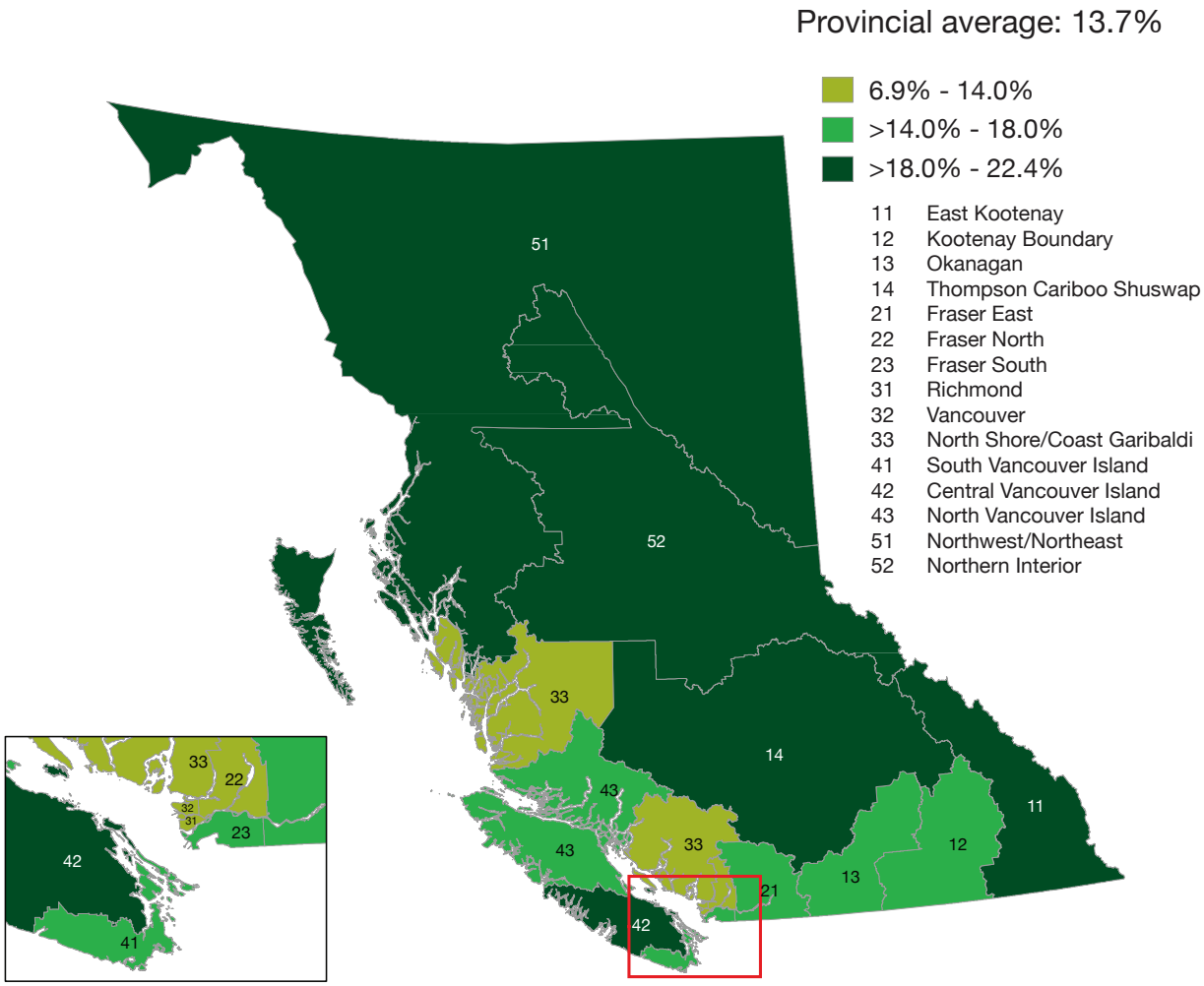
5.2.4 Adult obesity rate

For this report, adult obesity rate is defined as the percentage of the BC population (aged 18+) that are classified as obese (BMI $\geq$30 kg/m^2), based on self-reported height and weight data in the CCHS.

Obesity increased significantly in Canada between 1985 and 2000. Being obese substantially increases the risk for many chronic conditions, such as diabetes, asthma, depression, and cardiovascular diseases. Obesity and other weight-related issues are shaped by social, cultural, economic, political and environmental factors, such as current trends in food production and marketing, recreation and physical activity opportunities, sedentary work and transportation.[107]

Geographic region

Map 14. Prevalence of adult obesity (age 18+) in BC by HSDA, CCHS 2007/08-2011/12



Data source: Canadian Community Health Survey (2007/08, 2009/10, 2011/12)
Prepared by: Population and Public Health Program, Provincial Health Services Authority

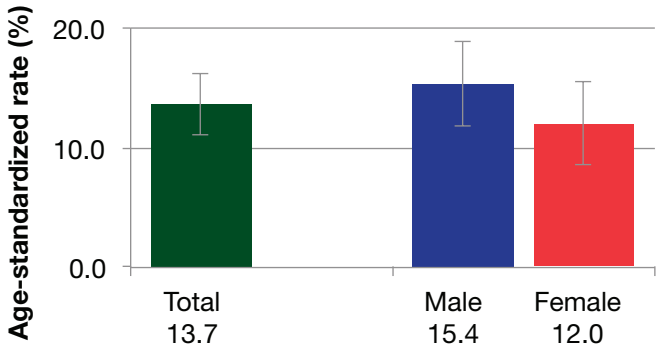
Among the HSDAs in BC, the rate of adult obesity ranged from 6.9% to 22.4%, with an average of 13.7%.

Rates were lower in the Lower Mainland and higher in the northern BC and in parts of the southern interior and Vancouver Island.

Adult obesity rate (cont'd)

Sex

Figure 42. Obesity rate of adult population (age 18+) in BC, by sex, CCHS 2007/08 - 2011/12

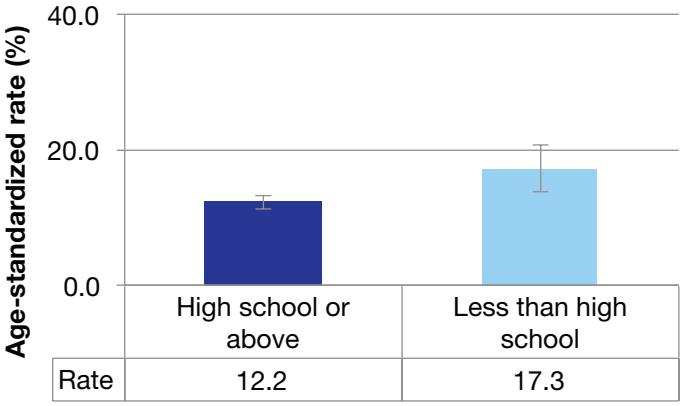


Males reported slightly higher rates of adult obesity (15.4%) than females (12.0%) between 2007 and 2012.

Overall, the average adult obesity rate in BC was 13.7%.

Education

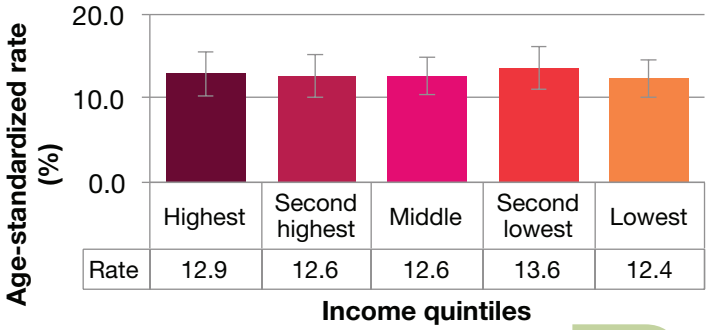
Figure 43. Obesity rate of adult population (age 18+) in BC, by education, CCHS 2007/08 - 2011/12



Adults who have not completed high school reported significantly higher rates of obesity (17.3%) than adults with at least a high school diploma (12.2%).

Income

Figure 44. Obesity rate of adult population (age 18+) and over in BC, by income, CCHS 2007/08 - 2011/12



Adult obesity rates were not significantly different across income groups.

5.2.5 Fruit and vegetable consumption

In this report, fruit and vegetable consumption (an indicator of healthy eating behaviour) is represented by the percentage of the BC population (age 15+) who reported consuming fruits and vegetables at least five times a day, based on CCHS data. This measure is used by Statistics Canada to represent adequate daily fruit and vegetable consumption.[108]

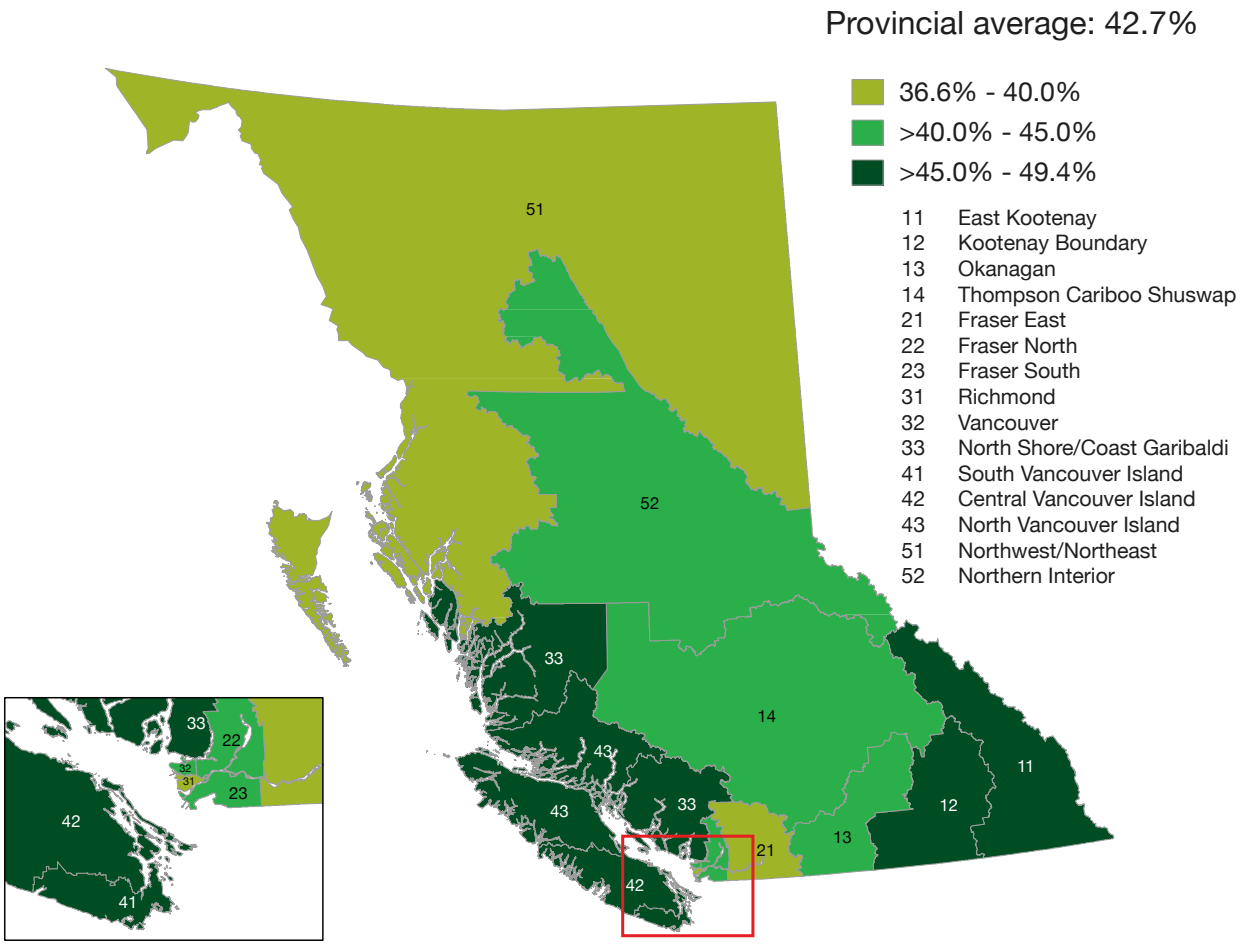
Choosing and practising healthy eating habits can promote and support social, physical and mental well-being for everyone, at all ages and stages of life.[109] However, not everyone has access to or can afford nutritious, safe and personally acceptable food. How food is produced, processed, distributed and marketed as well as a person's income and area of residence can all impact food choices.[110]

Increasing the overall percentage of British Columbians who consume at least five servings of fruits and vegetables from 44% in 2009/10 to 55% in 2023 is a target identified in *BC's Guiding Framework for Public Health*.

Fruit and vegetable consumption (cont'd)

Geographic region

Map 15. Prevalence of adequate daily fruit and vegetable consumption (age 15+) in BC by HSDA, CCHS 2007/08-2011/12



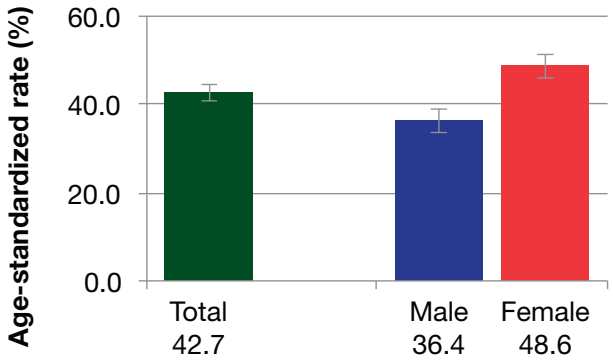
Data source: Canadian Community Health Survey (2007/08, 2009/10, 2011/12)
Prepared by: Population and Public Health Program, Provincial Health Services Authority

Among the HSDAs in BC, the rate of adequate fruit and vegetable consumption in the population (age 15+) ranged from 36.6% to 49.4%, with an average of 42.7%.

Rates were higher in the southern interior regions of the province as well as North Shore and Vancouver Island. Rates were lower in the northern regions of the province and parts of the upper Fraser Valley.

Sex

Figure 45. Adequate daily fruit and vegetable consumption (age 15+) in BC, by sex, CCHS 2007/08 - 2011/12

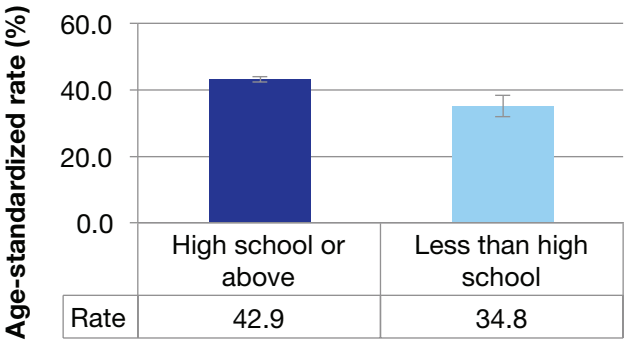


More females (48.6%) than males (36.4%) reported adequate daily fruit and vegetable consumption, between 2007 and 2012.

Overall, 42.7% of British Columbians (age 15+) reported having adequate daily fruit and vegetable consumption.

Education

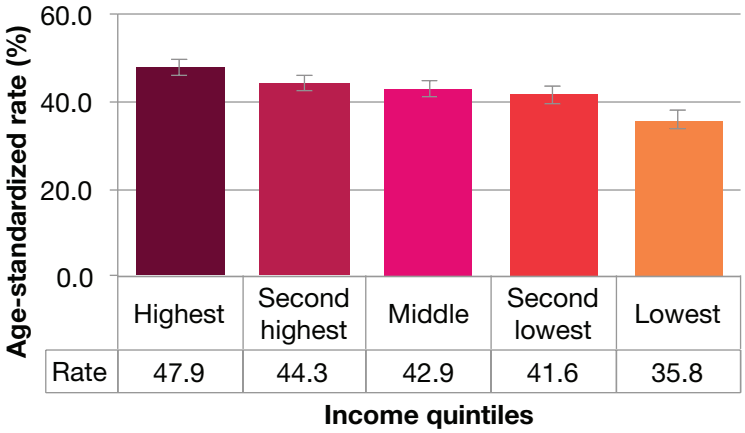
Figure 46. Adequate daily fruit and vegetable consumption (age 15+) in BC, by education, CCHS 2007/08 - 2011/12



People (age 15+) who have not completed high school reported significantly lower rates of adequate daily fruit and vegetable consumption (34.8%) than people with at least a high school diploma (42.9%).

Income

Figure 47. Adequate daily fruit and vegetable consumption (age 15+) in BC, by income, CCHS 2007/08 - 2011/12

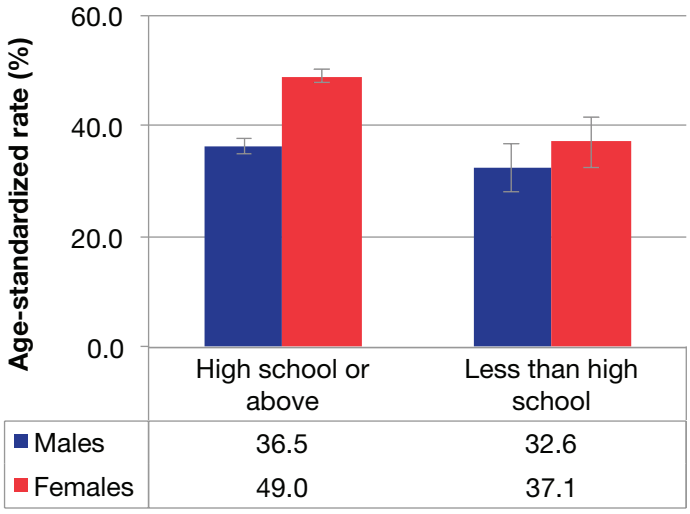


People (age 15+) with the lowest income reported significantly lower rate of adequate daily fruit and vegetable consumption (35.8%) than those in the highest income group (47.9%).

Fruit and vegetable consumption (cont'd)

Sex and education

Figure 48. Adequate daily fruit and vegetable consumption (age 15+) in BC, by sex and education, CCHS 2007/08 - 2011/12



	High school or above	Less than high school
Males	36.5	32.6
Females	49.0	37.1

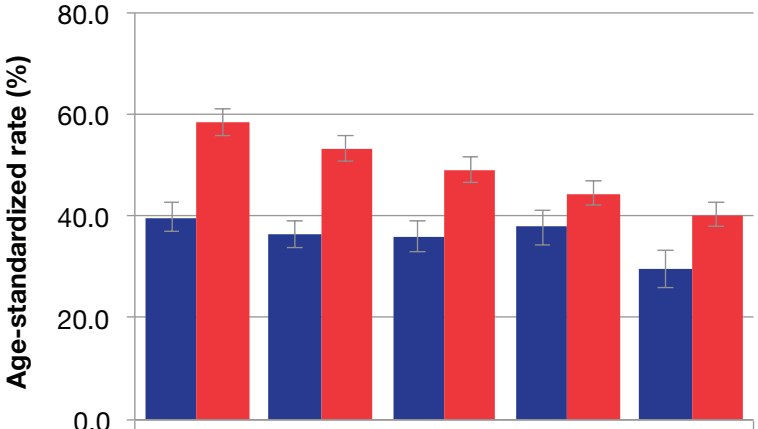
Among both males and females, those who did not complete high school reported less adequate daily fruit and vegetable consumption than those with at least a high school diploma.

Females reported higher rates of adequate daily fruit and vegetable consumption than males regardless of education level.

The difference in rate of adequate daily fruit and vegetable consumption between males and females was significant for those with at least a high school diploma.

Sex and income

Figure 49. Adequate daily fruit and vegetable consumption (age 15+) in BC, by sex and income, CCHS 2007/08 - 2011/12



	Highest	Second highest	Middle	Second lowest	Lowest
Males	39.9	36.4	36.1	37.9	29.6
Females	58.3	53.3	49.1	44.6	40.4

Females reported higher rates of adequate daily fruit and vegetable consumption than males at all income levels.

Females with the highest income reported the highest rates of adequate daily fruit and vegetable consumption (58.3%), whereas males with the lowest income reported the lowest rates (29.6%).

5.2.6 Leisure time physical activity

The leisure time physical activity indicator is represented by the percentage of the BC population aged 15 and over in the CCHS with self-reported leisure time physical activity classified as active or moderately active.[iii]

The health benefits of physical activity include reduced risks of cardiovascular disease, some types of cancer, osteoporosis, diabetes, obesity, high blood pressure, depression, stress and anxiety. The economic impact of physical inactivity can be substantial to the healthcare system: the total cost of physical inactivity in BC in 2013 was estimated at $1 billion.[111] Though physical activity is recognized as a key performance measure to monitor and promote healthy living in the province,[112] leisure time physical activity accounts for only a portion of an individual's overall physical activity. Leisure time physical activity does not include daily living, commuting and occupational physical activity including household chores. Monitoring trends in the level of leisure time physical activity across equity dimensions in the province can help to provide some understanding of the health risks of vulnerable population groups. Monitoring these trends could support planning and evaluation of policies and programs that promote physical activity, such as Healthy Families BC.

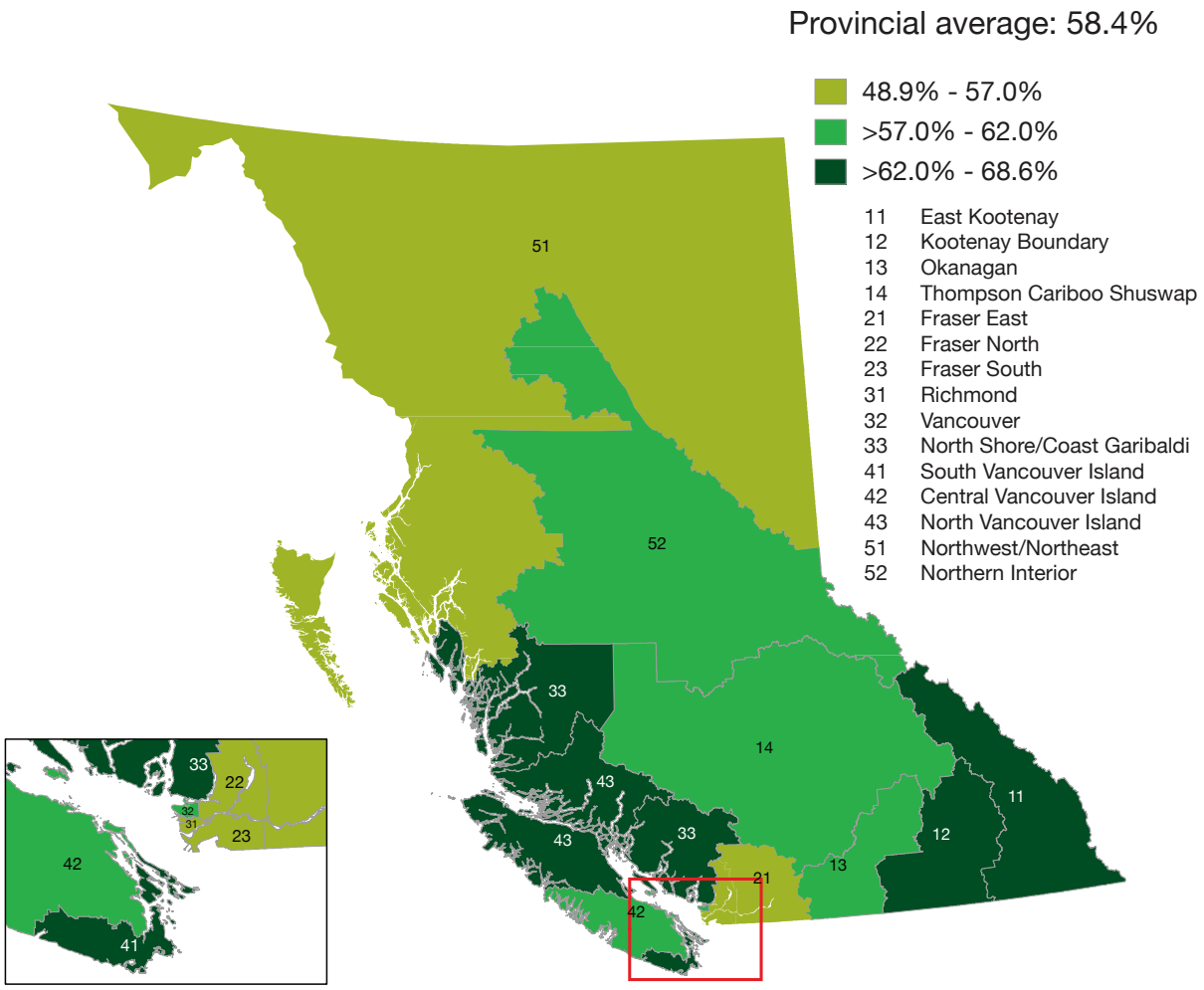
Increasing the overall percentage of British Columbians who are meeting the guidelines for physical activity from 60% in 2009/10 to 70% in 2023 is a target identified in *BC's Guiding Framework for Public Health*.

iii Respondents are 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 is 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 is calculated as the sum of the average daily energy expenditures of all activities. Respondents are classified as follows: 3.0 kcal/kg/day or more = physically active; 1.5 to 2.9 kcal/kg/day = moderately active; less than 1.5 kcal/kg/day = inactive.

Leisure time physical activity (cont'd)

Geographic region

Map 16. Prevalence of being physically active or moderately active during leisure time (age 15+) in BC, by HSDA, CCHS 2007/08-2011/12



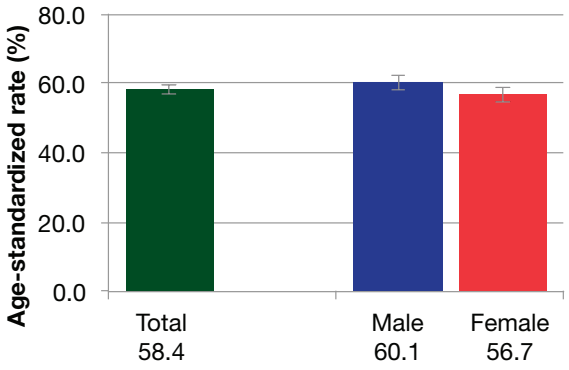
Data source: Canadian Community Health Survey (2007/08, 2009/10, 2011/12)
Prepared by: Population and Public Health Program, Provincial Health Services Authority

Among the HSDAs in BC, the percentage of population (age 15+) that is active or moderately active during leisure time ranged from 48.9% to 68.6%, with an average of 58.4%.

Rates were lower in the Lower Mainland and in the northern regions of the province. Rates were higher in the southern interior, the North Shore, and parts of Vancouver Island.

Sex

Figure 50. Percentage of population (age 15+) in BC that is active or moderately active during leisure time, total and by sex, CCHS 2007/08 - 2011/12

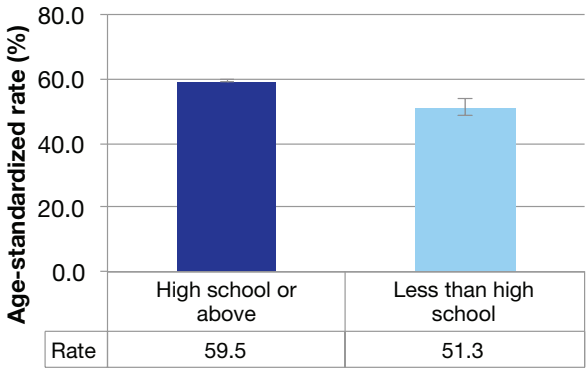


Slightly more males (60.1%) than females (56.7%) reported being active or moderately active during leisure time between 2007 and 2012.

Overall, 58.4% of the population (age 15+) were active or moderately active during leisure time.

Education

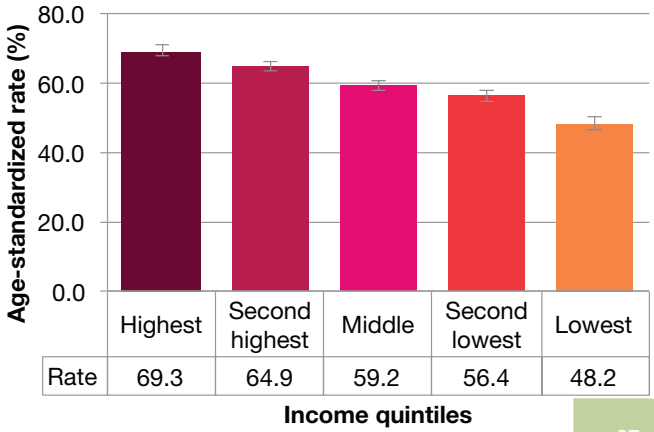
Figure 51. Percentage of population (age 15+) in BC that is active or moderately active during leisure time, by education, CCHS 2007/08 - 2011/12



People (age 15+) with less than high school education reported significantly lower rates of being active or moderately active during leisure time (51.3%) than people with at least a high school education (59.5%).

Income

Figure 52. Percentage of population (age 15+) in BC that is active or moderately active during leisure time, by income, CCHS 2007/08 - 2011/12

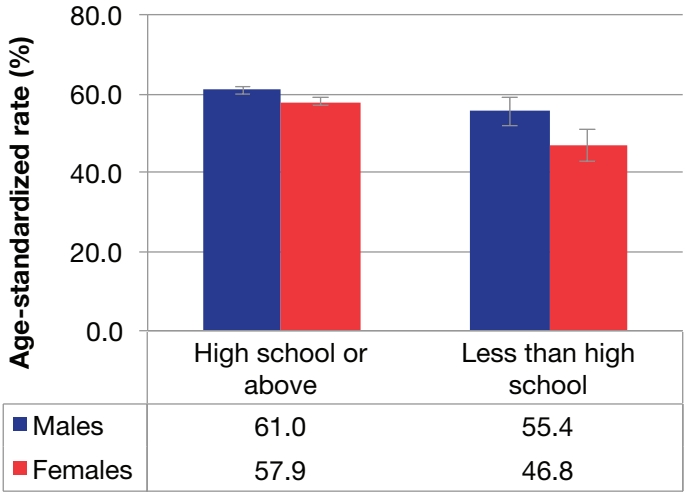


Rates of people (age 15+) who reported as active or moderately active during leisure time declined with decreasing levels of income; 69.3% for those in the highest income group, significantly higher than those in the lowest income group (48.2%).

Leisure time physical activity (cont'd)

Sex and education

Figure 53. Percentage of population (age 15+) in BC that is active or moderately active during leisure time, by sex and education, CCHS 2007/08 - 2011/12



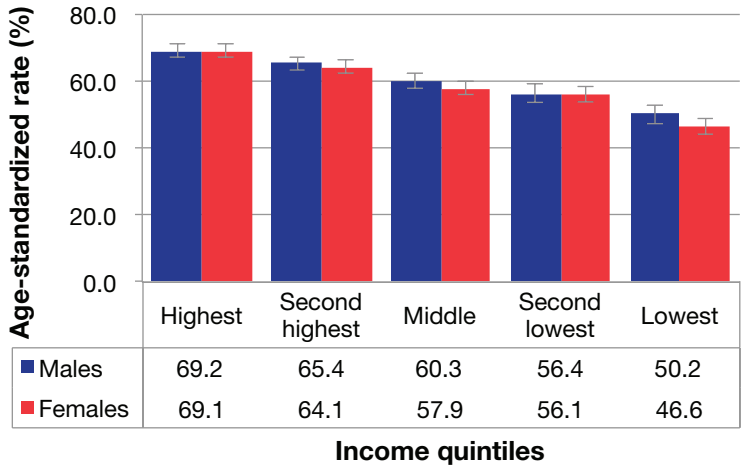
	High school or above	Less than high school
Males	61.0	55.4
Females	57.9	46.8

Among both males and females, those who have not completed high school reported lower rates of being active or moderately active during leisure time than those with at least a high school diploma.

Males reported significantly higher rates of being active or moderately active than females regardless of education level.

Sex and income

Figure 54. Percentage of population (age 15+) in BC that is active or moderately active during leisure time, by sex and income, CCHS 2007/08 - 2011/12



	Highest	Second highest	Middle	Second lowest	Lowest
Males	69.2	65.4	60.3	56.4	50.2
Females	69.1	64.1	57.9	56.1	46.6

Among both males and females, those with the lowest income reported the lowest rate of being active or moderately active during leisure time.

5.2.7 Adult current smoking rate

The adult current smoking rate is the percentage of the BC population (age 20+) in the CCHS who reported being a current daily or occasional smoker.

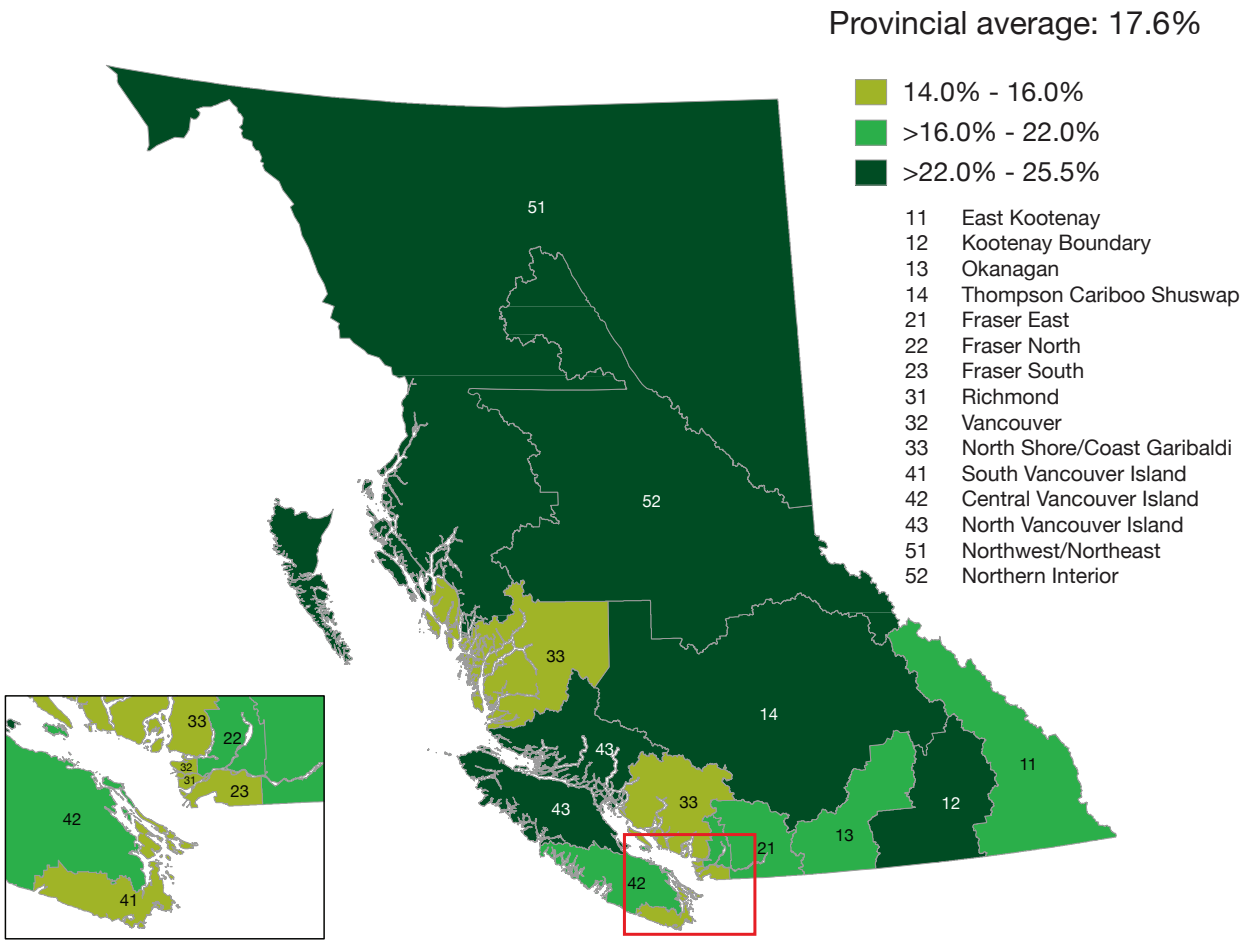
Tobacco smoking has serious health and economic impacts on society. It is the most preventable cause of lung cancer (a leading cause of cancer death), accounting for about 85% of all new lung cancer cases in Canada.[113] Smoking is estimated to increase the risk of coronary heart disease and stroke by 2 to 4 times; dying from chronic obstructive lung disease (such as bronchitis and emphysema) by 12 to 13 times; and the development of lung cancer in men by 23 times and in women by 13 times.[114] The estimated annual economic burden of tobacco smoking in Canada, based on 2012 figures, is $21.3 billion.[115] The annual economic burden attributable to smoking in BC is estimated at $2.0 billion in 2013.[116] The profound negative consequences of tobacco smoking at the individual and societal levels and the evidence of geographic, sex, and socio-economic differences in smoking rates in BC, warrants continued monitoring of this indicator. Identifying vulnerable groups could provide evidence to support future smoking reduction interventions.

Decreasing the overall percentage of British Columbians who smoke from 14% in 2011 to 10% in 2023 is a target identified in *BC's Guiding Framework for Public Health*.

Adult current smoking rate (cont'd)

Geographic region

Map 17. Prevalence of adult current smoking rate (age 20+) in BC, by HSDA, CCHS 2007/08-2011/12



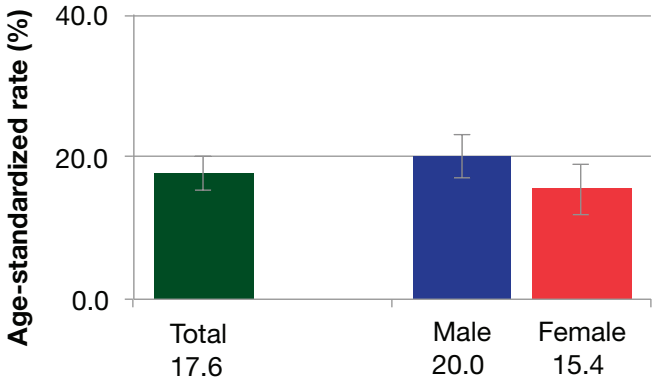
Data source: Canadian Community Health Survey (2007/08, 2009/10, 2011/12)
Prepared by: Population and Public Health Program, Provincial Health Services Authority

Among the HSDAs in BC, the rate of current smoking in adults (age 20+) ranged from 14.0% to 25.5%, with an average of 17.6%.

Rates were lower in the Lower Mainland and southern Vancouver Island. Rates were higher in northern regions of the province and Vancouver Island and parts of the interior.

Sex

Figure 55. Current smoking rate of population (age 20+) in BC, total and by sex, CCHS 2007/08 - 2011/12

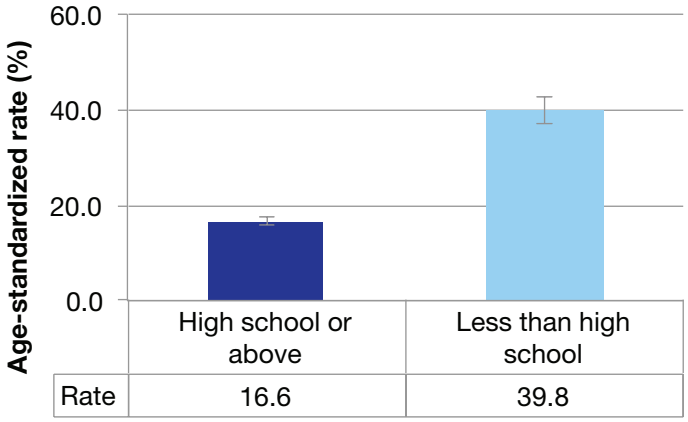


Slightly more males (20.0%) than females (15.4%) reported being current smokers between 2007 and 2012.

Overall, 17.6% of British Columbians (age 20+) were current smokers.

Education

Figure 56. Current smoking rate of population (age 20+) in BC, by education, CCHS 2007/08 - 2011/12

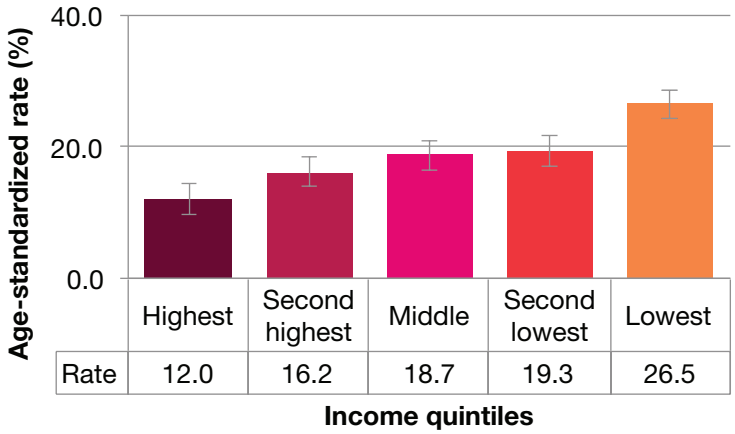


People with less than high school education reported significantly higher rates of smoking (39.8%) than people with at least a high school diploma (16.6%).

Adult current smoking rate (cont'd)

Income

Figure 57. Current smoking rate of population (age 20+) in BC, by income, CCHS 2007/08 - 2011/12



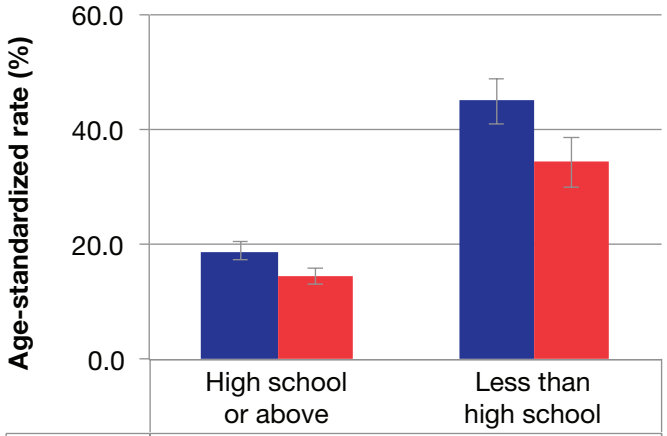
	Highest	Second highest	Middle	Second lowest	Lowest
Rate	12.0	16.2	18.7	19.3	26.5

People (age 20+) with the lowest income reported the highest rate of smoking (26.5%).

Rates of current smoking decreased with income level.

Sex and education

Figure 58. Current smoking rate of population (age 20+) in BC, by sex and education, CCHS 2007/08 - 2011/12



	High school or above	Less than high school
Males	18.9	44.9
Females	14.5	34.4

Among both males and females, those with less than high school education reported significantly higher rates of smoking than those with at least a high school diploma. Males with less than a high school diploma reported the highest rate of smoking (44.9%), whereas females with at least a high school diploma reported the lowest rates (14.5%).

Key results

Adult health and well-being is influenced by many social, economic and environmental factors, as well as early life experiences.

There were notable disparities in the general population health, chronic disease and health behaviour indicators in BC across demographic, geographic and socio-economic dimensions:

- **Sex –** Females reported lower rates of positive perceived health, positive perceived mental health, leisure-time physical activity, and higher rates of mood/anxiety disorder than males. Males reported lower rates of adequate daily fruit and vegetable consumption and higher rates of obesity and smoking.
- **Geography –** The rates of all general population health indicators varied by HSDA, but the prevalence of adult obesity showed the most regional variation, with rates in some HSDAs that were more than three times higher than others.
- **Education –** Analysis found significant disparity between people with at least high school education compared to those with less than a high school diploma for all general population health indicators in this chapter.
- **Income –** People with lower income reported lower rates of positive perceived health, positive perceived mental health, adequate fruit and vegetable consumption, and physical activity as well as higher rates of mood/anxiety disorder and smoking, than those with higher income.

6.0 Conclusions and next steps

British Columbians are generally healthy, and BC has a world-class, high-quality health system. However, it is also important to monitor how key indicators of health equity vary across population groups, including Aboriginal people, women and those living in rural and remote areas, among others. This report presents results from the first subset of 16 indicators from BC's priority health equity indicator suite, which was developed by PHSA in consultation with health sector partners. Except for life expectancy, this subset of indicators does not include data for on-reserve Aboriginal populations.

By examining these 16 indicators from the priority health indicator suite, this report shows that some groups of British Columbians are doing noticeably better than others. The evidence provided in this report reveals some of the inequities facing different population groups, which can help inform policies and programs to reduce inequitable gaps and improve the opportunities for good health across all population groups.

For example, life expectancy varies dramatically depending on where someone lives in the province: the results indicate more than a 10-year gap between the local health areas with the shortest and longest life expectancies. Kindergarten children vulnerable in one or more of the five core areas of early childhood development was highest among children in regions with the lowest income. As well, adolescent girls in BC reported significantly higher rates of abuse and discrimination than boys, and far fewer BC women than men reported that their health was 'excellent' or 'very good'. On the other hand, BC men reported much lower rates of adequate fruit and vegetable consumption than women, indicating an inequitable distribution of healthy eating habits. The rate of tobacco smoking is more than twice as high among adult British Columbians with less than high school education compared to those with at least a high school diploma, putting the first group at much higher risk for developing lung cancer and other chronic conditions. The rates of mood or anxiety disorder were more than twice as high among lowest-income British Columbians as compared to those in the highest income group.

As described in *BC's Guiding Framework for Public Health*, the focus of the population and public health system is to support better health for all British Columbians while promoting improved health equity across all population groups. In addition to monitoring overall progress towards targets for reducing the rates of risk factors or chronic conditions, analyzing health indicator data by equity dimensions can help discover which groups are doing well and which groups are being left behind. For example, while BC women with the highest income consume fruits and vegetables at a rate exceeding the 2023 target for this indicator, the rate among men with the lowest income lags by about half. While British Columbians with the highest income are already reporting levels of positive mental health that nearly reach the 2023 *Guiding Framework* target, those with the lowest income are more than twenty percentage points away.

While continuing to support provincial health status reporting, PPH also intends to engage our stakeholders in discussions to explore how surveillance of this prioritized suite of health equity indicators can inform monitoring trends in health inequity, as well as initiate action on promoting equity in health. This report provides some initial evidence of health equity indicators at the population level in BC, and offers important information to contribute to policy and program planning regarding gaps in health and well-being. It also demonstrates the value of conducting analysis of health indicators along various geographic, demographic and socio-economic dimensions to demonstrate inequitable distribution of chronic disease risk and protective factors or health conditions. The application of similar approaches by others at the health system or program levels could reveal important health inequities in health care service delivery or utilization.

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Appendix 1

Prioritized list of 52 health equity indicators for measuring healthy equity in B.C.

Tier 1: Health status and outcomes

Tier 1 themes	Indicators (Total 27)	Definition	Data source
Cancer	Incidence of lung cancer	Age-standardized incidence rate of lung cancer.	BC Cancer Registry
	Incidence of breast cancer	Age-standardized incidence rate of breast cancer.	BC Cancer Registry
	Incidence of colorectal cancer	Age-standardized incidence rate of colorectal cancer.	BC Cancer Registry
Life expectancy	Life expectancy at birth	Number of years a person would be expected to live, starting from birth, on the basis of the mortality statistics for a given observation period.	BC Stats, BC Vital Statistics Registry
	Health-adjusted life expectancy	Average number of years a person would be expected to live in healthy state.	BC Stats, BC Vital Statistics Registry, Canadian Community Health Survey
	Life expectancy at 65 years	Number of years a person would be expected to live, at age 65, on the basis of the mortality statistics for a given observation period.	BC Stats, BC Vital Statistics Registry
Mortality	Preventable premature mortality rate	Age-standardized premature mortality rate due to preventable causes.	BC Vital Statistics Registry
	Infant mortality rate	Mortality rate of infants who die in the first year of life, per 1,000 live births.	BC Vital Statistics Registry
	Mortality rate from cardiovascular disease	Age-standardized rate of death from cardiovascular diseases, including ischemic heart diseases, cerebrovascular diseases, and all other circulatory diseases.	BC Vital Statistics Registry
	Mortality rate from unintentional injuries	Age-standardized mortality rate for unintentional injuries.	BC Vital Statistics Registry
	Mortality rate from suicide	Age-standardized rate of deaths from suicide.	BC Vital Statistics Registry

Tier 1 themes	Indicators (Total 27)	Definition	Data source
Chronic diseases (excluding cancer)	Prevalence of heart disease	The percentage of population aged 12 and older with self-reported heart disease.	Canadian Community Health Survey
	Incidence of diabetes	Age standardized incidence rate of diabetes mellitus.	BC Ministry of Health
Birth weight	Low birth weight rate	Live births less than 2,500g, expressed as a percentage of all live births with known birth weight.	BC Perinatal Data Registry
	Small for gestational age rate	Total number of singleton live births with weights below the 10th percentile of birth weights for their gestational age and sex, expressed as a percentage of all live singleton births with gestational ages from 22 to 43 weeks with known birth weight.	BC Perinatal Data Registry
	Large for gestational age rate	Total number of singleton live births with weights more than 90th percentile of birth weights for their gestational age and sex, expressed as a percentage of all live singleton births with gestational ages from 22 to 43 weeks with known birth weight.	BC Perinatal Data Registry
Chronic health conditions	Prevalence of adult obesity	The percentage of adults aged 18 and older that are obese (BMI[i]≥30.0) according to self-reported height and weight.	Canadian Community Health Survey
Chronic health conditions in children/ youth	Prevalence of adolescent overweight and obesity	The percentage of adolescents, aged 12-17, that are overweight or obese according to the age-and-sex-specific BMI cut-off points as defined by Cole et al., using self-reported height and weight.	Canadian Community Health Survey
Injury and disability	Hospitalization rate due to injury	Age-standardized rate for injury hospitalization.	Discharge Abstract Database, BC Ministry of Health
Perceived health	Perceived health	The percentage of population aged 12 and older with self-reported perceived health status as very good or excellent.	Canadian Community Health Survey

i Body mass index. It is calculated as weight in kilograms/(height in metres)^2

Tier 1 themes	Indicators (Total 27)	Definition	Data source
Mental health	Perceived mental health	The percentage of population aged 12 and older with self-reported perceived mental health status as very good or excellent.	Canadian Community Health Survey
	Prevalence of mood/anxiety disorder	The percentage of population aged 12 and older with self-reported mood/anxiety disorder.	Canadian Community Health Survey
	Sub-indicator: Prevalence of depression	The percentage of population that have depression.	BC Ministry of Health
	Hospitalization rate for mental illness	Age-standardized acute care hospitalization rate for mental illness.[ii]	Discharge Abstract Database, BC Ministry of Health
School connectedness for children/youth	School connectedness	The percentage of students who exhibit school connectedness, based on McCreary Centre School Connectedness scale.	BC Adolescent Health Survey
Violence and abuse in children/ youth	Prevalence of physical and/or sexual abuse or mistreatment	The percentage of B.C. students who had been physically and/or sexually abused.	BC Adolescent Health Survey
	Prevalence of discrimination	The percentage of B.C. students who experienced discrimination based on race/ skin color, physical appearance, sexual orientation, gender/sex, a disability, (family) income, age, or being seen as different.	BC Adolescent Health Survey

ii Includes sub-categories: affective disorders, anxiety disorders and substance-related disorders.

TIER 2: Health system performance

Tier 2 themes	Indicators (Total 10)	Definition	Data source
Child immunization	Percent of 7-year olds with up-to-date immunization	The percentage of seven-year olds with up-to-date immunization for D/T/aP/ IPV, measles, mumps, rubella, varicella, meningococcal C and hepatitis B.	iPHIS, PARIS, BC MoE[iii]
Service utilization	Cervical cancer screening rate	The proportion of women aged 30-69, excluding those having had a hysterectomy, who have been screened for cervical cancer in the past three years.	BC Cancer Agency
	Colorectal cancer screening rate	Proportion of people aged 50-74 who had a colorectal cancer screening test in the previous two years.	BC Cancer Agency
	Screening mammography rate	The proportion of women aged 50-69 who had a screening mammogram in the past two years.	BC Cancer Agency
	A1C test uptake among diabetics	Percentage of people with diabetes that receive two or more A1C (HbA1c) tests per year.	BC Ministry of Health
Hospitalization	Hospitalization rate of ambulatory care sensitive conditions (ACSC[iv])	Age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care may prevent or reduce the need for admission to hospital.	Discharge Abstract Database, BC Ministry of Health
Service outcome	30-day acute myocardial infarction in-hospital mortality	The risk-adjusted rate of all-cause in-hospital death occurring within 30 days of first admission to an acute care hospital with a diagnosis of acute myocardial infarction.	Discharge Abstract Database, BC Ministry of Health
	Pneumonia re-admission rate	Hospital re-admission[v] rate for pneumonia i.e. risk adjusted rate of unplanned re-admission following admission for pneumonia.	Discharge Abstract Database, BC Ministry of Health
	Pressure ulcer[vi] rate among elderly patients	The rate of in-hospital pressure ulcers per 1,000 discharges among elderly patients.	Discharge Abstract Database, BC Ministry of Health
Access to service	Access to general practitioner (GP)	The percentage of population aged 12 and older with self-reported regular medical doctor.	Canadian Community Health Survey

iii Integrated Public Health Information system (iPHIS); Primary Access Regional Information System (PARIS); Ministry of Education (MoE) enrollment data.

iv ACSC includes grand mal status and other epileptic convulsions, chronic obstructive pulmonary disease, asthma, heart failure and pulmonary edema, hypertension, angina, and diabetes.

v A case is counted as a re-admission if it is for a relevant diagnosis or procedure and occurs within 28 days after the index episode of case. An episode of care refers to all continuous acute care hospitalizations including transfers.

vi Pressure ulcers, also known as bed sores, pressure sores, or decubitus ulcers, are wounds caused by unrelieved pressure on the skin.

Tier 3: Non-medical determinants of health

Tier 3 themes	Indicators (Total 15)	Definition	Data source
Tobacco smoking	Adult current smoking rate	The percentage of population aged 20 and older who reported being a current smoker (daily or occasional).	Canadian Community Health Survey
	Teen current smoking rate	The proportion of students in Grades 7 through 12 who smoked cigarettes within the past 30 days.	BC Adolescent Health Survey
	Rate of smoking during pregnancy	The percentage of new mothers who report smoking during pregnancy.	Canadian Community Health Survey
Environmental/ social determinants	Number of boil water advisory days	To be developed	To be explored
Food insecurity	Prevalence of household food insecurity	The proportion of households that were moderately or severely food insecure in the past 12 months.	Canadian Community Health Survey
Teen pregnancy	Teen pregnancy rate	Rate of births (live an still) and therapeutic abortion among females aged 15-19.	BC Vital Statistics Registry
Early childhood development	Children vulnerable in one or more Early Development Instrument (EDI) domain[vii]	Percentage of B.C. kindergarten children (ages 5-6) who are vulnerable in one or more of the EDI domains.[viii]	EDI[ix]
	Physical health and well-being vulnerability among kindergarten children	Percentage of B.C. kindergarten children (ages 5-6) who are vulnerable in the physical health and well-being development domain.[x]	EDI
Breastfeeding practices	Exclusive breastfeeding duration of 6 months or more	The percentage of women aged 15 to 49 who gave birth in the previous five years who reported exclusive breastfeeding duration of six months or more to their last child.[xi]	Canadian Community Health Survey
Alcohol consumption	Prevalence of hazardous drinking	The percentage of population aged 15 and older who reported being current drinkers and who reported drinking five or more drinks on at least one occasion per months in the past 12 months.	Canadian Community Health Survey
Dental insurance	Presence and source of dental insurance	The percentage of population aged 12 and older who reported that they have insurance of different sources that covers all or part of their dental expenses. Sources of dental insurance to be examined when possible.	Canadian Community Health Survey
Dietary practices	Fruit and vegetable consumption	The percentage of population aged 12 and older who reported consuming fruits and vegetables at least five times a day.[xii]	Canadian Community Health Survey

Tier 3 themes	Indicators (Total 15)	Definition	Data source
Physical activity	Leisure time physical activity	The percentage of population aged 12 and older with self-reported leisure time physical activity classified as active or moderately active.[xiii]	Canadian Community Health Survey
Substance use	Substance use before age 15	Among students who use alcohol or cannabis, the percentage whom first use before the age of 15.	BC Adolescent Health Survey

vii Early Development Instrument (EDI assessments are conducted on all kindergarten children (ages 5-6). Children who fall in the lowest 10th percentile for a given domain such as "physical health and wellbeing", and "language and cognitive development" are deemed "vulnerable" in that areas. Children who are vulnerable in more than one domain are categorized as "vulnerable".

viii The five EDI domains are: physical health and wellbeing; social competence; emotional maturity; language and cognitive development; communication skills and general knowledge.

ix The Early Development Instrument (EDI) is a questionnaire developed by Dr. Dan Offord and Dr. Magdalena Janus at the Offord Centre for Child Studies at McMaster University. It has 104 questions and measures five core areas of early child development that are known to be good predictors of adult health, education and social outcomes. Kindergarten teachers across BC complete the EDI in February for all children in their classes..

x This EDI domain includes assessments for fine and gross motor development, levels of energy, daily preparedness for school, washroom independence, and established handedness.

xi "Exclusive breastfeeding" refers to an infant receiving only breast milk, without any additional liquid (even water) or solid food. Benchmark is current Health Canada recommendations for six months exclusive breastfeeding.

xii Adequate fruit and vegetable consumption is examined in terms of the percentage of the population aged 12 or older who reported eating fruit and vegetables at least five time daily.

xiii Based on CCHS Physical Activities module consisting of a series of questions about participation in various types of leisure physical activities in the previous three months, as well as the frequency and duration of each activity. The interviewer enters the reporting unit (per day, week, month, year or never) and the number of times per reporting unit. Respondents are categorized into three physical activity levels according to energy expenditure (EE): active (EE of 3.0 kcal/kg/day or more); moderately active (EE 1.5-2.9 kcal/kg/day); inactive (EE less than 1.5 kcal/kg/day).

Appendix 2

Technical notes

2.0 Life expectancy

Data for life expectancy at birth (LE_0, 2007-2011) and overall socio-economic status (SES) index scores (2011) at the LHA level were obtained from BC Stats.[1] Abridged Life tables were used in the calculation of LE_0, where death data used is the average of five year census-year (July 1 to June 30) period deaths by place of residence and population is the average of July 1 estimates.[2] The overall SES index score for each LHA was developed by BC Stats[3] as a weighted summary of six individual indices including four basic indicators of regional hardship (human economic hardship, crime, health problems, and education concerns) and two additional indicators that highlight the target groups of children and youth. Detailed methodology for the development the overall SES index has been published previously.[4]

To demonstrate geographic disparity in life expectancy, a map was produced to depict life expectancy for the LHAs in the province.

To demonstrate disparity in life expectancy by socio-economic status, the overall SES index scores (2011) at the LHA level as developed by BC Stats were used as an ecological measure of overall SES in each LHA. Since the overall SES index score was only available for the city of Vancouver, the city's aggregate value was applied for all six LHAs within the city (including City Centre, Downtown Eastside, Northeast, West side, Midtown, and South Vancouver). Six LHAs[i] elsewhere in the province were excluded since the overall SES index scores were not available due to small population sizes. The remaining LHAs were categorized into three SES groups (low, medium and high) using tertiles of the overall SES index scores as cut-off points.

Separate analyses were conducted for males[ii], females[iii], and both sexes combined. For each analysis, average life expectancy at birth and its 95% CI was calculated for LHAs categorized into each SES tertile and compared using t-tests at the conservative significance level of 1%.

Some limitations of data should be recognized in the interpretation of results from this study. LHA-level SES index was used as a measure for LHA SES. As LHAs vary in geographic and population sizes as well as population characteristics, the overall SES index represented the average situation in each LHA. In the case of Vancouver city, one aggregate value of SES index was applied to all of its six LHAs with diverse population compositions and SES. Specifically, Downtown Eastside LHA hosts some of the poorest neighbourhoods in the province. Additionally, having to exclude some of the rural and remote LHAs in northern BC due to unavailability of SES data was expected to under-estimate the gap in SES across the province as they often have low SES. The interplay among these limitations was expected to attenuate the gap observed in LE_0 by SES across LHAs overall, and it should be noted that any associations observed at the aggregate level might not necessarily hold true at the individual LHA level. The exclusion of a few

i Snow Country, Central Coast, Stikine, Nisga'a, Telegraph Creek, and South Surrey/White Rock

ii Analysis for males excluded six additional LHAs due to their lack of male life expectancy data – Arrow Lakes, Kettle Valley, Keremeos, Queen Charlotte, Princeton, and Lillooet.

iii Analysis for females excluded 12 additional LHAs due to their lack of female life expectancy data – Arrow Lakes, Kettle Valley, Keremeos, Queen Charlotte, Windermere, Kootenay Lake, South Okanagan, Revelstoke, North Thompson, Summerland, Enderby, and Fort Nelson.

additional LHAs due to lack of sex-specific LE_0 data further attested to the diversity in population density across the different regions of the province. Sparsely populated regions in northern parts of BC were under-represented in the results and could attenuate sex-specific associations observed between LE_0 and SES. The ecological nature of the analytical approach and the inability to control for other potential confounders also precluded any causal inferences made between social determinants of health and LE_0.

3.0 Early childhood development

Early Development Instrument (EDI) data

Three indicators that fall under the category of vulnerability in early childhood were included in the prioritized suite of health equity indicators (Appendix 1). They are listed and defined below:

1. Children vulnerable in one or more EDI areas: Percentage of kindergarten children that are vulnerable on one or more of the five core areas as measured by EDI.
2. Physical health and well-being vulnerability among kindergarten children: Percentage of kindergarten children that are vulnerable on the physical health and well-being area.
3. Language and cognitive development vulnerability among kindergarten children: Percentage of kindergarten children that are vulnerable on the language and cognitive development area.

The primary data source for analyzing early childhood vulnerability indicators is the BC EDI, for which the data were collected and managed by Human Early Learning Partnership (HELP) based at the University of British Columbia (UBC). The EDI was originally developed as a questionnaire by Dr. Dan Offord and Dr. Magdalena Janus at the Offort Centre for Child Studies at McMaster University.[5] The questionnaire has 104 questions and measures five core areas (including physical health and well-being, language and cognitive development, social competence, emotional maturity, and communication skills and general knowledge) of early child development that are known to be good predictors of adult health, education and social outcomes.

In BC, the EDI questionnaire is completed by kindergarten teachers from across the province for all children in their classes. Kindergarten children living in on-reserve First Nations may not be included in the sample. The EDI is a population-level research tool that is commonly used to understand the vulnerability of the population of children at various levels of geography: provincial, regional and neighbourhood.

The definition of vulnerability in the EDI is statistical and population-based. It refers to the portion of the population which, without additional support and care, may experience future challenges in school and society. The determination of vulnerability is based on the distribution of scores from the first complete round of data collection in the province. The vulnerability threshold or cut-off is the EDI score that delineates the children who scored in the bottom of the distribution. Children who fall below the cut-off are said to be vulnerable in that area of development.

Geocoding of EDI data

Each record on the EDI data has a six digit postal code associated with the residence of the child. These six digit postal codes were geocoded using PCCF+ Version 5K[iv] to assign each record a census tract (CT) or census subdivision (CSD) as well as to classify whether the postal code was urban or rural. In addition, each six-digit postal code has been geocoded to a HA and HSDA by the HELP mapping team. Records were matched by child postal code to DMTI postal data. If a match could not be found or was of insufficient precision (<4 in the DMTI database, 4 being FSA[v] precision), the school address (not postal code) was used to locate the child.

Linkage to National Household Survey (NHS) 2011 data

In order to examine socio-economic disparities in early childhood development, and as the EDI itself does not collect socio-economic information about the children's families, neighbourhood unemployment rate and median after-tax family income from the 2011 National Household Survey (NHS) were applied to records in the EDI based on their six-digit postal code. Linkage to the NHS data was done at the CT level, and where this was not possible, at the CSD level.

Data analysis

Overall indicator rates were presented in a choropleth map using quantile classification method with three classes where each class contains approximately equal number of HSDAs.

For each indicator, population-level percentage estimates and 95% CI[vi] were calculated at the provincial and, where possible, HA and HSDA levels by the following equity dimensions:

1. Sex of the child: Male or female
2. Area of residence of the child: Urban or rural (see section on Geocoding of EDI data for further details)
3. Neighbourhood unemployment rate: higher or lower. In this chapter, higher unemployment rate is defined as neighborhood unemployment rate is higher than provincial average and lower unemployment rate is defined as neighborhood unemployment rate is equal to provincial average or below (see section on Geocoding of EDI data for further details).
4. Neighbourhood median after-tax family income: Quintiles defined using quintile cut-off values of economic family median after-tax income for all census subdivisions in the province (see section on Geocoding of EDI data for further details)

Analyses were conducted in SPSS as a collaborative effort between PHSA PPH team and HELP team, and results were reported here in accordance with HELP's releasability criteria.

The EDI provides population-based data about early child development and has been studied by national and international researchers in a continued effort to assess its psychometric reliability and validity. In this analysis, area-based unemployment rate and median after-tax family income were used in the absence

iv Census of Canada. Postal Code Conversion File, PCCF+ Version 5K May 2011 Postal Codes, 2006 [2012].

v Forward sortation area

vi Indicated in charts as grey error bars

of more granular level SES information. While it is not uncommon to use area-based measures to inform socio-economic status of the population, the use of area-based measures suffers the limitation of inability to distinguish the variation below the geographic level of the area-based measures. As a result, the observed disparity may be attenuated.

4.0 Adolescent health

Adolescent Health Survey (AHS) Data

The primary data source for analyzing adolescent health indicators is the BC Adolescent Health Survey. The AHS, first conducted by the McCreary Centre Society in 1992 (hereafter referred to as McCreary), was developed to monitor the health and risks facing BC youth, and to inform health care planning and health promotion with young people throughout the province. The survey has been repeated with new cohorts in 1998, 2003, and 2008. The latest and fifth cycle of the survey on which the results presented in this report are based was conducted in 2013.

The 2013 BC AHS was conducted in 56 of the 59 school districts in the province, which contain over 98% of all students enrolled in Grades 7 through 12 in public schools across BC. Sampling of the AHS did not include on-reserve First Nations schools. A stratified random sampling design resulted in 42,453 students from 443 different schools in the final sample. For detailed description of the survey and related methodology pertaining to the 2013 AHS, refer to the Methodology Fact Sheet published by McCreary.[6]

The five specific indicators in the prioritized suite of health equity indicators that are categorized under the theme of adolescent health are listed and defined below:

1. Teen current smoking rate: The percentage of students as represented in the AHS that reported any smoking in the past month.
2. Substance use before age 15: The percentage of students as represented in the AHS that reported first trying alcohol, tobacco and/or marijuana before age 15.
3. Prevalence of discrimination: The percentage of students as represented in the AHS that reported any discrimination in the past year based on race/skin colour, sexual orientation, physical appearance, gender/sex, a disability, (family) income, age and/or being seen as different.
4. Prevalence of physical and/or sexual abuse: The percentage of students as represented in the AHS that reported any physical abuse or sexual abuse where sexual abuse included any indication of sexual abuse, forced sex, or being the younger sexual partner of someone who was not close in age at first sex based on Bill C-22 passed in 2007. Note that Bill C-22 did not apply to youth under age 12. For the 2013 AHS, sex between youth who were both less than 12 years old was not considered abuse. However, sex between a youth less than 12 years old and a partner who was 12 years old or older was considered abuse.
5. School connectedness: Mean score based on students' (as represented in the AHS) feelings about being a part of their school, being happy at their school, school staff treating them fairly, getting along with teachers, safety at school, teachers caring about them, and other school staff caring about them. A higher score indicates higher connectedness to school.

Geocoding of AHS data

Each record on the AHS dataset has a six-digit postal code associated with the school that the student attends. These six-digit postal codes were geocoded using PCCF+ Version 5K[vii] to assign each record to a census tract (CT) or census subdivision (CSD) to facilitate linkage to socio-economic data. In addition, each school has been geocoded to a HA and HSDA.

Linkage to National Household Survey (NHS) 2011 data

As family income is not available for records in the AHS, median after-tax family income from the 2011 National Household Survey (NHS) was applied to records in the AHS based on their six-digit school postal code. Linkage to the NHS data was done at the CSD level.

Data analysis

Overall indicator rates were presented in a choropleth map using quantile classification method with three classes where each class contains approximately equal number of HSDAs.

For each indicator, population-level percentage estimates (mean score for school connectedness) and confidence intervals (CIs)[viii], where applicable, were calculated at the provincial and, where possible, HA, and HSDA levels by the following equity dimensions:

1. Sex of the student: Male or female
2. Neighbourhood median family income after-tax: Quintiles defined using quintile cut-off values of economic family median after-tax income for all assigned income data.

In addition, provincial-level results were examined by Grade of the student (7, 8, 9, 10, 11, or 12) to observe any variations by Grade or age.

In line with McCreary's reporting conventions, for provincial and HA-level results, 99% CIs were reported, and for HSDA-level results, 95% CIs were reported. No significance testing of differences between reported percentage estimates or between mean estimates across different equity dimensions was performed. Caution should therefore be used in comparing estimates using CIs.

Analyses were conducted in SPSS using the Complex Samples module as a collaborative effort between PHSA PPH team and the McCreary team, and results were reported in accordance with McCreary's releasability criteria.

In this analysis, area-based median after-tax family income was used in the absence of more granular level SES information and the linkage to income data has limitations in that it was not specific to each individual student, but to their school based on linkage to the school postal code. While it is not uncommon to use area-based measures to inform socio-economic status of the population, the use of area-based measures suffers the limitation of inability to distinguish the variation below the geographic level of the area-based measures. As a result, the observed disparity may be attenuated.

vii Census of Canada. Postal Code Conversion File, PCCF+ Version 5K May 2011 Postal Codes, 2006 [2012].

viii Indicated in charts as grey error bars

A few other limitations are to be noted. The 2013 BC AHS was conducted in 56 of 59 school districts containing, in total, 98.5% of public school students in Grades 7 to 12. The 1.5% of the student population not covered by the survey is too small to have any appreciable effects on provincial estimates. However, as two of the non-participating school districts were in the same northern HSDA, the coverage rate for Northwest HSDA was 76%. Despite this, the aggregate coverage rate for the Northern Health Authority was a respectable 94%. The third non-participating school district was located in Fraser East HSDA, resulting in a coverage rate of 85% for this area. Still, the aggregate coverage rate for the Fraser Health Authority was excellent at 97%. Coverage rates were 100% for all other areas of the province.

The overall response rate for the province in the 2013 AHS was 70%. Response rates varied by modality of consent, where the response rate was lowest in school districts requiring signed parental consent, and highest in school districts that permitted parental notification. The response rate for school districts that required signed parental consent for seventh-graders and parental notification for the older students fell in the intermediate level.

There was little variation in response rates by grade, suggesting that the target population's grade structure is well-represented in the sample. However, there was variation in response rates among HSDAs. Any regional or grade differences in coverage and response rates were accounted for in the sample weighting.

Some of the students' data records (a total of 82) were deleted from the final sample to maximize the validity and accuracy of the survey estimates. Records were deleted for respondents who provided a number of inconsistent, contradictory or joking answers and/or exhibited response-set biases across one or more sections of the questionnaire. The level of occasional refusals or inability to provide a valid response to some questions was very low (in general between 1% and 3% of the sample) in the 2013 BC AHS and were unreported.

5.0 General population health

Data sources

The primary data source for analyzing indicators in the category of general population health is the Canadian Community Health Survey (CCHS). The CCHS is a cross-sectional survey conducted by Statistics Canada that collects self-reported information related to health status, health care utilization, and health determinants for the Canadian population living in private occupied dwellings. The CCHS covers the Canadian population 12 years of age and over living in the ten provinces and the three territories. Excluded from the survey's coverage are: persons living on reserves and other Aboriginal settlements in the provinces; full-time members of the Canadian Forces; the institutionalized population and persons living in two Quebec health regions. Altogether, these exclusions represent less than 3% of the target population in Canada. Detailed information about CCHS methodology has been published previously.[7]

Since 2007, data collection of the CCHS occurred every year, and in addition to an annual microdata file, a file combing two years of data was also produced. Analyses for this report were restricted to respondents from the province of British Columbia aged 15 and over where applicable.

The seven specific indicators in the prioritized suite of health equity indicators that are categorized under the theme of general population health are listed and defined below:

1. Perceived health: The percentage of population aged 15 and over as represented in the CCHS that reported very good or excellent perceived health.
2. Perceived mental health: The percentage of population aged 15 and over as represented in the CCHS that reported very good or excellent perceived mental health.
3. Prevalence of mood/anxiety disorder: The percentage of population aged 15 and over as represented in the CCHS with self-reported mood/anxiety disorder.
4. Prevalence of adult obesity: The percentage of population aged 18 and over as represented in the CCHS that are obese (BMI≥30) according to self-reported height and weight. BMI is calculated as (weight in kilograms) / (height in meters)^2.
5. Fruit and vegetable consumption: The percentage of population aged 15 and over as represented in the CCHS who reported consuming fruits and vegetables at least five times a day.
6. Leisure time physical activity: The percentage of population aged 15 and over as represented in the CCHS with self-reported leisure time physical activity classified as active or moderately active[ix].
7. Adult current smoking rate: The percentage of population aged 20 and over as represented in the CCHS who reported being a current smoker (daily or occasional).

Data analysis

Overall indicator rates were presented in a choropleth map using quantile classification method with three classes where each class contains approximately equal number of HSDAs.

At the provincial level, age-standardized and sex-disaggregated population-level percentage estimates were calculated along with corresponding 95% confidence intervals. Age-standardization was conducted using direct standardization method with 10-year age groups (starting at age 20 for adult current smoking rate and age 15 for all other indicators). Age for each CCHS respondent was derived from their date, month, and year of birth, and confirmed with the respondent at the time of interview. Respondent's sex, male or female, was collected by the interviewer, and where necessary, with a question for confirmation.

At the HSDA level, crude population-level percentage estimates were reported along with 95% confidence intervals. Age-standardization and sex-disaggregation was not done due to sample size restrictions.

At each level of health jurisdiction, the indicators were examined by the following two key equity dimensions:

- Education: The highest level of education acquired by the respondent (less than secondary school graduation vs. secondary school graduation or above).

ix Respondents are 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 is 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 is calculated as the sum of the average daily energy expenditures of all activities. Respondents are classified as follows: 3.0 kcal/kg/day or more = physically active; 1.5 to 2.9 kcal/kg/day = moderately active; less than 1.5 kcal/kg/day = inactive.

- Income: The income variable used in the analyses of CCHS data is based on the self-reported household income and provides, for each respondent, a relative measure of their household income to the household income of all other respondents in the same province. The distribution of income is divided into quintiles with British Columbians living in the lowest-income households comprising the bottom 20% of households and individuals from the households with the highest incomes comprising the top 20% of households.

To increase statistical precision, data from the 2007/2008, 2009/2010, and 2011/12 cycles of the CCHS Public Use Microdata Files (PUMF) were joined using the pooled approach such that micro-data level data were combined to obtain a dataset that could be analyzed as a single sample from a population. Individual sampling weights were scaled by a factor of 1/3 to account for the use of data from three cycles. Rates calculated from the combined dataset were considered as period estimates of an average population, and the results using original weights or the scaled weights would have given the same results. Coefficients of variation of the period estimates were calculated from variances estimated using PROC SURVEYFREQ assuming a complex multistage survey design. All analyses were conducted in SAS version 9.2.

Some cautions about the data and methodology are noted. All data was based on self-report, and there might be concerns around bias in self-reported determinants of health such as physical activity. Self-reported bias in height and weight are also well-documented, which were expected to have influenced the results for adult obesity rates.

Differential refusal might be another source of bias, especially when the refusal rate is high, such as in the case of the income variable (20.9%). There was, however, approximately equal representation of people from all levels on the income quintiles among those with valid income responses.

Rates were calculated using denominators excluding subjects who either did not answer the questions, refused to answer the questions, or did not know the answers to the questions.

HSDA-level rates were not age-standardized, and caution should be exercised when comparing rates between HSDAs with different age structures.

All indicator rates in this report represent period estimates based on 3 CCHS PUMF cycles, and as such, the rates may not reflect values calculated from data of individual cycles. As CV tables are not available for the combined data file, CVs for the estimates were estimated using PROC SURVEYFREQ in SAS assuming a complex multistage survey design. Validation using single cycle data showed close alignment of CVs estimated using PROC SURVEYFREQ and those published by Statistics Canada using the bootstrap method.

Appendix 2 references

1 **Vital Statistics: Births and Deaths** [http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/VitalStatistics.aspx]

2 Ibid.

3 BC Stats: **British Columbia Regional Socio-economic indicators - Methodology**. 2013.

4 Ibid.

5 **Early Development Instrument** [http://earlylearning.ubc.ca/edi/]

6 Saewyc E, Stewart, D. & Green, R.: **Methodology for the 2013 BC Adolescent Health Survey [Fact Sheet].** Vancouver, BC: McCreary Centre Society; 2014.

7 Beland Y: **Canadian Community Health Survey - Methodological overview.** *Health Reports* 2002, **13**.

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