Summary Report on Health for British Columbia from Regional, Longitudinal and Gender Perspectives

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Province-wide solutions. Better health.

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1. EXECUTIVE SUMMARY

This report is a compilation of 19 selected indicators measuring health behaviours, health conditions and well-being of British Columbians. Designed to provide comparable information at the health service delivery area, health region and provincial levels, these indicators were extracted from the most recently available sources including the Canadian Community Health Survey data from Statistics Canada, Primary Health Care Disease Registries of the BC Ministry of Health Services, cancer statistics data from the BC Cancer Registry, Canadian 2006 Census profile from BC STATS and analytical results from the Centres for Population and Public Health of the BC Provincial Health Services Authority (PHSA).

This report is unique and informative in three aspects. Indicators were compared across geographic areas of BC, in particular five health regions and 16 health service delivery areas, as well as with other Canadian provinces. Secondly, indicators were examined longitudinally so as to allow assessment of current trends and future implications, which are especially useful to public health prevention and regional health resource planning. Finally, wherever possible, indicators were presented separately for men and women to allow assessment of the gender differences in risk factors and well-being.

Among the five indicators measuring health behaviours, BC had the healthiest scores on cigarette smoking, heavy alcohol consumption, obesity and physical activity in the 10 Canadian provinces. Tying with Alberta, BC was the second best province in fruit and vegetable consumption after Quebec.

Among the 10 selected chronic conditions, BC women had lower crude prevalence rates than men only in three conditions (diabetes, cardiovascular disease, cancer and chronic obstructive pulmonary disease (COPD)) and had higher rates for hypertension, asthma, depression, dementia, osteoarthritis and rheumatoid arthritis. Since age-standardized prevalence rates were not available from our data sources, we do not know whether these gaps were due to gender difference or differences in age structures for men and women.

Regional inequalities in health are seen in BC. Northern Health Region had lower crude prevalence rates due to its relatively younger population. However, with age adjustment, Northern Health Region had not only the highest prevalence rates in hypertension, CVD and asthma, but also the highest rates of increase for these three conditions and COPD. Interior Health Region had the highest rates of depression/anxiety, osteoarthritis and rheumatoid arthritis in both prevalence and rates of increase in addition to the highest prevalence rate for COPD. Diabetes is a strong health threat to Fraser Health Region where both the prevalence rate and rate of increase were the highest among the five health regions. Taking into account that Fraser Health Region has the fastest growing population, the future burden of diabetes in Fraser Health Region is cause for concern.

We also found that though BC residents had the best health behaviours and health conditions in the nation, they did not perceive themselves as having a high quality of life. BC residents were 7th in perceiving their health as excellent or very good, 9th in perceiving their mental health as excellent or very good, 3rd highest in perceiving their life as quite stressful, and 9th in being satisfied or very satisfied with their lives in Canada.

Further investigation into gender gaps and regional inequities in health coupled with emerging trends is important to help guide policy intervention for the improvement of health for British Columbians.

2. INTRODUCTION

Canada is one of the healthiest nations in the world [1] and British Columbia (BC) is recognized as the healthiest province of Canada [2]. However, as identified by some life expectancy and mortality studies [3], the health status of women in BC as well as in Canada is slipping relative to the health status of women from other leading countries of the world and their male counterparts. On the other hand, significant regional inequities in disease condition have been found in BC using data from self-reported surveys [4]. The conclusions from these studies can be confirmed by using medical status from healthcare utilization data.

This report made use of healthcare utilization data, provincial cancer registry data, health survey data and census data with the intent of providing multi-dimensional pictures of health conditions, health behaviours, and self-perceived well-being for BC from regional, longitudinal and gender comparative perspectives.

Also in this report, we identified the health regions (HR) and health service delivery areas (HSDA) with the worst rates of chronic conditions, well-being and behaviours. These findings were used to provide region-specific recommendations for early disease prevention, health promotion as well as early healthcare resource planning.

3. BRITISH COLUMBIA AND ITS REGIONAL HEALTH GEOGRAPHIES

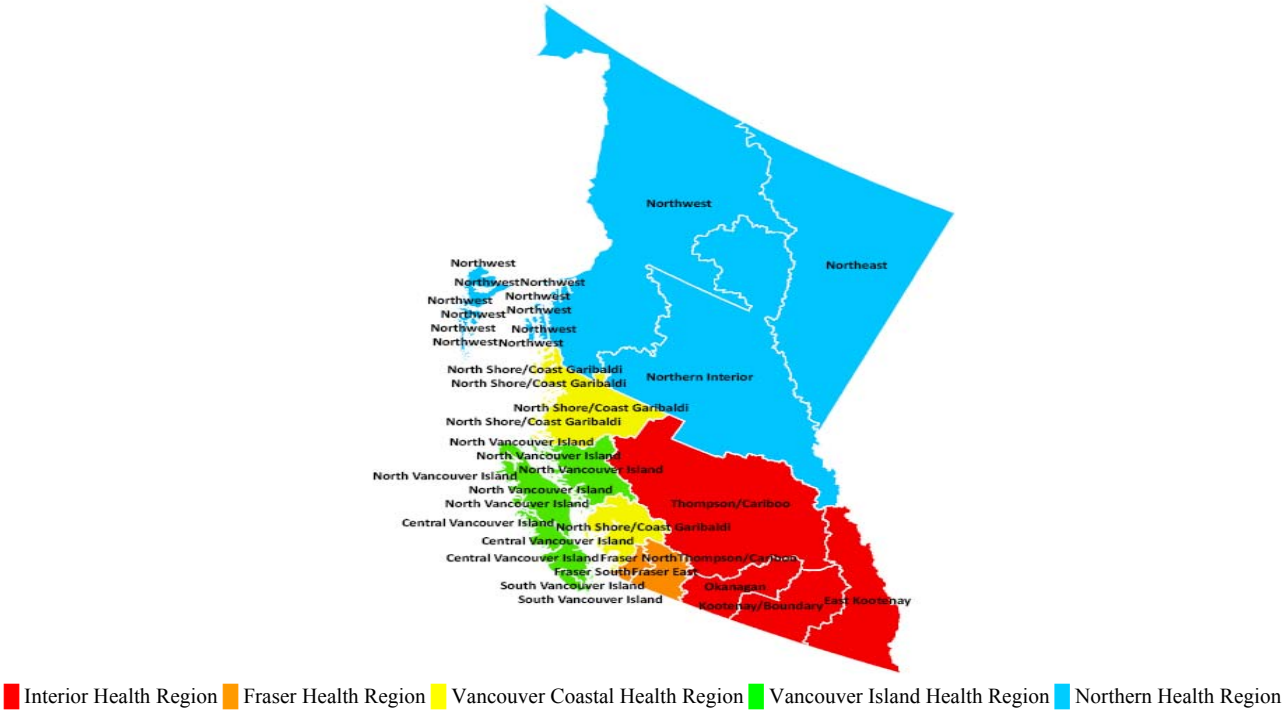
In BC, health care services are managed and delivered by five regional health authorities that govern, plan and coordinate health services within their corresponding regions. The five health regions are: Interior Health Region, Fraser Health Region, Vancouver Coastal Health Region, Vancouver Island Health Region and Northern Health Region. Each of the five health regions consists of three to four health service delivery areas.

The five health regions and the 16 HSDAs are listed in Table 1 and shown in Figure 1 (in five colours with white boundaries demarking the HSDAs).

Table 1 Health regions and the HSDAs covered

Health Region (HR)	Health Services Delivery Area (HSDA)
Interior (01)	East Kootenay (11)
	Kootenay Boundary (12)
	Okanagan (13)
	Thompson / Cariboo (14)
Fraser (02)	Fraser East (21)
	Fraser North (22)
	Fraser South (23)
Vancouver Coastal (03)	Richmond (31)
	Vancouver (32)
	North Shore / Coast Garibaldi (33)
Vancouver Island (04)	South Vancouver Island (41)
	Central Vancouver Island (42)
	North Vancouver Island (43)
Northern (05)	Northwest (51)
	Northern Interior (52)
	Northeast (53)

Figure 1 Health geographies in BC



4. DATA SOURCES

Most of the health indicators presented in this report were obtained from the following three sources:

- Statistics Canada Canadian Community Health Survey data (CCHS) (2003, 2005, 2007 and 2008)
- BC Ministry of Health Services healthcare utilization data (2000/2001 through 2008/2009)
- BC Cancer Agency cancer registry data (2000 through 2007)
- BC STATS (P.E.O.P.L.E. 33) population estimates

Canadian Community Health Survey (CCHS)

A cross-sectional survey conducted by Statistics Canada, CCHS represents the Canadian population aged 12 or older living in private households. The population living on Indian reserves, institutions, some remote areas and military bases are not included. Participants provide their demographic, socioeconomic, behavioural, and health-related information. A detailed description of the CCHS methodology is available [5]. The CCHS is a rich source of individual level data that is not readily available elsewhere.

All estimates based on CCHS data were produced by Statistics Canada and weighted to represent the entire household population in each province for the survey year. Differences between estimates were tested to ensure statistical significance at the 0.05 level. To account for the survey sampling design of the CCHS, the bootstrap technique [6-8] was used to calculate confidence intervals, coefficients of variation and for testing the statistical significance of differences between the estimates.

Healthcare Utilization Data

Health condition indicators were obtained from Primary Health Care Registries 2008/2009 of the BC Ministry of Health Services 2008/09 directly and as reported in the Quantum Analyzer (QA) Primary Health Care (PHC) knowledge base version 2.0. QA, using information from a number of administrative databases for health services from the Ministry, provides readily accessible and instantly analyzable summary-level data. Examples of these databases include Medical Services Plan (MSP), Discharge Abstract Database (DAD), and *PharmaNet*.

MSP is the public funded health insurance that pays for medical services provided to British Columbians by BC physicians. Two data sets from MSP are the Client Registry and the Claims Database. The Client Registry contains demographic information for the population served by MSP. Since by law, all BC residents are required to be registered with MSP, the MSP Client Registry has complete coverage of the entire population. The Claims Database, on the other hand, captures each and every episode of service encounter for which a claim is made to MSP for payment. For each service encounter, the Claims Database records the identity of the person served, the service provider, the nature of the service, and the medical diagnosis necessitating the service.

DAD, which is maintained by the BC Ministry of Health Services, is also used to identify residents' health conditions. Each record in the DAD contains information on an episode of hospital utilization: patient identifier (PHN), hospital identifier, dates of admission and discharge, primary and contributory diagnoses, and procedures performed.

PharmaNet is a province-wide network that links all BC pharmacies to a central set of data systems. *PharmaNet* supports drug dispensing, drug monitoring and claims processing for the entire BC population.

Using the unique PHN, the MSP Clients Registry, Claims Database, DAD and *PharmaNet* were linked by BC Ministry of Health Services to identify each individual BC resident's health conditions and healthcare service utilization.

Compared to the self-reported health conditions from health surveys disease status identified from primary health care utilization records are more reliable and accurate. The healthcare utilization data provide residents' detailed utilization experience, including information about specific diagnoses and treatments. In contrast, working with the self reported survey data, we observed internal inconsistencies in how people responded to survey questions. These inconsistencies raised concerns about the veracity of the self-reported measures. We therefore chose, in this report, to present population prevalence rates of chronic diseases based on healthcare utilization data.

To provide higher precision (less variability) of estimates, prevalence rates from BC Ministry of Health Services were calculated based on three years moving average. For example, the prevalence for 2005/06 fiscal year is an average of fiscal years 2004/05, 2005/06 and 2006/07. The three-year moving average was reported for all health conditions except prevalence of cancer, which was based on single year observation from the very reliable BC Cancer Registry.

BC Cancer Agency Cancer Registry Data

The BC Cancer Registry has been in existence since 1969, and has been maintained at the BC Cancer Agency since 1980. It contains personal and demographic information as well as diagnosis and death information on all cases of cancer for BC residents.

The BC Cancer Registry collects data and generates cancer statistics on the BC population for the purposes of cancer prevention and treatment in the province. Specifically, it provides data for cancer control. That is, it provides ongoing information on the scope of the cancer problem, information to plan programs to reduce mortality and morbidity, monitors the effectiveness of such programs, and provides the information used to project future trends of cancer to aid in strategic planning. The BC Cancer Registry also serves as a source of information for research.

Population Counts

In addition to above three data sources, the population of BC and its regions are estimated by BC STATS each year, based on demographic and economic trends, modified to take into consideration possible future changes. The most recent published cycle is known as P.E.O.P.L.E. 33 (Population Extrapolation for Organizational Planning with Less Error). These population projections were used to generate population rates for BC and its regions.

5. HEALTH BEHAVIOURS, HEALTH CONDITIONS AND WELL-BEING

5.1 HEALTH BEHAVIOURS

Encouraging changes in health behaviours through population level policy interventions or interventions directed at individuals are well known avenues for health improvement. For instance, when smokers quit smoking, they potentially improve their health and life-expectancy. Health service providers can target educational materials to a specific unhealthy lifestyle and populations and thereby encourage change. In addition, public policies such as banning smoking in the workplace can reduce exposure to second hand smoke and discourage smoking. Health behaviour indicators are also good predictors of future health conditions of population. The CCHS provides a wealth of data on personal health behaviours.

5.1.1 Cigarette Smoking

Cigarette smoking is known to cause detrimental health effects for smokers and those around them through the effects of second smoke. Almost five million Canadians aged 15 and older smoke [9]. According to Health Canada, close to half of smokers will die from smoking related illnesses before they turn 70 years old [10]. An entirely avoidable public health reality is that tobacco kills approximately 37,000 Canadians a year [10].

Cigarette smoking has multi-systemic consequences affecting the entire human body [11]. It is the single most important preventable cause of lung cancer, contributing to 85 per cent of all new cases in Canada [12]. In 2004, almost 14,000 Canadian smokers suffered from lung cancer compared to only 361 non-smokers [13]. Smoking also increases a person's risk of developing heart disease and stroke by contributing to the build up of plaque in arteries, increased risk of blood clots, increased blood pressure and reduced oxygen in the blood [14]. In 2004, almost 9,300 Canadian smokers over the age of 35 suffered from a heart attack compared with approximately 750 non-smokers. The respiratory symptoms associated with smoking include coughing, phlegm, wheezing and difficulty breathing, and can eventually lead to chronic obstructive pulmonary disease (COPD).

Furthermore, second-hand smoke is harmful and smoking during pregnancy affects fatal development and can have long term health consequences.

In this report, we compared current smokers, defined as either daily smokers or occasional smokers to the rest population.

Recent Data

Smoking status was obtained from the most recent CCHS. The two-year combined data from 2007 and 2008 were used to provide greater precision of estimates (as reported in Table 2).

BC has the lowest smoking rate in Canada with 18.2% of the total population aged 12 and over (20.9% in men and 15.6% in women) reporting current smoking. Gender-separated and gender-combined comparisons are all statistically significant except for BC and Ontario men and BC with Prince Edward Island (PEI) for the total population.

There were significantly more male smokers than female smokers in BC as well as in most of the 16 HSDAs. The proportions of current smokers at HSDA level in BC were the highest in Northeast HSDA for total population (25.0%) and men (29.6%) and in Northeast HSDA for women (29.6%); and the lowest in Richmond HSDA for total population (14.3%) and women (9.0%), and in South Vancouver Island HSDA for men (16.9%).

Recent Trend

Longitudinal smoking data in this study covered four recent time points (years 2003, 2005, 2007 and 2008) from the CCHS.

Table 2 Percent of current smokers for British Columbia in 2007/2008

Health Region		Total	Men	Women
BC		18.2%	20.9%	15.6%
Interior	East Kootenay	18.9%	18.7%	19.0%
	Kootenay Boundary	22.0%	28.5%	15.4%
	Okanagan	22.1%	23.7%	20.4%
	Thompson / Cariboo	25.0%	29.6%	20.3%
Fraser	Fraser East	16.5%	18.3%	14.7%
	Fraser North	17.1%	19.1%	15.2%
	Fraser South	16.7%	19.4%	14.2%
Vancouver Coastal	Richmond	14.3%	19.9%	9.0%[E]
	Vancouver	15.5%	21.0%	10.1%
	North Shore / Coast Garibaldi	15.6%	18.2%	13.1%
Vancouver Island	South Vancouver Island	14.8%	16.9%	12.8%
	Central Vancouver Island	23.9%	22.8%	25.0%
	North Vancouver Island	21.7%	22.4%[E]	21.1%
Northern	Northwest	22.9%	22.4%	23.4%
	Northern Interior	22.6%	24.0%	21.1%
	Northeast	27.3%	25.1%[E]	29.6%
Canada		21.7%	24.5%	19.0%

Rates marked with an E in superscript must be interpreted with caution due to small sample size

Figure 2 Temporal variations in the percent of current smokers in BC

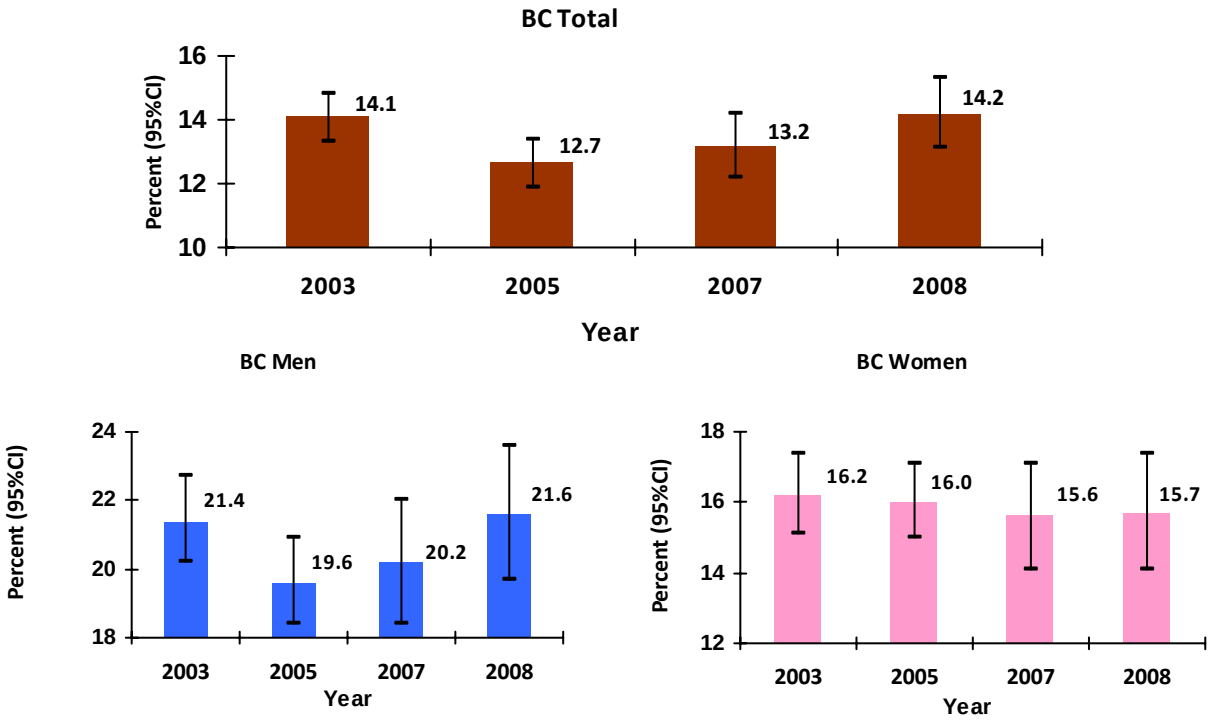


Figure 2 shows that current smokers in the BC population continued to grow in recent years even though this upward trend was not statistically significant. While smoking rates in BC women were slightly decreasing, rates for their male counterparts increased from 2005 to 2008. Again these results are not statistically significant.

5.1.2 Heavy Frequent Drinking

The consumption of alcohol can be either beneficial or harmful depending on the amount consumed, age and health condition of the person who drinks.

Moderate drinkers tend to have better health [15]. In addition to having fewer heart attacks and strokes, moderate consumers of alcoholic beverages (beer, wine or distilled spirits or liquor) are generally less likely to suffer hypertension, peripheral artery disease, Alzheimer's disease and the common cold. Sensible drinking also appears to be beneficial in reducing or preventing diabetes, rheumatoid arthritis, bone fractures and osteoporosis, kidney stones, digestive ailments, stress and depression, poor cognition and memory, Parkinson's disease, hepatitis A, pancreatic cancer, macular degeneration (a major cause of blindness), angina pectoris, duodenal ulcer, erectile dysfunction, hearing loss, gallstones, liver disease and poor physical condition in elderly [16]. Commonly, moderate drinking is defined as the consumption of up to one drink a day for women and up to two drinks a day for men; one drink consisting of either 5 fluid ounces of wine, 12 fluid ounces of regular beer, or 1.5 fluid ounces of 80-proof distilled spirits.

However, when consumed in greater amounts, alcohol can cause mental black outs, impairment of concentration and judgement, loss of coordination and emotional instability. Frequent heavy drinking damages liver cells and causes cirrhosis. Long-term alcohol use creates damage and weakens the heart's muscular tissue resulting in heart failure. Frequent heavy drinking is not only a health threat to drinkers themselves but also a social threat to families and communities and therefore should be avoided.

The volume of alcohol intake is determined by the Quantity-Frequency (QF) method, based on how much and how often alcohol is usually consumed. In our report, heavy frequent drinking is defined as consumption of 5 or more drinks on a single occasion at least once a month.

Recent Data

Drinking status was obtained from the most recent CCHS data. The two-year combined data from 2007 and 2008 were used to provide greater precision of estimates.

Table 3 Percent of heavy frequent drinkers in British Columbia in 2007/2008

Health Region		Total	Men	Women
BC		14.9%	21.6%	8.5%
Interior	East Kootenay	21.4%	29.4%	13.2%[E]
	Kootenay Boundary	22.4%	31.9%	12.9%[E]
	Okanagan	16.1%	22.4%	10.1%[E]
	Thompson / Cariboo	17.5%	26.5%	8.5%[E]
Fraser	Fraser East	12.8%	18.3%	7.5%[E]
	Fraser North	14.0%	19.6%	8.3%[E]
	Fraser South	12.8%	19.7%	6.1%[E]
Vancouver Coastal	Richmond	9.0%	14.4%[E]	F
	Vancouver	13.0%	19.2%	7.0%
	North Shore / Coast Garibaldi	18.6%	25.3%	12.1%[E]
Vancouver Island	South Vancouver Island	17.1%	25.5%	9.6%
	Central Vancouver Island	15.8%	21.2%	10.6%[E]
	North Vancouver Island	17.6%	27.7%	8.1%[E]
Northern	Northwest	16.6%	21.6%	11.3%[E]
	Northern Interior	17.6%	24.4%	10.9%[E]
	Northeast	15.5%	21.8%	9.1%[E]
Canada		16.9%	24.0%	9.6%

Rates marked with an E in superscript must be interpreted with caution due to small sample size

BC has the lowest rate of heavy frequent drinkers in Canada. In BC, 14.9% of the population aged 12 and over (21.6% of men and 8.5% of women) self reported as heavy frequent drinkers, which ranked the lowest among all provinces of Canada. The differences between BC and other provinces were significant, except in comparison with Ontario, and in comparison of BC women with Quebec, PEI and New Brunswick women.

There were more heavy frequent drinkers in men than in women in BC and its 16 HSDAs. Furthermore, the proportion of heavy frequent drinkers was the highest in Kootenay Boundary HSDA for total population (22.4%) and men (31.9%) and in East Kootenay HSDA for women (13.2%); and the lowest in Richmond HSDA for total population (9.0%) and men (14.4%), and in Fraser South HSDA (6.1%) for women.

Recent Trends

Longitudinal data on heavy frequent drinking discussed in this study were assessed for the years of 2003, 2005, 2007 and 2008 from the Canadian Community Health Surveys.

Figure 3 Temporal variations in the percent of heavy frequent drinkers in BC

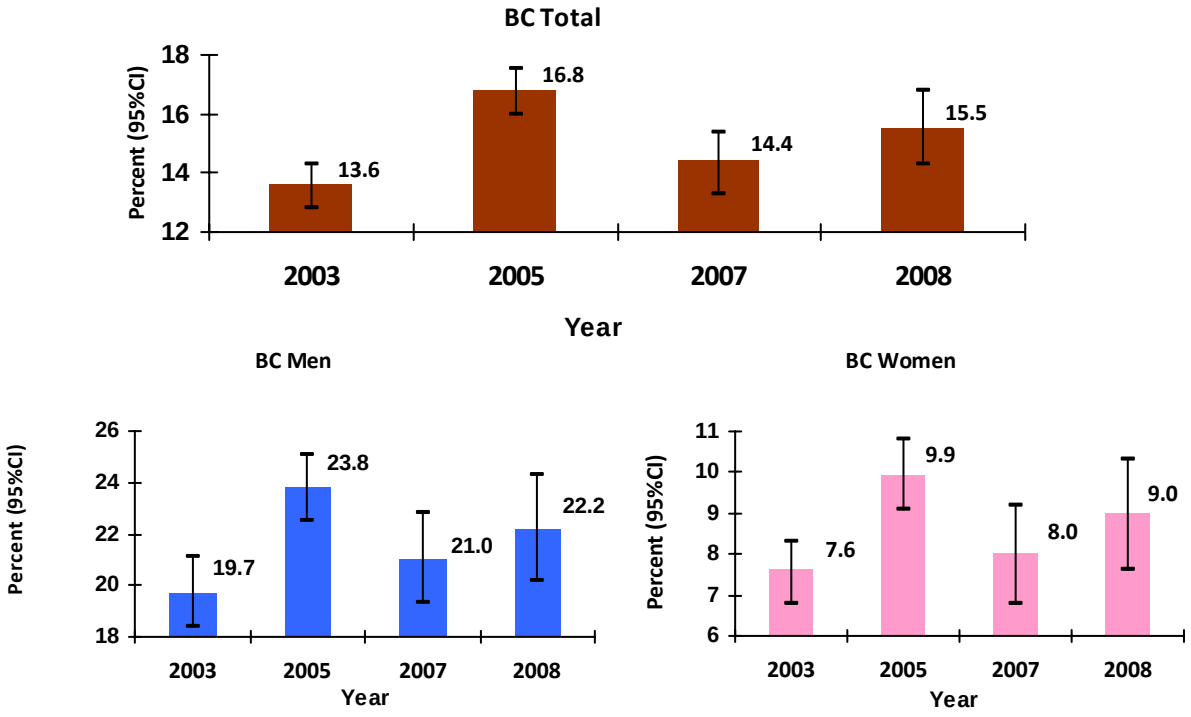


Figure 3 shows that the proportion of heavy frequent drinkers in the BC population aged 12 and over continued to increase in recent years (statistically insignificant) except for a peak observation in 2005 for both men and women. It is difficult to interpret the isolated jump in 2005 since survey methodology and sampling procedures were the same in those years. The pattern for men and women was similar.

5.1.3 Fruit and Vegetable Consumption

Fruit and vegetables are important components of a healthy diet, and their sufficient daily consumption can help to prevent major diseases, such as cardiovascular diseases and certain cancers. Overall, it is estimated by the World Health Organization that up to 2.7 million lives around the world could potentially be saved each year if fruit and vegetable consumption were increased to recommended levels [17].

The Canada Food Guide recommends that we consume 5 to 10 servings of fruits and vegetables per day [18]. The CCHS fruit and vegetable consumption measure is calculated from responses to questions on the number of times daily that fruit juice, fruit, green salad, potatoes, carrots, and other vegetables are consumed. While the frequency of consumption of fruits and vegetables as measured by the CCHS does not translate into the measure of servings of the Canada Food Guide we have used frequency as a proxy for servings. While this is not accurate it does give a sense of healthy eating patterns.

Those listed as below requirement consumed fruits and vegetables fewer than 5 times per day and those who met requirement consumed fruits and vegetables at least 5 times per day.

As there is no means to convert frequency of daily consumption into dietary recommendations for servings we made comparisons on the basis of those consuming fruits and vegetables 5 or more times per day with those who did not.

Recent Data

Fruit and vegetable consumption data were obtained from the most recent CCHS. The two-year combined data from 2007 and 2008 were used to provide greater precision of estimates.

Overall, only 43.4% of British Columbians (36.8% for men and 49.6% for women) consumed fruits and vegetable at least 5 times daily, which was similar to the national average but significantly lower than Quebec with 50.4%.

Table 4 Percent of BC population meeting the fruit & vegetable requirement in 2007/2008

Health Region		Total	Men	Women
BC		43.4%	36.8%	49.6%
Interior	East Kootenay	45.3%	35.5%	54.7%
	Kootenay Boundary	43.0%	38.6%	47.4%
	Okanagan	40.9%	31.9%	49.5%
	Thompson / Cariboo	39.0%	35.2%	42.7%
Fraser	Fraser East	39.4%	28.0%	50.5%
	Fraser North	45.2%	39.4%	50.8%
	Fraser South	38.9%	37.9%	39.9%
Vancouver Coastal	Richmond	35.7%	27.1%	43.7%
	Vancouver	44.7%	39.7%	49.7%
	North Shore / Coast Garibaldi	50.1%	44.6%	55.1%
Vancouver Island	South Vancouver Island	50.4%	38.2%	61.5%
	Central Vancouver Island	43.8%	33.6%	53.0%
	North Vancouver Island	50.8%	41.5%	58.9%
Northern	Northwest	40.6%	31.8%	49.4%
	Northern Interior	44.8%	37.3%	52.3%
	Northeast	40.3%	37.9%[E]	42.7%
Canada		43.8%	36.8%	50.4%

Rates marked with an E in superscript must be interpreted with caution due to small sample size

Lack of enough fruit and vegetable consumption was common in men. Men were significantly less likely to meet recommended levels of daily fruit and vegetable consumption than women in BC and all its 16 HSDAs. A wide range of meeting requirement was observed across HSDAs. Richmond HSDA had the lowest consumption rate at 35.7%, while North Vancouver Island HSDA reported the highest at 50.8%.

Recent Trend

Longitudinal data on fruit and vegetable consumption discussed in this study were for the years of 2003, 2005, 2007 and 2008 from the CCHS.

Figure 4 Temporal variations in the percent of population meeting the fruit & vegetable requirement

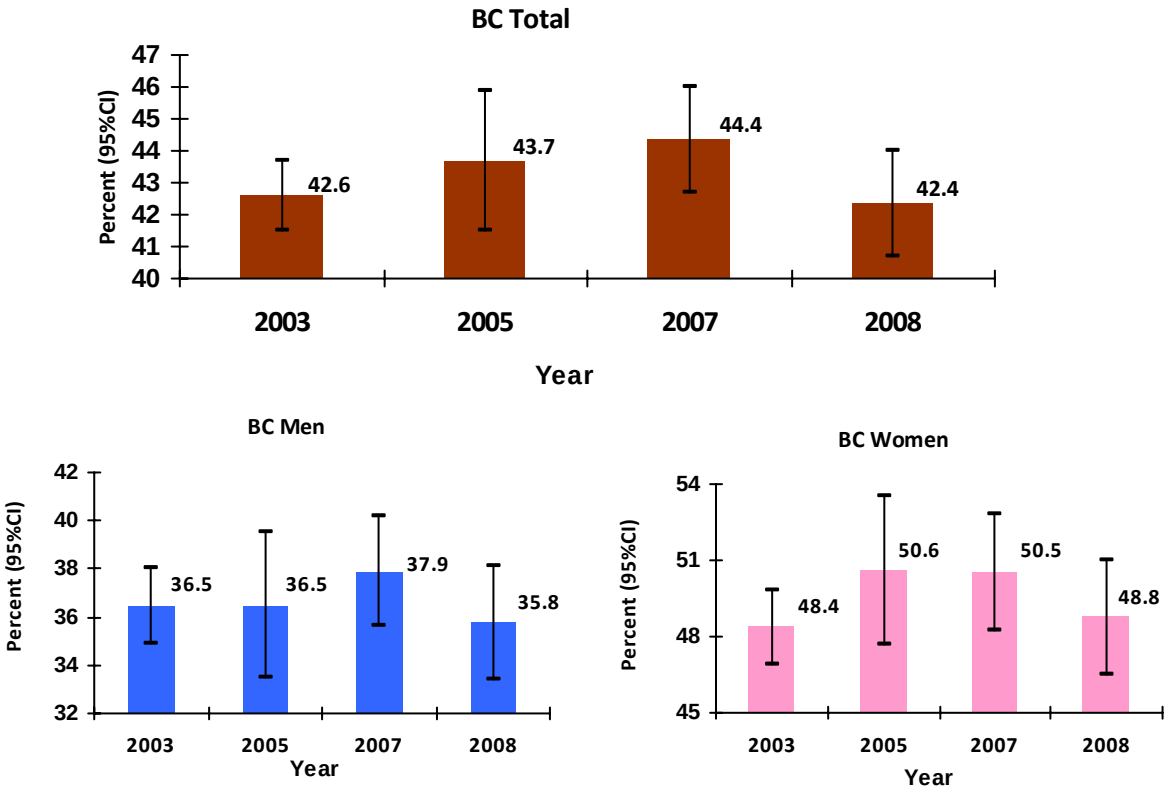


Figure 4 shows that the proportion of BC population aged 12 and over who met the daily fruit and vegetable requirement increased in recent years except for 2008. However, all the temporal changes were not statistically significant.

5.1.4 Physical Activity

Scientific evidence strongly supports the role of physical activity in chronic disease prevention and control. Research shows that physical inactivity can cause premature death, chronic disease and disability [19].

Regular physical activity reduces the risk of developing or dying from obesity, diabetes, hypertension, heart disease and stroke, colon cancer, breast cancers, depression and anxiety, as well as, musculoskeletal conditions [20]. Physical activity is a key determinant of energy expenditure, and thus is fundamental to energy balance and maintaining a healthy weight.

The level of physical activity for the population aged 12 and over was determined by Statistics Canada according to responses to CCHS survey questions on the frequency, duration and intensity of their participation in leisure-time physical activity.

Survey respondents are classified as vigorously 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, 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 = vigorously active; 1.5 - 2.9 kcal/kg/day = moderately active; less than 1.5 kcal per day = inactive.

In this report, survey respondents who were either vigorously active or moderately active are considered physically active; otherwise respondents were classified as inactive.

Recent Data

Physical activity level was obtained from the most recent CCHS. The two-year combined data from 2007 and 2008 were used to provide greater precision of estimates.

BC residents were the most physically active in Canada. In BC 57.7% of the population aged 12 and over (59.1% in men and 56.4% in women) self reported as physically active. The differences were statistically significant between BC and all Canadian provinces except for BC women when compared to Alberta women.

Table 5 Percent of physically active or moderately active people in the BC in 2007/2008

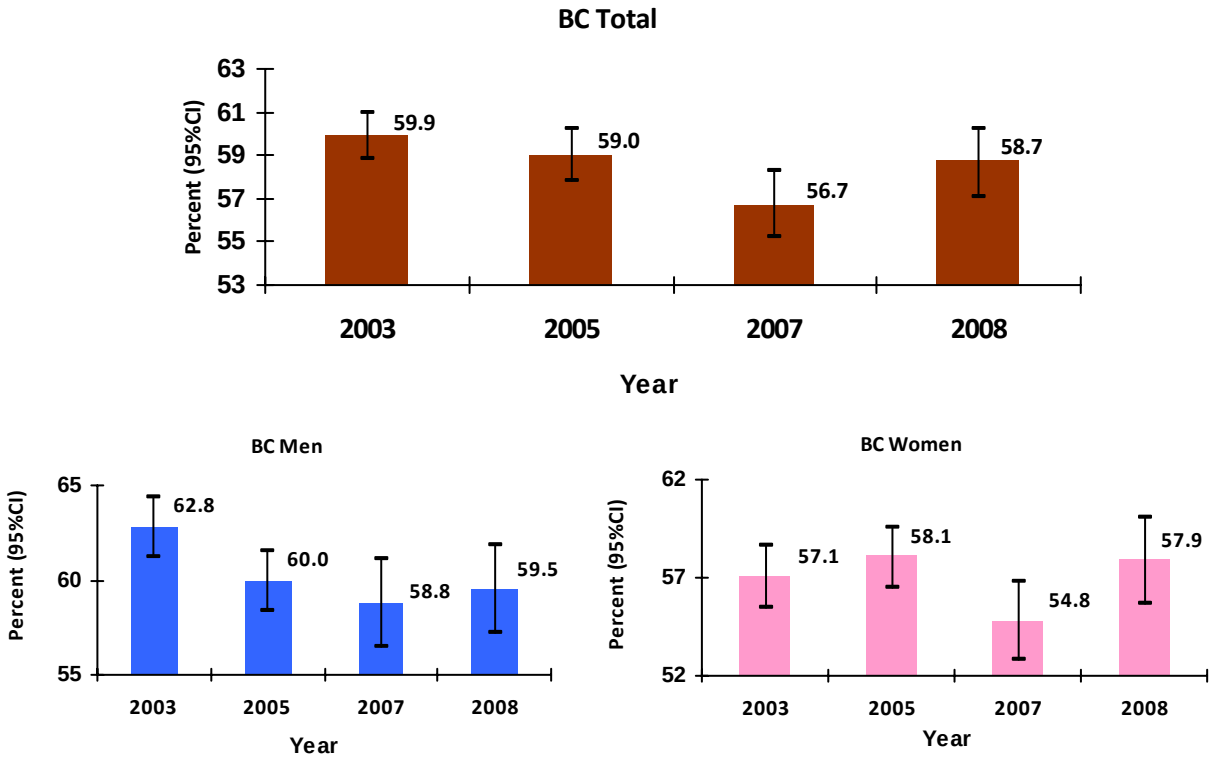
Health Region		Total	Men	Women
BC		57.7%	59.1%	56.4%
Interior	East Kootenay	60.1%	65.1%	55.3%
	Kootenay Boundary	70.6%	74.9%	66.3%
	Okanagan	61.7%	63.5%	60.1%
	Thompson / Cariboo	57.6%	55.8%	59.2%
Fraser	Fraser East	56.1%	54.9%	57.3%
	Fraser North	53.2%	59.4%	47.3%
	Fraser South	54.2%	56.4%	51.9%
Vancouver Coastal	Richmond	50.1%	53.0%	47.4%
	Vancouver	57.4%	58.1%	56.8%
	North Shore / Coast Garibaldi	61.8%	61.4%	62.2%
Vancouver Island	South Vancouver Island	64.8%	63.4%	66.0%
	Central Vancouver Island	56.8%	57.5%	56.1%
	North Vancouver Island	62.8%	60.5%	64.8%
Northern	Northwest	56.0%	58.5%	53.4%
	Northern Interior	61.0%	59.4%	62.7%
	Northeast	54.9%	55.4%	52.7%
Canada		50.5%	53.9%	47.2%

BC men were more physically active than BC women. Geographically the proportions of active population were the highest in Kootenay Boundary HSDA for total population (70.6%), men (74.9%) and women (66.3%); and the lowest in Richmond HSDA for total population (50.1%) and for men (53.0%), and in Fraser North HSDA for women (47.3%).

Recent Trend

Longitudinal data on physical activity used in this study were for the years of 2003, 2005, 2007 and 2008 from the Canadian Community Health Surveys.

Figure 5 Temporal variations in the percent of active population in BC



Decrease in the active population may create potential negative impacts on health outcomes in future years. Figure 5 shows that the proportion of the BC population that was physically active decreased slightly, although this decrease is not statistically significant trend. However, there was a small statistically insignificant increase in proportion of the population that was active in 2008. The decrease in the proportion of active men in 2007 and for total population compared to 2003 was statistically significant. The statistically insignificant increase in 2008, though small, needs to be watched further in coming years before we can draw any sound conclusion on future trends.

5.2 HEALTH CONDITIONS

5.2.1 Defining a Person's Chronic Condition (Case Definition)

The source of the case definitions currently being used to create disease registries in BC are modifications of a case definition for diabetes that was created in Manitoba, validated in other provinces, and is currently being used for the National Diabetes Surveillance System. The case definitions are based on ICD-9 and ICD-10 codes in medical diagnoses from the healthcare utilization data, which are selected according to the specific disease.

For example, the diabetes registry is based on an ICD-9 code of 250 or ICD-10 code of E10-E14. To be considered a diabetes case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9/ICD-10 codes within 365 days.

Cancer data differs since BC Cancer Registry is population-based with accurate and comprehensive clinical information on cancer diagnosis and treatment; as a result, patients' cancer status is clear and clinically confirmed. Thus no additional rules are needed for cancer status.

Since health condition data from utilization records were only accessible for BC, no utilization-based inter-provincial comparisons are made. However, BC was compared with other provinces using disease prevalence based on survey data.

Overweight and obesity are discussed in this section since unhealthy weight is widely considered as pre-conditions leading to various chronic diseases. Unhealthy weight is highly associated with individual's income level and the social environment he/she lives rather than solely a behavioural choice. In this report, prevalence of overweight and obese population was obtained based on self-reported data from the Canadian Community Health Survey.

5.2.2 Overweight and Obesity in Adults and in Youth

Being overweight or obese can lead to serious health consequences including cardiovascular disease (mainly heart disease and stroke), diabetes, osteoarthritis and some cancers (endometrial, breast, and colon) [21-22]. In addition, being overweight or obese also incurs significant costs to Canadian society and the health care system [23]. In Canada the prevalence of overweight and obese people is not uniformly distributed by geography or socio-demography or temporally and is increasing over time [24-25].

Body mass index (BMI) is a method of classifying body weight according to health risk. BMI is calculated as a ratio of weight in kilograms over height in metres squared.

According to the World Health Organisation (WHO) and Health Canada guidelines, health risk levels are associated with each of the following BMI categories: normal weight = least health risk; underweight and overweight = increased health risk; obese class I = high health risk; obese class II = very high health risk; obese class III = extremely high health risk.

Overweight and Obesity in Adults

For adults, the BMI categories are given as: under 18.5 (underweight); 18.5 to 24.9 (normal weight); 25.0 to 29.9 (overweight); 30.0 or greater (obese). In this report, unhealthy weight (BMI >=25.0) is defined as being either overweight or obese; grouping them together enhances statistical power in reporting and identifying significant differences across areas in BC. The corresponding cut-off points for youth are specified later in this section.

Self-reported measurements of BMI for BC and its HSDAs are available from all cycles of the CCHS. BMI based on self-report is usually lower than BMI based on direct measurements because of under-reporting weight and over-reporting height. However, self-reported BMI is the only readily available data for longitudinal and cross-sectional analysis. Thus, we present self-report based indicators in this report.

Table 6 Percent of self-reported adults as overweight or obese in BC in 2007/2008

Health Service Delivery Region	Total	Men	Women
BC	44.5%	52.8%	36.3%
East Kootenay	54.3%	68.9%	39.4%
Kootenay Boundary	50.3%	55.2%	45.1%
Okanagan	45.7%	52.1%	39.4%
Thompson / Cariboo	55.1%	60.4%	49.6%
Fraser East	50.1%	57.2%	43.1%
Fraser North	43.7%	53.1%	34.4%
Fraser South	44.1%	52.2%	35.9%
Richmond	32.4%	42.1%	23.0%
Vancouver	30.1%	39.3%	20.9%
North Shore / Coast Garibaldi	41.0%	49.9%	32.5%
South Vancouver Island	45.8%	55.4%	36.9%
Central Vancouver Island	52.8%	59.4%	46.7%
North Vancouver Island	52.0%	59.1%	45.2%
Northwest	64.1%	74.9%	51.9%
Northern Interior	61.2%	68.7%	53.4%
Northeast	61.9%	67.2%	55.8%
Canada	50.9%	58.7%	43.2%

Recent Data

Data on unhealthy weights were obtained from the most recent CCHS 2007/2008 combined data and the results for adults are listed in Table 6.

BC residents had the lowest unhealthy weight rate for adults in Canada with 44.5% of adults (52.8% in men and 36.3% in women) classified as being either overweight or obese. The differences were statistically significant between BC and all other Canadian provinces except when comparing BC and Quebec men. We also noticed a large gender gap in the prevalence of unhealthy weight in adults. Men were more likely to report unhealthy weight than women in BC in all its 16 HSDAs. Furthermore, the proportion of adults with unhealthy weights was the highest in Northwest HSDA for the total population (64.1%) and for men (74.9%), and in Northeast HSDA for women (55.8%), and the lowest in Vancouver HSDA (30.1% overall, 39.3% for men and 20.9% for women).

Recent Trend

Longitudinal data on unhealthy weights presented in this study were for the years of 2003, 2005, 2007 and 2008 from the Canadian Community Health Surveys.

Figure 6 Temporal variations in the percent of adults with unhealthy weight in BC

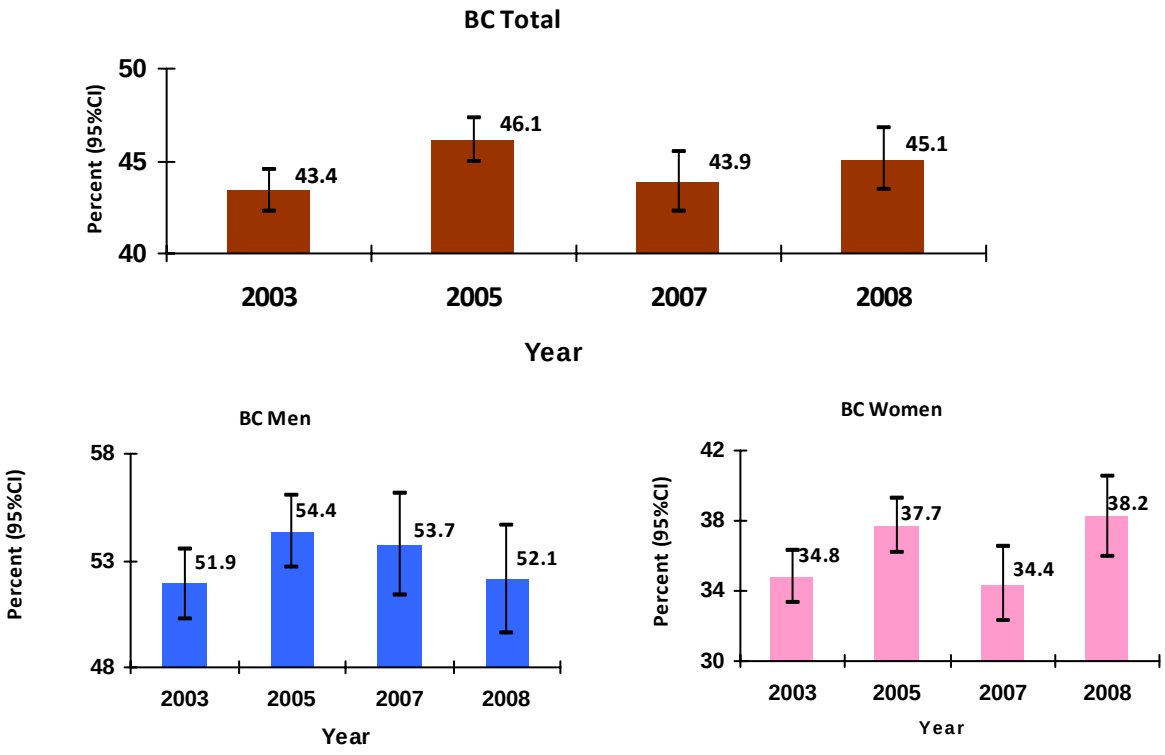


Figure 6 shows that similar to the temporal pattern for heavy frequent drinking, the proportion of BC adults with unhealthy weight from self-report data continued to increase in recent years with a peak observation in 2005 for both men and women. It is difficult to interpret the isolated jump in 2005 since survey methodology and sampling procedures were the same across all years. Similar jumps in 2005 were also observed in the Atlantic Provinces, Saskatchewan and Alberta but not in populous provinces such as Ontario and Quebec. Overall, it is difficult to draw any sound conclusion on trends at this moment.

Overweight or Obese Rates for Youth (Aged 12 to 19)

Childhood obesity is associated with a higher chance of premature death and disability in adulthood [26-29]. The increase in youth with an unhealthy weight results from an increasing energy intake from food and decreasing energy expenditure due to increases in sedentary behaviours (television viewing, internet surfing and computer games) and a decrease in physical activity.

BMI-based classification of overweight or obesity for youth is different from that for adults. Overweight and obese cut-off points for youth from Statistics Canada are listed in Table 7.

Table 7 Overweight and obese BMI cut-off points for youth by sex

	Overweight cut-off		Obese cut-off	
	BMI greater than or equal to:		BMI greater than or equal to:	
Age (years)	**Boys**	**Girls**	**Boys**	**Girls**
12	21.22	21.68	26.02	26.67
12.5	21.56	22.14	26.43	27.24
13	21.91	22.58	26.84	27.76
13.5	22.27	22.98	27.25	28.20
14	22.62	23.34	27.63	28.57
14.5	22.96	23.66	27.98	28.87
15	23.29	23.94	28.30	29.11
15.5	23.60	24.17	28.60	29.29
16	23.90	24.37	28.88	29.43
16.5	24.19	24.54	29.14	29.56
17	24.46	24.70	29.41	29.69
17.5	24.73	24.85	29.70	29.84

Data on proportions of youth who are overweight or obese with acceptable statistical reliability are only available at the provincial level. Proportions of overweight or obese youth in 10 Canadian provinces were obtained from the most recent CCHS 2007/2008 combined data and are listed in Table 8.

Table 8 Self-reported Canadian youth who are overweight or obese in 2007/2008 by province

Province	Total	Males	Females
Canada	19.0%	23.7%	14.0%
Newfoundland and Labrador	35.6%	41.9%	29.4%
Prince Edward Island	23.4%	33.7%[E]	12.3%[E]
Nova Scotia	17.9%	20.9%	15.0%[E]
New Brunswick	24.3%	32.4%	15.5%[E]
Quebec	15.8%	18.7%	12.7%
Ontario	20.1%	24.9%	14.9%
Manitoba	22.0%	29.3%	14.9%[E]
Saskatchewan	21.8%	28.2%	14.9%[E]
Alberta	18.7%	25.6%	11.0%[E]
British Columbia	17.1%	21.1%	12.5%[E]

Rates marked with an E in superscript must be interpreted with caution due to small sample size

Similar to BC adults, BC youth had the second lowest prevalence rate of unhealthy weights after Quebec in Canada. Based on the self-reported data, 17.1% of BC youth aged 12 to 19 (21.1% in boys and 12.5% in girls) were classified as either overweight or obese. In gender-separated comparisons, BC was the third lowest in prevalence of unhealthy weight after Quebec and Nova Scotia for boys and third after Alberta and Prince Edward Island for girls. There was also a large gender gap in the proportions of unhealthy weight in youth. Compared to girls, boys were much more likely to report being an unhealthy weight. This conclusion held true in all 10 Canadian provinces.

5.2.3 Diabetes – a Nutritional and Metabolic Disease

To be considered a diabetes case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9 (250) or ICD-10 (E10-E14) codes within 365 days.

Recent Data

The population prevalence of diabetes was obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and is shown in Table 9.

Table 9 Prevalence of Diabetes in BC in 2007/2008

		Crude			Age-Standardized[1]
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		6.5%	6.9%	6.0%	**1 the worst; 16 the best**
Interior	East Kootenay	5.7%	6.0%	5.4%	13
	Kootenay Boundary	5.8%	6.1%	5.5%	15
	Okanagan	6.5%	7.3%	5.8%	12
	Thompson / Cariboo	6.4%	6.8%	6.1%	9
Fraser	Fraser East	7.1%	7.6%	6.6%	2
	Fraser North	6.4%	6.8%	6.0%	5
	Fraser South	7.1%	7.6%	6.5%	1
Vancouver Coastal	Richmond	6.9%	7.5%	6.4%	6
	Vancouver	6.2%	6.4%	6.0%	8
	North Shore / Coast Garibaldi	5.1%	5.6%	4.7%	16
Vancouver Island	South Vancouver Island	5.9%	6.3%	5.5%	14
	Central Vancouver Island	6.8%	7.6%	6.1%	11
	North Vancouver Island	6.3%	6.9%	5.7%	10
Northern	Northwest	6.1%	6.3%	5.9%	3
	Northern Interior	6.2%	6.4%	6.0%	4
	Northeast	4.7%	4.8%	4.6%	7

[1] age-standardized prevalence rates (ASPR) were calculated based on 3-year moving average of 2006/07, 2007/08 and 2008/09.

According to the most recent case report on diabetes for 2007/2008, 6.46% of the total BC population (6.92% in men and 6.01% in women) had diabetes. There appears to be a gender gap on the proportions of diabetes in BC. Men were more likely to have diabetes than women in BC and all of the 16 HSDAs. Furthermore, prevalence rates of diabetes were the highest in Fraser East HSDA for total population (7.10%) and women (6.62%) and in Central Vancouver Island HSDA for men (7.62%), and the lowest in Northeast HSDA for men, women and the total population.

Recent Trend

Longitudinal data on diabetes discussed in this study were for the years of 2001/2002 through 2007/2008. Age-standardized rates were calculated based on 3-year moving average.

Figure 7 Prevalence of diabetes

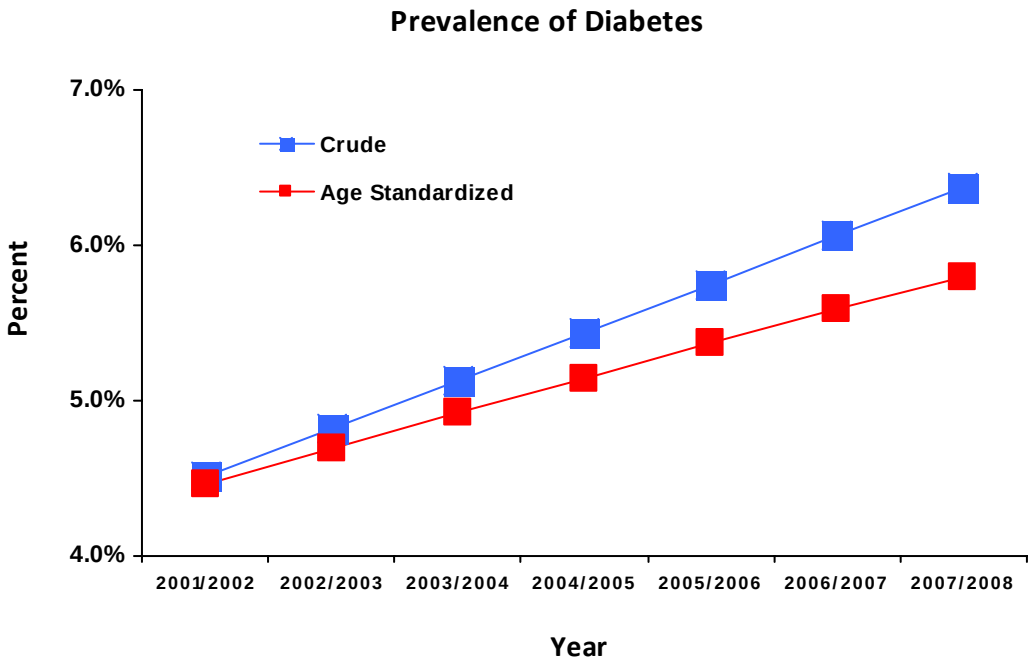
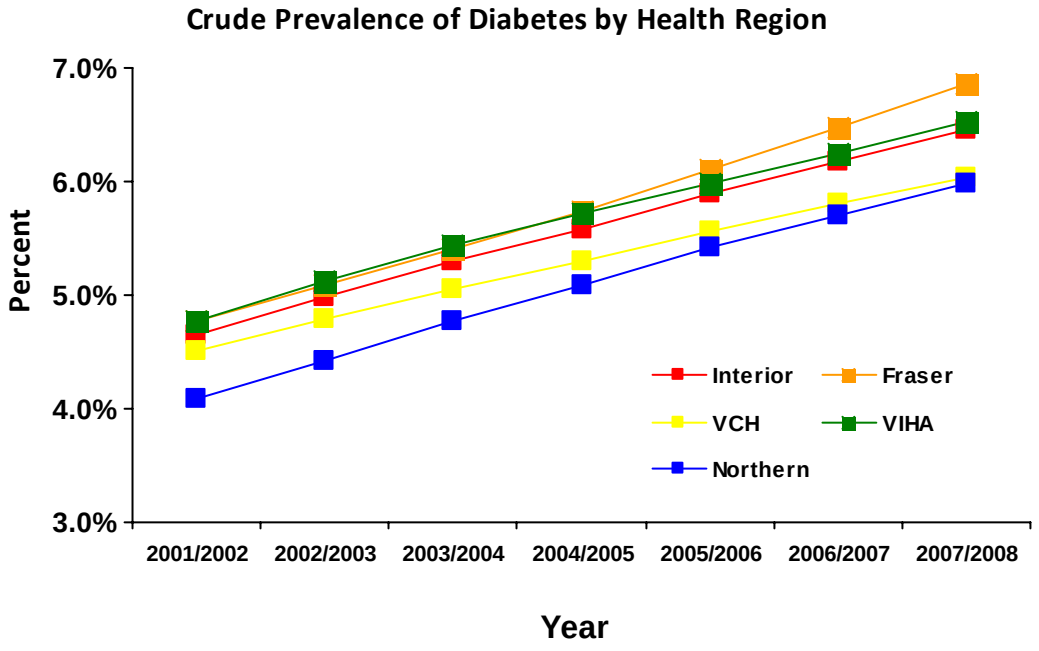


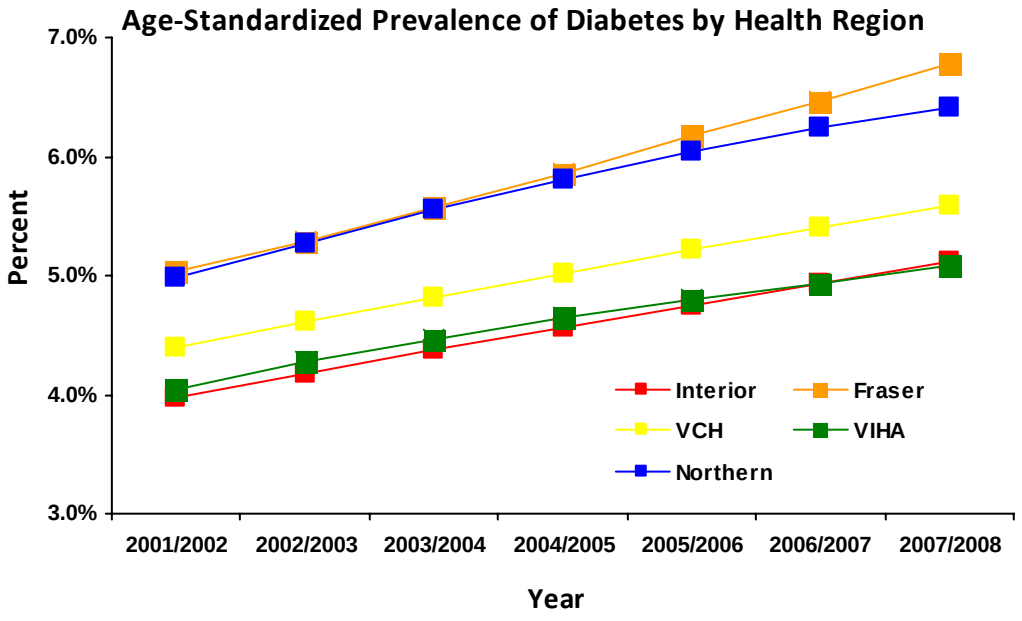
Figure 7 shows that the crude prevalence rates of diabetes in the BC population have continued to increase in recent years. The flatter slope in diabetes prevalence increase after age-standardization indicates a rise in crude prevalence over time was attributable to both population aging and increases in incidence rates due to the high prevalence of obesity in the population.

Regional Trend

We further examined the prevalence of diabetes in the five health regions of BC and observed that the prevalence of diabetes increased in all regions. From Figure 8(a), the crude prevalence rates were the highest in Fraser Health Region and lowest in Northern Health Region in 2007/2008 (fiscal year). After age standardization, however, Northern Health Region was actually closer to Fraser Health Region, the highest in the Province. The high prevalence rates in Vancouver Island Health Region and Interior Health Regions by crude measure became the lowest in BC after the age effect was removed by age standardization.

Figure 8 Prevalence of diabetes by health region





5.2.4 Hypertension – a Circulatory System Disease

To be considered a hypertension case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9 (401-405) or ICD-10 (I10, I11, I12, I13 and I15) codes within 365 days.

Recent Data

The proportion of the population with hypertension was obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 10.

Table 10 Prevalence of hypertension in BC in 2007/2008

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		17.2%	16.2%	18.3%	**1 the worst; 16 the best**
Interior	East Kootenay	16.6%	15.5%	17.8%	15
	Kootenay Boundary	18.3%	16.8%	19.9%	14
	Okanagan	20.0%	18.9%	21.0%	13
	Thompson / Cariboo	17.9%	16.8%	19.0%	9
Fraser	Fraser East	16.8%	15.6%	18.0%	4
	Fraser North	15.6%	14.7%	16.5%	6
	Fraser South	17.0%	16.0%	17.9%	2
Vancouver Coastal	Richmond	17.4%	16.8%	17.9%	7
	Vancouver	15.4%	14.3%	16.4%	12
	North Shore / Coast Garibaldi	15.6%	14.7%	16.5%	16
Vancouver Island	South Vancouver Island	18.9%	17.2%	20.5%	10
	Central Vancouver Island	20.1%	19.2%	20.9%	11
	North Vancouver Island	18.5%	17.4%	19.7%	8
Northern	Northwest	15.6%	14.7%	16.7%	3
	Northern Interior	16.2%	15.4%	16.9%	1
	Northeast	12.2%	11.3%	13.2%	5

In 2007/2008, 17.2% of the total BC population (16.2% in men and 18.3% in women) had hypertension. There are consistent gender differences in favour of men in the prevalence of hypertension across all 16 HSDAs. Furthermore, the crude prevalence of hypertension was the highest in Central Vancouver Island HSDA for the total population (20.1%) and men (19.2%), and in Okanagan HSDA for women (21.0%), and lowest in Northeast HSDA for men, women and gender-combined data. Controlling for age, the combined standardized prevalence was the lowest in North Shore/Coast Garibaldi and highest in Northern Interior.

Recent Trend

Longitudinal data on hypertension discussed in this study were for the years of 2001/2002 through 2007/2008. Age-standardized rates were calculated based on 3-year moving average.

Figure 9 Prevalence of hypertension

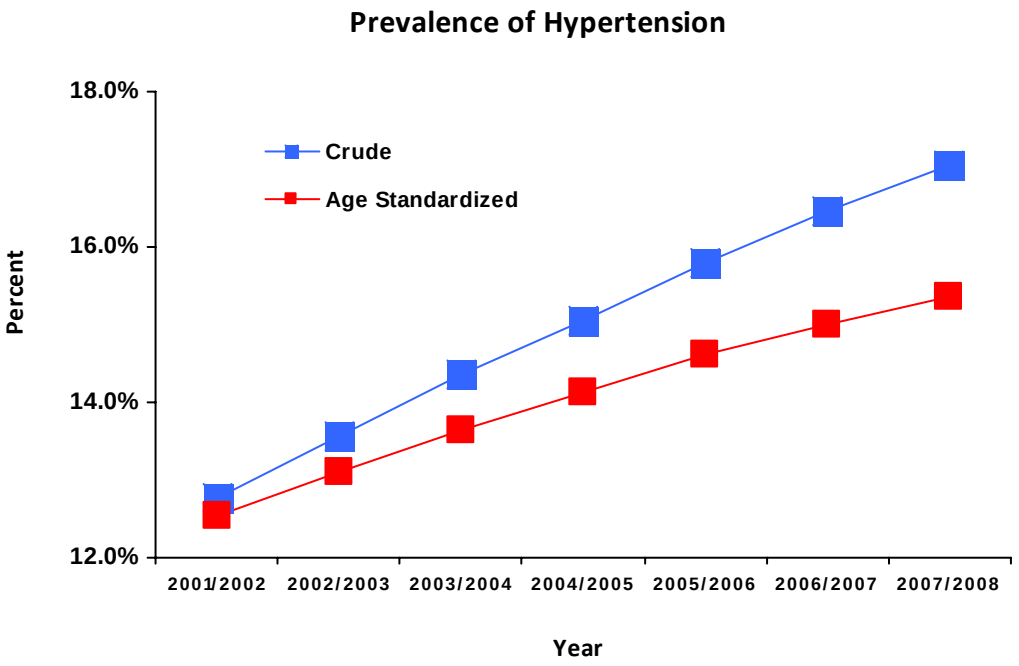
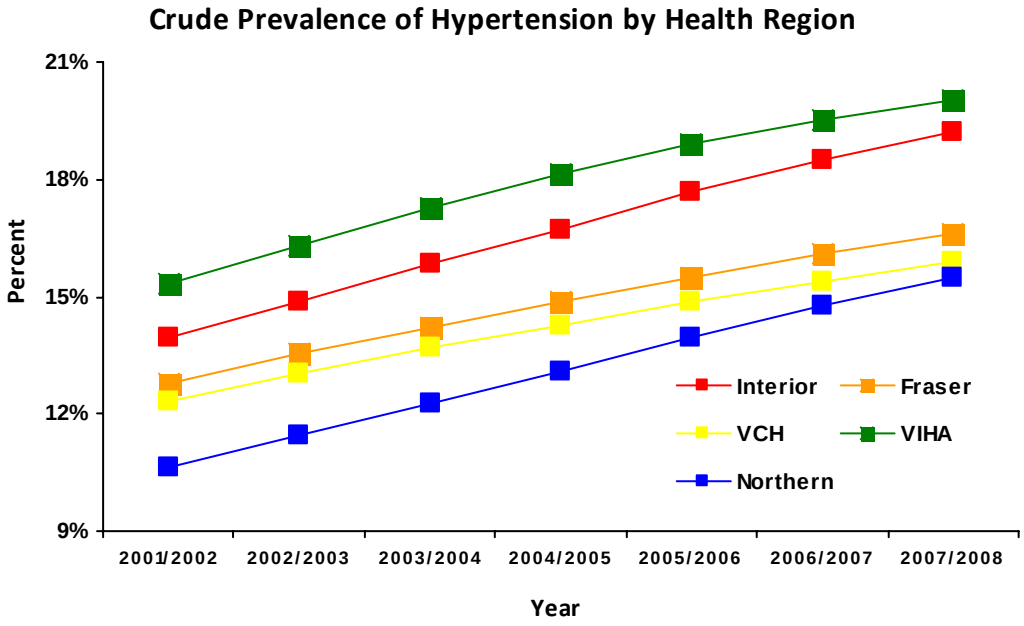


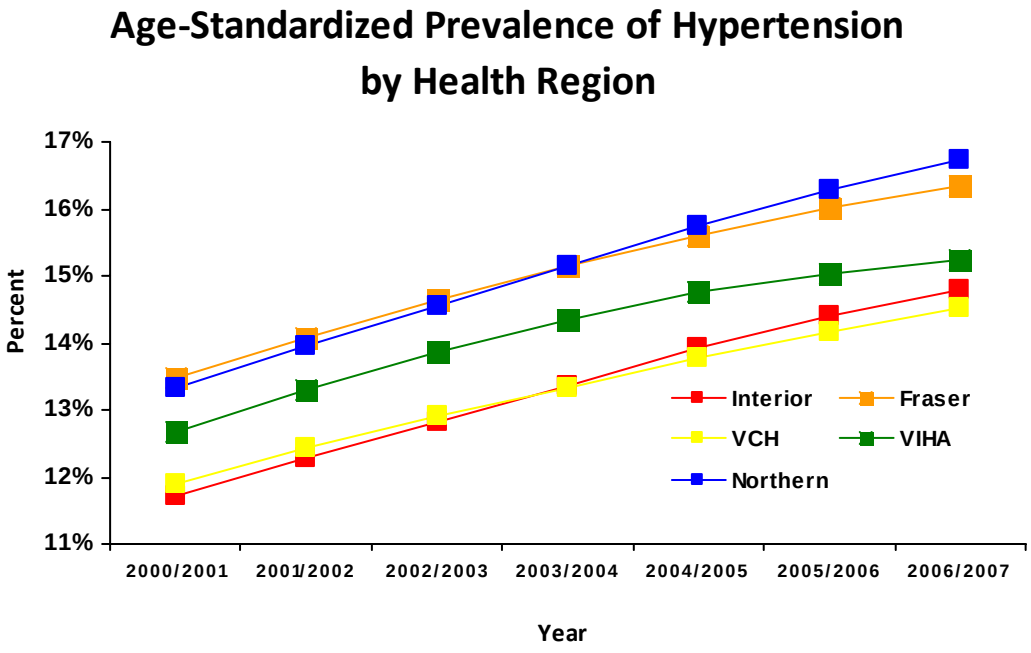
Figure 9 shows that the crude prevalence of hypertension in the population of BC was constantly increasing in recent years. Similar to trend for diabetes, the increasing trend for hypertension was attributable to both population aging and increase in hypertension incidence.

Regional Trends

We further examined the prevalence of hypertension in the five health regions of BC and found that the hypertension prevalence increased in all regions. The crude prevalence rate was the highest in Vancouver Island Health Region and the lowest in Northern Health Region in 2007/2008 (fiscal year) as shown in Figure 10(a). However, in Figure 10(b) after age standardization, both the prevalence and increase in prevalence was highest in Northern Health Region. Furthermore, based on temporal trends, the crude prevalence of hypertension increased the fastest in Interior Health Region mainly due to population aging.

Figure 10 Prevalence of hypertension by health region





5.2.5 Cardiovascular Disease – a Circulatory System Disease

To be considered a cardiovascular disease case, an individual must have one hospitalization or two medical claims coded as cardiovascular disease within 365 days. Cardiovascular diseases (CVD) include angina (ICD-9: 413; ICD-10: I20), acute myocardial infarction (ICD-9:410; ICD-10:I21) and congestive heart failure (ICD-9:428; ICD-10:I50) and the earliest of the three case dates can be used as the CVD case date.

Recent Data

Prevalence rates for CVD in the BC population were obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 11.

Table 11 Prevalence of Cardiovascular Disease in BC in 2007/2008

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		4.8%	5.5%	4.1%	**1 the worst; 16 the best**
Interior	East Kootenay	5.3%	6.0%	4.5%	10
	Kootenay Boundary	6.2%	6.9%	5.6%	4
	Okanagan	6.7%	7.7%	5.9%	7
	Thompson / Cariboo	5.4%	6.2%	4.5%	9
Fraser	Fraser East	5.2%	5.8%	4.6%	3
	Fraser North	4.1%	4.6%	3.6%	12
	Fraser South	4.6%	5.3%	3.9%	6
Vancouver Coastal	Richmond	3.5%	4.1%	2.9%	16
	Vancouver	3.6%	4.0%	3.2%	15
	North Shore / Coast Garibaldi	4.6%	5.4%	3.7%	13
Vancouver Island	South Vancouver Island	5.0%	5.8%	4.3%	14
	Central Vancouver Island	6.1%	7.4%	4.9%	11
	North Vancouver Island	5.5%	6.4%	4.6%	8
Northern	Northwest	4.4%	5.2%	3.6%	1
	Northern Interior	4.3%	5.0%	3.5%	2
	Northeast	3.2%	3.7%	2.6%	5

In 2007/2008, 4.8% of the total BC population (5.5% in men and 4.1% in women) had cardiovascular disease. We observed a consistent gender gap in favour of women in the prevalence of cardiovascular disease across all 16 BC HSDAs. Furthermore, the crude prevalence of cardiovascular disease was the highest in Okanagan HSDA for the total population (6.7%), men (7.7%) and women (5.9%), and lowest in Northeast HSDA for men (3.7%) and women (2.6%) and total population (3.2%). Controlling for age, we see the lowest prevalence of cardiovascular disease in Richmond HSDA and the highest in Northwest HSDA.

Recent Trends

Longitudinal data on cardiovascular disease discussed in this study were for the years of 2001/2002 through 2007/2008. Age-standardized rates were calculated based on 3-year moving average.

Figure 11 Prevalence of Cardiovascular Disease

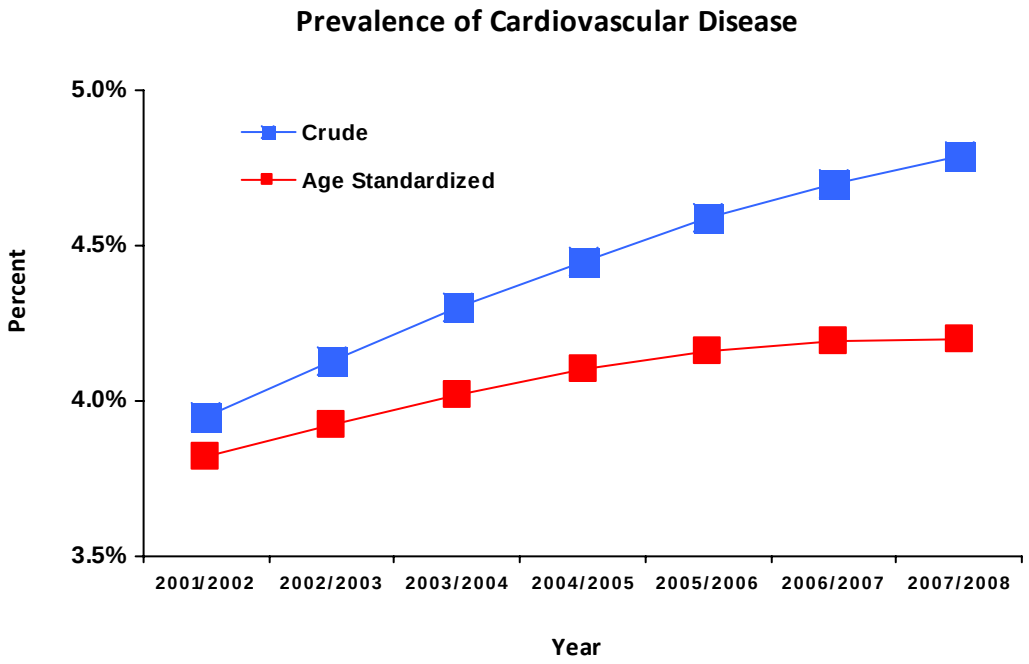
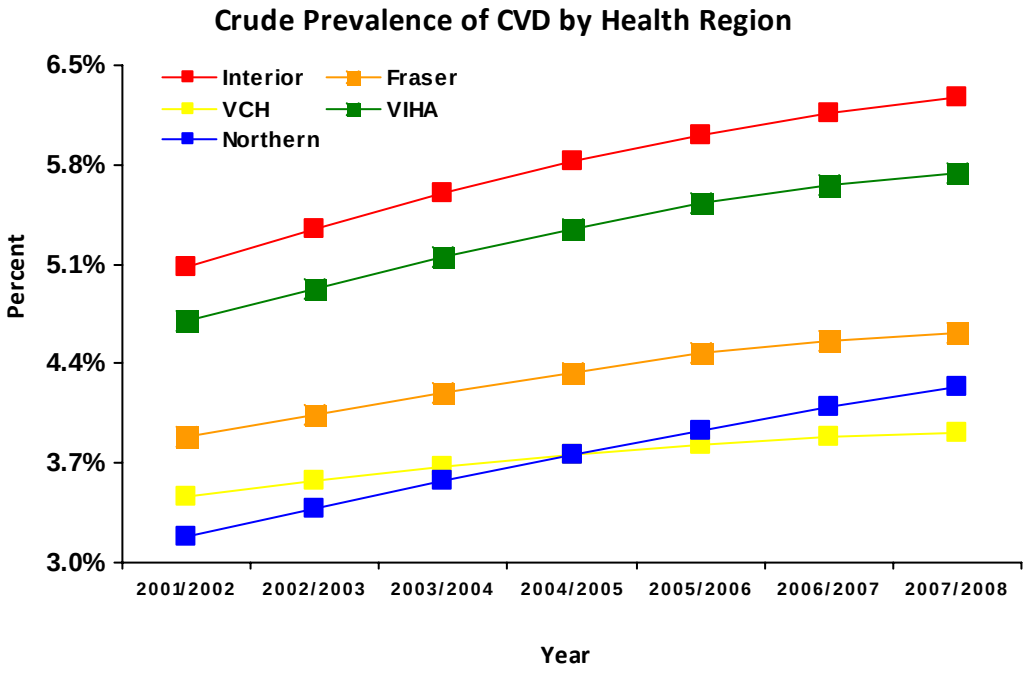


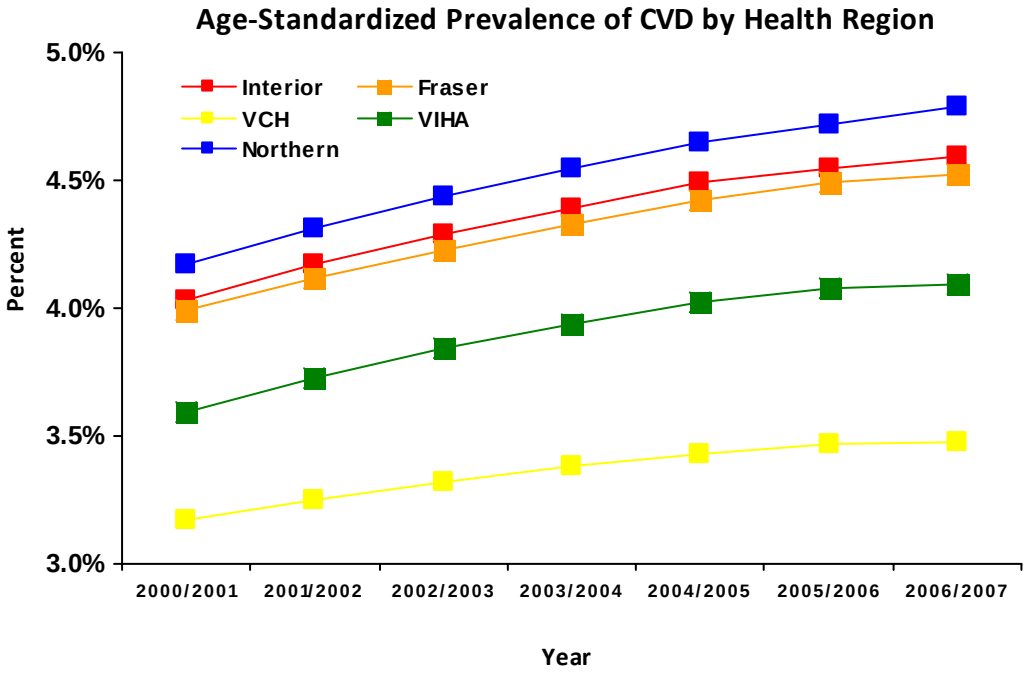
Figure 11 shows that crude prevalence of cardiovascular disease in the BC population was consistently increasing in recent years. However, after age standardization, we see that the increase in crude prevalence of cardiovascular disease for BC decreased by almost half the gain by crude rate. This means population aging plays a remarkable role in the increase of cardiovascular disease in population.

Regional Trends

We further examined the prevalence of CVD in the five health regions of BC and found cardiovascular disease prevalence increased in all health regions. The crude prevalence rate was the highest in Interior Health Region in 2007/2008 (fiscal year) and lowest in Vancouver Coastal Health Region. However, after age standardization, the prevalence rate of CVS was the highest in Northern Health Region and lowest in Vancouver Coastal Health Region.

Figure 12 Prevalence of CVD by health region





5.2.6 Cancer

Though routinely reported for other chronic diseases, prevalence has only been recently used to assess the impact of cancer while incidence and mortality rates continue to be used as effective reflections of cancer prevention and cancer treatment, respectively.

With an emphasis on the costs to the healthcare system, we present cancer prevalence rates in this report. Cancer patients may either die from cancer or be cured with full recovery. Cancer survivors after five years are usually less dependent on healthcare and are no burden to the health system. Thus, we report cancer prevalence based on patients diagnosed within 5 years instead of the total population who have ever been diagnosed with cancer.

To be considered a cancer case, an individual must have been diagnosed within 5 years with a prior invasive non-skin cancer (ICD-9: 140-172, 174-208 or ICD-10: C00-C43, C45-C48) and still be alive after 365 days. The cancer case counts were obtained from the Population & Preventive Oncology Group of the BC Cancer Agency and the BC population estimates (P.E.O.P.L.E. 33) from BC STATS.

Recent Data

Proportion of population living with cancer for BC and the 16 HSDAs are listed in Table 12.

Table 12 Cancer Prevalence Diagnosed within Five Years in BC in 2007

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		1.3%	1.4%	1.3%	**1 the worst; 16 the best**
Interior	East Kootenay	1.3%	1.3%	1.3%	16
	Kootenay Boundary	1.5%	1.6%	1.5%	11
	Okanagan	1.7%	1.8%	1.5%	5
	Thompson / Cariboo	1.5%	1.6%	1.4%	7
Fraser	Fraser East	1.3%	1.3%	1.2%	6
	Fraser North	1.2%	1.2%	1.1%	10
	Fraser South	1.2%	1.2%	1.1%	9
Vancouver Coastal	Richmond	1.1%	1.1%	1.2%	15
	Vancouver	1.1%	1.1%	1.1%	13
	North Shore / Coast Garibaldi	1.4%	1.5%	1.4%	4
Vancouver Island	South Vancouver Island	1.6%	1.7%	1.5%	2
	Central Vancouver Island	1.7%	1.8%	1.6%	3
	North Vancouver Island	1.7%	1.8%	1.5%	1
Northern	Northwest	1.1%	1.2%	1.0%	8
	Northern Interior	1.1%	1.1%	1.1%	12
	Northeast	0.8%	0.8%	0.9%	14

According to the case report for 2007, 1.3% of the total BC population (1.4% of men and 1.3% of women) lived with cancer. We also noticed a consistent gender gap in favour of women in cancer prevalence rate across all 16 BC HSDAs except in Richmond HSDA and Northeast HSDA. Furthermore, age-standardized prevalence rates of cancer were the highest in North Vancouver Island HSDA and lowest in East Kootenay HSDA.

Recent Data

Longitudinal data on cancer discussed in this study were for the years of 2000 through 2007 for both crude rates and age-standardized rates from the BC Cancer Agency.

Figure 13 Prevalence of cancer

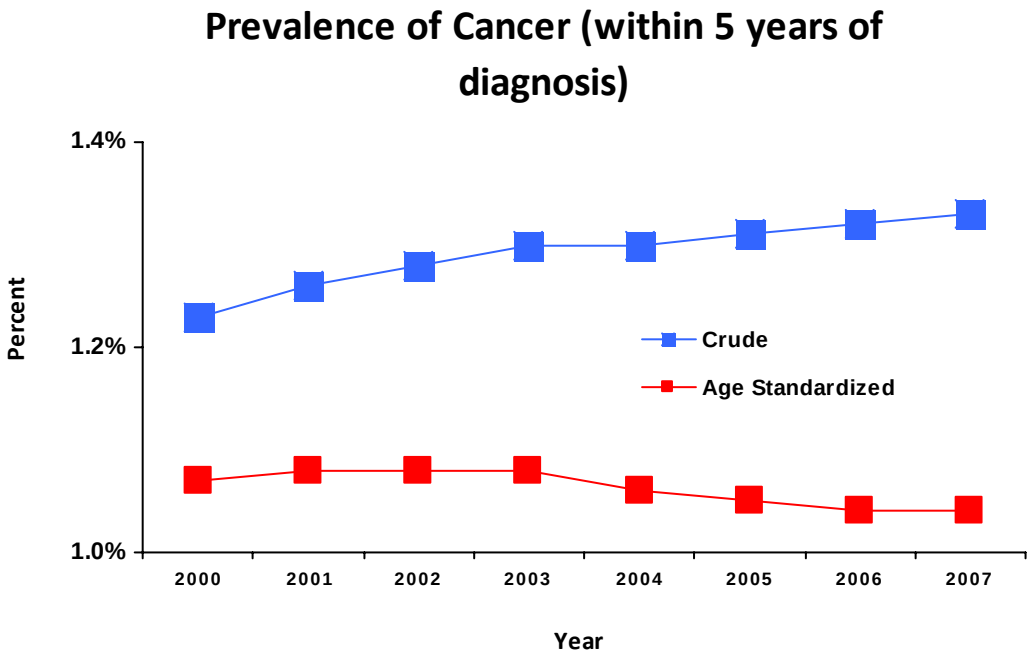
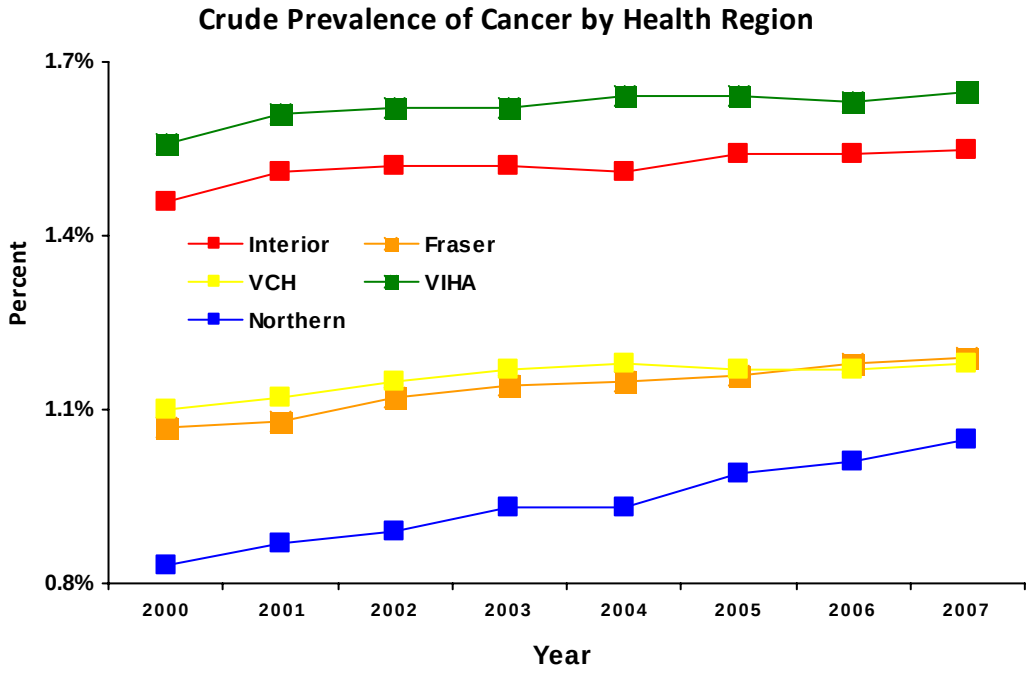


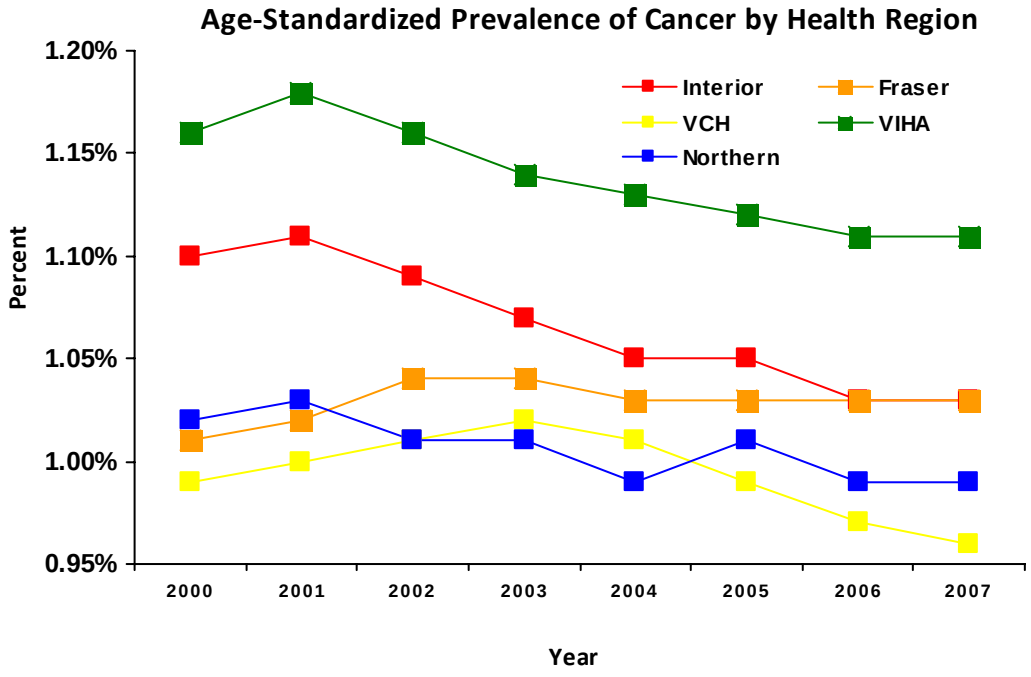
Figure 13 shows that crude cancer prevalence rates in the BC population were consistently increasing in recent years. However, after adjusting for age, the prevalence of cancer was actually decreasing. The increase in crude population prevalence of cancer was due to population aging.

Regional Trends

We further examined cancer prevalence rates in the five health regions of BC and found crude cancer prevalence rates increased slightly over time in all health regions. The crude prevalence rate was the highest in Vancouver Island Health Region in 2007 and lowest in Northern Health Region. However, with age adjustment, the age-standardized prevalence of cancer actually decreased significantly except in Fraser Health Region which increased slightly.

Figure 14 Prevalence of cancer by health region





5.2.7 Asthma – a Respiratory System Disease

To be considered an asthma case, an individual must have one hospitalization or two medical claims coded as asthma with the specified ICD-9 (493) or ICD-10 (J45-J46) codes within 365 days.

Recent Data

Prevalence rates of asthma in the BC population aged between 5 and 54 were obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 13.

Table 13 Prevalence of Asthma in BC in 2006/2007

		Crude			Age-Standardized[1]
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		12.4%	11.7%	13.1%	**1 the worst; 16 the best**
Interior	East Kootenay	10.1%	9.3%	10.9%	15
	Kootenay Boundary	10.9%	9.8%	12.0%	14
	Okanagan	12.9%	12.0%	13.9%	7
	Thompson / Cariboo	13.5%	12.2%	14.9%	5
Fraser	Fraser East	15.2%	14.5%	15.8%	1
	Fraser North	11.2%	10.5%	11.8%	11
	Fraser South	14.1%	13.9%	14.2%	3
Vancouver Coastal	Richmond	10.2%	10.3%	10.1%	16
	Vancouver	10.8%	10.4%	11.1%	10
	North Shore / Coast Garibaldi	10.7%	9.9%	11.5%	13
Vancouver Island	South Vancouver Island	11.8%	10.6%	13.0%	8
	Central Vancouver Island	13.5%	12.5%	14.5%	4
	North Vancouver Island	14.2%	12.6%	15.9%	2
Northern	Northwest	12.8%	11.3%	14.4%	9
	Northern Interior	13.9%	12.4%	15.4%	6
	Northeast	11.3%	10.3%	12.4%	12

[1] Ranks for age-standardized prevalence rates were for 2005/2006 calculated based on three-year moving average.

According to the case report for 2006/2007, 12.4% of the BC population aged 5 through 54 (11.7% in men and 13.1% in women) had asthma. We noticed a consistent gender gap in favour of men in asthma prevalence across all the BC HSDAs excluding Richmond HSDA. Furthermore, the crude prevalence of asthma was the highest in Fraser East HSDA for the total population (15.2%) and men (14.5%) and in North Vancouver Island HSDA for women (15.9%), and lowest in East Kootenay HSDA for the total population (10.1%) and men (9.3%) and in Richmond HSDA for women (10.1%). Age-standardized prevalence was highest in Fraser East HSDA and lowest in Richmond HSDA.

Recent Data

Longitudinal data on asthma discussed in this study were for the years of 2000/2001 through 2005/2006. Age-standardized rates were calculated based on by 3-year moving average.

Figure 15 Prevalence of asthma

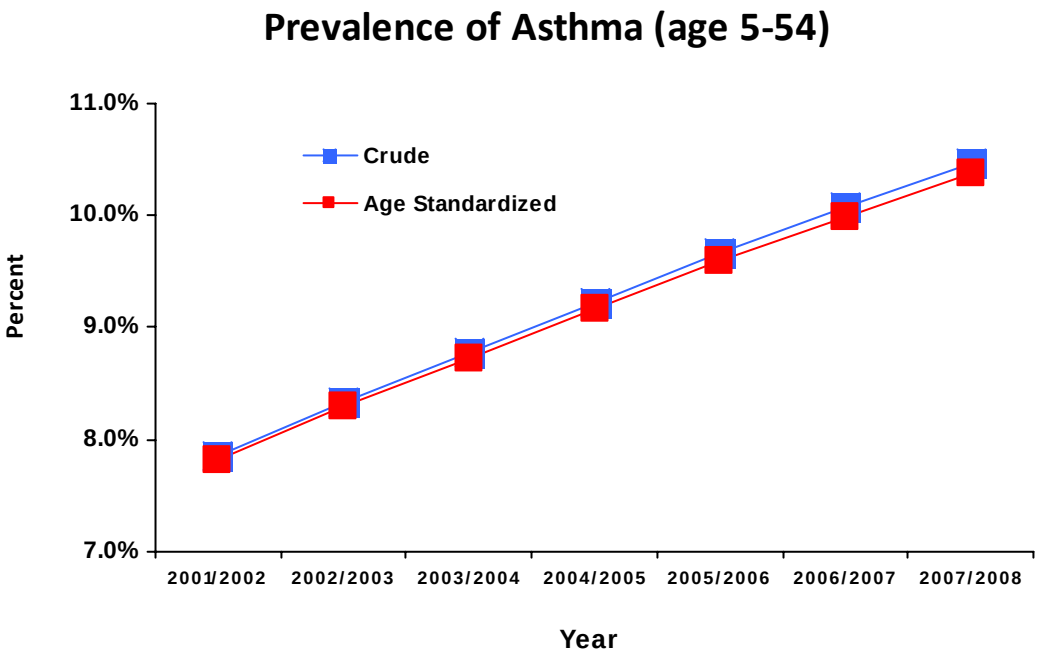
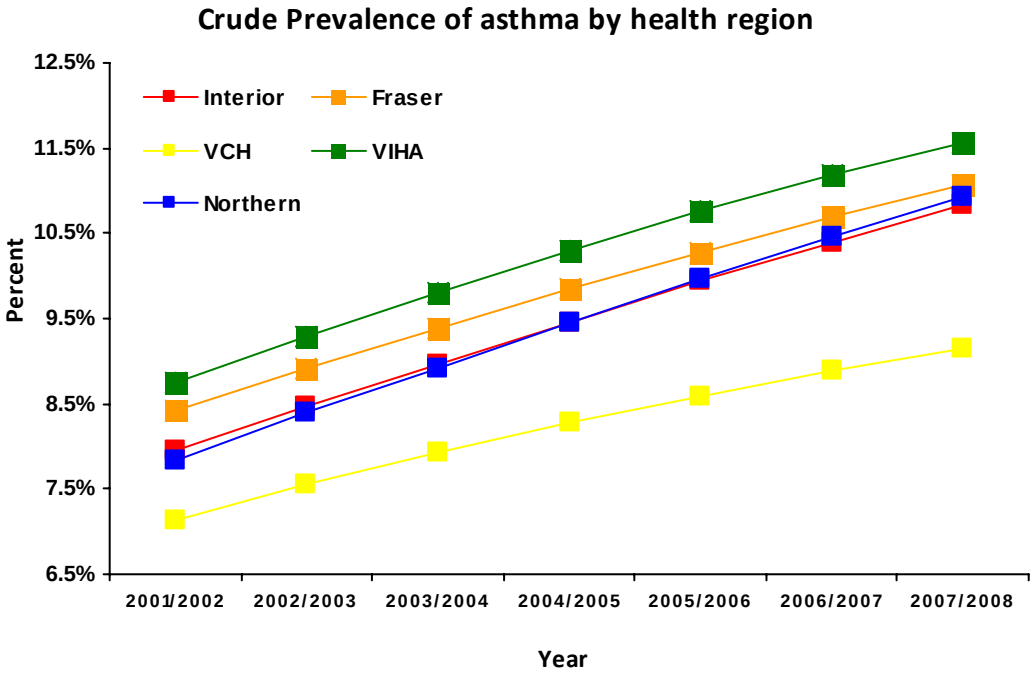


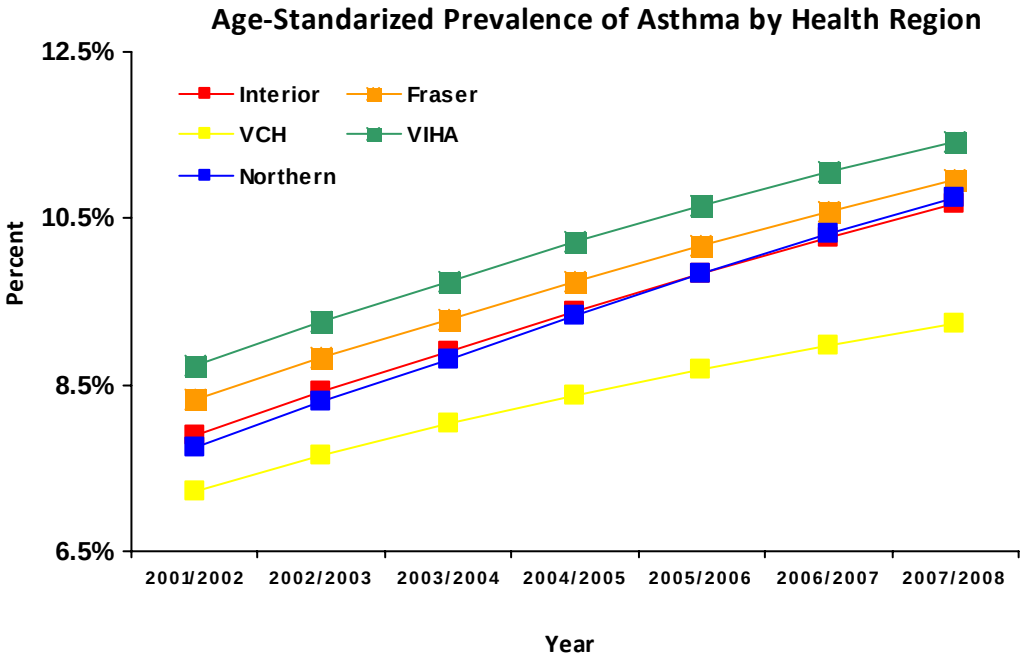
Figure 15 shows that prevalence of asthma for the BC population aged 5 through 54 were consistently increasing over time. Population aging did not affect asthma prevalence rate.

Regional Trend

We further examined the prevalence of asthma in the five health regions of BC and found asthma prevalence increased in all health regions. The prevalence was the highest in both Northern Health Region and Fraser Health Region in 2005/2006 (fiscal year) and lowest in Vancouver Coastal Health Region. Age-standardization had no appreciable effect on the prevalence of asthma or rate of increase in prevalence of asthma.

Figure 16 Prevalence of asthma by health region





5.2.8 COPD – a Respiratory System Disease

To be considered a COPD (Chronic Obstructive Pulmonary Disease) case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9 (491, 492 and 496) or ICD-10 (J41-J44) codes within 365 days.

Recent Data

Proportions of COPD population aged 45 and over were obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 14.

Table 14 Prevalence of COPD (aged 45+) in BC in 2007/2008

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		5.0%	5.3%	4.7%	**1 the worst; 16 the best**
Interior	East Kootenay	5.8%	6.1%	5.4%	6
	Kootenay Boundary	6.2%	6.9%	5.6%	4
	Okanagan	6.9%	7.5%	6.4%	5
	Thompson / Cariboo	6.3%	6.8%	5.9%	3
Fraser	Fraser East	4.9%	5.1%	4.7%	11
	Fraser North	4.6%	4.7%	4.4%	10
	Fraser South	4.4%	4.6%	4.3%	13
Vancouver Coastal	Richmond	3.4%	3.6%	3.3%	16
	Vancouver	4.8%	5.5%	4.1%	12
	North Shore / Coast Garibaldi	3.5%	3.6%	3.4%	15
Vancouver Island	South Vancouver Island	4.2%	4.6%	3.9%	14
	Central Vancouver Island	5.5%	6.1%	5.1%	9
	North Vancouver Island	5.2%	5.3%	5.0%	8
Northern	Northwest	4.7%	5.0%	4.5%	7
	Northern Interior	5.5%	5.8%	5.3%	2
	Northeast	5.5%	5.6%	5.4%	1

According to the case reports for 2007/2008, 5.0% of the BC population aged 45 and over (5.3% of men and 4.7% of women) had COPD. We noticed a consistent gender gap in favour of women in COPD prevalence across the 16 BC HSDAs. Furthermore, crude prevalence rates of COPD were the highest in Okanagan HSDA for the total population (6.9%), men (7.5%) and women (6.4%), and lowest in Richmond HSDA for the total population (3.4%), men (3.6%) and women (3.3%). Controlling for age effect, the age-standardized prevalence rates were the highest in Northeast HSDA and lowest in Richmond HSDA.

Recent Trends

Longitudinal data on COPD in population aged 45 and over discussed in this study were for the years of 2001/2002 through 2007/2008. Age standardized prevalence rates were calculated based on 3-year moving average.

Figure 17 Prevalence of COPD aged 45+

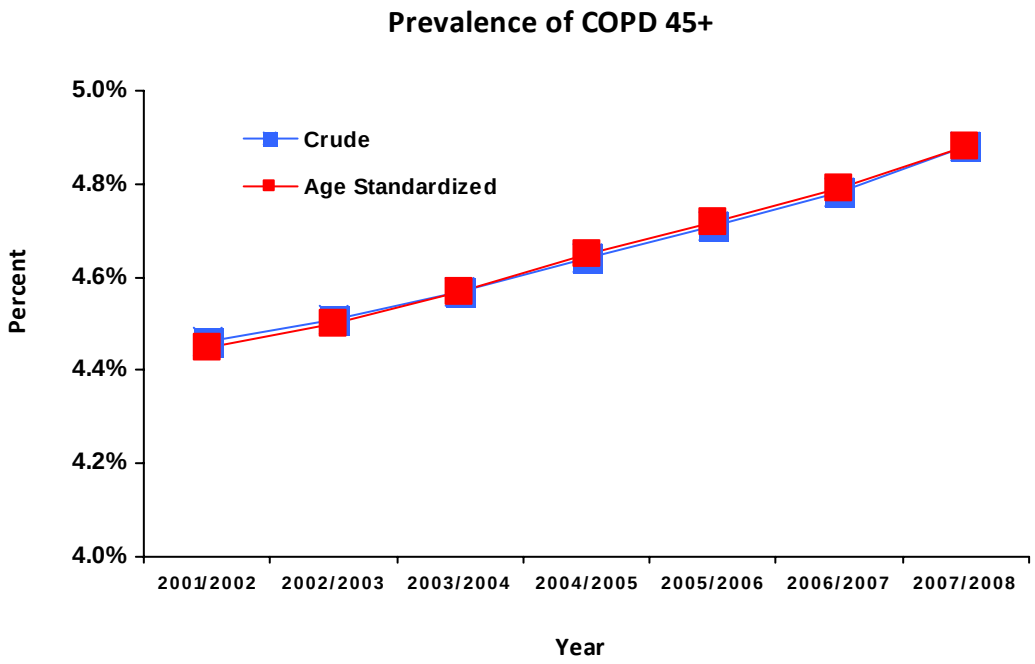
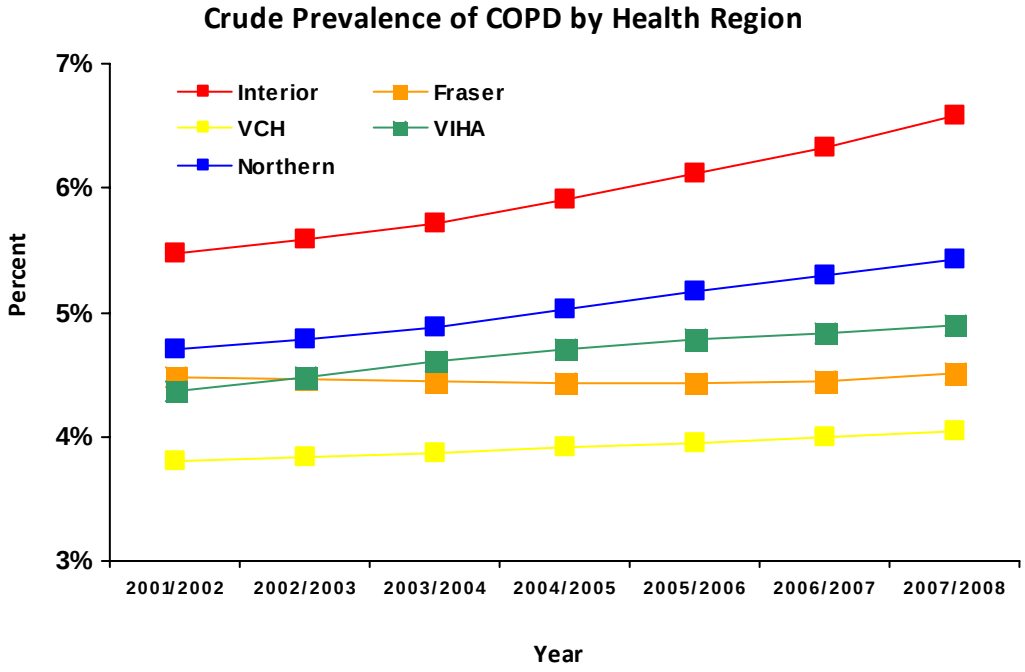


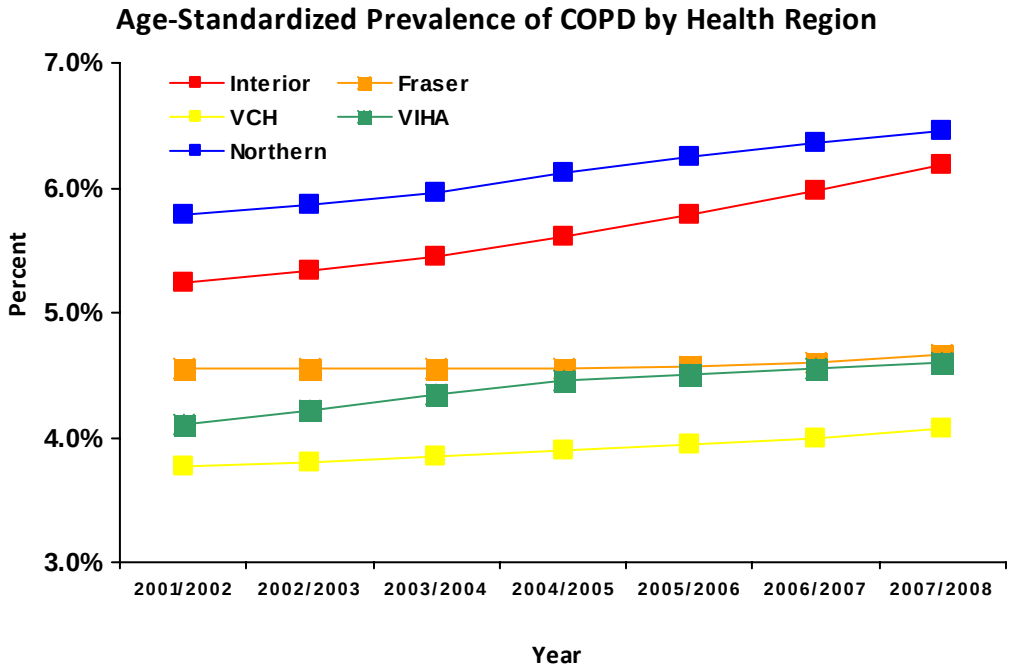
Figure 17 shows that crude prevalence of COPD for the BC population aged 45 and over increased in recent years. However, after removing age effects by age standardization, the prevalence of COPD was actually decreasing in recent years. The observed increases in the crude rates were due to population aging.

Regional Trends

We further examined the prevalence of COPD in the five health regions of BC and found the crude COPD prevalence increased in all health regions except Fraser Health Region. The crude prevalence rate was the highest in Interior Health Region in 2007/2008 fiscal year and lowest in Vancouver Coastal Health Region. Except for Fraser Health Region, age-standardized COPD prevalence rates increased in recent years. Larger increases in COPD prevalence were observed in Northern Health Region and Interior Health Region and slightly in Vancouver Island Health Region and Vancouver Coastal Health Region.

Figure 18 Prevalence of COPD aged 45+ by health region





5.2.9 Depression/Anxiety – a Mental Health Problem

To be considered a depression/anxiety case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9 (291, 311) or ICD-10 (F32-F33)/MSP DX 50B codes within 365 days.

Recent Data

Proportions of the population with depression/anxiety were obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 15.

Table 15 Prevalence of Depression in BC in 2007/2008

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		21.8%	15.6%	27.9%	**1 the worst; 16 the best**
Interior	East Kootenay	17.5%	11.7%	23.4%	15
	Kootenay Boundary	22.6%	16.3%	29.0%	8
	Okanagan	26.1%	18.9%	33.0%	1
	Thompson / Cariboo	24.1%	16.6%	31.7%	5
Fraser	Fraser East	22.8%	16.1%	29.6%	3
	Fraser North	18.7%	13.1%	24.1%	13
	Fraser South	21.5%	15.0%	27.9%	9
Vancouver Coastal	Richmond	16.3%	11.6%	20.8%	16
	Vancouver	19.4%	15.2%	23.5%	14
	North Shore / Coast Garibaldi	20.9%	14.5%	27.0%	12
Vancouver Island	South Vancouver Island	24.5%	17.8%	30.6%	4
	Central Vancouver Island	23.0%	16.2%	29.7%	7
	North Vancouver Island	23.3%	15.9%	30.8%	6
Northern	Northwest	23.2%	15.8%	31.2%	2
	Northern Interior	21.2%	14.5%	28.3%	10
	Northeast	18.8%	12.0%	26.1%	11

According to the case reports for 2007/2008, 21.8% of the BC population (15.6% of men and 27.9% of women) had depression or anxiety. We observed a consistent gender gap in favour of men in the proportions of depression/anxiety across the 16 BC HSDAs. Furthermore, the crude prevalence of depression/anxiety was the highest in South Vancouver Island HSDA for the total population (24.5%) and men (17.8%) and in Okanagan HSDA for women (33.0%), and lowest in Richmond HSDA for men (11.6%), women (20.8%) and total population (15.3%). After age adjustment, prevalence of depression/anxiety was the highest in Okanagan HSDA and lowest in Richmond HSDA.

Recent Data

Longitudinal data on depression/anxiety discussed in this study were for the years of 2001/2002 through 2007/2008. Age-standardized rates were calculated based on 3-year moving average.

Figure 19 Prevalence of depression/anxiety

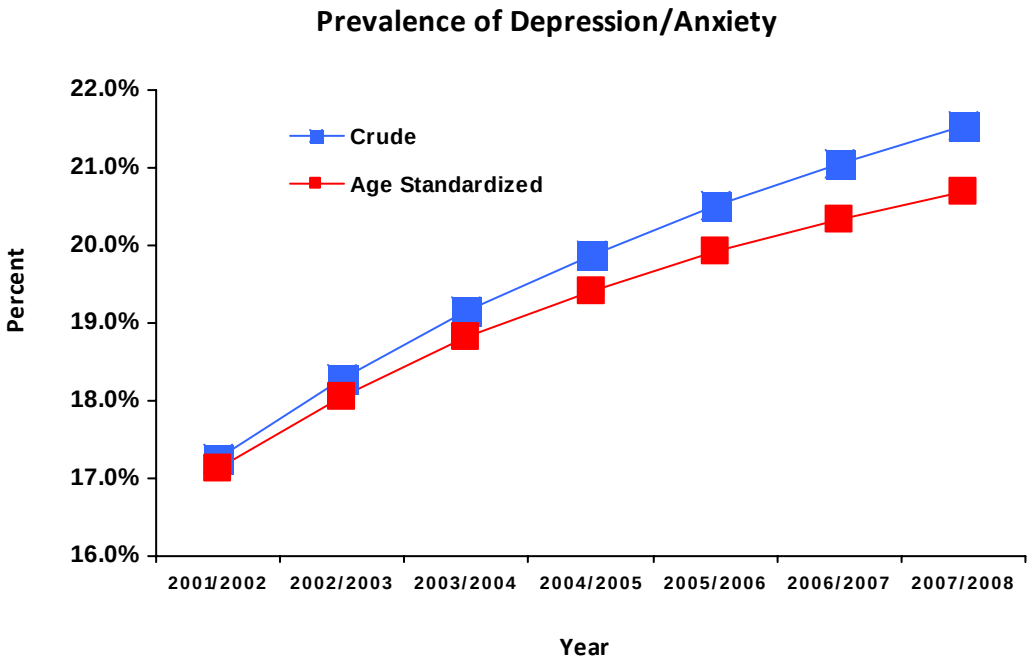
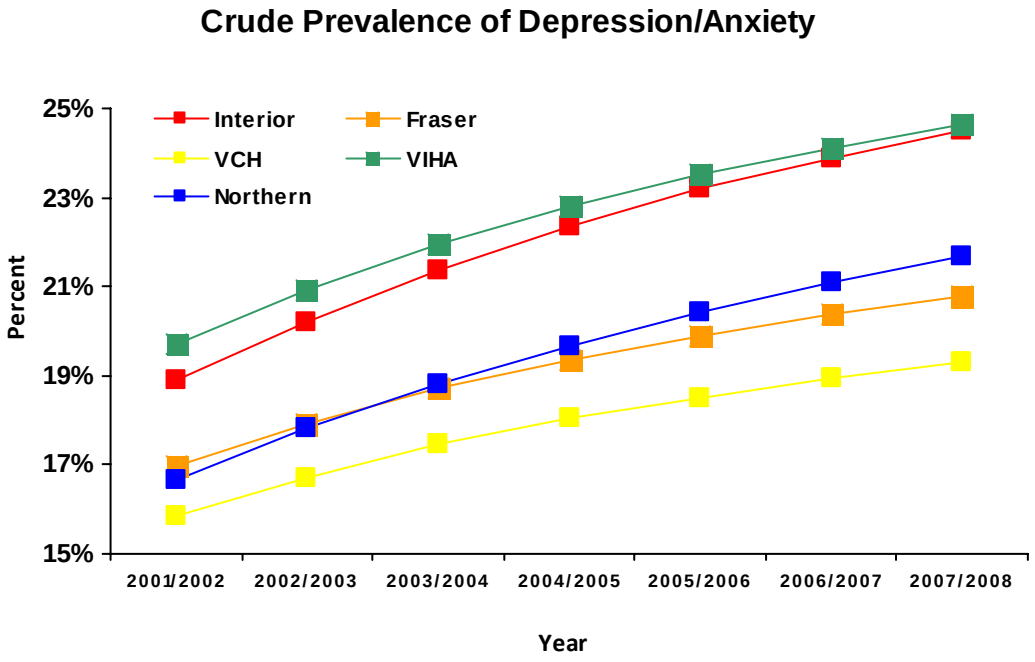


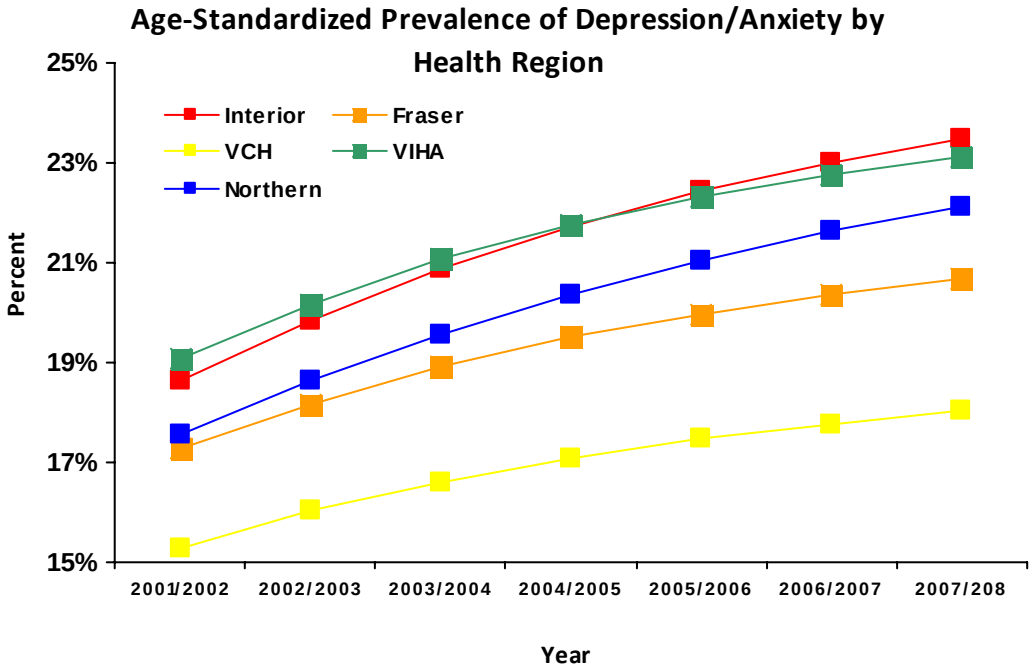
Figure 19 shows that the prevalence of depression/anxiety for the BC population was constantly increasing in recent years. That age-standardized prevalence rates were lower than crude rates indicates the increase in prevalence of depression/anxiety can be contributed in part to population aging.

Regional Trends

We further examined prevalence of depression/anxiety in the five health regions of BC and found that the prevalence of depression/anxiety increased in all health regions. The prevalence rate was the highest in Interior Health Region in 2007/2008 fiscal year and lowest in Vancouver Coastal Health Region.

Figure 20 Prevalence of Depression/Anxiety





5.2.10 Dementia in BC Seniors (aged 65+) – a Mental Health Problem

To be considered a dementia case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9 (290) or ICD-10 (F00-F03) codes within 365 days.

Recent Data

Proportions of the BC population with dementia were obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 16.

Table 16 Prevalence of Dementia in BC in 2007/2008

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		7.2%	5.9%	8.3%	**1 the worst; 16 the best**
Interior	East Kootenay	5.8%	4.4%	7.1%	12
	Kootenay Boundary	6.8%	5.2%	8.3%	6
	Okanagan	6.7%	5.6%	7.6%	11
	Thompson / Cariboo	6.3%	5.1%	7.5%	5
Fraser	Fraser East	5.3%	4.6%	5.9%	15
	Fraser North	6.0%	4.9%	6.9%	13
	Fraser South	7.0%	5.8%	8.0%	12
Vancouver Coastal	Richmond	4.8%	3.7%	5.8%	16
	Vancouver	9.7%	7.8%	11.2%	1
	North Shore / Coast Garibaldi	7.4%	6.0%	8.5%	7
Vancouver Island	South Vancouver Island	8.7%	7.3%	9.7%	3
	Central Vancouver Island	6.3%	5.4%	7.2%	10
	North Vancouver Island	8.0%	6.2%	9.7%	2
Northern	Northwest	5.3%	5.1%	5.4%	14
	Northern Interior	6.2%	5.1%	7.4%	4
	Northeast	5.8%	4.7%	6.9%	8

According to the case reports for 2007/2008, 7.2% of BC seniors (5.9% of men and 8.3% of women) had dementia. We also noticed a consistent gender gap with women being consistently higher in the proportions of dementia across the 16 BC HSDAs. Furthermore, the crude prevalence of dementia was the highest in Vancouver HSDA for the total population (9.7%), men (7.8%) and women (11.2%), and lowest in Richmond HSDA for the total population (4.8%) and men (3.7%) and in Northwest HSDA for women (5.4%). Age-standardized prevalence was also highest in Vancouver HSDA and lowest in Richmond HSDA.

Recent Data

Longitudinal data on dementia in seniors discussed in this study were for the years of 2001/2002 through 2007/2008 for crude rates. Age-standardized rates were calculated based on 3-year moving average.

Figure 21 Prevalence of dementia

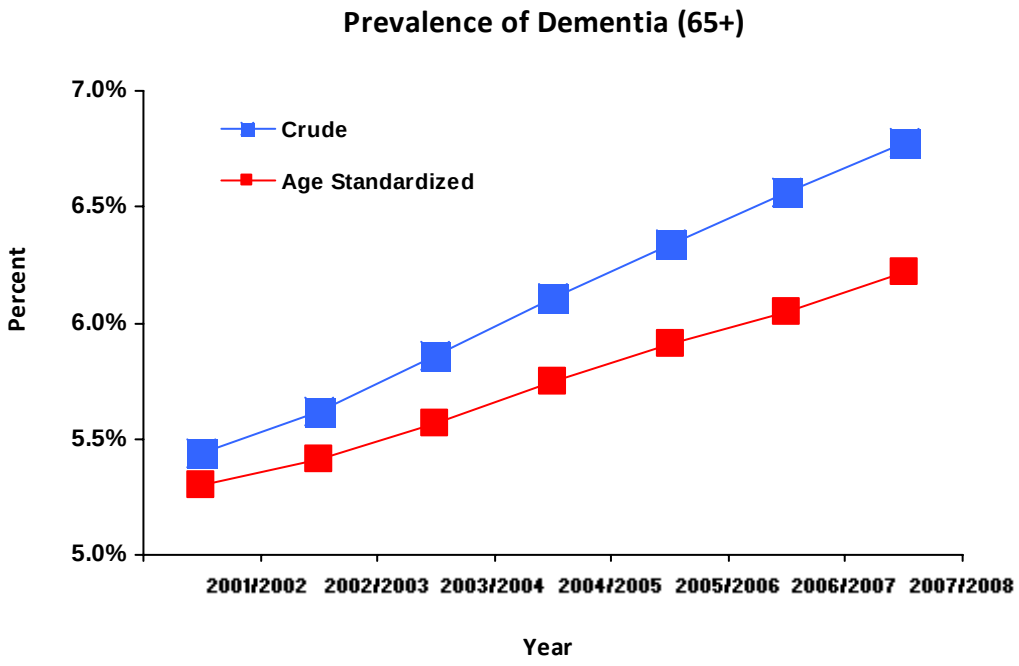
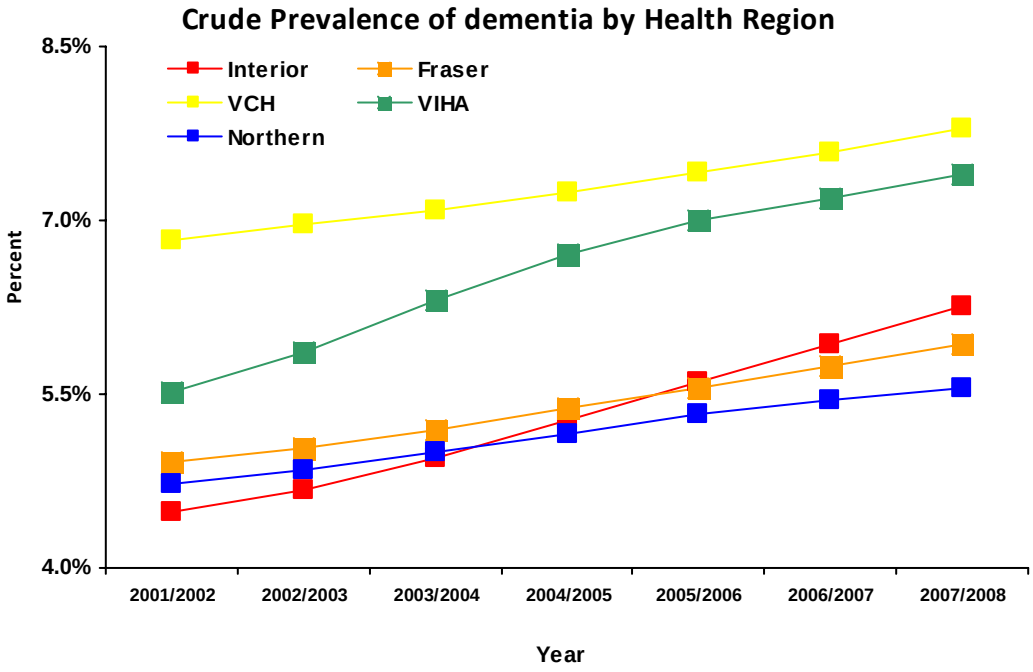


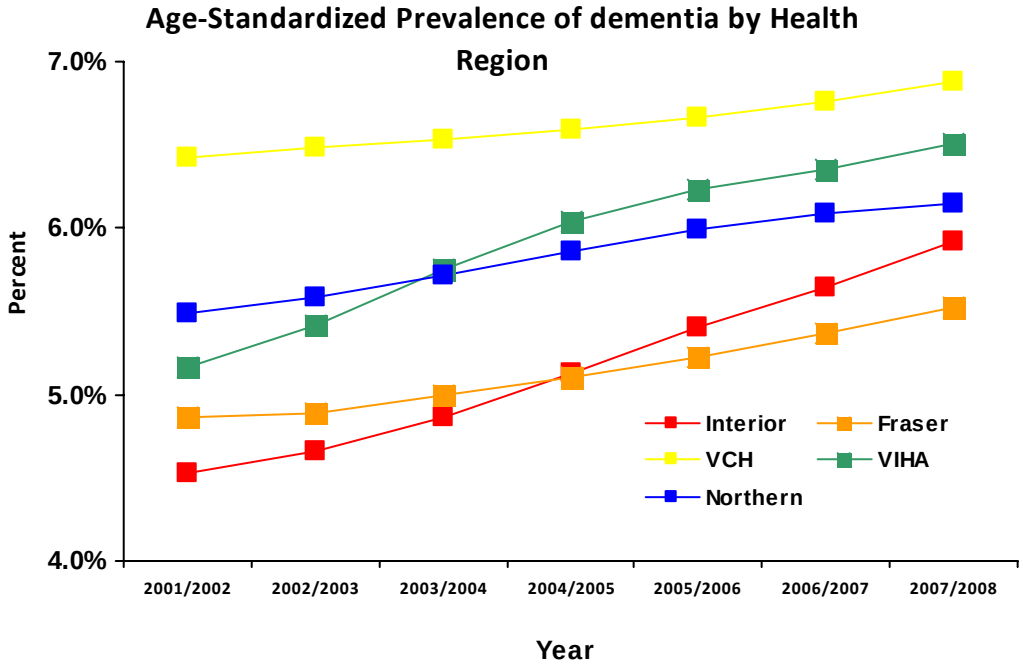
Figure 21 shows that the prevalence of dementia in BC seniors was steadily increasing in recent years. That age-standardized prevalence rates were lower than crude rates indicates the increasing prevalence can be attributed in part to population aging.

Regional Trends

We further examined prevalence of dementia in the five health regions of BC and found that the prevalence of dementia increased in all health regions. The crude prevalence rate was the highest in Vancouver Coastal Health Region in 2007/2008 fiscal year and lowest in Northern Health Region. Furthermore, the prevalence of dementia increased the fastest in both Vancouver Island Health Region and Interior Health Region for both crude and age-standardized measures.

Figure 22 Prevalence of dementia by health region





5.2.11 Osteoarthritis – a Musculoskeletal Disease

To be considered an osteoarthritis case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9 (715) or ICD-10 (M15-M19) codes within 365 days. Once the case definition is met, a case date is assigned.

Recent Data

The proportion of the population with osteoarthritis were obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 17.

Table 17 Prevalence of osteoarthritis in BC in 2007/2008

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		7.6%	6.3%	8.9%	**1 the worst; 16 the best**
Interior	East Kootenay	7.9%	7.0%	8.8%	5
	Kootenay Boundary	8.1%	7.0%	9.2%	8
	Okanagan	10.7%	9.2%	12.2%	2
	Thompson / Cariboo	9.4%	8.2%	10.5%	1
Fraser	Fraser East	7.6%	6.3%	8.9%	10
	Fraser North	6.1%	4.8%	7.3%	13
	Fraser South	7.7%	6.2%	9.2%	11
Vancouver Coastal	Richmond	4.6%	3.5%	5.7%	16
	Vancouver	5.9%	4.6%	7.3%	15
	North Shore / Coast Garibaldi	6.9%	5.8%	7.9%	6
Vancouver Island	South Vancouver Island	8.4%	6.8%	9.9%	14
	Central Vancouver Island	9.9%	8.7%	11.1%	12
	North Vancouver Island	8.6%	7.4%	9.9%	9
Northern	Northwest	8.9%	7.7%	10.1%	7
	Northern Interior	7.2%	6.1%	8.4%	3
	Northeast	4.3%	3.7%	4.9%	4

According to the case reports for 2007/2008, 7.6% of the BC population (6.3% of men and 8.9% of women) had osteoarthritis. We observed a consistent gender gap in favour of men in the proportions of osteoarthritis across all 16 BC HSDAs. Furthermore, the crude prevalence of osteoarthritis was highest in Okanagan HSDA for the total population (10.7%), men (9.2%) and women (12.2%), and lowest in Northeast HSDA for the total population (4.3%) and women (4.9%), and in Richmond HSDA for men (3.5%). After adjustment for age, the prevalence of osteoarthritis was the highest in Thomson/Cariboo HSDA and lowest in Richmond HSDA.

Recent Data

Longitudinal data on osteoarthritis discussed in this study were for the years of 2001/2002 through 2007/2008 for crude rates. Age-standardized rates were calculated based on 3-year moving average.

Figure 23 Prevalence of osteoarthritis

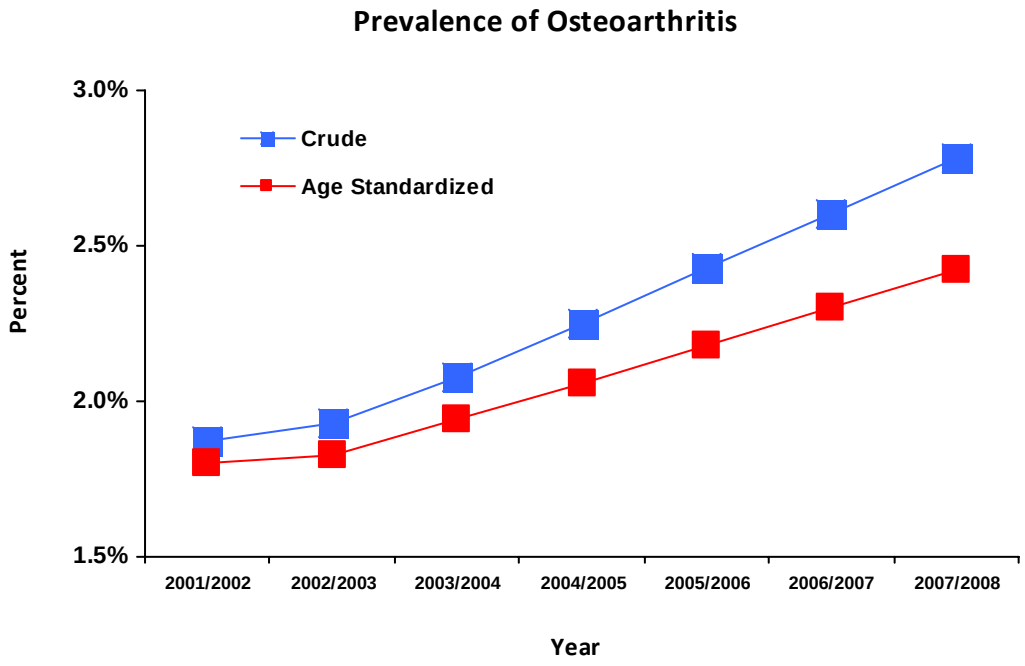
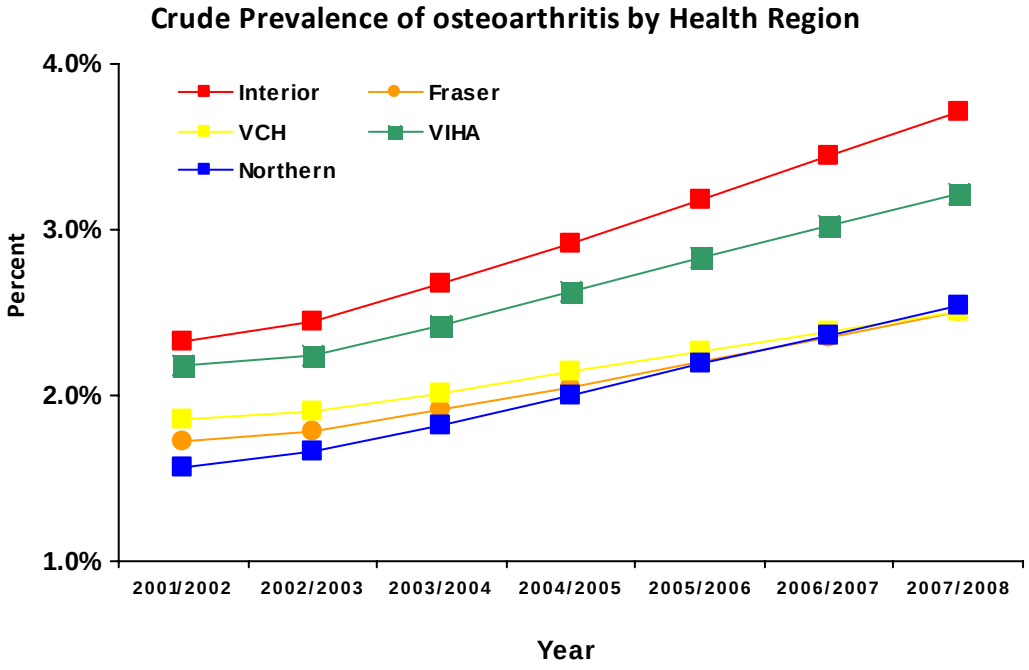


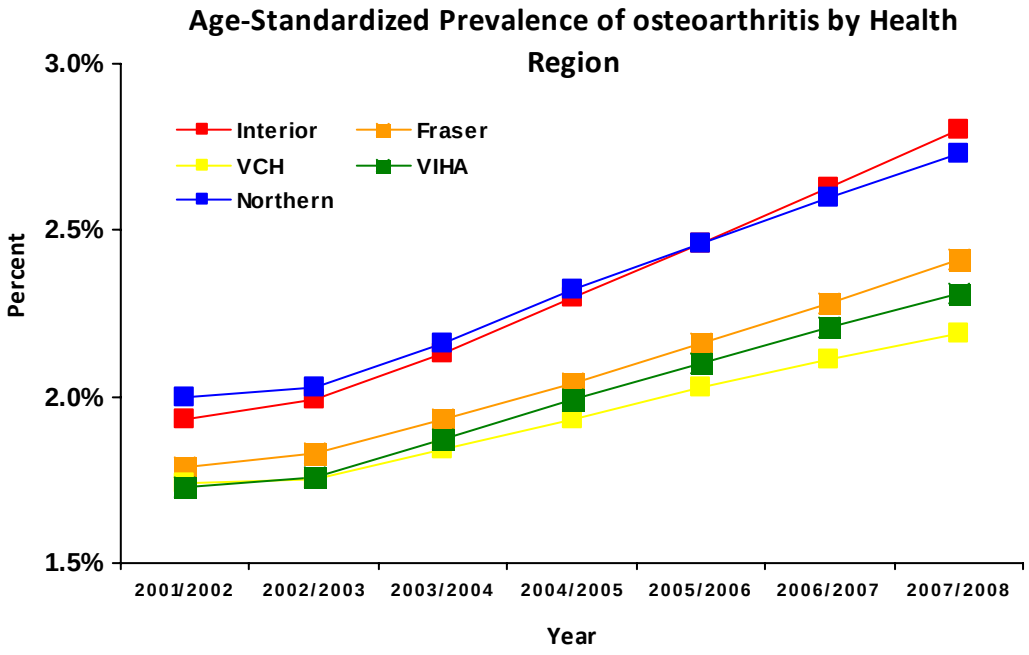
Figure 23 shows that the prevalence of osteoarthritis for BC was increasing in recent years. That age-standardized prevalence rates were lower than crude rates indicates that population aging can explain some of the increase in osteoarthritis.

Regional Trends

We further examined the prevalence of osteoarthritis in the five health regions of BC and found osteoarthritis prevalence increased in all health regions. The crude prevalence rate was the highest in Interior Health Region in 2007/2008 fiscal year and lowest in Vancouver Coastal Health Region and Northern Health Region. Furthermore, based on temporal trends, osteoarthritis prevalence increased the fastest in both Interior Health Region and Northern Health Region. Controlling for age, the prevalence of osteoarthritis for Northern Health Region was actually close to Interior Health Region, the highest in BC.

Figure 24 Prevalence of osteoarthritis by health region





5.2.12 Rheumatoid Arthritis – a Musculoskeletal Disease

To be considered a rheumatoid arthritis case, an individual must have one hospitalization or two medical claims coded with the specified ICD-9 (714) codes or ICD-10 (M05, M06) codes within 365 days.

Recent Data

The proportion of the population with rheumatoid arthritis were obtained from the BC Ministry of Health Services as reported in the QA PHC knowledge base version 2.0 and listed in Table 18.

Table 18 Prevalence of rheumatoid arthritis in BC in 2007/2008

		Crude			Age-Standardized
Health Region	**Health Service Delivery Area**	**Total**	**Men**	**Women**	Overall Ranking
BC		1.0%	0.6%	1.4%	**1 the worst; 16 the best**
Interior	East Kootenay	0.8%	0.5%	1.1%	14
	Kootenay Boundary	1.1%	0.8%	1.5%	10
	Okanagan	1.6%	1.0%	2.1%	2
	Thompson / Cariboo	1.2%	0.8%	1.7%	3
Fraser	Fraser East	1.0%	0.6%	1.4%	8
	Fraser North	0.8%	0.4%	1.1%	12
	Fraser South	1.0%	0.6%	1.4%	6
Vancouver Coastal	Richmond	0.7%	0.4%	0.9%	16
	Vancouver	0.7%	0.4%	1.0%	15
	North Shore / Coast Garibaldi	0.9%	0.6%	1.2%	13
Vancouver Island	South Vancouver Island	1.0%	0.6%	1.4%	11
	Central Vancouver Island	1.2%	0.8%	1.6%	7
	North Vancouver Island	1.2%	0.8%	1.7%	4
Northern	Northwest	1.2%	0.6%	1.9%	1
	Northern Interior	1.0%	0.6%	1.4%	5
	Northeast	0.7%	0.5%	1.0%	9

According to the case reports for 2007/2008, 1.0% of the BC total population (0.6% of men and 1.4% of women) had rheumatoid arthritis. We also noticed a consistent gender gap in favour of men in the proportions of rheumatoid arthritis across the 16 BC HSDAs. Furthermore, crude prevalence of rheumatoid arthritis was highest in Okanagan HSDA for the total population (1.6%), men (1.0%) and women (2.1%), and lowest in Richmond HSDA for the total population (0.7%), men (0.4%), and women (0.9%). Meanwhile, age standardized prevalence rates were the highest in Northwest HSDA and lowest in Richmond HSDA.

Recent Trends

Longitudinal data on rheumatoid arthritis discussed in this study were for the years of 2000/2001 through 2007/2008. Age-standardized rates were calculated based on 3-year moving average.

Figure 25 Prevalence of rheumatoid arthritis

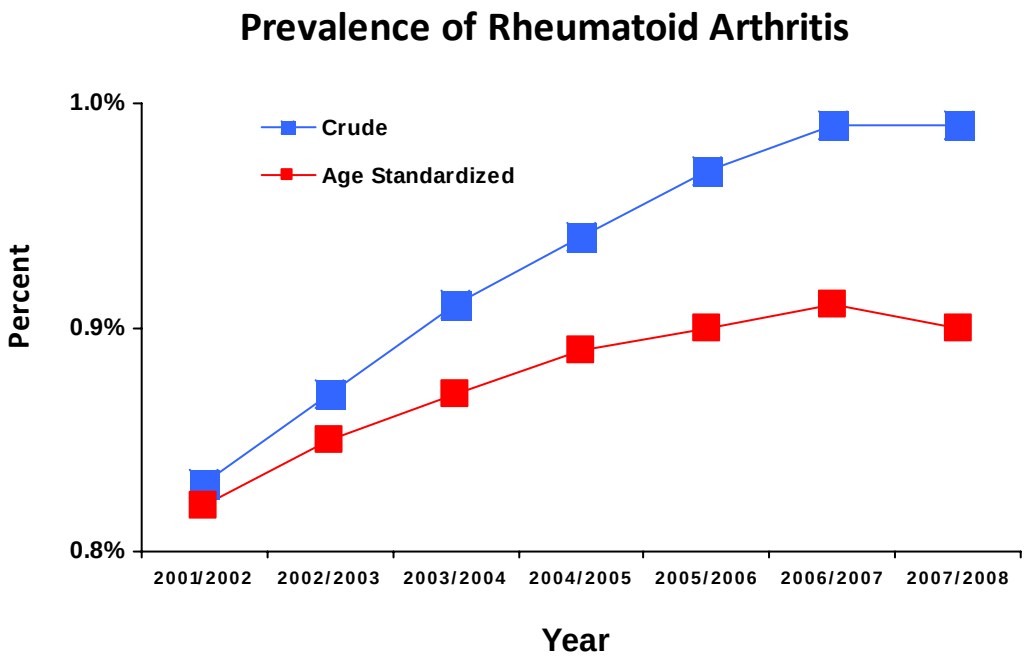
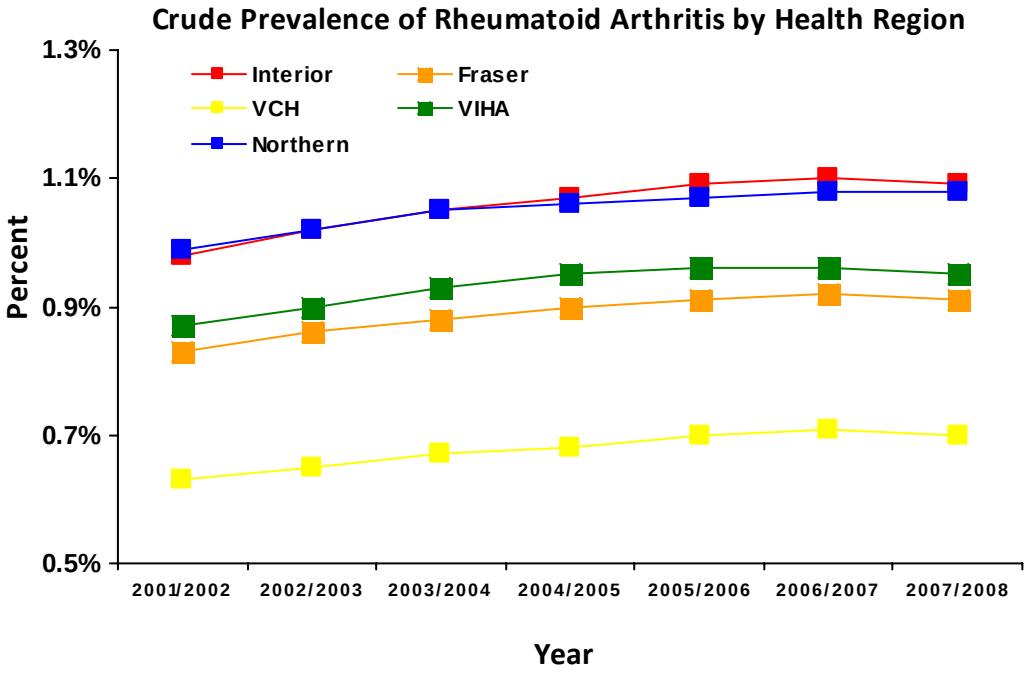


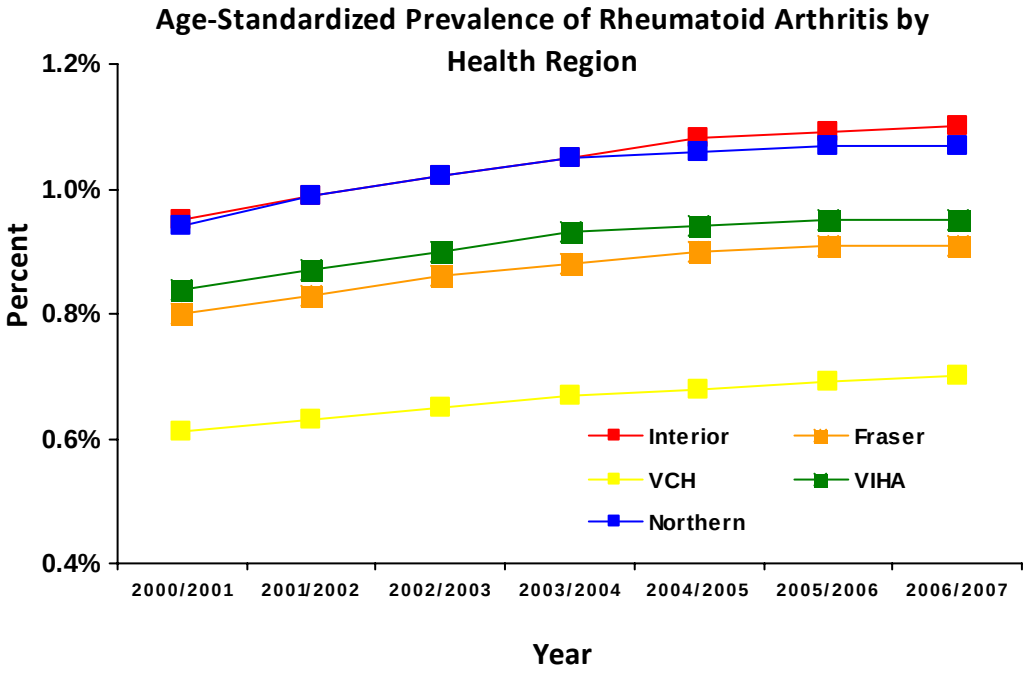
Figure 25 shows that the prevalence of rheumatoid arthritis for BC increased from the beginning of the century but stopped increasing in recent years. That age-standardized prevalence rates were lower than crude rates indicates that a partial explanation of the increase is population aging.

Regional Trends

We further examined the prevalence of rheumatoid arthritis in the five health regions of BC and found rheumatoid arthritis prevalence slightly increased in all health regions and recently has levelled off and started to decrease slightly. The prevalence rate was the highest in Interior Health Region in 2007/2008 fiscal year and lowest in Vancouver Coastal Health Region. The patterns of progressions for both crude and age-standardized prevalence rates were similar, which indicates population aging may not be a determining factor of rheumatoid arthritis in BC.

Figure 26 Prevalence of rheumatoid arthritis





5.2.13 High Risk Health Regions and HSDAs

Crude prevalence rates are good measures of the real health conditions and true healthcare resource burden of a region and can be used for health resource planning and management. Chronic disease prevalence is influenced by the age distribution of a population, i.e., younger populations tend to have lower prevalence rates of chronic disease. If we want to remove the age effect on health outcomes of BC regions and areas, age-standardized prevalence rates need to be calculated. In this section we calculate age-standardized prevalence rates using the 2001 Canadian census population as the reference population.

Table 19 Age-standardized prevalence rates in BC in 2006/2007 (3-Year Moving Average)

	Diabetes	Hypertension	CVD	Cancer	Depression/ Anxiety	Rheumatoid Arthritis
BC	5.80%	15.35%	4.20%	1.07%	20.70%	0.90%
Interior	5.11%	14.80%	4.59%	1.10%	23.47%	1.09%
East Kootenay	4.97%	14.24%	4.43%	0.99%	17.32%	0.73%
Kootenay Boundary	4.62%	14.51%	4.80%	1.12%	22.04%	0.94%
Okanagan	4.99%	14.68%	4.60%	1.13%	25.07%	1.20%
Thompson / Cariboo	5.55%	15.24%	4.54%	1.09%	23.67%	1.08%
Fraser	6.78%	16.34%	4.52%	1.01%	20.70%	0.91%
Fraser East	6.84%	16.13%	4.82%	1.04%	24.00%	0.96%
Fraser North	6.45%	15.80%	4.24%	0.98%	18.22%	0.81%
Fraser South	7.05%	16.90%	4.62%	1.01%	21.68%	0.99%
Vancouver Coastal	5.58%	14.53%	3.48%	0.99%	18.02%	0.70%
Richmond	6.20%	15.58%	3.20%	0.96%	14.82%	0.61%
Vancouver	5.96%	14.71%	3.40%	0.93%	18.19%	0.70%
North Shore / Coast Garibaldi	4.42%	13.47%	3.83%	1.11%	20.16%	0.77%
Vancouver Island	5.09%	15.23%	4.07%	1.16%	23.14%	0.95%
South Vancouver Island	4.88%	15.22%	3.71%	1.14%	23.68%	0.88%
Central Vancouver Island	5.28%	15.11%	4.35%	1.14%	22.47%	0.99%
North Vancouver Island	5.30%	15.40%	4.56%	1.30%	23.24%	1.07%
Northern	6.42%	16.73%	4.88%	1.02%	22.10%	1.08%
Northwest	6.52%	16.82%	5.14%	0.99%	24.24%	1.27%
Northern Interior	6.51%	16.99%	4.84%	1.04%	21.61%	1.03%
Northeast	6.07%	15.97%	4.63%	1.02%	20.80%	0.95%

■ Observed worse than BC average; ■ observed better than BC average; ☐ observed same as BC average

As shown in Table 19, Vancouver Coastal Health Region had the lowest age-standardized prevalence, compared to the provincial average, for all selected chronic conditions, followed by Vancouver Island Health Region and then Interior Health Region. Fraser Health Region and Northern Health Region both had a higher prevalence of chronic conditions compared to the provincial averages. Among the HSDAs with the lowest rates of chronic disease, the top three HSDAs were Richmond HSDA, Vancouver HSDA and North Shore/Coast Garibaldi HSDA. The three worst performing HSDAs were Northwest, Northern Interior, Fraser East and Fraser South, which cover most of Northern Health and Fraser Health Regions.

5.2.14 BC's Performance in Disease Condition among the 10 Canadian Provinces

In order to adjust for demographic factors, multivariate logistic regression models were used to examine the relationship between each disease condition and province of residence relative to BC. Analyses were adjusted for demographic factors (age, sex and immigration status) and one socioeconomic factor (education level). Respondents aged 45 and over from CCHS 2005 data were used in this analysis. The bootstrap technique was used to test the statistical significance of odds ratios (*OR*s) and to estimate 95% confidence intervals. All behavioural factors (tobacco use, alcohol drinking habits, fruit/vegetable consumption and physical activity participation) were purposely excluded from the model because they are modifiable factors to health.

An odds ratio of 1.26 for Quebec on diabetes risk indicates that the residents of Quebec were 26% more likely to have diabetes than BC residents. In other words, Quebec residents were 1.26 times as likely to have diabetes as their BC counterparts.

Table 20 Odds ratios of chronic conditions for individual Canadian provinces relative to BC

	Hypertension	Diabetes	Heart Disease	Cancer	Mood Disorder	Arthritis or rheumatism
Newfoundland & Labrador	1.68(1.43-1.97)	1.72(1.40-2.10)	1.33(1.07-1.67)	0.73(0.59-0.90)	0.67(0.50-0.91)	1.43(1.23-1.65)
Prince Edward Island	1.34(1.12-1.61)	1.48(1.13-1.95)	1.78(1.40-2.25)	0.92(0.67-1.27)	0.61(0.40-0.94)	1.51(1.24-1.85)
Nova Scotia	1.48(1.30-1.69)	1.59(1.33-1.91)	1.84(1.55-2.19)	1.22(1.02-1.45)	1.01(0.78-1.29)	1.42(1.24-1.62)
New Brunswick	1.65(1.44-1.88)	1.47(1.21-1.79)	1.70(1.40-2.07)	0.94(0.76-1.16)	0.77(0.60-0.99)	1.20(1.06-1.37)
Quebec	1.26(1.15-1.39)	1.26(1.10-1.45)	1.24(1.10-1.40)	0.79(0.69-0.90)	0.60(0.50-0.72)	0.80(0.72-0.88)
Ontario	1.31(1.19-1.43)	1.23(1.08-1.40)	1.32(1.16-1.49)	1.03(0.92-1.14)	0.97(0.85-1.11)	1.26(1.15-1.38)
Manitoba	1.14(1.00-1.31)	0.97(0.80-1.17)	0.87(0.71-1.07)	0.84(0.70-1.01)	0.80(0.61-1.05)	1.16(1.02-1.31)
Saskatchewan	1.24(1.10-1.39)	1.17(0.97-1.41)	0.96(0.80-1.17)	0.96(0.81-1.12)	0.63(0.50-0.78)	1.22(1.07-1.39)
Alberta	1.16(1.02-1.30)	1.08(0.90-1.31)	1.07(0.90-1.27)	0.87(0.73-1.02)	0.97(0.77-1.20)	1.08(0.96-1.22)
British Columbia	Baseline					

■ Statistically significantly worse than BC; ■ significantly better than BC; ☐statistically not significant

Table 20 clearly shows, statistically speaking, that BC residents were less likely to have hypertension, diabetes, heart disease and arthritis or rheumatism than most if not all provinces of Canada. However, four provinces indicate significantly better rates than BC for mood disorder, while Quebec and Newfoundland and Labrador were better than BC for cancer, and Quebec was better than BC for arthritis or rheumatism.

5.3 WELL-BEING

Well-being represents a good or satisfactory condition of existence; a state characterized by health, happiness, and prosperity. Self-perceived well-being assessed in the CCHS covers a wide range of measures on self-perceived quality of life.

5.3.1 Self-Perceived Health

Self-perceived health is an indicator of overall health status. It can reflect aspects of health not captured in other measures, such as: incipient disease, disease severity, aspects of positive health status, physiological and psychological reserves and social and mental function. Self-perceived health refers to self perception of a person's health in general, either by the person himself or herself, or, in the case of proxy response, by the proxy completing the survey on behalf of the survey-identified person. Furthermore, health means not only the absence of disease or injury but also physical, mental and social well being.

Recent Data

Data on reported self-perceived health, rated as either very good or excellent, were obtained from two-years of combined CCHS data, 2007 and 2008, and the results are listed in Table 21.

Respondents were asked how they perceived their overall health status. In BC, 57.8% of the population (59.1% of men and 56.5% of women) reported their overall health to be very good or excellent, which was ranked 7th among the 10 provinces and was significantly lower than those for Alberta, Newfoundland & Labrador and Ontario. This gap was mainly due to the significantly lower rates reported by BC women.

As shown in Table 21, compared to BC Women, BC men were more likely to report their overall health to be very good or excellent although the difference was not statistically significant and was not true for all 16 HSDAs. Furthermore, the prevalence of reported excellent or very good self-perceived health was the highest in North Vancouver Island HSDA for the total population (63.3%) and men (63.4%), and South Vancouver Island HSDA for women (65.8%); and the lowest in Northwest HSDA for the total population (50.8%) and men (46.5%) and in Northeast HSDA for women (48.4%).

Table 21 Prevalence of self-perceived health as excellent or very good in BC in 2007/2008

	Total	Men	Women
BC	57.8%	59.1%	56.5%
East Kootenay	54.6%	53.3%	55.9%
Kootenay Boundary	57.7%	55.3%	60.0%
Okanagan	58.3%	62.7%	54.1%
Thompson / Cariboo	54.1%	54.0%	54.3%
Fraser East	54.8%	57.3%	52.4%
Fraser North	58.6%	61.9%	55.3%
Fraser South	58.6%	62.7%	54.5%
Richmond	52.3%	53.4%	51.3%
Vancouver	59.4%	59.3%	59.6%
North Shore / Coast Garibaldi	63.0%	64.9%	61.2%
South Vancouver Island	62.8%	62.0%	63.2%
Central Vancouver Island	51.4%	48.0%	54.7%
North Vancouver Island	63.3%	63.4%	63.1%
Northwest	50.8%	46.5%	55.4%
Northern Interior	52.0%	51.2%	52.8%
Northeast	55.1%	58.9%	50.9%
Canada	59.3%	59.7%	58.8%

Recent Trends

Longitudinal data on self-perceived health reported in this study were for the years 2003, 2005, 2007 and 2008 of the CCHS.

Figure 27 Percent to report self-perceived health as excellent or very good

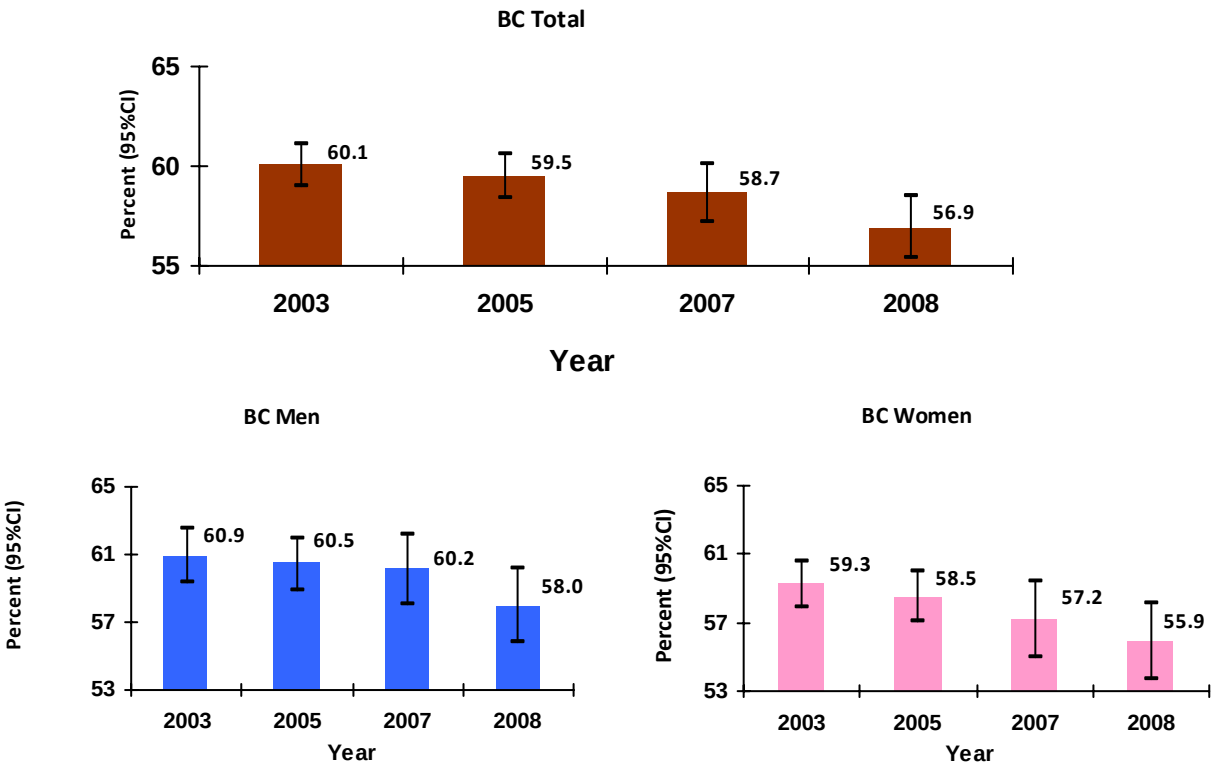


Figure 27 shows that rates for the BC population aged 12 and over who reported to be excellent or very good in self-perceived health continued to decrease in recent years. In other words, fewer British Columbians perceived their health as good as earlier years. Compared to rates in 2003, the percentage of British Columbians reporting excellent or very good self-perceived health significantly dropped in 2008 for the total BC population aged 12 and over.

5.3.2 Self-Perceived Mental Health

In the CCHS respondents were asked how they perceived their overall mental health status (excellent, very good, fair or poor). Self-perceived mental health can be used to provide a general indication of the population suffering from some form of mental disorder, mental or emotional problems, or distress.

Recent Data

The prevalence of reported self-perceived mental health, either excellent or very good, was obtained from the most recent CCHS, two-year combined data from 2007 and 2008 and is listed in Table 22.

In BC, 71.4% of the population aged 12 and over (70.5% of men and 72.3% of women) reported their overall mental health to be excellent or very good, which was the 9th lowest among the 10 provinces and statistically significantly lower than Quebec, Newfoundland & Labrador, Alberta and Ontario, as shown in Table 22. BC men contributed more to these differences than their female counterparts.

Compared to BC men, BC women were more likely to report their overall mental health to be excellent or very good although the difference was not statistically significant and does not hold true for all 16 HSDAs. Furthermore, the proportion of people reporting either excellent or very good self-perceived mental health is the highest in South Vancouver Island HSDA for the total population (74.6%) and women (77.3%), and in Fraser North HSDA for men (74.3%); and the lowest in Northern Interior HSDA for the total population (65.8%), for men (64.5%) and for women (67.1%).

Table 22 Proportion of self-perceived mental health as excellent or very good in BC in 2007/2008

	Total	Men	Women
BC	71.4%	70.5%	72.3%
East Kootenay	71.4%	67.5%	75.1%
Kootenay Boundary	70.5%	66.5%	74.6%
Okanagan	70.9%	68.1%	73.4%
Thompson / Cariboo	70.1%	68.0%	72.1%
Fraser East	69.9%	70.9%	68.9%
Fraser North	74.4%	74.3%	74.5%
Fraser South	71.2%	69.8%	72.5%
Richmond	68.9%	66.9%	70.8%
Vancouver	70.3%	71.7%	68.9%
North Shore / Coast Garibaldi	70.4%	68.4%	72.3%
South Vancouver Island	74.6%	71.6%	77.3%
Central Vancouver Island	72.4%	72.5%	72.3%
North Vancouver Island	73.6%	73.8%	73.3%
Northwest	67.8%	68.1%	67.6%
Northern Interior	65.8%	64.5%	67.1%
Northeast	71.7%	72.1%	71.3%
Canada	74.6%	75.4%	73.8%

Recent Trends

Longitudinal data on self-perceived health reported in this study were for the years 2003, 2005, 2007 and 2008 of the CCHS.

Figure 28 Percent to report self-perceived mental health as excellent or very good

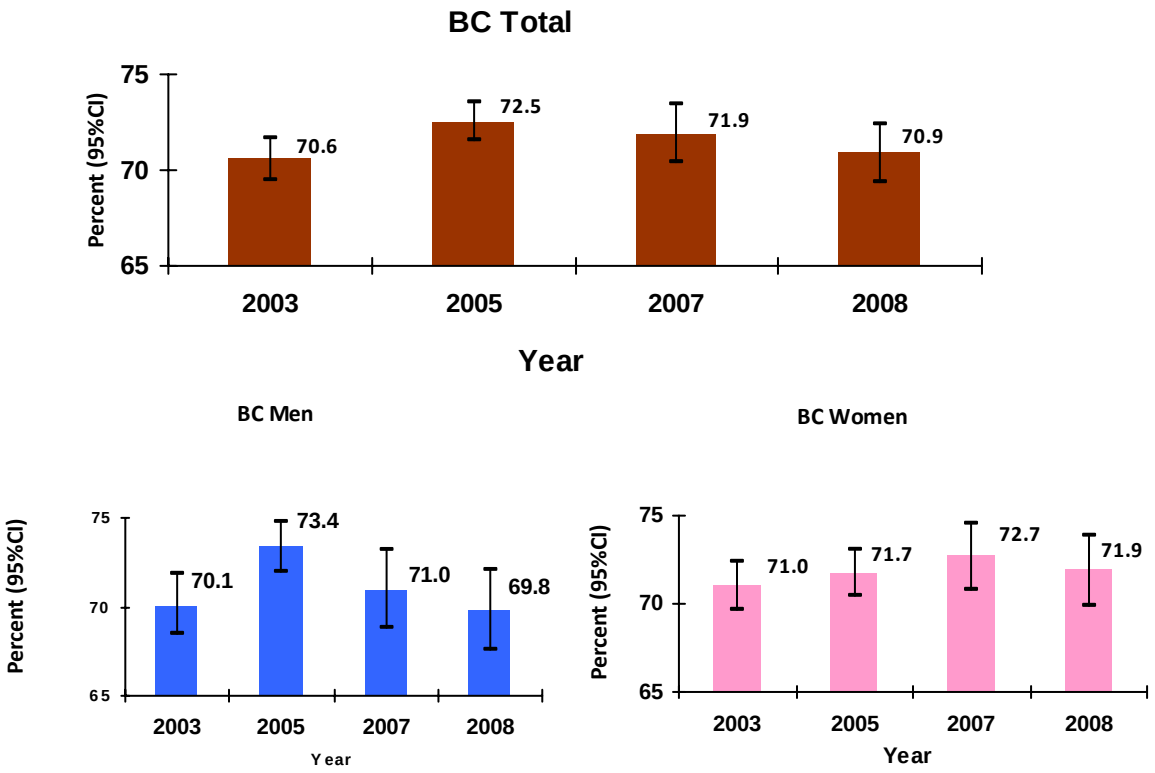


Figure 28 shows that rates for the BC population reporting excellent or very good self-perceived mental health were stable in recent years. Non-significant decreases were observed from 2005 through 2008 in BC men.

5.3.3 Life Stress

CCHS respondents were asked about the amount of stress in their life. The population aged 15 and over who reported perceiving quite a lot life stress were defined as having life stress.

Recent Data

Life stress status was obtained from the most recent CCHS, two-year combined data from 2007 and 2008 and listed in Table 23.

In BC, 21.0% of the population aged 15 and over (20.6% of men and 21.5% of women) reported they had quite a lot life stress, which was 4th highest after Quebec, Ontario and Alberta among the 10 provinces and significantly higher than Newfoundland and Labrador (12.2%) and Prince Edward Island (15.0%).

Proportion of the population reporting life stress were the highest in Fraser South HSDA for the total population (24.0%) and men (26.8%), and in Northeast HSDA for women (24.8%); and the lowest in Kootenay Boundary HSDA for the total population (15.2%) and for men (14.3%) and in Richmond HSDA for women (13.9%).

Table 23 Proportion of population with quite a lot life stress in BC in 2007/2008

	Total	Men	Women
BC	21.0%	20.6%	21.5%
East Kootenay	16.5%	16.5%	16.5%
Kootenay Boundary	15.2%	14.3%	16.1%
Okanagan	19.4%	17.1%	21.6%
Thompson / Cariboo	20.0%	23.0%	16.9%
Fraser East	18.5%	15.7%	21.3%
Fraser North	23.1%	22.3%	23.8%
Fraser South	24.0%	26.8%	21.3%
Richmond	18.3%	23.3%	13.9%
Vancouver	21.6%	20.5%	22.6%
North Shore / Coast Garibaldi	21.9%	22.4%	21.4%
South Vancouver Island	20.4%	17.4%	23.2%
Central Vancouver Island	19.3%	16.9%	21.6%
North Vancouver Island	16.8%	10.8%[E]	22.4%
Northwest	21.4%	19.0%	23.9%
Northern Interior	22.5%	21.8%	23.2%
Northeast	21.6%	18.7%	24.8%
Canada	22.4%	21.3%	23.4%

Recent Trends

Longitudinal data on life stress reported in this study were for the years 2003, 2005, 2007 and 2008 of the CCHS.

Figure 29 Percent to report quite a lot life stress

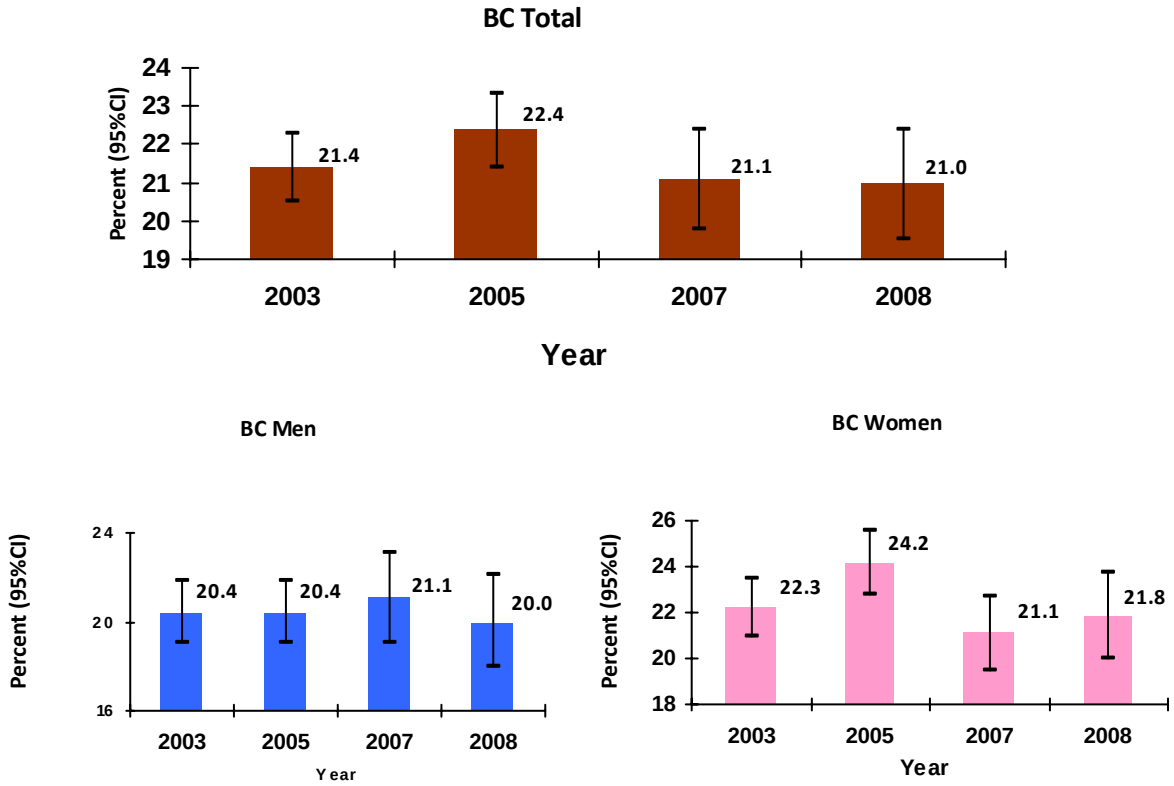


Figure 29 shows that rates for the BC population aged 15 and over who reported quite a lot life stress were stable in recent years. The only significant change was a decrease observed in BC women from 2005 to 2007.

5.3.4 Life Satisfaction

Respondents aged 12 and over were asked how satisfied they were with their lives and were considered satisfied if they responded that they were satisfied or very satisfied.

Recent Data

Life satisfaction data were obtained from the most recent CCHS, two-years of combined data from 2007 and 2008 and is listed in Table 24.

In BC, 91.1% of the population aged 12 and over (91.0% in men and 91.1% in women) reported they were satisfied or very satisfied with their life, which was ranked 2nd worst among the 10 provinces and statistically significantly lower than Prince Edward Island (94.2%), Newfoundland and Labrador (93.6%), New Brunswick (93.4%) and Quebec (92.6%).

As shown in Table 24, the proportion of people reporting satisfaction with their life was the highest in Northeast HSDA for the total population (94.3%) and men (95.5%), and in Richmond HSDA for women (95.0%); and the lowest in Vancouver HSDA for the total population (88.7%) and for women (87.5%), and in Northern Interior HSDA for men (87.8%).

Table 24 Proportion of population with life satisfaction in BC in 2007/2008

	Total	Men	Women
BC	91.1%	91.0%	91.1%
East Kootenay	93.7%	92.7%	94.7%
Kootenay Boundary	91.4%	93.7%	89.0%
Okanagan	90.8%	93.1%	88.5%
Thompson / Cariboo	90.8%	92.1%	89.6%
Fraser East	91.1%	90.4%	91.7%
Fraser North	91.9%	90.9%	92.9%
Fraser South	90.1%	90.1%	90.1%
Richmond	92.3%	89.4%	95.0%
Vancouver	88.7%	89.9%	87.5%
North Shore / Coast Garibaldi	93.0%	92.7%	93.3%
South Vancouver Island	92.6%	92.0%	93.1%
Central Vancouver Island	91.4%	91.3%	91.5%
North Vancouver Island	92.3%	91.5%	92.9%
Northwest	90.6%	89.0%	92.3%
Northern Interior	89.7%	87.8%	91.6%
Northeast	94.3%	95.5%	93.0%
Canada	91.6%	91.8%	91.5%

Recent Trends

Longitudinal data on life satisfaction reported in this study were for the years 2003, 2005, 2007 and 2008 of the CCHS.

Figure 30 Percent of population with life satisfaction

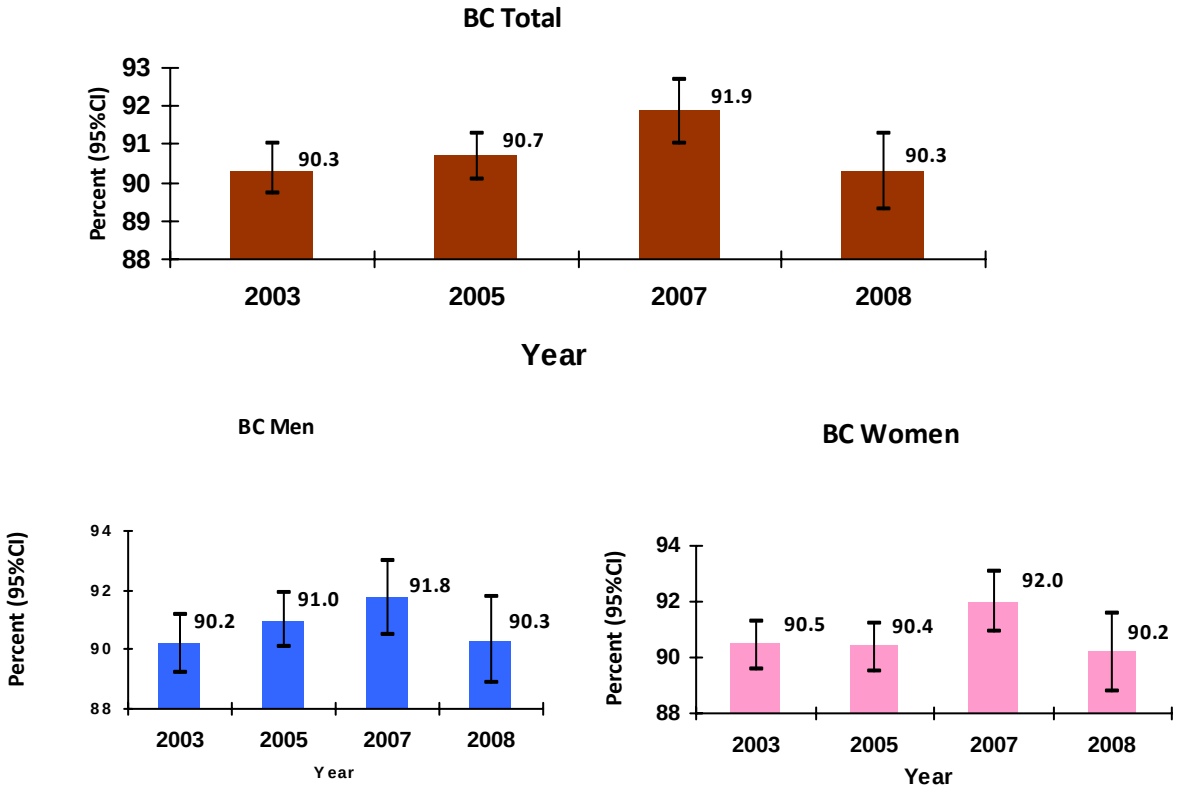


Figure 30 shows that rates for the BC population aged 12 and over with life satisfaction increased in recent years except 2008. There was a drop observed in BC from 2007 to 2008 and deserves further investigation.

6 SUMMARY AND CONCLUSIONS

This report has summarized major health indicators measuring health behaviours, health conditions and well-being for British Columbians. Cross-sectional and longitudinal comparisons within BC and among Canadian provinces helped to identify the weak areas and negative trends for potential policy intervention and healthcare resource planning.

In general, BC residents had the best health behaviours in Canada. Specifically, BC, among the 10 provinces of Canada, had the lowest rates of cigarette smoking, heavy alcohol drinking and unhealthy weight and the highest rate of participating in active or moderately active physical activities. In regards to fruit and vegetable consumption, BC tied with Alberta, was second behind Quebec.

Among the 10 chronic conditions examined in this report, BC women had better (lower) prevalence rates than their male counterparts for only four chronic conditions (diabetes, CVD, cancer and COPD) and had higher rates for hypertension, asthma, depression, dementia, osteoarthritis and rheumatoid arthritis. Prevalence rates for all 10 chronic conditions increased in both men and women in BC in recent years. With age adjustment, we see monotone increases in all age-standardized disease prevalence rates except cancer in BC, which indicates that population aging is not the only driving force increasing disease prevalence. The good news from cancer statistics is that the age-standardized cancer prevalence was actually going down in recent years.

Geographic inequalities in health are obvious in BC. For example, with age adjustment, Northern Health Region had the highest rates not only in prevalence but also in the rate of increase for chronic conditions such as for hypertension, CVD and asthma. On the other hand, Interior Health Region had the highest rates of prevalence and increase for depression/anxiety, dementia, osteoarthritis and rheumatoid arthritis. Fraser Health Region had both highest diabetes rates and greatest rate of increase of diabetes. Additionally, Fraser Health Region prevalence rates of cancer and asthma were not the highest in BC but the rates of increase were the highest in the province. These findings are especially important to healthcare planning and strategic policy for disease prevention.

Although BC residents had the best health behaviours and health conditions in the nation, self-perceptions of physical or mental health do not reflect this. BC residents ranked 7th in perceiving their health as excellent or very good, 9th in perceiving their mental health as excellent or very good, had the 3rd highest ranking in perceiving their life stress as quite a lot, and 9th lowest in being satisfied or very satisfied of their lives.

Our study has some limitations. One limitation is that most health indicators reported here were directly provided to us as point estimates for HAs and HSDAs and no further variability such as confidence intervals or p-values for statistical tests could be calculated. There are also limitations associated with using either administrative data where coding errors exist or population-based surveys data where sampling and recall errors are inevitable. The small sample size in the targeted population group in the CCHS also limits the ability to provide enough power to test for differences between areas.

Further investigation of gender gaps in health conditions and variations and area inequalities of health and temporal changes are crucial and can help guide policy development for improvements in the health of all British Columbians.

7 REFEFERENCES

1. Fang, R, Millar JS, Canada's global position in life expectancy: a longitudinal comparison with the healthiest countries in the world. Canadian Journal of Public Health 2009; 100(1): 9-13.
2. Statistics Canada, the Daily report June 25, 2009 on Canadian Community Health Survey: http://www.statcan.gc.ca/daily-quotidien/090625/dq090625b-eng.htm
3. Fang, R, Life expectancy as a measure of population health: comparing British Columbia with other Olympic and Paralympic Winter Games host jurisdictions, BC Provincial Health Services Authority, Vancouver, BC, Canada. http://www.phsa.ca/NR/rdonlyres/76D687CF-6596-46FE-AA9A-A536D61FB038/23536/PHSAreportlifeexpectancy.pdf
4. Health Inequities in British Columbia, a discussion paper, released from BC Health Officers' Council http://www.phabc.org/files/HOC_Inequities_Report.pdf
5. Beland, Y. Canadian Community Health Survey – Methodological overview, Health Reports (Statistics Canada, Catalogue 82-003) 2002; 13(3): 9-14.
6. Korn EL, Graubard MA. Epidemiological studies utilizing surveys: Accounting for the sampling design. American Journal of Public Health 1991; 81(9): 1166-73.
7. Rao, JNK, Wu, CFJ, Yue, K. Some recent work on resampling methods for complex surveys. Survey Methodology (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.
8. Rust, KF, Rao, JNK, Variance estimation for complex surveys using replication techniques. Statistical Methods in Medical Research 1996; 5: 281-310.
9. Health Canada. Smoking Rates: Canadian Tobacco Use Monitoring Survey (CTUMS). http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/research-recherche/stat/ctums-esutc_2006-eng.php. Accessed in August 2009.
10. Health Canada. Overview of Health Risks of Smoking. http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/res/news-nouvelles/risks-risques-eng.php. Accessed August 2009.
11. Health Canada. Written Pleadings Filed by the Attorney General of Canada with the Quebec Superior Court. http://www.hc-sc.gc.ca/hc-ps/pubs/tobac-tabac/pleadings-argumentation/cac-acc-eng.php. Accessed August 2009.
12. Health Canada. Smoking and Your Body. http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/body-corps/index-eng.php . Accessed August 2009.
13. Estimated tobacco-caused deaths in Canada. Physicians for a Smoke-Free Canada. http://www.smoke-free.ca/factsheets/pdf/smokingdeaths.pdf. 2004
14. Heart and Stroke Foundation of Canada. Smoking, Heart Disease and Stroke. http://www.heartandstroke.com/site/c.ikIQLcMWJtE/b.3484037/. Accessed August 2009.
15. Hanson, D, Benefits of Moderate Drinking Result from Alcohol Itself, Alcohol Problems and Solutions, http://www2.potsdam.edu/hansondj/controversies/1088441583.html . Accessed August 2009.
16. World Health Organization. Global Status Report on Alcohol 2004. http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf
17. World Health Organization. World Health Report, Reducing Risks, Promoting Healthy Lives, 2002.
18. Health Canada. Eating Well with Canada' Food Guide available at https://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/food-guide-aliment/view_eatwell_vue_bienmang-eng.pdf. 2007.

19. Public Health Agency of Canada, Canadian Society for Exercise Physiology. Canada's Physical Activity Guide to Healthy Active Living available at http://www.phac-aspc.gc.ca/pau-uap/fitness/pdf/guideEng.pdf 1998

20. U.S. Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996. Available at http://www.cdc.gov/NCCDPHP/sgr/pdf/sgrfull.pdf.

21. Bagchi, D, Preuss, HG. Obesity: Epidemiology, Pathophysiology, and Prevention. CRC Series in Modern Nutrition Science, CRC Press, Taylor & Francis Group, Boca Raton, FL, USA 2007.

22. International Association for the Study of Obesity (IASO) Press Release, (March 17, 2003).

23. Birmingham, CL, Muller, JL, Palepu, A, Spinelli, JJ and Anis, AH. The cost of obesity in Canada. Canadian Medical Association Journal, 160: 483-8, 1999.

24. Tremblay, MS, Katzmarzyk PT, Willms, JD. Temporal trends in overweight and obesity in Canada, 1981-1996. International Journal of Obesity, 26: 538-43, 2002.

25. Willms, JD, Tremblay, MS, Katzmarzyk, PT. Geographic and demographic variation in the prevalence of overweight Canadian children. Obesity Research. 11: 668-73, 2003.

26. Becque, MD, Katch, VL, Rocchini, AP, Marks, CR, & Moorehead, C. Coronary risk incidence of obese adolescents: Reduction by exercise plus diet intervention. Pediatrics, 81(5): 605-612. 1988.

27. Dietz, WH. Childhood obesity: Susceptibility, cause, and management. Journal of Pediatrics, 103(5): 676-686. 1983.

28. Epstein, LH, Wing, RR, Koeske, R, & Valoski, A. Long-term effects of family-based treatment of childhood obesity. Journal of Consulting and Clinical Psychology, 55(1): 91-95. EJ 352 076. 1987.

29. Gortmaker, SL, Dietz, WH, Sobol, AM, & Wehler, CA. Increasing pediatric obesity in the United States. American Journal of Diseases of Children, 141: 535-540. 1987.