Introduction to the supplement

This is the fourth supplement, to support the *The British Columbia Atlas of Wellness* which was published in 2007. These works have been developed in response to the BC Government’s ActNow BC initiative which was created in 2005, following the release of the province’s strategic plan. The leadership role was assigned to the then Ministry of Health to make it a comprehensive health promotion initiative for the whole of government. The initiative is now the responsibility of the Ministry of Healthy Living and Sport.

The main aspects of ActNow BC have been to help ensure that citizens could make positive lifestyle choices and also be active in order to stay well and in good health. ActNow BC has recently been recognized by the World Health Organization (WHO) as a model for its inter-governmental approach to health promotion (BC Healthy Living Alliance, 2009; Geneau et al., 2009).

The provincial government set itself very ambitious goals for key areas to be achieved by the year 2010, the same year that BC hosted the winter Olympic and Paralympic Games. Improvements in health were organized around five key pillars:

- Reduce tobacco use by 10%.
- Increase the number of people who eat at least five servings of fruits and vegetables daily by 20%.
- Increase the number of people who are physically active by 20%.
- Reduce the number of BC adults who are overweight by 20%.
- Increase the number of women counseled about alcohol use during pregnancy by 50%.

At the time of writing, these still remain the key pillars and goals of ActNow BC.

Each wellness supplement has used data from the Canadian Community Health Surveys (CCHS) and mapped key indicators at either the Health Survey Delivery Area (HSDA) level, or at the provincial/territorial level across Canada. Several of the indicators form the basis of ActNow BC’s goals and include smoke-free living, healthy eating and food security, physical activity and healthy weights. These indicators were also mirrored in the work of the BC Healthy Living Alliance, a group of organizations with a mission to improve the health of British Columbians through leadership that enhances collaborative action for health promotion and chronic disease prevention (BC Healthy Living Alliance, 2007a; b; c).

The first supplement focused on seniors’ wellness and provided maps and supporting tables of indicators for the 16 HSDAs in the province based on the 2005 Canadian Community Health Survey (CCHS 3.1). The focus of the second supplement was to compare 50 indicators among the provinces and territories of Canada, based on the 2007 Canadian Community Health Survey (CCHS 4.1, half sample). The third supplement, used the 2007/2008 combined sample of the Canadian Community Health Survey (CCHS 4.1, full sample) to map data within BC at the HSDA level but also provided comparisons with data for Canada as a whole.

Each supplement has used data in a slightly different manner to try to show variations in wellness and add something new to the presentation of data. This new women’s supplement is no different and uses several additional age cohorts than the other supplements, as well as making comparisons with male respondents for each age cohort nationally, provincially and for each HSDA.

All wellness supplements, including this women’s supplement and *The British Columbia Atlas of Wellness*, can be found at: [http://www.geog.uvic.ca/wellness](http://www.geog.uvic.ca/wellness).

Why wellness mapping?

As noted in *The British Columbia Atlas of Wellness*, most health related mapping initiatives tend to focus on what is “bad” rather than what is “good”, on “deficits” rather than “assets”, on “mortality” rather than “life”, on “illness” rather than on “wellness”. Many also focus on the use of the health care system and distribution of health services and facilities. Health mapping initiatives have rarely accentuated positive features such as wellness (Foster & Keller, 2007), although in the last two years, that has started to change (e.g. see [http://www.communityindicators.net.au/](http://www.communityindicators.net.au/) which provides an interactive mapping capability of well-being indicators for Victoria, Australia).

As with the previous wellness publications this supplement takes a positive approach to measuring factors that affect health and well-being. Rather than measuring factors such as physical inactivity, or smoking, an approach usually taken by public health policy makers, we measure indicators such as healthy physical activity and smoke-free behaviour and environments. These are assets that promote or maintain health and wellness at both the individual and population level. While this is not meant to be critical of mapping problem areas or issues – as such an approach may help to garner public and political attention on those issues – the wellness mapping project is based on the idea that it is also...
beneficial to focus on the positive and learn which regions are doing well and might be studied further to see why they are doing well, what are their key characteristics and what can be learned from them.

Wellness is not an easy thing to define and it can be argued that wellness is subjective and has a value judgment about what it is and what it isn’t (Miller & Foster, 2010). Because of the subjective nature of wellness, using responses from individuals to specific questions on the CCHS captures this subjectivity around wellness. And because the CCHS is a national survey it allows geographical comparisons to be made not only within the province, but also between provinces and with overall Canadian averages (McKee, et al., 2009).

Throughout this supplement there are indicators that reflect some of the key ‘social determinants of health’, which have been widely accepted by the WHO, the Canadian and BC Governments, public policy experts, academics, and community-based organizations (Benoit & Shumka, 2009). These social determinants of health include gender, education, social support, food security, and employment, among others (WHO, 2003; CSDH, 2008). Some even argue that this expanded approach to health and wellness can partly be credited to the emergence of the women’s health movement (Boscoe, et al. 2004).

There are also more subjective indicators included, such as life satisfaction, which is used by the Conference Board of Canada (2010) in its annual A Report Card on Canada and social interactions and support within the community which have been accepted as an important social determinant of health (Benoit & Shumka, 2009).

A focus on women’s wellness

Women’s health and wellness has become recognized as an increasingly important determinant of health and like other countries, Canada has moved steadily towards a deeper appreciation of the role of gender in health. The importance of women’s health has also been acknowledged on the international stage with the recognition that “protecting and promoting the health of women is crucial to health and development – not only for the citizens of today but also for those of future generations” (WHO, 2009).

Here in British Columbia, the importance of women’s health has also gained support in recent years with the creation of the Women’s Healthy Living Secretariat within the Ministry of Healthy Living and Sport in March 2009. The establishment of the Secretariat clearly affirms that gender is an important determinant of health that creates differential social, physical, and emotional conditions (Provincial Health Services Authority, 2010).

Gender can play an important role in the wellness of an individual (Mikkonen & Raphael, 2010). While traditionally women’s health has been looked at through the lens of sex, “studies of gender differences in health suggest the need to develop an understanding of changing gender relationships, women’s and men’s differences in power and access to resources, and changing expectations of appropriate gender roles and behaviours” (Canadian Institute for Health Information, 2003) – thus looking at women’s health and wellness through a gender lens may be a more holistic approach.

Men and women differ not only in their reproductive roles but also through other biological and socio-cultural traits. For example gender differences in the size of their coronary arteries may explain women’s and men’s different experiences of heart diseases, while differences in hormonal make-up may contribute to how women and men experience and respond to stress differently. Gender also affects how women and men use their bodies in work and play as well as how bodies respond to experiences and to the physical environment (Clow et al., 2009). Finally the roles and expectations attached to different genders also affect the chances of completing school, caring for others, having an adequate income, experiencing violence and having a long, healthy life. These ideas are reflected in the definition provided for the framework for discussion on women and health at the Fourth World Conference on Women, held in Beijing in 1995:

“Women’s health involves women’s emotional, social, cultural, spiritual and physical well-being and is determined by the social, political and economic context of women’s lives as well as by biology. This broad definition recognizes the validity of women’s life experiences and women’s own beliefs and experiences of health. Every woman should be provided with the opportunity to achieve, sustain and maintain health as defined by that woman herself to her full potential” (United Nations, 1995).

While British Columbians rank among the healthiest in the world – as measured by life expectancy – women’s life expectancy is not improving as rapidly as men’s life expectancy in the province, nor is it improving as quickly as women’s life expectancy in other countries (Provincial Health Services Authority, 2007). Social differences are important in shaping male and female patterns of health and wellness. This was demonstrated in the Health Officers Council of BC (2008) report entitled Health Inequities in British Columbia which found women to have “poorer health status than men for many health indicators including: heart disease, self-perceived health and overnight hospital stays, as well as being at higher risk for homelessness and food insecurity” (Provincial Health Services Authority, 2010). Many of these differences in wellness between women and men arise from modifiable factors (Clow et al., 2009). Focusing future research on positive health behaviours among women and their perceptions of health may aid in ensuring women receive the appropriate information and resources for health promotion and wellness improvement.

Initially, the idea for doing this supplement emerged from discussions with the BC Ministry of Healthy Living and Sports Women’s Healthy Living Secretariat which was interested in seeing a women’s wellness supplement along the line of the seniors supplement. At the outset it is important to note that we are only using CCHS data to which we already had access and that have been used to support the overall wellness mapping project of the population at large. As such there are no specific variables that are focused only on women, such as issues of reproductive health and well-being as briefly noted above.

Accordingly, our intent has been to put a more intense gender lens on the CCHS data. To this point our publications have only shown limited gender comparisons, primarily for the total sample ages 12 years and over. This supplement gives gender comparisons for several different age cohorts and provides a more detailed look at the results from women respondents in comparison to their male counterparts by age.
cohort, HSDA and BC comparisons to Canada. In so doing we show the actual results for women, but also indicate if the results are significantly different from male respondents.

The Provincial Health Officer, Dr. Perry Kendall has also indicated an interest in this work (see Foreword), in that it has the potential to assist with an upcoming annual report related to women’s health and well-being. That annual report will provide a much more comprehensive look at women’s health and well-being than is possible by just using the CCHS data set. Nevertheless, the CCHS data set has good potential for providing information that is not available in the usual health administrative data sets.

The Canadian Community Health Survey

The data collection for the full sample for CCHS 4.1 took place over the 24 month period of January 2007 to December 2008 inclusive, and included individuals aged 12 or more years.

Approximately 50% of the respondents were sampled in both years. The total sample size (N) was 14,651, of which 8,733 (54%) were women. Certain groups were excluded from the sample as follows: those living in institutions, on Indian Reserves, on Canadian Forces Bases or in very remote and small communities. Also, data collection varied throughout the months of the year, with over 1,800 being sampled in March and May of both years, and less than 700 sampled in each of June and December of both years. Accordingly, some caution is required in interpreting the results of the maps and supporting tables, especially for those questions that might be related to seasonal activities.

The Share File data set has been used for our analysis. Only responses from those individuals who agreed to share their data with Statistics Canada’s partners, i.e., provincial/territorial health departments, are included in the Share File (Statistics Canada, 2009). Reporting of the data follows the guidelines suggested by Statistics Canada. Indicators from samples of less than 10 individuals, or those with a coefficient of variation greater than 33.33 are not reported in this analysis. Selected characteristics of the BC survey respondents were as follows:

- Nearly 97% of interviews were conducted in English, 2% were conducted in Chinese languages and 1% in other languages.
- 52% were married or living common law, 27% were single or never married, and 21% were widowed, divorced or separated.
- Median annual family income was just under $60,000.
- 74% were born in Canada, 11% in Europe, 10% in Asia and 5% elsewhere.
- Approximately 5% self-identified as Aboriginal.
- Approximately 60% had paid work.
- Over 19% had at least a bachelors degree.
- Over 74% of men and over 59% of women respondents were in the paid work force.

As with the previous mapping publications on wellness, the indicators are mapped on positive responses to questions asked. Unless noted all indicators were used in one or more of the previous wellness publications (http://geog.uvic.ca/wellness).

Each indicator is mapped using the five map model introduced in The British Columbia Atlas of Wellness, and most are based on the following age cohorts:

- Women respondents aged 12 years and over.
- Women respondents aged 20 to 34 years.
- Women respondents aged 35 to 49 years.
- Women respondents aged 50 to 64 years.
- Women respondents aged 65 years and over.

In some instances different age cohorts are used as the standard age groups are not appropriate.

This occurs primarily for indicators related to questions concerning employment, but also occurs for educational achievement and the measuring of healthy weights (BMI – Body Mass Index). Graduation from high school (Chapter 2) and BMI (Chapter 5) both use 18 and over, rather than 12 and over as the base age cohort. This minor change reflects more appropriate age cohorts for these variables: the earliest the majority of individuals graduate from high school is age 18, while the BMI calculation for those younger than 18 years is different from that of older age groups.

One other difference involves the stress related indicator in Chapter 7, which uses the age cohort 15 years and over rather than 12 and over, to reflect the fact that the question was only asked of the respondents aged 15 years and older.

It is possible to see the values of each HSDA relative to the average for BC and the average for Canada as a whole and to observe whether the differences between HSDAs and the provincial average values are statistically significantly different (higher or lower), or whether the provincial average values are significantly different to those of Canada. Further, the tables allow the reader to see whether there are significant differences within HSDAs, the province as a whole, and Canada as a whole between respondents for the different demographic cohorts.

A new feature for this supplement is the addition of a graph which provides data for all age cohorts noted above and also includes the 12 to 19, 65 to 74 and the 75 and over age cohorts. These age cohorts are provided at the provincial and Canada levels only. There are two reasons for this: first, we wished to stay with a five map model for consistency with previous supplements; and second, these additional age cohorts had relatively small sample sizes for several HSDAs, especially in the north and south east parts of the province, making it difficult to provide useful and reportable results at the HSDA level. Nevertheless, we have included results provincially and nationally along with confidence intervals and significant differences can be observed between age cohorts. This provides a fuller picture of variations in women’s wellness provincially and nationally.

### A brief discussion of sample size, confidence intervals and significance levels

Sample survey data only give an estimate of the actual value and so it is useful to provide confidence intervals for each value. The intervals provide the range that the actual value of the population will fall within and we have used a confidence interval of 95%. What this means is if the survey was
repeated, the point value would occur within this interval 95 times out of 100. For example, if the point estimate of an indicator is 80\% and the standard error of the estimate yields a 3\% error either side of 80\%, then the point value estimated by repeated sampling of the population will be in the interval from 77\% to 83\%, 19 times out of 20.

If a larger sample is collected, the confidence interval will be narrower giving a clearer picture of the true value of the response. For example, if the sample size is doubled, the confidence interval either side of the estimated value may shrink to say 2\%, so that the estimate of the value will fall within 2\% either side of 80\%, that is, 78\% to 82\%. As the sample size increases the confidence interval gets narrower giving a closer approximation of the true value.

For our purposes, confidence intervals have been calculated using the “bootstrap” methodology provided by Statistics Canada.

To determine if two sample estimates are significantly different, their confidence intervals are compared. If one sample (A) has a value of 80\% with a confidence interval of 6\%, its real value lies within the range of 77\% to 83\%. If another sample (B) has a value of 76\% and a confidence interval of 4\%, the real value falls within the range of 74\% to 78\%. Because the lowest value (77\%) of sample A is less than the highest value (78\%) of sample B then we cannot say that the two values are statistically significantly different from one another.

If a third sample (C) has a value of 88\% with a confidence interval of 8\%, then its true value falls within the range of 84\% to 92\%. Because the lowest value of sample C (84\%) is higher than the highest confidence interval values of both samples A and B, then we can say with 95\% confidence, that sample C is statistically significantly different (higher) than both sample A and B.

**Wellness groups**

In all 42 indicators, including one (home exercise) that has not been used in the previous wellness publications, are mapped and presented in the following five chapters as follows:

- Chapter 2: Wellness assets (7 indicators).
- Chapter 3: Smoke-free living (5 indicators).
- Chapter 4: Nutrition, food security and alcohol (13 indicators).
- Chapter 5: Physical activity and healthy weight (6 indicators).
- Chapter 6: Wellness outcomes (11 indicators).

The results from each of these chapters are summarized in Chapter 7. An overall wellness index is developed based on those indicators that are statistically significantly different (better or worse) than the provincial average, and also compares BC with Canada as a whole.

As with the previous wellness publications these summaries or “rankings” are based on an index score calculated as follows: if the HSDA is statistically significantly higher (better) than the provincial value then it is given a value of +1, and if it is statistically significantly lower (worse), then it is given a value of -1. These values are then aggregated to give a net positive (+), negative (-) or neutral (0) score so that comparisons can be made among the HSDAs. If one HSDA has three positive indicators and one negative indicator, then its net index will be (+3 -1) = +2. In comparing Canada with BC, the same approach is used.

Given that there are 42 individual indicators, the maximum and minimum index scores that are possible for any HSDA are +42 and -42, respectively. A similar approach is used to compare BC and Canada.

These indices are developed for each age cohort and allow the following broad sets of comparisons to be made:

- Differences in wellness between genders for Canada, BC, and HSDAs
- Differences in women’s wellness between BC and Canada; and between HSDAs when compared to the provincial averages.

An Appendix is also provided and this deals specifically with five work setting indicators. Because the work environment indicators have very different age cohorts to the vast majority of the indicators in Chapters 2 through 6, separate indices are calculated for this group of indicators and the maximum and minimum scores are +5 and -5, respectively. The indicators related to the work setting use the following four age cohorts: 15 to 75 years; 15 to 34 years; 35 to 44 years; and 45 to 75 years. These cohorts better reflect the working age population. It is worth noting at this stage that because less than 60\% of women respondents were in the paid workforce, sample sizes for some of the HSDAs are relatively small, especially in the 15 to 34 and 35 to 44 age cohorts. Given small sample sizes, results should be interpreted with caution. In some cases results are suppressed under Statistics Canada reporting guidelines (Statistics Canada, 2009).

**Interpreting and reading the maps, graphs and tables**

The following provides a brief guide to interpreting the maps, graphs and tables contained in this supplement.

Each indicator has two pages devoted to it and they provide a summary of what is happening geographically within the province. There are three main instruments which show how the indicator varies by age cohort and by HSDA, and allows a comparison between values at the HSDA level with the provincial average value and a comparison between the BC average and the Canadian average. Significant differences between genders are also noted: if the numerical value in the table on the left hand side of the page is shown in **GREEN**, this means that the women’s value is statistically significantly higher (better) than the male value for that cell. If the value is in **RED** it means that the women’s value is statistically significantly lower (poorer) than the male value for that cell. If the value is in black there is no statistically significant difference between the genders.

For example in the table overleaf, for the 12+ age cohort, the Vancouver HSDA has a value of 56.11 (**GREEN**), which is significantly higher than male respondents in the HSDA, while British Columbia at 61.14 (**GREEN**), and Canada at 60.95 (**GREEN**) are both significantly higher than their male counterparts. For the 65+ age cohort the Fraser South HSDA has a value of 60.39 (**RED**) which is significantly lower than male respondents in the HSDA, while Canada at 54.62 (**RED**) is significantly lower than male counterparts for this age cohort.
The five maps opposite plot a sample of data to illustrate the presentation methodology used throughout the Atlas. The values in percent (%) for HSDA respondents who answered the question in a positive way from a wellness perspective are listed in the table. The algorithm used places each of the highest and lowest three HSDAs in the best and worst category respectively, while the next best and next worst three HSDAs are set in the second and fourth groups respectively, with the remaining four placed in the middle group. The algorithm is designed to highlight the highest (best) and lowest (worst) performing HSDAs. Where two or more units share the same score and fall into overlapping groups, they are placed in the least extreme category of the overlap, i.e., the bias is towards the middle group rather than to the extremes. The colour index at the side of the maps provides the range of values of the five groups used for mapping.

For the larger top map opposite, which shows data for the 12 and over age cohort, the DARK GREEN group has a range of 64.21% - 69.77% and includes the three HSDAs (Central Vancouver Island, Kootenay Boundary, South Vancouver Island) with the highest values; the next highest group, in LIGHT GREEN, has a range of 62.43% - 64.20% and includes the three HSDAs with the next highest values; the middle group contains the four HSDAs with the middle values which are coloured BEIGE; the next three HSDAs are coloured ORANGE and have lower values than the middle group; and finally the three with the lowest values are RED and have a range of 48.79 - 54.75%. When HSDAs are GREY it indicates that data are not available for mapping, usually because the sample size is considered too small (less than 10) to report for that region. This is based on the convention developed by Statistics Canada for these survey data.

The four smaller maps focus on different age cohorts of respondents: 20 to 34; 35 to 49; 50 to 64; and 65+. CROSS HATCHING again denotes any areas that have statistically significantly higher or lower values than the BC average.

The table above supports the maps opposite. Using the same colour scheme and hatching symbols as the maps, the left hand column shows the values of the HSDAs from highest to lowest for the 12+ age cohort. The other columns keep the order of the left hand column and provide the point estimate for each HSDA for the four other age cohorts. This allows the user to get a more complete picture of any of the wellness related indicators mapped and provides a tabular mosaic of the values of the indicator by geographic area. The bottom rows show point estimates for BC and Canada respectively. A cross hatching symbol against the BC value indicates that it is significantly different (higher or lower) than the Canadian value.

E following a value in the table, (e.g., 37.77E for Northwest British Columbia Ages 35 to 49), alerts the reader to a relatively high coefficient of variation (16.67 ≤ CV ≤ 33.3) which yields a large confidence interval rendering a caution in interpretation. F (e.g., North Vancouver Island for Ages 20 to 34) indicates the point estimate has been suppressed because the sample size was <10 or the CV was greater than 33.33.

Finally, the graph above provides the 95% confidence interval ranges (I) for several age cohorts for both BC and Canada so that comparisons can be made between the two jurisdictions, and between different age cohorts. For example, there are no significant differences between Canada and BC for any individual age cohort, but the 12 to 19 age cohort for both BC and Canada are significantly higher (better) than their respective 75+ age cohort.
Canadian Community Health Survey sample data

Ages 12+ (%)

- 64.21 - 69.77
- 62.43 - 64.20
- 59.92 - 62.42
- 54.76 - 59.91
- 48.79 - 54.75

Ages 20 to 34 (%)

- 72.09 - 74.68
- 67.64 - 72.08
- 55.84 - 67.63
- 51.71 - 55.83
- 49.17 - 51.70

Ages 35 to 49 (%)

- 70.84 - 74.83
- 64.28 - 70.83
- 58.90 - 64.27
- 55.11 - 58.89
- 37.77 - 55.10

Ages 50 to 64 (%)

- 65.23 - 69.89
- 59.24 - 65.22
- 58.27 - 59.23
- 50.86 - 58.26
- 43.93 - 50.85

Ages 65+ (%)

- 64.75 - 68.88
- 61.31 - 64.74
- 54.75 - 61.30
- 49.34 - 54.74
- 42.37 - 49.33


Data are suppressed in grey shaded areas due to Statistics Canada guidelines.

Cross hatched areas are significantly different than provincial average.