

3

Data, Information, and Map Reading

Introduction

In producing the maps contained in this Atlas, several key data sets and information sources were used. Key criteria for including data are as follows:

- Data are readily available. No new data have been collected specifically for the analysis included in the Atlas. Rather, existing data are brought together from a variety of different sources in order to develop the maps.
- Data are collected on an ongoing or periodic basis. This allows an opportunity to measure changes and trends over time.
- Data can be analysed on a geographical basis, primarily for the 16 Health Service Delivery Areas (HSDAs) of the province. This ensures that geographical differences can be measured, and patterns detected. For some maps, depending on the data source, School Districts (59), Economic Development Regions (8), or BC Games Zones (8) are used (see following pages). In others, “custom” maps are presented, based on a single, novel indicator.
- Data have not been mapped and published elsewhere. In large part, the maps included in the Atlas are unique and have been constructed specifically for the purposes of this Atlas. In a couple of instances this is not the case, as key maps and data are necessary to provide context for the maps that follow.

The following are the key data sources that were used for mapping purposes.

Canadian Community Health Survey (CCHS-3.1)

The Canadian Community Health Survey (CCHS) is undertaken by Statistics Canada, in partnership with Health Canada, on a regular basis across the country. There is a standard set of questions asked of all participants, whose ages range from 12 years and up. Provinces can buy extra modules of questions dealing with a variety of different health- and wellness-related factors (www.statcan.ca/english/concepts/health/cycle3_1/overview.htm). BC, for example, purchased additional modules related to such areas of interest as social supports in the latest survey, which was undertaken throughout 2005 and for which results are now readily available (Ibid.). More than 14,000 BC residents participated in the survey.

As noted above, respondents are limited to those 12 years of age and older and, as the title suggests, the survey collects information from respondents living in the general community. Therefore, data are limited, in that individuals living in institutions (e.g., care or health institutions, jails) or living on Indian reserves or Crown lands, full-time members of the Canadian Armed Forces, and residents of very remote regions are not included. Some of these groups, particularly Aboriginal peoples, are known to have, on average, generally poorer health and wellness status than the remainder of the population (see, for example, Kendall, 2002, 2007; Foster, Macdonald, Tuk, Uh, and Talbot, 1996). As a consequence, the data presented from the survey may be biased toward more positive values of

wellness, although approximately 98% of the Canadian population aged 12 and older are covered. Given the relatively large numbers of remote communities, particularly Indian reserves, in the province, it is likely that the coverage may be less than the national average of 98% for BC. As with any survey data, although best attempts are made to ensure clarity of questions, honesty of responses, and randomness in the selection of respondents, these criteria may not always be fully met, and caution should always be practiced when studying the data and making conclusions based on the resulting analyses.

For BC, survey data are available at the HSDA level, and numerous indicators based on the survey are mapped in this Atlas. In most cases, for each indicator, five separate maps are provided consisting of results for the total population, for males and females separately, and for two separate age cohorts—12 to 19 year olds, and those aged 65 years or older. The values of the indicators are given as percentages (%) of respondents answering a question in a certain way. In some cases, the value for the Canadian population as a whole is provided, usually when there is a statistically significant difference (as determined through confidence intervals—see below) between provincial results and Canadian results. Occasionally, specific values are provided just for selected variables for Aboriginal respondents, but only at the provincial level. The sample size for the Aboriginal population is too small to undertake geographical mapping. The Aboriginal identifier used was whether the respondent reported being an Aboriginal person or having Aboriginal origins.

Confidence intervals have been calculated so that statistical significance can be determined at the 95% confidence level. This enables statements to be made on the significance of variations in values by geography (HSDA), gender, and age groups. Confidence intervals are used when values are calculated based on a survey sample of the population. They estimate the margin of error and give a range within which the true value lies. The ranges used for determining significance for these mapped indicators are at the 95% level. This means that, if the survey were repeated, the same results would occur within this range 95 times out of 100. Thanks is given to Statistics Canada for the use of these data.

2001 Canadian Census Data

Every 5 years, the Government of Canada undertakes a general census of the total population and its

characteristics. Although the 2006 census has been completed, detailed data are not available to the public as of yet. Consequently, 2001 census data are used in this Atlas. Key determinants of wellness and health are available from this data source, and several are mapped to provide a sense of the “assets” or “positives” available at the population level to support wellness. The data for our purposes, although owned by Statistics Canada, have been provided by BC Statistics and by the Ministry of Health Data Warehouse. Once again, the provision for use of these data is gratefully acknowledged. One caution with respect to census data is that several of the population characteristics depend on self-identification, such as “Aboriginal heritage.” This may be underestimated as a result.

School District Data

There is a variety of data related to wellness indicators available from school districts. For several years, the BC Ministry of Education has undertaken annual satisfaction surveys of students in selected grades, canvassing various issues, such as physical activity, bullying, and school safety, to name a few. These data are readily available at the school district level (www.bced.gov.bc.ca/apps/imcl/imclWeb/Home). A number of indicators have been mapped at this geographic level, including physical activity/nutrition and school safety. Although a survey instrument was used for Grades 3/4, 7, 10, and 12, all students were surveyed, eliminating the need for developing confidence intervals, as was necessary for the CCHS data. Given the young age of some of the respondents, caution should be exercised when interpreting results. Educational outcome data are also available. Key indicators include high school graduation. Data are available at the Ministry of Education website, and other maps are available in Foster and McKee (2007).

The Human Early Learning Partnership (HELP) at the University of British Columbia continues to collect “readiness to learn” data on entry level kindergarten students throughout the province of BC using the Early Development Instrument (EDI). Only a limited number of maps are included in the *BC Atlas of Wellness*, as many are available elsewhere (www.earlylearning.ubc.ca/). In 2005, the first edition of the *British Columbia Atlas of Child Development* was produced for the province as a whole (Kershaw et al., 2005), and contains numerous maps for the interested reader.

McCreary Centre Society Adolescent Health Survey

Over the past decade or so, the McCreary Centre Society, a non-profit agency in Burnaby focused on youth health and behaviour, has undertaken three major surveys of students in Grades 7 to 12 in BC. The last survey, which included over 30,000 respondents, was undertaken in 2003, while the next is scheduled for 2008. There are well over 100 questions in the survey instrument, which is administered in randomly selected classes throughout most school districts. While this is a very rich and robust data set, not all school districts in the province elected to be included in the survey, leaving several areas of the province without data, particularly in the northeast and the Fraser Valley. Data, while collected at the school level, are sampled and weighted based on the characteristics of the school population in each HSDA. For 2003, data gaps occur for the Fraser South, Fraser East, and Northeast HSDAs. More information about the McCreary survey, along with numerous reports based on their surveys, can be found on their website (www.mcs.bc.ca). Additional maps are available in Foster and McKee (2007).

BC Vital Statistics Data

The BC Vital Statistics Agency collects a variety of data on births, deaths, and marriages, as well as data related to congenital anomalies and handicapping conditions contained within its Health Status Registry (www.vs.gov.bc.ca). Important wellness data on maternal conditions, perinatal conditions, and outcomes for newborns and infants (first year of life) are collected through the Physician's Notice of Birth (PNOB). A healthy beginning for a child is related to healthy development through to adulthood. Important data used in this Atlas include, among others, age of mother giving birth, birth weight, and length of pregnancy before delivery—all key wellness factors for newborns (Kierans, Collison, Foster, and Uh, 1993; Kierans et al., 2004; Kierans, Kendall, Foster, Liston, and Tuk, 2006; Kierans, Kendall, et al., 2007a; Kierans, Verhulst, Mohamed, and Foster, 2007). Some caution is required with the use of the PNOB data as they rely on individual physicians to complete all of the required components of the form, and data are not always complete. Also, the data presented in the Atlas only cover events that occurred in the province. Events occurring to BC residents elsewhere are not included, and this is particularly problematic for the

northeast and southeast of the province where difficult or risky births may occur in the neighbouring province of Alberta (Burr, McKee, Foster, and Nualt, 1995). Again, caution is required when analysing the maps.

Women's and Children's Hospital Perinatal Data Base

An important database related to new mothers and babies has been developed by Women's and Children's Hospital in Vancouver. It records information on each birth in the province, including characteristics of the mother and the baby. Key data used in this Atlas include non-smoking behaviour in pregnancy, and breastfeeding of newborns on discharge from the hospital, both of which are key assets for the wellness of newborns and their healthy development into adulthood. In all, data are available on approximately 150,000 babies who were discharged from BC's hospitals between April 2000 and March 2004.

BC Recreation and Parks Association (BCRPA)

Over the past 3 years, the BCRPA has sponsored three key surveys of assets related to wellness. These include selected public recreation facilities (BCRPA, 2004), selected sports and recreation outdoor assets (BCRPA, 2006a), and selected community-based activity centres (BCRPA, 2006b). While the first survey of local government had a response rate of 100%, the later two both had response rates of 88% of the 185 entities surveyed, and so some caution is required in interpreting results. These data are mapped at the HSDA level. In addition, BCRPA is responsible for promoting increased physical activity at the community level through its promotion of Active Communities. The population living in registered active communities within HSDAs are mapped using data provided by BCRPA. Thanks to this organization for access to its data.

Sports BC Membership Data

Sports BC is a non-profit agency that represents more than 80 sport organizations, including over 60 designated provincial sports organizations. Membership registration is collected for numerous sports and games activities by Sports BC. Key rates of participation, as measured by registration in different sports activities,

have been used in the Atlas based on the data provided by Sports BC for 2005. These data do not include sports activities undertaken through schools and, as such, participation rates are likely an underestimate of actual sports participation in the province. Thanks is given to Sports BC for allowing access to its data.

Other Data Sources

There is a variety of other data sources used to map different indicators. These include, among others, public transit, public library use, combined child and senior dependency ratios, heart and stroke walking clubs, municipal and school district no smoking bylaws, as well as several climatic change and physical feature maps.

Interpreting the Maps and Tables

In total, there are more than 270 maps and supporting tables provided in the *BC Atlas of Wellness* to show specific patterns and values of wellness-related indicators, based on the previously mentioned data sources. There are several major map forms included in the Atlas. To the extent possible, data are mapped at the Health Service Delivery Area (HSDA) administration level, of which there are 16 in the province. As noted earlier, this is the most detailed unit for which much of the data are available and thus it represents the base mapping unit for the Atlas. Using a common mapping unit enables an examination of the values of different indicators for any HSDA, thus allowing the ability to build an overall wellness picture of that HSDA based on numerous indicators related to wellness determinants/assets, smoke-free environments, nutrition and food security, activity, healthy weights, and healthy pregnancy and birth. These are the key components of the ActNow BC initiative. In addition, indicators based on wellness outcomes are included.

The second geographical area used in the Atlas is the school district administrative unit, of which there are 59 for mapping purposes (an additional school district, Ecole Scolaire Francophone, is not geographically based, but is generally included in the total values for the provincial school population). Several key indicators are available at this level for kindergarten to Grade 12 students, for total students and for male and female students separately, and for school districts themselves.

Thirdly, a series of maps uses the larger BC Games Zone administrative area, consisting of eight zones,

and the eight Economic Development Regions are used for several maps. Finally, there is a series of individual maps that provide information on novel indicators and may not conform to administrative boundary maps: they are what we refer to as “custom” maps. These cover a variety of information sources, and provide information as point sources (e.g., Farmers Markets) or as isolines (e.g., hours of bright sunshine).

Where possible, data are divided into quintiles for mapping purposes. A quintile represents one-fifth or 20% of the administrative units being mapped for any particular indicator. Different colours differentiate between the quintile groupings. Most range from GREEN for those geographical units with indicator wellness values in the highest or best quintile (or top 20%) through colour gradations to RED for the lowest quintile (or bottom 20%) value areas. The following section provides an example of the most frequent map page form, along with a supporting table. The CCHS map model is used, but the majority of other maps are of a similar nature for presentation and analysis purposes.

Cautions and Caveats

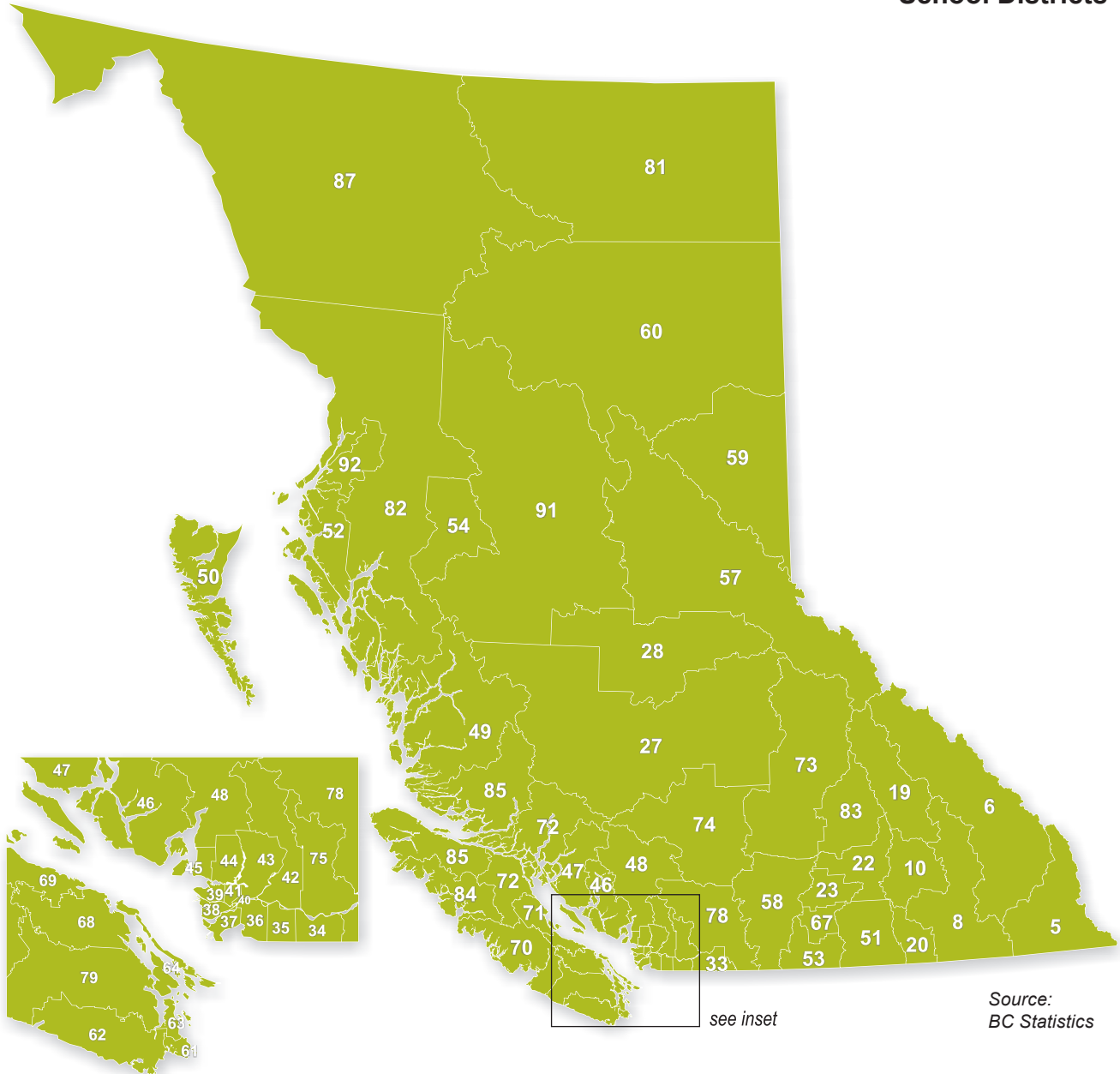
When using maps to view information and data the user should be aware of a couple of major cautions, especially for many of the maps presented in this Atlas. While we are able to show variations in indicator values *between* different HSDAs, or school districts, we do not show variations *within* HSDAs. In many instances, such as Vancouver, which has large variations in many socio-economic characteristics among the smaller areas within the HSDA, the variations in the indicator values may be greater than those between Vancouver and all other HSDAs. Secondly, the population in BC is very much concentrated in the extreme southwest of the province and southern part of Vancouver Island. Much of the interior, north, and southeast of the province is very sparsely populated, but covers large tracts of land. Users must be cautioned against coming to a conclusion that much of the province has high or low values related to a certain indicator. While technically that may be correct from the perspective of land mass covered, it would not be correct to say those values occur to most of the population in the province.

The following pages provide base maps for HSDAs, School Districts, BC Games Zones, and Economic Development Regions, along with a brief guide on how to interpret and analyse the maps and tables used in this Atlas.

Health Service Delivery Areas



School Districts



- 005 Southeast Kootenay
- 006 Rocky Mountain
- 008 Kootenay Lake
- 010 Arrow Lakes
- 019 Revelstoke
- 020 Kootenay-Columbia
- 022 Vernon
- 023 Central Okanagan
- 027 Cariboo-Chilcotin
- 028 Quesnel
- 033 Chilliwack
- 034 Abbotsford
- 035 Langley
- 036 Surrey
- 037 Delta
- 038 Richmond
- 039 Vancouver
- 040 New Westminster
- 041 Burnaby
- 042 Maple Ridge-Pitt Meadows

- 043 Coquitlam
- 044 North Vancouver
- 045 West Vancouver
- 046 Sunshine Coast
- 047 Powell River
- 048 Howe Sound
- 049 Central Coast
- 050 Haida Gwaii/Queen Charlotte
- 051 Boundary
- 052 Prince Rupert
- 053 Okanagan Similkameen
- 054 Bulkley Valley
- 057 Prince George
- 058 Nicola-Similkameen
- 059 Peace River South
- 060 Peace River North
- 061 Greater Victoria
- 062 Sooke
- 063 Saanich
- 064 Gulf Islands

- 067 Okanagan Skaha
- 068 Nanaimo-Ladysmith
- 069 Qualicum
- 070 Alberni
- 071 Comox Valley
- 072 Campbell River
- 073 Kamloops/Thompson
- 074 Gold Trail
- 075 Mission
- 078 Fraser-Cascade
- 079 Cowichan Valley
- 081 Fort Nelson
- 082 Coast Mountains
- 083 North Okanagan-Shuswap
- 084 Vancouver Island West
- 085 Vancouver Island North
- 087 Stikine
- 091 Nechako Lakes
- 092 Nisga'a

see inset

Source:
BC Statistics

BC Games Zones



Economic Development Regions





Canadian Community Health Survey—sample data

The five maps plot, by quintile, the values in percent (%) for the total respondents who answered the CCHS question in a positive way from a wellness asset perspective. The colour index at the side of the maps provides the range of the values of the five quintiles used for mapping. For example, the **DARK GREEN** or highest wellness quintile has a range of 38.17–52.44% for the larger top map and includes the three HSDAs (East Kootenay #11, Central Vancouver Island #42, South Vancouver Island #41) with the highest values; the next highest quintile, in **LIGHT GREEN**, has a range of 25.57–32.63% and includes the three HSDAs with the next highest values; the middle quintile (which has four HSDAs because the 16 HSDAs cannot be divided into five equal groupings) 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 HSDAs with the lowest values are **RED** and have a range of 18.94–19.14% (Fraser East #21, North Vancouver Island #43, Richmond #31). When HSDAs are **GREY** it indicates that data are not available for mapping, usually because the sample size is too small (less than 30) to report for that HSDA (see map at bottom left opposite). This follows the convention developed by Statistics Canada for these survey data.

CROSSHATCHED HSDAs have values that are significantly different statistically from the overall provincial value (see Fraser East, North Vancouver Island, and Richmond, which are all significantly lower than the provincial average). An inset for the lower mainland HSDAs is provided; although these have a small land mass, this is where the majority of the province’s population resides.

Four smaller maps below the larger map focus on characteristics of the CCHS respondents. The first two look at the patterns for males and females individually, and also note by **CROSSHATCHING** any HSDAs that have significantly higher or lower values statistically than

Health Service Delivery Area	All respondents (%)	Males (%)	Females (%)	Ages 12-19 (%)	Ages 20-64 (%)	Ages 65+ (%)
011 East Kootenay	52.44	52.49	52.39	55.33	51.79	52.99
042 Central Vancouver Island	38.49	41.79	35.33	32.92	42.92	27.09‡
041 South Vancouver Island	38.17	33.65†	42.25†	34.06	40.24	32.67
012 Kootenay Boundary	32.63	32.08	33.18	F	34.18	30.25
014 Thompson Cariboo Shuswap	29.93	32.35	27.52	F	32.79	21.28E
022 Fraser North	25.57	22.97	28.12	31.97	26.47	14.43E‡
053 Northeast	25.51	19.55E	31.91	F	26.41	F
033 North Shore/Coast Garibaldi	25.01	25.67	24.38	F	26.61	21.12
051 Northwest	24.56	29.43	19.30	F	27.82	F
052 Northern Interior	23.73	24.17	23.26	F	26.15	F
013 Okanagan	20.83	18.47	23.06	21.93	22.44	15.09E
023 Fraser South	20.59	19.40	21.75	22.80	21.25	14.64
032 Vancouver	19.20	18.75	19.64	F	21.51	12.20E‡
021 Fraser East	19.14	17.02	21.20	F	19.50	19.47
043 North Vancouver Island	19.01	16.93E	21.07E	F	19.92E	F
031 Richmond	18.94	20.87	17.13	F	18.16	F
999 Province	25.30	24.40	26.18	23.77	26.70	19.79‡

‡ Age group differs significantly from 20-64 group.
 E Interpret data with caution (16.77 < coefficient of variation < 33.3).
 F Data suppressed due to Statistics Canada sampling rules.
 † Males differ significantly from females.

the provincial average by gender (see East Kootenay #11 in both cases). The second two maps focus on the age “book ends” of the data. One looks at the youngest or youth/teen age group of 12- to 19-year-olds, while the other looks at the 65 and over seniors age group. A key focus of ActNow BC is to work on healthy developments for children and youth and healthier living for seniors.

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. The other columns keep the HSDA order of the left hand column and provide the actual data for each HSDA by gender and for three separate age cohorts. The † symbol indicates that there is a significant difference (statistically) between males and females within a particular HSDA; ‡ indicates there is a significant difference between the 12 to 19 age group and the 20 to 64 age group, or between the 65 and over age group and the 20 to 64 age group within the HSDA. (Note that no separate map is provided for the population aged 20-64 years because of space constraints. In most cases, the pattern is very similar to that for “All respondents.”) The symbol **F** denotes that the sample size is too small or has a very large coefficient of variation, and the symbol **E** denotes caution in interpretation because of unstable values (large coefficient of variation). 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 HSDA.

Canadian Community Health Survey—sample map

