



Health Trends in Alberta: A Working Document

ACKNOWLEDGEMENTS

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ISSN: 1480-6657

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Strategic Direction

A sound understanding of trends in health is an essential part of setting goals and priorities for health systems and for publicly funded programs that support health and well being. In turn, setting goals and priorities is critical if we are to ensure accountability and continuous improvement within health systems and beyond. Across Canada and internationally, there is a move to develop indicators for measuring and reporting health trends. Within Canada, the drive to align these efforts on a national basis is led by the Canadian Institute of Health Information (CIHI) *Information Road Map Initiative*. The Health Trends Initiative, led by the Surveillance and Environmental Health Branch of Alberta Health and Wellness, supports this national endeavour.

The Health Trends Initiative consists of seven integrated sub-projects designed to meet current and evolving health needs.

- This document, ***Health Trends in Alberta, A Working Document*** is the primary communications tool for the Health Trends Initiative. It provides technical information on a number of health and health determinant indicators.
- The ***Report on the Health of Albertans*** (2006) is a document about the health status of Albertans, and includes discussions of important health issues and strategies. This document is written to be understood by a broad public audience.
- The **Methods** initiative is developing and standardizing analytic strategies, display capacity (including graphic elements and mapping) and interpretation of the data and information that is used in this and other Alberta Health and Wellness reports.
- The **Health Priorities** subproject is developing and refining a model for identifying and prioritizing the most important population health issues in Alberta.
- The **Health Targets** subproject is exploring the feasibility of developing targets for health status measures and where appropriate will recommend targets.
- The **Health Strategies** subproject is identifying strategies that can be used to address high priority health issues.
- The **Health Research** subproject is identifying priority areas of health research to support the measurement of health status, the development of health strategies, the assessment of health strategy effectiveness, and the communication and dissemination of health status information.

This report, *Health Trends in Alberta, A Working Document*, will continue to be a health status information resource that is appropriately responsive to a variety of needs. To serve this end, the Surveillance and Environmental Health Branch at Alberta Health and Wellness has sought wide-ranging participation from internal and external stakeholders.

Objectives

The main objectives of *Health Trends in Alberta, A Working Document* are to:

- Provide an overview of selected health trends including demographics, health status, health determinants, mortality, and communicable disease incidence from an Alberta perspective within a Canadian context;
- Estimate provincial changes in these trends over time; and
- Describe the age/sex distribution and spatial variations, where appropriate, of these health issues for the province

Health Trends in Alberta, A Working Document can also be viewed as an Alberta-specific complement to two major reports prepared by the Federal, Provincial and Territorial Advisory Committee on Population Health. These reports, *Towards a Healthy Future: Second Report on the Health of Canadians* and *Statistical Report on the Health of Canadians*, present a wide range of data from a Canadian perspective, including information on many of the trends described here.

Approach

Health surveillance is "... the tracking and forecasting of any health event or health determinant through the collection of data, and its integration, analysis, and interpretation into surveillance products, and the dissemination of those surveillance products to those who need to know" (Health Canada, 1999).

Selecting health trends for monitoring is a crucial component of surveillance activity. *Health Trends in Alberta, A Working Document* includes measures which have been consistently used in the scientific and research literature, and for which Alberta Health and Wellness has national comparative data. Where possible, measures include those recommended for population health monitoring by the Canadian Institute of Health Information (CIHI) *Information Road Map Initiative*.

For each health issue selected where 'person-level' data are available, there are point-in-time comparisons between Canada, Alberta and 'best province'; trend data for Alberta (1985 to present); a distribution of the measure by age and sex; and a brief interpretation of the data presented. For measures where sufficient appropriate data are available and informative, regional comparisons are illustrated with regional and sub-regional maps.

Many of the trends that are identified here focus on mortality measures by disease category. Incidence data are provided by infectious disease categories. Health determinant trends have been derived primarily from survey sources. So far, measures of wellness are under-represented in the document.

Disease Categories and Data Sources

The Ninth and Tenth Revision of the *International Classification of Diseases* (ICD-9 and ICD-10) were used to identify diagnoses in mortality and morbidity statistics. ICD-9 codes were used for data up to 1999, and ICD-10 codes were used for data from 2000 and later. A description of ICD-9 and 10 codes by disease is provided in Appendix A. Records of non-Alberta residents were excluded from all provincial level analyses.

Data were obtained from several sources:

- Mortality and birth data were obtained from Alberta Vital Statistics for the years 1985 to 2006. Comparison data for Canada and the “best province” came from *Health Indicators '2003 and 2005* produced by Statistics Canada.
- Health status data were obtained from the *National Population Health Survey* (1994-95, 1996-97) and the Canadian Community Health Survey (2000-2001, 2002-2003, 2004-2005).
- Data for incidence measures of infectious diseases were obtained from communicable diseases databases at Alberta Health and Wellness and from the Centre for Infectious Disease Prevention and Control of the Public Health Agency of Canada.
- Data from additional sources were also used and are identified where they are employed.

Epidemiologic Measures

Age- and sex-specific rates were computed for mortality measures. Only those mortality measures where sufficient cases were available to calculate stable estimates were included in this report. To allow for a comparison over time and across health regions, age-standardized mortality rates were calculated using the direct method. The 1996 Canadian population was used as the standard set of weights. This method controls for potential sources of bias resulting from variations in age distribution of populations across provinces, regions, and over time.

The incidence measures for communicable diseases have not been age- or sex-standardized. Only total counts are available for interprovincial comparisons. For some communicable disease data, regional breakdowns are not available and in some instances not provided because there are too few cases to allow stable rate estimates.

Measures based on surveys have been weighted to reflect sampling strategies and to provide accurate population estimates. These measures have not typically been age- or sex-standardized.

Where time trends and age-sex curves are graphed, a trend line has often also been drawn. Several different smoothing techniques were employed. Since the intention was to indicate the most general features of the data, these curves should be considered descriptive.

Epidemiologic Measures for Maps

All health events reported in this document are mapped according to the method described below. It was developed to address the issue of how population sizes of health regions can affect rate stability -- specifically, rates will be less stable for regional health authorities with small populations than those for regional health authorities with larger populations. The mapping method used in this report is designed to address this issue and allow statistically consistent interpretations. (As an example, the numbers shown in the calculations in steps 1, 2 and 3 below use birth weight data for three years combined to calculate a crude rate and its standard error. It should be noted that *where sex- age standardized rates are used a more detailed calculation would be required* for these three steps.)

The mapping method consists of the following seven steps:

1. Calculate the rates for each region. For crude rates, an example of this calculation is shown below.

Health Region #	Low Birth Weight (LBW)	Total Births	Proportion LBW
1	189	3,453	0.05
2	183	3,069	0.06
.	.	.	.
.	.	.	.
.	.	.	.
9	65	1,557	0.04

2. Calculate the rate for the province. For crude rates, an example of this calculation is shown below.

- Number of low birth weight newborns: 6,726
- Total number of live births: 113,252
- Proportion low birth weight: 6,726 / 113,252 = 0.059

3. Calculate standard error of a probability of a health event for each regional rate. For crude rates the formula which follows can be used.

$$\sqrt{\frac{p(1-p)}{n}}$$

Where: *p* is the proportion (estimate of probability) for the region
n is the number of births.

Health Region #	Low Birth Weight	Total Births	Proportion LBW	Calculation	Standard Error
1	189	3,453	0.05	$\sqrt{\frac{0.05(1-0.05)}{3,453}}$	0.0038
2	183	3,069	0.06	$\sqrt{\frac{0.06(1-0.06)}{3,069}}$	0.0037
.
.
9	65	1,557	0.04	$\sqrt{\frac{0.04(1-0.04)}{1,557}}$	0.0051

4. Calculate the regional-specific standard scores.

Subtract the regional proportion from the provincial proportion and divide these by the standard score derived for each region in step 3. Repeat for each region.

$$\frac{\text{regional proportion} - \text{provincial proportion}}{\text{regional standard error}}$$

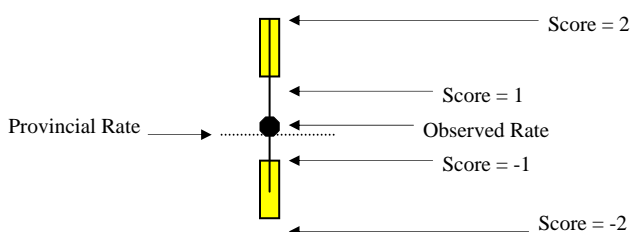
5. Graph the regional-specific standard scores calculated in Step 4.

The following colour scheme is used to differentiate the rates that may differ from the provincial average.

Score	Interpretation	Colour
> 2	Higher than provincial average (significant difference in a conventional statistical test ($p < 0.05$))	Red
1 to 2	probably higher than provincial average ($p > 0.5$ but < 0.95 that difference is not due to random variation)	Orange
1 to -1	Not likely to differ from provincial average ($p < 0.5$ that difference is not due to random variation)	Yellow
-1 to -2	Probably lower than provincial average ($p > 0.5$ but < 0.95 that difference is not due to random variation)	Light green
< -2	Lower than provincial average (significant difference in a conventional statistical test ($p < 0.05$))	Dark green

The figure below illustrates how to interpret the graphic for an individual region. The yellow bars are used to show that the provincial rate crosses between the 1 and -1 score range. The table above lists other colour possibilities by score category.

The black dot represents the value of the rate for each region. The colour of the bars above and below the dot represents the score of the region. The portion of the bar closest to the black dot represents the value for a standard score of 1 or -1, while the part of the bars farthest from the dot represent the value for a score of 2 or -2.



6. Generate maps using the same categories for each region as listed in Step 5.

The graph and map are placed on the same page. The map allows the reader to obtain a quick overview while more detailed information is presented on the graph. The colour assigned to each region is based on the colour of the bars in the graph for the same region. This provides a spatial context to the distribution patterns and consistency among the two graphic elements.

7. Generate a cartogram.

A cartogram is similar to a map. However, a circle sized in proportion to the regional population represents each region. This graphic is useful for interpreting reported rates by providing an indication of the population size of each region.

Sub-Region Maps

In order to provide more detailed information at the regional level, this version of the Health Trends report has included a sub-region map where possible for some indicators. The sub-region map breaks each of the 9 regional health authorities into 68 sub-regions defined in 2004. The sub-region map complements the regional maps by showing where differences may exist within each regional health authority.

The sub-region map is generated using similar steps as the regional map by calculating the sub-region rate, provincial rate and sub-region standard error. Differences in colour schemes between the regional and sub-regional maps may occur when differences in rates occur in sub-regions within a regional health authority. For a more detailed description on the sub-region methodology see the report: Alberta Health and Wellness (2005). *Calculating Small Area Analysis: Definition of Sub-regional Geographic Units in Alberta*.

Updating the Working Document

This working document is intended to support planning and policy initiatives in Alberta. As some of the data are valid for a point in time, updates will be provided as new data become available. Additional sections will also be added as other needs for information and sources of information are identified or become available. New measures, such as morbidity measures for chronic diseases and injuries, may also result in the addition of new graphs. Future versions of Health Trends will be available as an online searchable resource.

Updates will be placed on Alberta Health and Wellness public website: <http://www.health.gov.ab.ca/>. For further information about this report, please contact the Public Health Surveillance and Environmental Health Branch, Alberta Health and Wellness, by phone at (780) 427-4518, by fax at (780) 427-1470, or by the toll-free RITE line from within Alberta at 310-0000.

Further relevant information is available from many sources. Some of these, both print and electronic, are listed in the References section.

