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## First Nations & Inuit Health

### ARCHIVED - A Statistical Profile on the Health of First Nations in Canada: Vital Statistics for Atlantic and Western Canada, 2001/2002

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## Highlights

- Only partial vital statistics data (that is, birth and death data) for the Registered (Status) First Nations population in Canada are included in this report as valid data (that is, birth and/or death certificate data) are unavailable for some regions. Birth data are presented for Atlantic, Manitoba, Saskatchewan, Alberta and British Columbia regions. Death data are presented for Manitoba, Saskatchewan, Alberta and British Columbia regions.
- Attempts were made to include both the on- and off-reserve Registered First Nations populations. However, due to data limitations data obtained from Alberta and British Columbia regions include both the on- and off-reserve Registered First Nations population while data obtained from Atlantic, Manitoba and Saskatchewan regions include only the on-reserve Registered First Nations population.
- In this report, population estimates based on the Indian and Northern Affairs Canada Indian Register population are used as the source population (that is, denominator). This data source corresponded most appropriately with available vital statistics measures.
- The Registered First Nations population in Atlantic and Western Canada has a high total fertility rate compared to the corresponding general Canadian population (2.8 versus 1.5 births per female).
- The young population and high fertility in the Registered First Nations population combine to produce a much higher birth rate than found in the general Canadian population, while the young Registered First Nations population makes for a low crude death rate.
- The rate of natural increase of the Registered First Nations population in Western Canada (18.9 per 1,000 population per year) is more than four times that of the general Canadian population in Western Canada (4.2 per 1,000 population per year).
- Mothers giving birth in the Registered First Nations population are younger than the general Canadian population.
- Two regional studies (in British Columbia and Manitoba) showed the infant mortality rate among Registered First Nations to be approximately twice that of the general regional population.
- The prevalence of high birth weight infants is high for Registered First Nations mothers 40 years of age and older compared to younger Registered First Nations mothers in Atlantic and Western Canada.
- Registered First Nations populations in Atlantic and Western Canada have a high proportion of high birth weight live births in all age groups in comparison to the corresponding general population. The distribution of low birth weights is similar across both populations for most age groups.
- The age-standardized death rate among the Registered First Nations population in Western Canada (5.3 per 1,000 population per year) is higher than the age-standardized death rate among the corresponding general Canadian population (2.4 per 1,000 population per year).
- In 2001, life expectancy for the Registered First Nations population was lower than that of the general Canadian population by 6.6 years for males and 6.5 years for females, but is increasing slightly faster.
- 'External causes of morbidity and mortality' (as categorized by the International Classification of Diseases, Version 10 codes) are the leading cause of the higher mortality in the Registered First Nations population, and are responsible for over one-third of the overall gap in mortality, and approximately 40 percent of potential years of life lost. Within this International Classification of Diseases-10 chapter, the leading causes are accidental poisoning, transport accidents and intentional self-harm.
- Suicide among Registered First Nations in Western Canada accounts for greater premature mortality

than either circulatory diseases or cancers.

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## Introduction

This series presents a national description of the health status of First Nations people in Canada. It differs from previous editions of *A Statistical Profile on the Health of First Nations in Canada*, in that each chapter is being published as a stand-alone report. Therefore, it is not a continuation of the previous edition of the series containing statistics for the year 2000. This report provides information on demographic indicators for Registered (Status) First Nations people in Atlantic and Western Canada. It should be noted that the population base used in this report and the method of calculating rates differ from previous editions and thus, it should not be compared to previously published results. The publication of this report would not be possible without the contribution of Health Canada's First Nations and Inuit Health Branch and Regions and Programs Branch, the Assembly of First Nations, Indian and Northern Affairs Canada, the Public Health Agency of Canada, and the Health Data Technical Working Group. Their hard work and dedication is gratefully acknowledged and further listed in the [Acknowledgements](#) section of this report.

## Background

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Demographic indicators are traditionally important health indicators, due to their high quality and availability. They place other indicators in context and facilitate comparisons across populations. Traditional demographic indicators include population statistics (for example, age and sex distributions) and vital statistics (for example, birth and death data). However, these data are often unavailable or of low quality for First Nations populations in Canada. This report provides information on demographic indicators for Registered (Status) First Nations populations in Atlantic (birth data only), Manitoba, Saskatchewan, Alberta, and British Columbia regions for the years 2001 and 2002. Death data are not presented for Atlantic Region and neither birth nor death data are presented for Quebec and Ontario regions, since valid data from vital registrations are unavailable. In this report, demographic indicators for the Registered First Nations population are compared, where applicable, with those of the respective general Canadian population.

The First Nations and Inuit Health Branch has a role in promoting and protecting the health of First Nations people and supports delivery of public health programs/services in First Nations communities. However, due to several factors including lack of federal legislative authority for public health, and other historical, legal and political factors, it is difficult to compile comprehensive health information for the First Nations population.

Population health assessment and health surveillance are two of the five core functions of a public health system and are the foundation for essential public health activities including:

- Interpretation of disease/injury trends;
- Recognition of emerging diseases;
- Supporting evidence-based public health actions;
- Evaluation of programs/policies and interventions; and,
- Setting priorities and guiding resource allocation.

It is well recognized that there are major gaps in health information of Aboriginal populations, including First Nations people.<sup>1</sup> While some progress has been made, such as the First Nations Regional Longitudinal Health Survey, sources of data and data coverage remain highly fragmented. The continuing health disparities between First Nations and other Canadians underline the need to work collaboratively with stakeholders and partners to develop models that will close existing gaps in First Nations health information and allow for evidence-based public health decision-making.

## Health Canada Activities

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The First Nations and Inuit Health Branch of Health Canada supports the delivery of public health and health promotion services on-reserve and in Inuit communities, and provides some targeted services off-reserve and in urban centres. It provides drug, dental and ancillary health services, regardless of

residence. Ancillary services include vision care, medical supplies and equipment, medical transportation, and mental health intervention counselling. First Nations and Inuit Health Branch also provides primary care services on-reserve in remote and isolated areas, where there are no provincial services readily available.

As of February 2011, the First Nations and Inuit Health Branch funded over 500 health facilities across the country, including 78 nursing stations, 222 health centres, 49 alcohol and drug treatment centres, and nine youth solvent abuse centres. Home and community care were provided in 663 communities, and primary health care was provided in approximately 200 remote communities.

First Nations and Inuit health programs are delivered across the country through the collaborative efforts of headquarters and regional employees working in partnership with First Nations and Inuit communities. Regional offices are located in every province, with the exception of the Atlantic Provinces, which are represented by the Atlantic Region located in Halifax, Nova Scotia. The Northern Region (formerly the Northern Secretariat) -- located in Ottawa and Whitehorse -- is responsible for programs in the Northwest Territories, the Yukon and Nunavut. Each region has its own unique characteristics. First Nations and Inuit Health regional staff (administered under the Health Canada Regions and Programs Branch) play a critical role in ensuring that programs and services effectively respond to the needs of communities within their jurisdiction.

In order to carry out its role effectively, First Nations and Inuit Health Branch, as with First Nations and Inuit communities, needs information on population health status, health determinants and risk factors. To this end, the regional offices collect and report information from various sources. Territories are not required to report vital statistics as they have responsibility for primary health care. However, obligatory reporting requirements are in place for mandatory programs funded through First Nations and Inuit Health Branch Contribution Agreements, including reporting on the provision of communicable disease control and environmental health initiatives. Communicable disease control includes reporting on immunization levels (by age, sex and antigen). This reporting may be required by provincial regulations. For diseases with epidemic potential, the provincial, territorial and regional offices require notification of cases within 24 hours. It should be noted that legislation to support communicable disease control is in the domain of provincial and territorial governments.

Environmental health information, in relation to First Nations and Inuit Health Branch programs, includes the total number and percentage of facilities meeting provincial, territorial or federal health and environmental standards for food services, water supply, sewage and garbage, pollution and hazardous substances. Within 24 hours, communities must also notify Health Canada of any environmental hazards or conditions that may have significant environmental impacts, including the steps taken to remedy the particular situation. Further information on the past and present role of Health Canada in delivering services to First Nations and Inuit can be found on the [Branch website](http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/services_e.html) at [http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/services\\_e.html](http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/services_e.html).

## Provincial and Territorial Activities

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Health care in Canada is largely under provincial and territorial jurisdiction. Therefore, First Nations and Inuit individuals obtain much of their care from the provincial and/or territorial health systems, including hospitals or physicians in private practice. Data relating to these individuals are held in provincial/territorial databases. Other health services (such as dental care, prescriptions and medical supplies), as well as allied health services situated outside of hospitals (such as mental health services, community-based prevention and home care) are generally not provided by provincial governments to First Nations on-reserve. The costs of these additional health services fall to the federal jurisdiction, assigned to Health Canada. For example, the federal government pays for health professionals such as dentists, dental therapists and optometrists who provide services to remote and isolated communities on a visiting basis, or for First Nations and Inuit travelling to larger centres for specialized/emergency treatments.

This section focuses on two main data sources: vital statistics (births and deaths) that are collected by Health Canada's Regions and Programs Branch regional offices, and the Indian Register maintained by Indian and Northern Affairs Canada. Other data sources used to produce demographic indicators are

discussed below.

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## Data Sources

### Terminology

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This report focuses on the Registered (Status) First Nations population in Canada. First Nations are one of the three Aboriginal populations in Canada, along with Inuit and Métis that are recognized under the *Canadian Constitution Act*. Terms related to each definition are not interchangeable; as a result, every effort has been deployed to label correctly each piece of data presented.<sup>2</sup>

#### *First Nation(s)*

A term that came into common usage in the 1970s to replace the word 'Indian', which many people found offensive. Although the term 'First Nation(s)' is widely used, no legal definition of it exists. Many First Nations people have also adopted the term 'First Nation' to replace the word 'Band' in the name of their community. Both Status (Registered) and non-Status (non-Registered) Indian people in Canada are referred to as 'First Nations people(s)'.<sup>2</sup> This report considers only Registered First Nations peoples.

#### *Registered (Status) Indian*

A First Nations person who is registered under the *Indian Act*. The Act sets out requirements for determining who is a Status Indian.<sup>2</sup> A non-status Indian is a First Nations person who is not registered as an Indian under the *Indian Act*. This may be because his or her ancestors were never registered, or because he or she lost Indian status under former provisions of the *Indian Act*.<sup>3</sup>

### Births and Deaths

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For the purposes of this report, vital statistics data for the calendar years 2001 and 2002 were provided by five of Health Canada's regional offices -- Atlantic, Manitoba, Saskatchewan, Alberta, and British Columbia. Birth data were provided by all five regional offices, while death data were provided by Manitoba, Saskatchewan, Alberta and British Columbia regional offices only. Data obtained from Alberta and British Columbia regions included both the on- and off-reserve Registered (Status) First Nations population, while data obtained from Atlantic, Manitoba and Saskatchewan regions included only the on-reserve Registered First Nations population. Birth and death data from Quebec and Ontario regions, as well as death data from Atlantic region have not been presented due to unreliable data quality.

The methods used to extract and collate birth and death vital events varied according to region, as do the limitations associated with the collection of these data. Methods and limitations for the regions included in this report are summarized briefly in [Table 1](#) and are based on work completed by Green<sup>4</sup>. Through Health Canada's Regions and Programs Branch regional offices, First Nations and Inuit Health Branch headquarters received vital statistics for Registered First Nations.

In summary, the method of collecting and identifying birth and death data for the First Nations population varies considerably across regions. Generally, information based on provincial birth and death registrations (or certificates) is the most valid source of data for vital statistics. This information is collected by the province, and in some instances, is shared with Health Canada's regional offices through varied mechanisms. Information on Aboriginal identity is also collected on birth or death certificates for some provinces but this information is often considered to be an optional field and it is often incomplete. In order to correctly identify vital events, all regions included in this report, with the exception of Atlantic, use some form of manual review or file linkage systems, generally in combination with either community reporting or voluntary identification of Aboriginal identity on birth and death registrations, in order to identify birth and death events. The method used for file linkage varies across regions; for example, Saskatchewan completes manual queries, while British Columbia's process includes a probabilistic matching routine. It should be noted that some regions rely exclusively on reports of vital events from First Nations communities.<sup>4</sup>



**Table 1. Methods used to Extract and Collate First Nations Vital Events, by Region**

Region	Identification of First Nations Status on Provincial/Territorial (P/T) Registry for Vital Events	Birth and Death Information obtained from P/T Registry for Vital Events	Method of Collection for First Nations Data	ICD Coding (Deaths)
Atlantic <sup>1</sup>	No <sup>1</sup> , <sup>2</sup>	No	Passive system, regional office receives birth reports through fax-based reporting system	N/A <sup>1</sup>
Manitoba	Optional (by self-identification)	Yes	Manual review of available records	ICD-10
Saskatchewan	Optional	Yes	Manual review of records completed at regional office	ICD-10
Alberta	No	Yes	File linkages and manual review of records completed at regional office	ICD-10
British Columbia	Optional	Yes	File linkages	ICD-10

<sup>1</sup> In the Atlantic region, only birth data were included in the report.

<sup>2</sup> In the Atlantic region, with the exception of the province of New Brunswick, there is no identification of First Nations Status on P/T registry for births and deaths.

Note:

ICD-10 refers to International Classification of Diseases, Version 10.

Source: Green, ME. Final Report: Reporting Infant Mortality Rates for Aboriginal Populations in Canada: A Jurisdictional Review of Methodologies. Unpublished; 2007.

## Indian Register

The Indian Register is the official record kept by Indian and Northern Affairs Canada of all Status/Registered Indians in Canada.<sup>5</sup> It includes populations living on- and off-reserve. Information on this list concerning the demographic characteristics of the Status/Registered Indian population is updated when vital or administrative events (for example, births, deaths, marriages, Band transfers) are reported to Indian and Northern Affairs Canada. These events are reported to Indian and Northern Affairs Canada by nearly 500 Indian Registry Administrators, most of whom are located in individual Bands. The Indian Register does not collect health specific information such as cause of death or birth weights.

The Indian Register is subject to error through late reporting and under-reporting of births and deaths; the average lag in reporting is 2.75 years for births and 1.5 years for deaths. Analysis suggests that the extent of late birth reporting is much larger among the off-reserve population.<sup>6</sup> This also would most likely hold true for the reporting of deaths. To account for late reporting and under-reporting of vital events, it is necessary to make adjustments to the Register.<sup>5</sup>

The Register also contains a residency code which indicates if an individual's type of residence is classified as on- or off-reserve. This code is not a mandatory data field, and is only updated in conjunction with other events such as those described above. Therefore, its accuracy is uncertain, at best. To the (unknown) extent that on-reserve and off-reserve populations differ, the inclusion of off-reserve individuals for some regions and their exclusion for others will introduce errors into the results.

The estimates of the Registered First Nations population produced by Indian and Northern Affairs Canada, based on the Indian Register, correspond best to the birth and death data presented in this report. These estimates were thus used as denominators for subsequent rate calculations. Population estimates were obtained from regions for which numerator data were available for 2001 and 2002 -- Atlantic, Manitoba and Saskatchewan (on-reserve); and Alberta and British Columbia (on- and off-reserve). This data source was also used for the purposes of describing population trends, and age and sex composition of the First Nations population in Canada.

The Census of Population (Statistics Canada) is another data source that estimates the population of

Registered First Nations in Canada. The Census uses a different method to identify Registered First Nations populations and as a result produces different estimates for the Registered First Nations populations. However, population estimates based on the Indian Registry are the authoritative source for Registered Indian demography, and hence, were used in this report.

## Other Data Sources

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The following data sources were used to obtain additional demographic indicators presented in this report:

- Final intercensal estimates for 2001 and 2002 based on the 2001 Census of Population (Statistics Canada) were used in order to obtain population estimates for the general Canadian population; and information on the composition of the general Canadian population.<sup>7</sup>
- Birth and death data for the appropriate general Canadian population were provided to Health Canada from the Canadian Vital Statistics databases at Statistics Canada with the knowledge and consent of the provincial and territorial vital statistics registries which supply the data to Statistics Canada. Their cooperation is gratefully acknowledged<sup>8,9</sup> Birth and death data were extracted by place of residence.
- Life expectancy data for the First Nations and general Canadian populations were obtained from a published report produced by Indian and Northern Affairs Canada.<sup>5</sup> Life expectancy estimates obtained from this source include all provinces and territories.

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## Methods and Limitations

### Births and Deaths

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In order to provide increased stability to birth and death rates, two calendar years of data (2001 and 2002) were combined.

Live birth data for Registered First Nations submitted by Health Canada's regional offices in Atlantic, Manitoba, Saskatchewan, Alberta, and British Columbia regions included information on maternal age and birth weight. Of the live birth data used in this report approximately 95 percent of the records were complete.

Death data for Registered First Nations submitted by Health Canada's regional offices in Manitoba, Saskatchewan, Alberta, and British Columbia included information on cause of death and age at death. Mortality data was categorized by the International Classification of Diseases, Version 10; codes and details of codes are provided in [Appendix 1](#). Of the death data used in this report approximately 87 percent of the records were complete for infant deaths (<1 year of age at death), and 93 percent of the records were complete for non-infants deaths (≥1 year of age at death).

In addition, coverage for all birth and death events may be incomplete. There is currently no method to identify unreported cases; thus there is no way to determine the accuracy of reported events.

### Calculation of Rates

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#### *Population (Denominator)*

As previously mentioned, in order to calculate accurate rates, it is necessary to use a denominator that corresponds well with the numerator, in this case, a denominator that represents the population to which the people included in the numerator belong. The population used for this report was derived from projected population estimates for the years 2001 and 2002 produced by Indian and Northern Affairs Canada. These rates are based on reported Indian Register data.

#### *Rates/Indicators*

- *Live Birth Rate*



The birth rate is calculated by dividing the number of live births in a given year by the Indian and Northern Affairs Canada population estimates for the same calendar year. The rate is expressed as the number of live births per 1,000 population per year. Since this is a crude rate, it is affected by the age distribution of a population. It is useful for estimating the growth rate in a population, as well as planning for reproductive health care.

- *Fertility Rate*

The fertility rate is calculated by dividing the number of live births by the number of females of reproductive age (15 to 44 years of age). The rate is expressed as the number of live births per 1,000 female population per year. Usually it is calculated for five-year age groups, and is thus an age-specific rate. It reflects the reproductive performance of a population, and is less affected by the age distribution of the population because it is age-specific.

- *Total Fertility Rate*

The total fertility rate is the sum of the age-specific fertility rates, usually 5-year rates, for women of reproductive age (15 to 44 years of age) during a specified time period, and represents the average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children at the age-specific rates for that year. About 2.1 live births per woman are necessary for a population to replace itself; the extra 0.1 is necessary to account for female children who die before reaching reproductive age.<sup>[10](#)</sup>

- *Infant Mortality Rate*

The infant mortality rate is the number of infants who die during their first year of life, per thousand live born infants; and can be calculated using cohort (gold standard) or cross-sectional methods.<sup>[11](#)</sup> In this report, we did not calculate the infant mortality rate because data for Registered First Nations are incomplete. However, we do report the distribution of the primary causes of deaths for infants who die during their first year of life.

- *Crude Mortality Rate*

The crude mortality rate is calculated by dividing the number of deaths during a year by the total population for the same calendar year. It is expressed as the number of deaths per 1,000 population per year for both all-cause mortality and cause-specific mortality. Like the (crude) birth rate, it is useful in estimating population growth rate; however, it is greatly influenced by the age of the population, so is less useful for indicating the level of health.

- *Rate of Natural Increase (Growth Rate of Population)*

The rate of natural increase is a measure of population growth (in the absence of migration). It is the difference between the crude birth rate and crude death rate.

- *Age-Specific Mortality Rates*

Age-specific mortality rates are the number of deaths for a specified age group divided by the population of the same age group. It is expressed as the number of deaths per 1,000 population (for *all-causes mortality*) or per 100,000 population (for *cause-specific mortality*) per year. If the age groups are reasonably narrow, they are not influenced by the age composition of the population.

- *Age-Standardized Mortality Rates*

To compare mortality rates in the First Nations population with the general Canadian population age-standardized rates were calculated. Age-standardized rates are expressed as the number of

deaths per 1,000 population (for *all-causes mortality*) or per 100,000 population (for *cause-specific mortality*) per year. The age-standardized rate is calculated by using the direct method, multiplying the age-specific mortality rates of a population by the standard population of the same age groups to yield expected numbers of deaths. These are then added across age groups and the sum divided by the total standard population. The age-standardized rate represents what the crude rate would have been in the study population if it had the same age distribution as the standard population. Thus, it adjusts for differences in the age distributions of the populations being compared, in this case the First Nations and general Canadian populations. In this report, the standard population used is the 2001 and 2002 First Nations population. This is different from the usual practice of standardizing to the national population and was done so that the crude rate would be maintained for the First Nations population, allowing one to estimate the excess deaths directly. Standardizing to the national population would yield an artificial figure for the First Nations population.

- *Life Expectancy*

This is the estimated average number of years a newborn baby can be expected to live if current mortality trends continue, and is an artificial measure. Life expectancy is calculated using a life table, for which the only input is age-specific mortality rates. Life expectancy can be validly compared across populations with different age distributions.

- *Potential Years of Life Lost*

Potential years of life lost, is calculated by using the Canadian Institute for Health Information standard definition, and is expressed as a rate per 100,000 population per year (crude or age-standardized). "Potential" life is lost when a person dies before the age of 75 years. Potential years of life lost can be calculated for all causes or for specific causes.

- *Age-standardized Potential Years of life Lost*

Similar to age-standardized mortality rates, age-standardized potential years of lives lost were calculated. Specifically, in this report the standard population used is the 2001 and 2002 First Nations population.

- *Average Rate*

An average rate was calculated by dividing the sum of the number of vital events, that is, births or deaths for 2001 and 2002, by the sum of the Indian Register population for 2001 and 2002.

- *Confidence Intervals*

All data presented have an associated 95 percent confidence interval. The confidence interval illustrates the amount of chance error associated with a rate. Wide confidence intervals indicate high variability (low precision), thus, these rates should be interpreted and compared with due caution. Some age-standardized rates were suppressed due to both a very small underlying count and extremely high variability. Confidence intervals can also be used to determine whether a rate in one population is statistically below, above or no different than the rate for the same indicator in another population. In this report, only differences where confidence intervals do not overlap are highlighted, which is a very conservative approach. Confidence interval formulas can be found in [Appendix 2](#).

## Comparison of Rates

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In this report, demographic indicators among Registered First Nations in Atlantic (birth data only) and Western Canada are compared to indicators in the corresponding general Canadian population. The general Canadian population includes only those provinces for which comparable Registered First Nations data were available (i.e. Atlantic (birth data only), Manitoba, Saskatchewan, Alberta, and British Columbia). In this report, demographic indicators were reported as crude, age-specific and/or

age-standardized rates (described in detail in previous section). Ratios (relative comparisons) and differences (absolute comparisons) were calculated to enable a single figure comparison of demographic indicators of the two separate population groups (First Nations and general Canadian population), and are defined as follows:

- *Rate ratio*: divides the birth or death rate of the First Nations population by the birth or death rate for the corresponding general Canadian population. The ratios of the rates for First Nations to the corresponding rates for the general Canadian population indicate the relative magnitude of the two rates. A rate ratio of 1.0 indicates that the First Nations and general Canadian population both experience the same birth or death rate. A rate ratio greater than 1.0 indicates that First Nations people experience more births or deaths, while a rate ratio less than 1.0 indicates that First Nations people experience fewer births or deaths than the general Canadian population.
- *Rate difference*: subtracts the birth or death rate for the general Canadian population from the birth or death rate for the First Nations population. The differences between the two values indicate the difference in health status carried by the First Nations population, in absolute terms. Differences take into account the frequency of the condition, and provide a basis for estimating the magnitude of any intervention that is indicated. A positive rate difference indicates the excess birth or death rate in the First Nations population, while a negative rate difference indicates the excess birth or death rate in the general Canadian population.

When making the comparisons, differences and/or ratios are presented where appropriate. In addition, when cause-specific rates are being compared the differences can also be expressed as percentages of the total all-causes difference (provided the differences are all in the same direction) or as percentages of the First Nations rates.

## Limitations

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In assessing these rates, it should be noted that for some regions the on- and off-reserve Registered (Status) First Nations population are included in the analyses (Alberta and British Columbia), while for others, only on-reserve Registered First Nations are included (Atlantic (birth data only), Manitoba and Saskatchewan). If, for example, the fertility rates of on-reserve and off-reserve women are different, the summarized rates will not accurately reflect the whole Registered First Nations population. Additionally, the residency code, used to identify type of residence as on- or off-reserve, is not a mandatory data field in the Indian Register, and is only updated in conjunction with other events. Data are unavailable to complete a comparison of birth and death rates in on- and off-reserve First Nations populations.

Other issues can lead to problems with reporting of births and deaths. In some cases an event may not be recorded at all, and in other cases, albeit rarely, an event may be recorded multiple times.<sup>4</sup> Remoteness and lack of health services for many First Nations communities mean that some births or deaths occur in regions where health facilities do not exist. In addition, individuals may be required to travel outside of their home community to receive medical care. Lack of information on Aboriginal identity on vital events is also a cause of incomplete birth or death information. However, as there is no method to identify unreported cases there is no way of determining the degree to which the reported events are accurate.

Finally, it has not been possible to present longitudinal data as the population base and the rate calculation method used in this report differ from previous reports. Thus, findings in this report should not be compared to previously published results. It should be noted however, that future reports will use the population base and methods of this report, so longitudinal comparisons will become possible.

## Results and Discussion

For the purposes of this report, vital statistics data for the calendar years 2001 and 2002 were provided by five of Health Canada's regional offices -- Atlantic, Manitoba, Saskatchewan, Alberta, and British Columbia. Birth data for Registered (Status) First Nations were provided by all five regional offices, while death data for Registered First Nations were provided by Manitoba, Saskatchewan, Alberta and British Columbia regional offices only. Data obtained from Alberta and British Columbia regions included both the on- and off-reserve Registered First Nations population, while data obtained from Atlantic, Manitoba and

Saskatchewan regions included only the on-reserve Registered First Nations population.

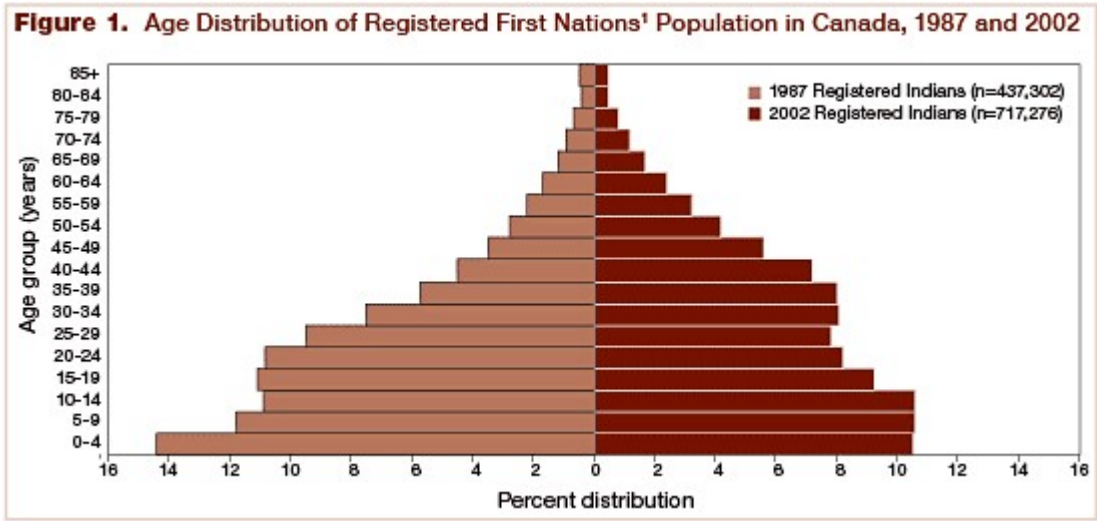
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## Population

The limitations of these data were previously described in the [Methods and Limitations](#) section.

### Age Distribution of the First Nations Population in Canada

**Figure 1** shows the changes in the age distribution of the Registered (Status) First Nations population between 1987 and 2002. In 1985, the Parliament of Canada passed Bill C-31 (amendment to the *Indian Act*) which allowed for new registrations and the reinstatement of Indian status of eligible individuals. This has had a major impact on the demography of the First Nations population, as approximately 113,354 people regained or acquired Indian status by December 31, 2003.<sup>[12](#)</sup>



1 Includes on- and off-reserve populations for all provinces and territories, excluding Nunavut.

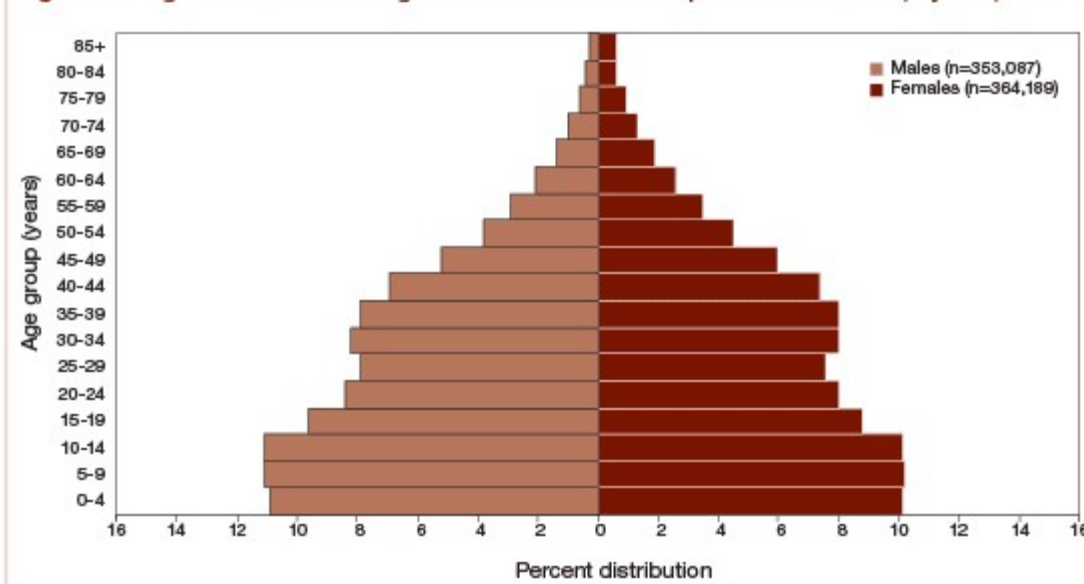
**Notes:**

- a) The projected Indian Register population for 2002 was calculated using the base population from the Indian Register as of December 31, 2000. The base population has been adjusted for late / under reporting of births and deaths.
- b) Detailed estimates can be found in [Appendix 3](#).

**Source:** Population Projections of Registered Indians, 2000-2021, Indian and Northern Affairs Canada, 2002.

The 2002 population of Registered First Nations in Canada numbered 717,276 according to estimates produced from the Indian Registry. Over the 15 year period from 1987 to 2002, the proportion of the population under 25 years of age fell by 9.9 percentage points, from 59.0 percent to 49.1 percent. The proportion of the population aged 25 to 64 years rose by 9.1 percentage points, from 37.3 percent in 1987 to 46.4 percent in 2002, and there was a marked increase in population in the age groups from 30 to 49 years. The proportion of the population aged 65 years and over increased by 0.8 percentage points, from 3.7 percent to 4.5 percent. These findings suggest that there has been a modest shift in the First Nations population to older age groups, although it still remains very young overall.

**Figure 2. Age Distribution of Registered First Nations<sup>1</sup> Population in Canada, by Sex, 2002**



1 Includes on- and off-reserve populations for all provinces and territories, excluding Nunavut.

**Notes:**

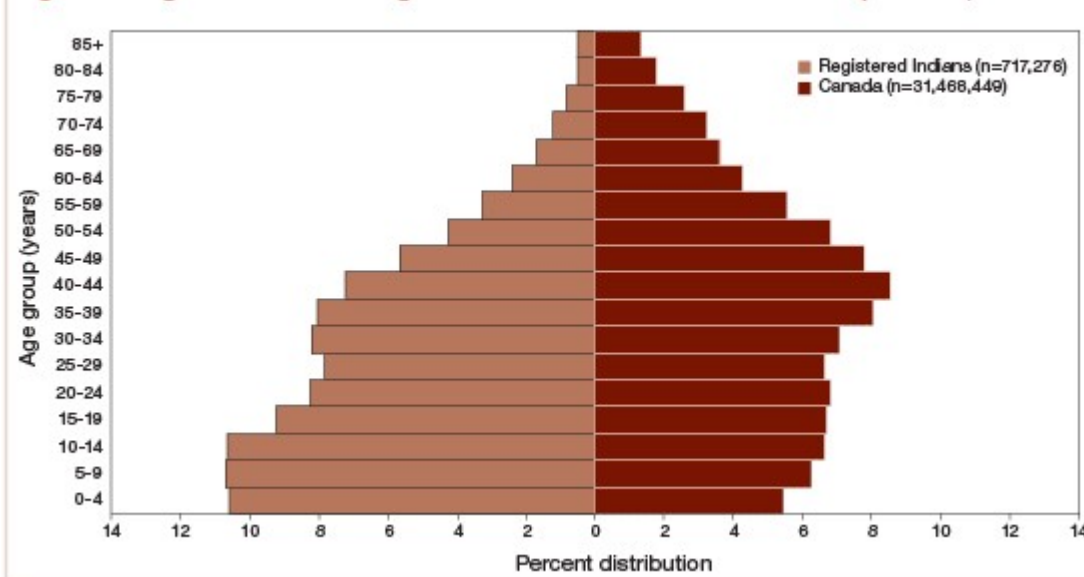
- a) The projected Indian Register population for 2002 was calculated using the base population from the Indian Register as of December 31, 2000. The base population has been adjusted for late / under reporting of births and deaths.
- b) Detailed estimates can be found in [Appendix 3](#).

**Source:** Population Projections of Registered Indians, 2000-2021, Indian and Northern Affairs Canada, 2002.

**Figure 2** presents the distribution of the Registered First Nations population by sex in 2002. The 2002 population consisted of 49.2 percent males and 50.8 percent females. As in most populations, there are more males at younger ages (more boys are born than girls), and more females at older ages (females live longer on average). Males outnumbered females in all age groups up to 29 years.

## Comparison of Age Distribution of First Nations and Canadian Populations

**Figure 3. Age Distribution of Registered First Nations<sup>1</sup> and Canadian<sup>2</sup> Populations, 2002**



1 Includes on- and off-reserve populations for all provinces and territories, excluding Nunavut.

2 Includes populations for all provinces and territories.

**Notes:**

- a) The projected Indian Register population for 2002 was calculated using the base population from the Indian Register as of December 31, 2000. The base population has been adjusted for late / under reporting of births and deaths.
- b) Detailed estimates can be found in [Appendix 3](#).

**Source:** Population Projections of Registered Indians, 2000-2021, Indian and Northern Affairs Canada, 2002; 2001 Census Population, Statistics Canada, 2001.

**Figure 3** compares the age distributions of the Registered First Nations and total Canadian populations. The First Nations population is younger and barely shows the peak seen at 35 to 49 years of age that is evident in the general Canadian population. The First Nations population peaks at 0 to 14 years of age, accounting for 31.7 percent of the total population, whereas the general Canadian population peaks at 35 to 49 years of age, representing 24.5 percent of the total population. The greatest difference in the population distribution occurs for the age group from 0 to 4 years, where the proportion within the First Nations population is 10.5 percent compared to 5.5 percent in the general Canadian population. The proportion of the First Nations population under 25 years of age is 49.1 percent, while the percentage of the general Canadian population in this age range is 32.1 percent. The proportion of the First Nations population over 65 years of age is 4.5 percent; in the general Canadian population it is almost three times higher, at 12.8 percent.

More recent population data for the Registered First Nations and Canadian populations can be obtained through Indian and Northern Affairs Canada and Statistics Canada, respectively.

## Perinatal and Reproductive Health

The limitations of these data have been previously described in the [Methods and Limitations](#) section.

Birth data submitted by Health Canada's regional offices in Atlantic, Manitoba, Saskatchewan, Alberta, and British Columbia regions included information on maternal age and birth weight for Registered (Status) First Nations. Of the live birth data used in this report approximately 95 percent of the records were complete. Birth data for the appropriate Canadian population were provided to Health Canada from the Canadian Vital Statistics databases at Statistics Canada with the knowledge and consent of the provincial and territorial vital statistics registries which supply the data to Statistics Canada. Birth data for the Canadian population were extracted by place of residence of mother.

## Birth Rates

Previous research on birth rates among Registered First Nations (based on data from Health Canada regional offices) suggests a slight decline in rates, from a peak of 30.1 births per 1,000 population in 1987 down to 27.5 in 1993.<sup>13</sup> Although not directly comparable to previous estimates from 1987 and 1993, the birth rate in 2000 among First Nations was 23.4 per 1,000 population.<sup>2</sup>

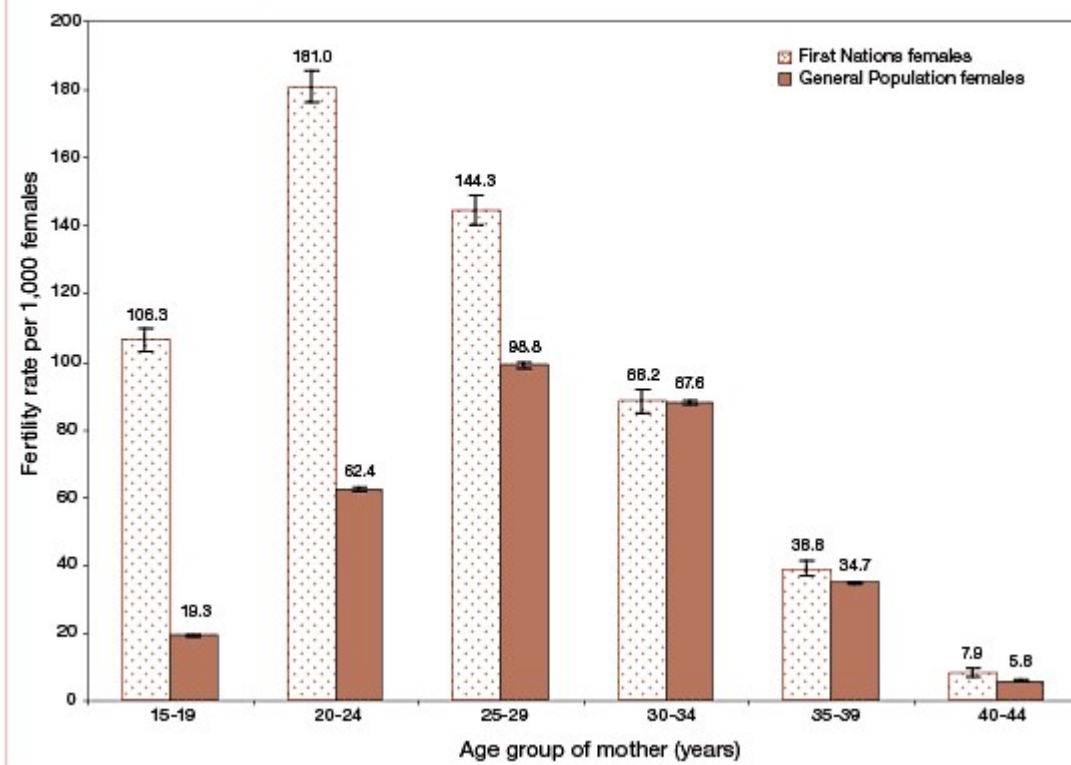
In this report, the 2001-2002 (average) First Nations rate of 24.0 births per 1,000 population (95 percent confidence interval: 23.6, 24.3) in participating regions was more than twice the corresponding Atlantic and Western general population birth rate (10.8 per 1,000 population, 95 percent confidence interval: 10.8, 10.9). This is at least partly due to the fact that the First Nations population is substantially younger. Since this is a crude birth rate, it is affected by the age distribution of the population.

## Fertility Rates

A high (crude) birth rate may be due to a young population or to high fertility. Fertility rates differ from birth rates in that fertility rates limit their denominators to the female population of reproductive age (15 to 44 years of age). Age-specific fertility rates for Registered First Nations and the corresponding Atlantic and Western population in 2001-2002 (average) are provided in **Figure 4** and [Table A4](#) in [Appendix 3](#).



**Figure 4. Age-specific Fertility Rates per 1,000 population, by Age Group of Mother, Registered First Nations<sup>1</sup> and General Population<sup>2</sup>, Atlantic and Western Canada, 2001-2002 (average)**



1 Includes on-reserve populations for Atlantic, Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

2 Includes the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Alberta and British Columbia.

#### Notes:

- Age-specific fertility rates for the First Nations and general populations are an average of the birth data for 2001 and 2002.
- First Nations population data exclude 131 births in 2001 and 177 births in 2002 where mother's age was not recorded.
- General population data were extracted by residence of mother.
- General population data exclude 11 births where mother's age was not recorded.
- Bars represent 95 percent confidence intervals.
- Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Birth Database, Statistics Canada, 2010.

In assessing these rates, it should be noted that for some regions on- and off-reserve Registered First Nations are included in the analyses, while for others, only on-reserve Registered First Nations are included. If the fertility rates of on-reserve and off-reserve women are different, the summarized rates will not accurately reflect the whole First Nations population.

The fertility rate for First Nations is higher than the corresponding population in Atlantic and Western Canada for the three youngest age groups (15 to 19; 20 to 24 and 25 to 29 years of age) and two oldest age groups (35 to 39 and 40 to 44 years of age). Additionally, there is an observed peak in the fertility rate of First Nations females aged 20 to 24 years, after which, the fertility rate declines with increasing age. The fertility rate of females in the corresponding general population peaks at a slightly older age (25 to 29 years of age).

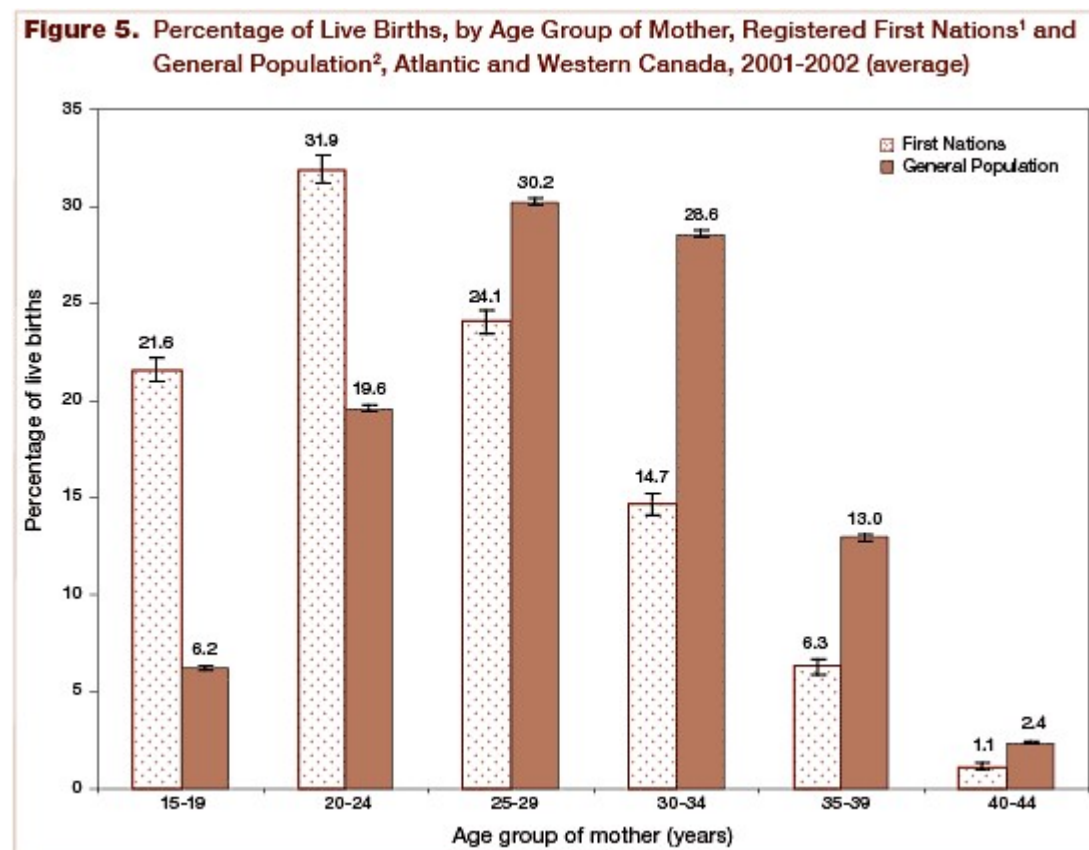
The fertility rate for First Nations females aged 15 to 19 years is 106.3 live births per 1,000 females (95 percent confidence interval: 102.9, 109.8); this is 5.5 times higher than the fertility rate of the corresponding population in Atlantic and Western Canada at 19.3 live births per 1,000 females (95 percent confidence interval: 19.0, 19.7). The fertility rate for First Nations females aged 20 to 24 years is 2.9 times higher than that of the corresponding general population (181.0 versus 62.4 per 1,000 female

population). The largest difference (118.5 per 1,000 live births) of First Nations to general population fertility rates occurs in women aged 20 to 24 years, and this age group accounts for 46 percent of the total difference in fertility. It is clear that First Nations will comprise an increasing proportion of the Canadian-born population for at least the next several decades.

The total fertility rate, which presents the average number of live-born babies per woman during her lifetime (refer to [Table A4](#) in [Appendix 3](#) for calculation of total fertility rate), was calculated for both populations. The total fertility rates for Registered First Nations and the corresponding general population in Atlantic and Western Canada (2.8 versus 1.5 births per female) are sharply different, and most of the difference in birth rates is due to the higher fertility in the First Nations population. Most of this high fertility occurs in the youngest women, who also comprise a larger proportion of the First Nations population than of the general population.

## Maternal Age Distribution

**Figure 5** shows the reported number of live births by maternal age group, as a percentage of total known live births, for the Registered First Nations and corresponding general populations between the ages of 15 and 49 years in Atlantic and Western Canada. Approximately one-fifth (21.6 percent) of First Nations births involve females between the ages of 15 to 19 years of age. The largest proportion of known First Nations births occurred among 20 to 24 year olds (31.9 percent), whereas the largest proportion of births in the general population occurred among 25 to 29 year olds (30.2 percent). The proportion of the First Nations female population that gave birth under the age of 25 years is 53.5 percent, much higher than the 25.8 percent observed in the general population. The proportion of the First Nations female population that gave birth over the age of 34 years is 7.4 percent, much lower than the 15.3 percent observed in the general population.



1 Includes on-reserve populations for Atlantic, Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

2 Includes the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Alberta and British Columbia.

Notes:

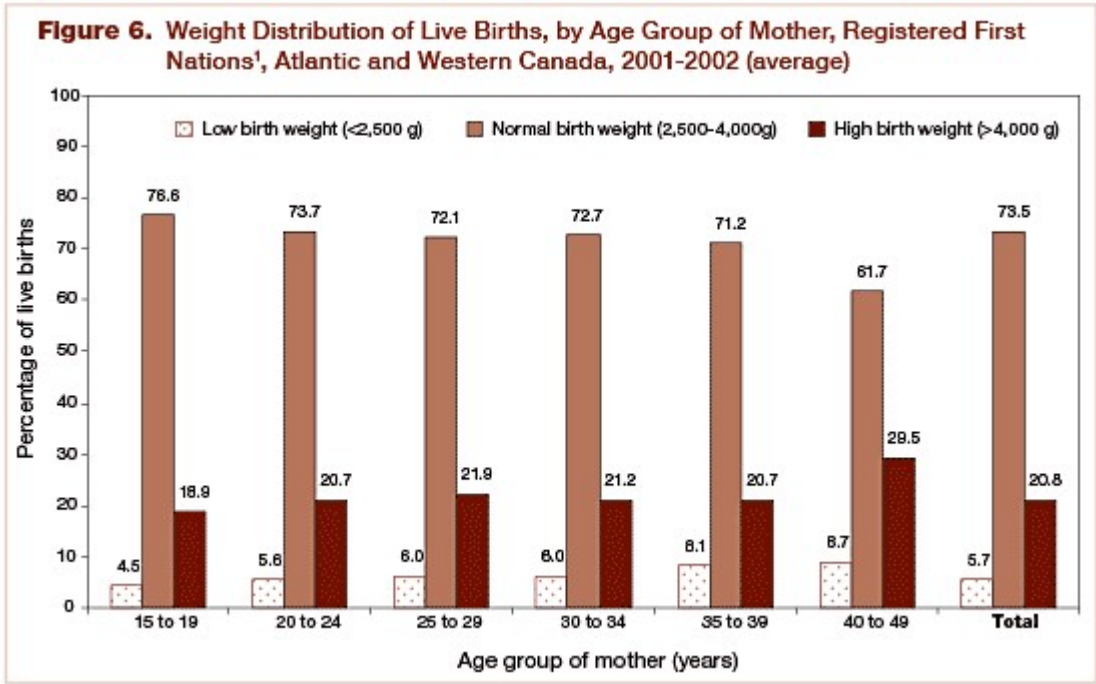
- a) Percentages of live births for the First Nations and general populations are an average of the birth data for 2001 and 2002.
- b) First Nations population data exclude 131 births in 2001 and 177 births in 2002 where mother's age was not recorded, and one record where mother's age was inva-lid.
- c) General population data were extracted by residence of mother.
- d) General population data exclude 17 births where mother's age was not recorded or invalid.
- e) Bars represent 95 percent confidence intervals.
- f) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Birth Database, Statistics Canada, 2010.

High fertility (high number of babies per woman) and a young population (high proportion of women of reproductive age) combine to produce a higher birth rate in the First Nations population. This in itself, apart from any higher incidence of reproductive health problems, means that maternal and child health services are in high demand for the First Nations population. In order for a population to replace itself, its women must have an average of approximately 2.1 live births each (the extra 0.1 being needed to compensate for newborns who do not survive to reproductive age).<sup>10</sup> At roughly 1.5 live births per female, the general population in Atlantic and Western Canada is not replacing itself, and has not been for many years. Conversely, the First Nations population included in this report has birth rates well above replacement level (2.8 live births per female).

Birth Weight

For this report, international definitions of birth weight have been used. Low birth weight has been defined as a birth weight of less than 2,500 grams and high birth weight is defined as a birth weight of greater than 4,000 grams.<sup>14-16</sup> **Figure 6** presents the birth weight data for Registered First Nations in Atlantic and Western Canada, by age group of mother.



1 Includes on-reserve populations for Atlantic, Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

Notes:

- a) Birth weights as a percentage of live births for the First Nations population are an average of the birth data for 2001 and 2002.
- b) Data exclude 466 births in 2001 and 389 births in 2002 where birth weight or mother's age was not recorded.
- c) General population data were extracted by residence of mother.
- d) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.

Of all known live births among First Nations, 5.7 percent are of low birth weight and 20.8 percent are of high birth weight (all age groups combined). The proportion of live births that are classified as underweight increases from 4.5 percent for mothers aged 15 to 19 years to 8.7 percent for mothers aged 40 to 49. Mothers aged 40 to 49 years have the highest proportion of high birth weight infants (29.5 percent), 1.6 times higher than the proportion of high birth weight infants born to mothers aged 15 to 19 years.

**Table 2** shows the distribution of low and high birth weights as a percentage of live births in maternal age groups for the Registered First Nations and corresponding general populations between the ages of 15 and 49 years in Atlantic and Western Canada. First Nations populations in Atlantic and Western Canada had a higher proportion of high birth weights among live births in all age groups in comparison to the corresponding general population. The distribution of low birth weights was similar across populations for most age groups, with the exception of the 15 to 19 and the 25 to 29 year age groups.

Epidemiological evidence indicates that low birth weight infants are more likely to die in comparison to heavier infants.<sup>17</sup> In addition, low birth weight has been associated with other poor health outcomes including fetal and neonatal mortality and morbidity; inhibited growth and cognitive development, as well as chronic diseases later in life.<sup>18</sup> Low birth weight is usually a result of preterm birth or restricted fetal growth.<sup>17</sup> Many factors affect the duration of gestation and fetal growth including the diet of the mother (and thus, her body composition at conception), physiological factors, and socio-economic conditions.<sup>15</sup>

One of the major concerns during high birth weight pregnancies is the increased need for medical intervention. Infant birth trauma, asphyxia, meconium aspiration and metabolic complications are most frequently associated with increased infant size.<sup>19</sup> However, Rodrigues *et alia*, noted that the frequency of caesarean delivery among the Cree was not higher among high birth weight (macrosomic) than among non-macrosomic birth weight infants.<sup>20</sup> In addition, Rodrigues *et alia*, added that the high mean birth weight of Aboriginal infants may be genetic due to differences in fetal growth.<sup>20</sup> Another concern is the relationship between high birth weight infants and diabetes among First Nations. McCance *et alia*, noted that the relationship between high birth weight and diabetes was largely explained by the presence of maternal diabetes during pregnancy.<sup>21</sup> Furthermore, in a study detailing the prevalence, trends and characteristics of macrosomia among First Nations in British Columbia, Kierans *et alia*, concluded that there was a higher risk of high birth weight among births to diabetic First Nations mothers in British Columbia.<sup>22</sup>

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**Table 2. Low and High Birth Weights as a Percentage of Live Births, by Age Group of Mother, Reg-istered First Nations<sup>1</sup> and General Population<sup>2</sup>, Atlantic and Western Canada, 2001-2002 (average)**

Age Group	Low birth weight (<2,500 g)		High birth weight (>4,000 g)	
	First Nations Percentage (95 percent CI; LCI, UCI)	General Population Percentage (95 percent CI; LCI, UCI)	First Nations Percentage (95 percent CI; LCI, UCI)	General Population Percentage (95 percent CI; LCI, UCI)
15 to 19	4.5 (3.8, 5.2)	6.0 (5.6, 6.4)	18.9 (17.6, 20.2)	13.3 (12.8, 13.9)
20 to 24	5.6 (5.0, 6.2)	5.7 (5.5, 5.9)	20.7 (19.6, 21.8)	13.6 (13.3, 13.9)
25 to 29	6.0 (5.2, 6.7)	5.0 (4.8, 5.1)	21.9 (20.6, 23.2)	14.7 (14.4, 14.9)
30 to 34	6.0 (5.1, 7.0)	5.2 (5.1, 5.4)	21.2 (19.6, 22.9)	15.0 (14.8, 15.3)
35 to 39	8.1 (6.4, 9.7)	6.7 (6.4, 6.9)	20.7 (18.2, 23.2)	14.3 (14.0, 14.7)
40 to 49	8.7 (4.7, 12.8)	8.1 (7.4, 8.8)	29.5 (22.9, 36.1)	14.1 (13.2, 14.9)

<sup>1</sup> Includes on-reserve populations for Atlantic, Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

<sup>2</sup> Includes the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Alberta and British Columbia.

**Notes:**

a) Birth weights as a percentage of live births for the First Nations and general populations are an average of the birth data for 2001 and 2002.

b) Data exclude 466 births in 2001 and 389 births in 2002 where birth weight or mother's age was not recorded.

c) General population data were extracted by residence of mother.

- d) General population data exclude 17 births where mother's age was not recorded or invalid and 248 records where birth weight was invalid or missing.
- e) CI refers to confidence interval; LCI refers to the lower confidence limit; and UCI refers to the upper confidence limit.
- f) Confidence intervals that do not overlap between populations are bolded.
- g) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Birth Database, Statistics Canada, 2010.

## Infant Mortality

Infant mortality is defined as the death of an infant during his or her first year of life.<sup>10</sup> The infant mortality rate Infant Mortality Rate is an important measure of the well-being of infants, children, and pregnant women because it is associated with a variety of factors such as maternal health, access to health care, the quality of health care, socio-economic conditions, and public health practices.<sup>11</sup> Infant mortality rate is the single most comprehensive indicator of the level of health development in a society and is recognized internationally in its inclusion in the Millennium Development Goals (Goal 4, Indicator 14), where the target calls for a reduction in child mortality, which includes infant mortality.<sup>23</sup>

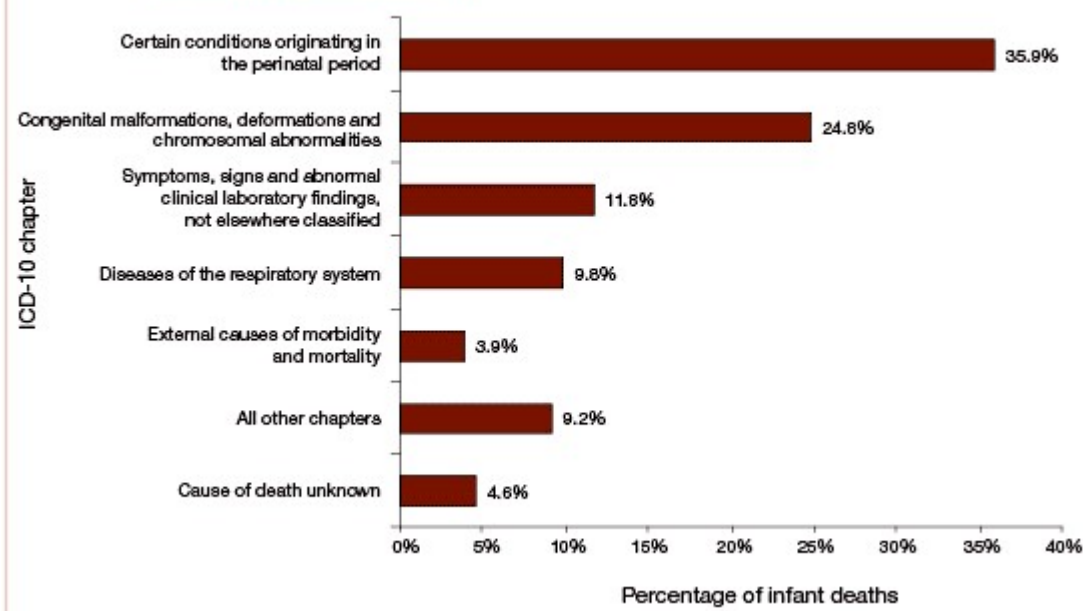
Unfortunately, current Canadian data systems fail to capture a significant number of First Nations infant deaths, resulting in incomplete data on this important indicator -- it is therefore not possible to report infant mortality for First Nations populations in Canada. The significant lack of First Nations-specific data on this indicator affects the ability of public health practitioners to identify and respond to conditions leading to First Nations infant illness and death. Measuring the infant mortality rate especially for the First Nations population, is a complex and challenging task. The challenge originates from the inability to link infant birth and death registrations, the lack of First Nations, Inuit and Métis identifiers in vital statistics databases, and infant deaths that are not reported to health information offices.

Concerns surrounding the coverage and quality of previously published First Nations infant mortality data have been expressed.<sup>24</sup> Consequently, the Joint Working Group on Infant Mortality was organized to improve the accuracy, reliability, coverage and appropriateness of First Nations, Inuit, and Métis infant mortality data.<sup>11</sup> This group consists of national Aboriginal governance groups and federal and provincial/territorial stakeholders.

Recently, the Joint Working Group on Infant Mortality conducted a systematic review of published literature for research surrounding the calculation of infant mortality rates for First Nations, Inuit, and Métis populations in Canada. This review presented current methodologies used in calculating infant mortality rates among Aboriginal populations, and their associated limitations. In terms of First Nations data, only two studies have produced high quality, albeit geographically limited, infant mortality rates.<sup>25,26</sup> and the data presented in these two studies indicate that the First Nations infant mortality rate has been declining, but remains consistently and considerably high compared to non-Aboriginal rates.<sup>11,26</sup> Specifically, Luo et alia linked birth and infant death data from 1981 to 2000 from the British Columbia Vital Statistics Agency to the Status Verification System file from the First Nations Inuit Health Branch, and to the Status Indian Entitlement Files from the British Columbia Medical Services Plan.<sup>26</sup> Results suggested that infant mortality rates among First Nations were approximately two times higher than among non-First Nations in British Columbia, with a greater rate disparity in rural areas (13.8 versus 6.1 deaths per 1,000 live births in rural areas; 12.7 versus 6.1 deaths per 1,000 live births in urban areas). This rate disparity was also present in the second study, which used vital statistics data from Manitoba from 1991 to 2000.<sup>25</sup> Data summarized in the systematic review indicated that the infant mortality rate for First Nations was twice that of non-First Nations in Manitoba (9.8 versus 5.0 per 1,000, respectively).<sup>11</sup> The national infant mortality rate for the First Nations population in Canada as a whole remains unavailable.



**Figure 7. Causes of Infant Deaths<sup>1</sup> by ICD-10 Chapter<sup>2</sup>, Registered First Nations<sup>3</sup>, Western Canada, 2001-2002 (average)**



1 Represents those deaths reported to FNIHB from the regional offices.

2 Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters.

3 Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

**Notes:**

a) Deaths are an average of the death data for 2001 and 2002.

b) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.

**Figure 7** describes the 153 infant deaths that were reported to the First Nations Inuit Health Branch headquarters through Health Canada's regional offices in Manitoba, Saskatchewan, Alberta and British Columbia, by cause of death according to International Classification of Diseases-10 chapter for the two-year period, 2001-2002. Data are not reflective of all deaths that occurred in this population during this time period, but merely present a description of the reported deaths by cause for these four regions. Excluding the 'All other chapters' and 'Cause of death unknown' categories, the greatest proportion of observed infant deaths in this dataset was due to 'Certain conditions originating in the perinatal period' (35.9 percent), a chapter which includes disorders related to length of gestation and fetal growth, birth trauma, and respiratory and cardiovascular disorders specific to the perinatal period. 'Certain conditions originating in the perinatal period' was followed by 'Congenital malformation, deformations and chromosomal abnormalities' (24.8 percent), a chapter which includes chromosomal abnormalities and congenital malformations of the nervous system or circulatory system. 'Symptoms, signs and abnormal clinical laboratory findings, not elsewhere classified', was responsible for 11.8 percent of all observed infant deaths in this dataset. Found among this last category, 'Sudden infant death syndrome' was responsible for 6.5 percent of all observed infant deaths in this dataset.

Most infant deaths occur very soon after birth, and are reflected in neonatal (first month of life) and early neonatal (first week of life) mortality. These early deaths are usually related to prenatal and birthing problems and congenital anomalies. Infant deaths that occur after the first month of life (post-neonatal) are more often related to sudden infant death syndrome and congenital anomalies.<sup>27</sup> Epidemiological studies have also shown an association between post-neonatal infant mortality and ethnicity and socio-economic status.<sup>28-31</sup> Infant mortality has historically been high among First Nations, but has been decreasing since 1979.<sup>13</sup> Potential explanations for this slight decline may include better environmental conditions (for example, housing and diet), better perinatal health care, and changes in the definition of a live birth and birth registration practices. It is regrettable that the available data collection mechanisms do



not provide data that are sufficiently accurate to warrant inclusion in this report. A recent paper by Green concluded that, "at the national level, we cannot at present provide reliable estimates of infant mortality ratios for any of our three key groups of aboriginal peoples."<sup>4</sup> Inability to provide reliable estimates of the most important indicator of infant health constitutes a major reporting gap, and addressing this deficiency must be a high priority for improving First Nations health statistics.

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## Mortality

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The limitations of these data have been previously described in the [Methods and Limitations](#) section.

Death data for Registered (Status) First Nations were submitted by Health Canada's regional offices in Manitoba, Saskatchewan, Alberta, and British Columbia regions included information on cause of death (International Classification of Diseases-10 codes), age at death and sex. Of the death data used in this report approximately 87 percent of the records were complete for infant deaths (<1 year of age at death), and 93 percent of the records were complete for non-infant deaths (≥1 year of age at death). Death data for the appropriate total Canadian population were provided to Health Canada from the Canadian Vital Statistics databases at Statistics Canada with the knowledge and consent of the provincial and territorial vital statistics registries which supply the data to Statistics Canada. Death data for the Canadian population were extracted by place of residence.

### General (All-Cause) Mortality

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The 2001-2002 (average) Registered First Nations crude mortality rate was 5.3 per 1,000 population in Western Canada (95 percent confidence interval: 5.1, 5.5 per 1,000 population). The crude mortality rate for First Nations males was 5.9 per 1,000 population (95 percent confidence interval: 5.6, 6.2 per 1,000 population) versus 4.7 per 1,000 population (95 percent confidence interval: 4.5, 4.9 per 1,000 population) for First Nations females. The 2001-2002 (average) general population crude mortality rate was 7.0 per 1,000 population in Western Canada (95 percent confidence interval: 6.9, 7.0 per 1,000 population). The crude mortality rate for general population males was 7.2 per 1,000 population (95 percent confidence interval: 7.2, 7.3 per 1,000 population) versus 6.7 per 1,000 population (95 percent confidence interval: 6.7, 6.8 per 1,000 population) for general population females. Crude rates are influenced by age (or other) differences between populations, and thus, should usually not be used to make comparisons between populations with differing age structures, such as the First Nations and general Canadian populations. However, crude rates have the advantage of describing what actually happened (for example, that a certain number of people died), regardless of whether it was because of advanced age or because of poor health.

To compare mortality rates in the First Nations population with the general Canadian population age-standardized rates were calculated. Age-standardized rates are artificial rates from which the effects of age have been removed. Here, the age-standardized rates for the general population in Western Canada have been standardized to the 2001-2002 Registered First Nations population in Western Canada, as described in the [Methods and Limitations](#) section. The age-standardized mortality rate for the general population in Western Canada is 2.4 per 1,000 population (95 percent confidence interval: 2.4, 2.4 per 1,000), less than half the rate for the Registered First Nations population (5.3 per 1,000, 95 percent confidence interval: 5.1, 5.5 per 1,000). This means that the First Nations population experienced approximately three more deaths per 1,000 population than it would have experienced if it had the same age-specific mortality rates as the general Canadian population.

These results are in line with findings from a recent paper by Wilkins in which age-standardized mortality rates were calculated across various groups, including persons with Aboriginal ancestry/identity, using mortality data from 1991 to 2001 from a 15 percent sample of the adult population of Canada.<sup>32</sup> Persons with any Aboriginal ancestry (First Nations, Métis and Inuit) had higher age-standardized mortality rates (standardized to the Aboriginal population structure) than did persons with no Aboriginal ancestry. Mortality rates were high among adult Registered Indians (25 years and older), with rate ratios of 1.6 (95 percent confidence interval: 1.5, 1.6) for men and 2.0 (95 percent confidence interval: 1.9, 2.0) for women, compared with all other residents of Canada. The rate ratio observed in this report for both sexes

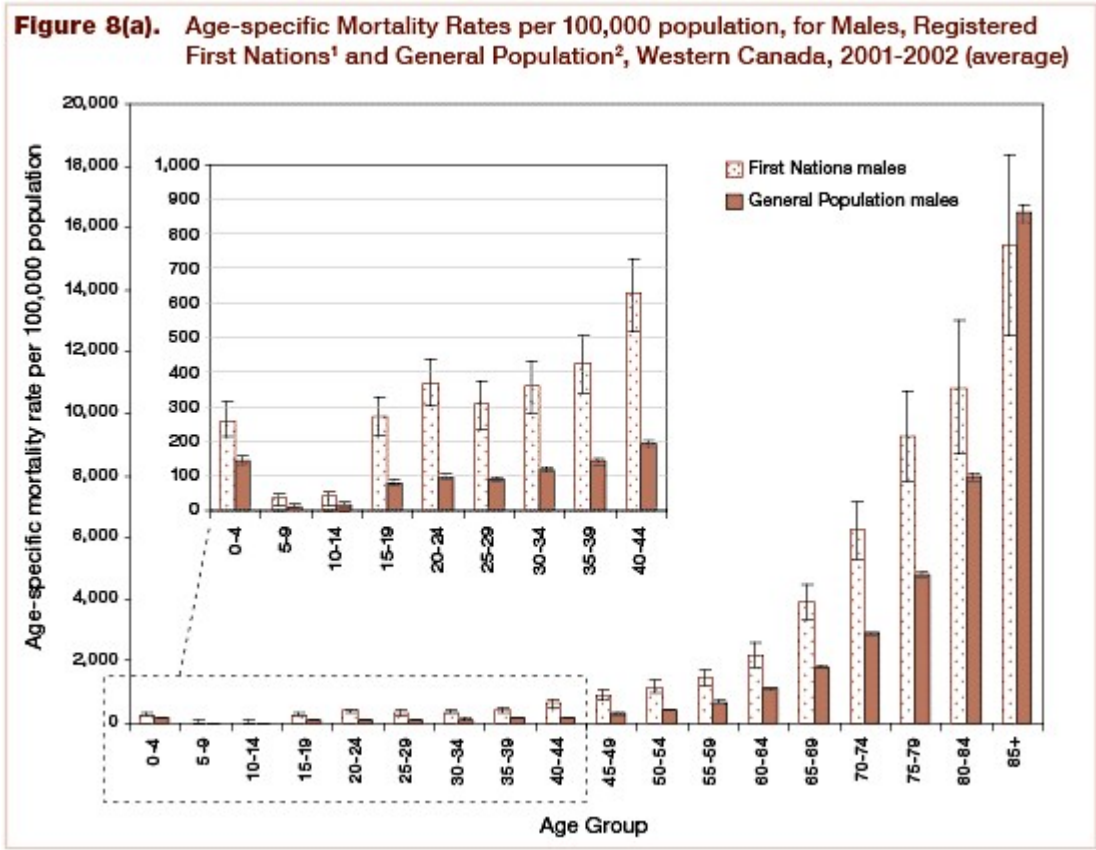
combined was 2.2.

Rate of Natural Increase

The rate of natural increase is simply the crude birth rate minus the crude mortality rate. It measures population growth, excluding migration. A positive rate indicates that the population is increasing and a negative rate indicates that the population is decreasing. For Registered First Nations in Western Canada, it is 18.9 per 1,000 population per year (95 percent confidence interval: 18.5, 19.3 per 1,000 population), while for the corresponding general population in Western Canada it is only 4.2 per 1,000 population per year (95 percent confidence interval: 4.2, 4.3 per 1,000 population) -- a difference of 14.7 per 1,000 population per year. Excluding migration, the First Nations population is growing 4.5 times as fast as the natural growth of the general population. Given that First Nations have a higher birth rate and a lower crude death rate than the general Canadian population, it follows that First Nations have a higher rate of natural increase.

Age-specific (All-Cause) Mortality

**Figures 8(a) and 8(b)** present age-specific mortality rates for Registered First Nations and for the general population in Western Canada, by sex. Age-specific rates can be validly compared across populations with different age compositions. Since they are unaffected by age differences (if the age groupings are narrow), age-specific rates are more directly informative of the health status of the population; high rates indicate an elevated risk of death for a given age.



1 Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

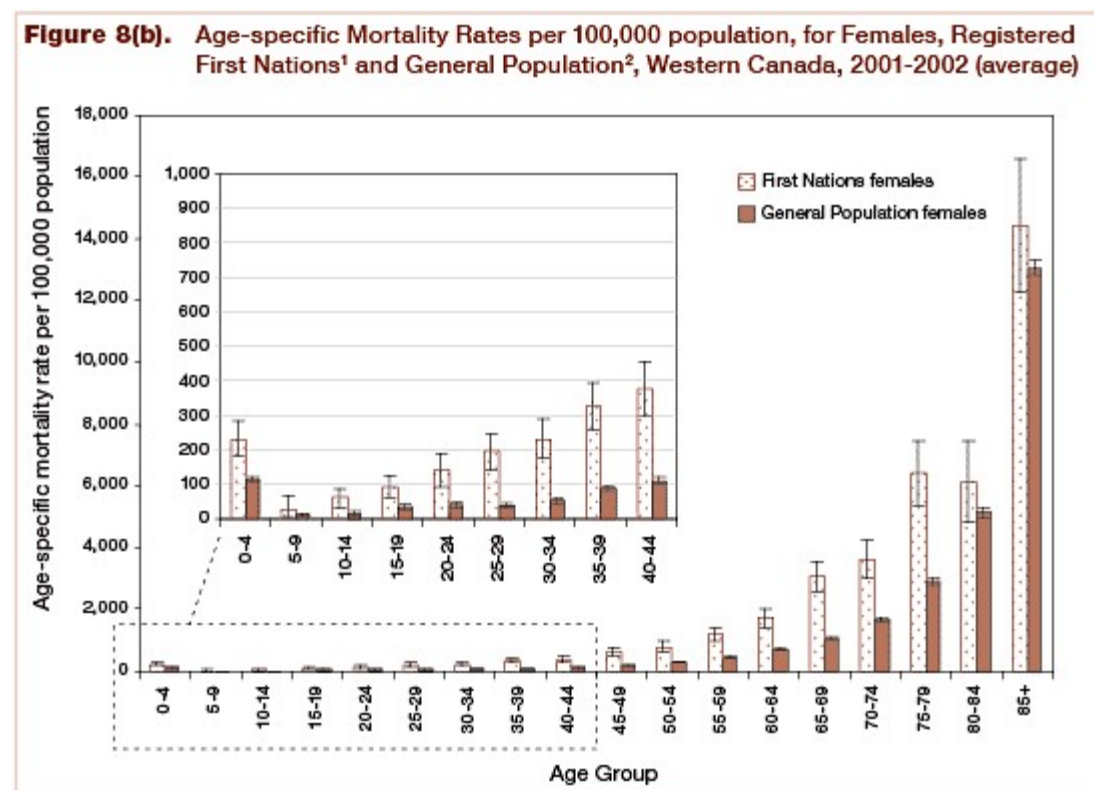
2 Includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

Notes:

- a) Age-specific mortality rates for the First Nations and general populations are an average of the death data for 2001 and 2002.
- b) General population data were extracted by the deceased's usual place of residence.
- c) Bars represent 95 percent confidence intervals.

d) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Death Database, Statistics Canada, 2010.



1 Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

2 Includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

**Notes:**

- a) Age-specific mortality rates for the First Nations and general populations are an average of the death data for 2001 and 2002.
- b) General population data were extracted by the deceased's usual place of residence.
- c) Bars represent 95 percent confidence intervals.
- d) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Death Database, Statistics Canada, 2010.

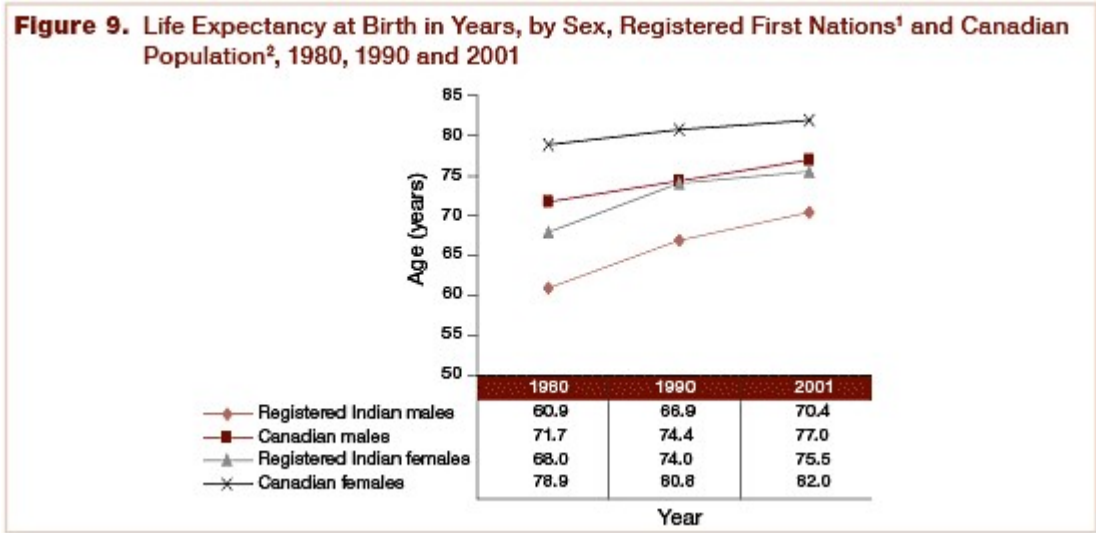
As in all populations, mortality rates in the First Nations and general populations in Western Canada increase with age. In the majority of age groups, for both males and females, the mortality rate is higher for First Nations than for the corresponding general population in Western Canada. Based on the confidence intervals, exceptions are for males and females aged 5 to 9 years and 85 years and older, males aged 10 to 14 years, and females aged 80 to 84 years ([Table A6\(a\)](#) and [A6\(b\)](#) in [Appendix 3](#)). The largest absolute rate difference experienced by First Nations relative to the corresponding general population is in the 75 to 79 age group for both sexes. The First Nations to the general Canadian population rate ratio reaches its maximum of 3.7 at age 20 to 24 in males and 5.3 at ages 25 to 29 in females.

The gender ratios of Registered First Nations age-specific mortality rates in Western Canada differ for some age groups ([Table A7](#) in [Appendix 3](#)). The highest ratio of First Nations male to female rates occurs between the 15 to 19 and 20 to 24 year age groups, where the male age-specific mortality rates are 3.0 and 2.7 times greater, respectively, than the female age-specific mortality rates. There is a large increase in the general population mortality rates for both sexes from the 80 to 84 year age group to the 85 years and older age group. The mortality rate for the 85 years and older age group is 2.1 times higher than the 80 to 84 year age group in males, and 2.5 times higher in females. This increase is much less dramatic for First Nation males, where the ratio is only 1.4; however, for First Nations females the

increase in mortality rates is similar to the general Canadian female population with an increase of 2.3, reflecting the low rates observed for the 80 to 84 year age group.

### Life Expectancy at Birth

Life expectancy data for the Registered First Nations and general Canadian populations were obtained from a published report produced by Indian and Northern Affairs Canada.<sup>12</sup> In contrast to other data presented in this report, life expectancy data presented include First Nations in all provinces and territories. Life expectancy is presented here because it is based solely on age-specific mortality rates. It presents the average age to which a cohort of newborn babies would live, provided that the age-specific mortality rates in the year of their birth continue unchanged throughout their lives. Although this is obviously an unrealistic assumption, life expectancies are a very useful summary of survival in populations, and can be validly compared across populations. **Figure 9** shows the life expectancy in the Registered First Nations and the general populations in Canada at three time periods.



1 Includes populations for all provinces and territories.

**Source:** Population Projections of Registered Indians, 2000-2021, Indian and Northern Affairs Canada, 2003; and Population Projections for Canada, Provinces and Territories, 2000-2026, Statistics Canada, 2001. Medium Assumption, pages 25-26, as cited in Basic Departmental Data 2004, Indian and Northern Affairs Canada, 2005. Catalogue no. R12-7/2003E.

During the period 1980 to 2001, life expectancy increased for both males and females in the Registered First Nations and general Canadian populations. Life expectancy rose by approximately 10 years for Registered First Nations males, and by almost eight years for Registered First Nations females. During this period, life expectancy gains in the general Canadian population were smaller, with increases of five years for males and three years for females. The result is a narrowing of the life expectancy gap over the 21 years, by approximately 40 percent in both males and females (from 10.8 years to 6.6 years and from 10.9 years to 6.5 years, respectively). Despite these fairly dramatic gains, life expectancy for Registered First Nations remains below that of the general population in Canada. As with the overall population, Registered First Nations females live longer than males. In 2001, the gender difference between Registered First Nations males and females was about five years, similar to the gender difference for the general population.

### Leading Causes of Death

In order to understand and begin to explain the gap in all-cause mortality rates, mortality rates from specific causes or groups of causes need to be examined. **Table 3** ranks the 10 leading causes of death in Registered First Nations by International Classification of Diseases-10 chapters. In this report, 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.<sup>1</sup>

(Refer to **Appendix 1** for a description of the International Classification of Diseases-10 chapters.) These

are crude rates, and thus indicate the deaths that were actually recorded. It is important to note that 298 deaths (8.3 percent) have not been classified (unknown International Classification of Diseases-10 code), so some of the rates by International Classification of Diseases-10 chapter underestimate the actual crude rates. The three leading causes of death for both sexes are 'External causes of morbidity and mortality', 'Diseases of the circulatory system' and 'Neoplasms'.

The reported leading cause of death for First Nations males in Western Canada is 'External causes of morbidity and mortality' with 173.6 deaths per 100,000 population (95 percent confidence interval: 159.6, 187.6). This is 91 more deaths per 100,000 population than the First Nation female rate (82.5 deaths per 100,000, 95 percent confidence interval: 72.8, 92.2). The reported leading cause of death for First Nations females in Western Canada is 'Diseases of the circulatory system', with a rate of 90.5 deaths per 100,000 population. 'Diseases of the circulatory system' is the second leading cause of death for First Nations males, while 'External causes of morbidity and mortality' is the second leading cause of death for First Nations females. 'Neoplasms' is the third leading cause of death for both First Nations males and females. Within the chapter 'External causes of morbidity and mortality' the three leading categories of death, for both sexes, are 'Other external causes of accidental injury', 'Transport accidents' and 'Intentional self-harm'.

These findings are in line with findings from the Wilkins paper, in which the three leading causes of death for Registered Indians aged 25 years and older in Canada from 1991 to 2001 were circulatory system diseases, external causes of morbidity and mortality, and neoplasms.<sup>32</sup> The rankings observed in this report differ slightly from those observed in the Wilkins paper, but are likely a result of methodological differences.<sup>32</sup>

**Table 4** breaks down the leading causes of death among Registered First Nations by age group, in both sexes combined. The most frequent cause of death for all ages up to 44 years of age is 'External causes of morbidity and mortality'. Of note, this International Classification of Diseases-10 chapter accounts for 72 percent of deaths in the 10 to 19 year age group for the First Nations population. For those aged 45 years and older, the most frequent cause of death is 'Neoplasms' or 'Diseases of the circulatory system'.

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**Table 3. Leading Causes of Death<sup>1</sup> (crude rates per 100,000 population), by Sex, Registered First Nations<sup>2</sup>, Western Canada, 2001-2002 (average)**

ICD-10 Chapter (ICD-10 Chapter Number)	Deaths per 100,000 population (95 percent CI; LCI, UCI) and Rank					
	Both sexes combined	Rank	First Nations males	Rank	First Nations females	Rank
External causes of morbidity and mortality (20)	128.1 (119.6, 136.6)	1	173.6 (159.6, 187.6)	1	82.5 (72.8, 92.2)	2
Diseases of the circulatory system (9)	99.0 (91.5, 106.5)	2	107.5 (96.5, 118.5)	2	90.5 (80.3, 100.6)	1
Neoplasms (2)	76.1 (69.5, 82.6)	3	73.1 (64.1, 82.2)	3	79.0 (69.5, 88.4)	3
Diseases of the digestive system (11)	34.9 (30.4, 39.3)	4	31.7 (25.7, 37.7)	5	38.0 (31.4, 44.6)	4
Diseases of the respiratory system (10)	34.6 (30.1, 39.0)	5	40.0 (33.2, 46.7)	4	29.2 (23.4, 34.9)	5
Endocrine, nutritional and metabolic diseases (4)	27.7 (23.7, 31.6)	6	31.1 (25.2, 37.1)	6	24.2 (18.9, 29.4)	6
Certain infectious and parasitic diseases (1)	16.6 (13.6, 19.7)	7	14.4 (10.4, 18.4)	8	18.9 (14.2, 23.5)	7
Mental and behavioural disorders (5)	13.8 (11.0, 16.6)	8	16.5 (12.1, 20.8)	7	11.2 (7.6, 14.8)	9
Diseases of the genitourinary system (14)	11.6 (9.1, 14.2)	9	10.6 (7.1, 14.0)	10	12.7 (8.9, 16.5)	8
Diseases of the nervous system (6)	9.4 (7.1, 11.7)	10	10.6 (7.1, 14.0)	10	8.2 (5.2, 11.3)	12

<sup>1</sup> Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.

<sup>2</sup> Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

**Notes:**

- a) Crude mortality rates for the First Nations population are an average of the death data for 2001 and 2002.
- b) Ranking based on crude mortality rate (deaths per 100,000 population) for the entire First Nations population for 2001 and 2002, excluding deaths that have not been classified ('Unknown').



- c) CI refers to 95 percent confidence interval; LCI refers to the lower confidence limit; and UCI refers to the upper confidence limit.  
d) Confidence intervals which do not overlap between sexes are bolded.  
e) Detailed rates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.

**Table 4. Leading Causes of Death<sup>1</sup>, by Age Group, Registered First Nations<sup>2</sup>, Western Canada, 2001-2002 (average)**

Age group (N = # of deaths)	ICD -10 Chapter (ICD-10 Chapter Number)	Percentage of deaths
1 to 9 (N=71)	External causes of morbidity and mortality (20)	46.5
	Neoplasms (2)	8.5
	Diseases of the nervous system (6)	8.5
	Congenital malformations, deformations & chromosomal abnormalities (17)	7.0
	Other causes	29.6
10 to 19 (N=162)	External causes of morbidity and mortality (20)	72.2
	Other causes	27.8
20 to 44 (N=852)	External causes of morbidity and mortality (20)	59.0
	Diseases of the digestive system (11)	6.5
	Neoplasms (2)	5.5
	Other causes	29.0
45 to 64 (N=987)	Neoplasms (2)	20.4
	Diseases of the circulatory system (9)	20.0
	External causes of morbidity and mortality (20)	15.3
	Diseases of the digestive system (11)	9.9
	Endocrine, nutritional & metabolic diseases (4)	6.2
	Diseases of the respiratory system (10)	5.2
	Other causes	23.1
≥65 (N=1,379)	Diseases of the circulatory system (9)	31.4
	Neoplasms (2)	18.8
	Diseases of the respiratory system (10)	11.1
	Endocrine, nutritional & metabolic diseases (4)	7.7
	Diseases of the digestive system (11)	5.6
	Other causes	25.5

<sup>1</sup> Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.

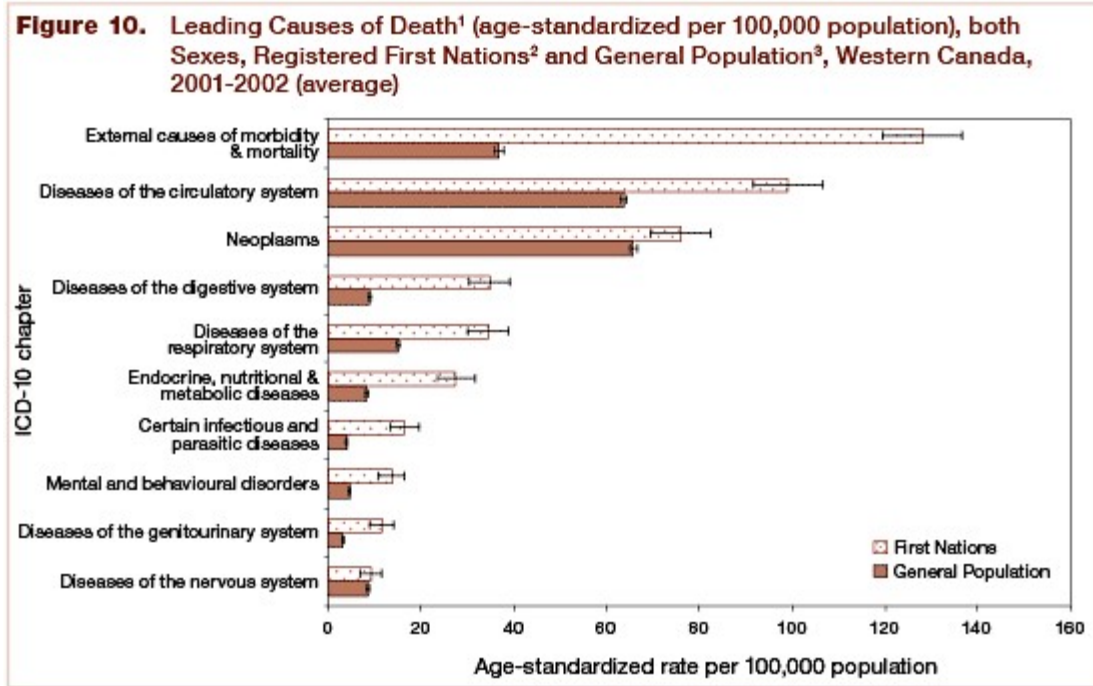
<sup>2</sup> Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

**Notes:**

- a) Data are combined deaths for 2001 and 2002.  
b) Due to rounding, the sum of proportions by age group may not equal 100 percent.  
c) 'N' refers to number of deaths.  
d) Causes of deaths with counts less than five were aggregated into the category 'Other causes'.  
e) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.





1 Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.2 Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.3 Includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

**Notes:**

- a) Rates are standardized to the 2001-2002 First Nations population in Western Canada.
- b) Mortality rates for the First Nations and General populations are an average of the death data for 2001 and 2002.
- c) Ranking based on mortality rate (number of deaths per 100,000 population) for First Nations population for 2001 and 2002.
- d) Bars represent 95 percent confidence intervals.
- e) Detailed estimates can be found in [Appendix 3](#).

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Death Database, Statistics Canada, 2010.

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**Figure 10** ([Table A9](#) in [Appendix 3](#)) presents age-standardized rates for Registered First Nations and the general Canadian population, for the 10 leading causes of death in First Nations. The leading causes of death for First Nations were 'External causes of morbidity and mortality', 'Diseases of the circulatory system' and 'Neoplasms', as stated above. If the corresponding general population had had the same age distribution as the First Nations, its leading causes of death would have been 'Neoplasms', 'Diseases of the circulatory System', and 'External causes of morbidity and mortality'.

A closer examination of 'Intentional self-harm' or suicide (data not presented) across age groupings, shows that deaths due to suicide as a proportion of all deaths was largest among Registered First Nations youths. Specifically, in 2001-2002, suicide accounted for 30.6 percent of all deaths in youth aged 10 to 14 years, 25.4 percent of all deaths in youth aged 15 to 19 years, and 26.4 percent of all deaths in youth aged 20 to 24 years. In addition, intentional self-harm accounted for 14.9 percent of deaths in adults aged 25 to 40 years. During 2001-2002, the crude First Nations suicide rate was 27.4 deaths per 100,000 population (95 percent confidence interval: 23.4, 31.3 deaths per 100,000), a rate that is three times higher than the age-standardized general Canadian population's 2001-2002 rate of 9.9 deaths per 100,000 population (95 percent confidence interval: 9.5, 10.3 deaths per 100,000), and represents 17.5 excess deaths per 100,000 population. Within the First Nations population, males are at a higher risk than females. The First Nations male suicide rate (37.3 deaths per 100,000 population, 95 percent confidence interval: 30.8, 43.8 deaths per 100,000) was approximately two times higher than the female rate (17.4 deaths per 100,000 population, 95 percent confidence interval: 12.9, 21.8 deaths per 100,000).

The observed suicide rate among First Nations in this report was quite high. However, it is important to note that there is great variability in these rates, depending on the community. Among First Nations, it

has been noted that suicides often occur in clusters, by either time or geographic area, resulting in higher national rates.<sup>33</sup> Some communities may experience much higher rates of suicide while others may experience little to none. Investigating community-specific factors related to suicide may help to provide a more accurate picture of suicide prevalence.<sup>33</sup>

As shown in **Table A9** in **Appendix 3**, 'External causes of morbidity and mortality' resulted in the largest absolute rate difference, with Registered First Nations experiencing 91 more deaths per 100,000 per year from this cause than would the general population if it had the same age distribution as the First Nations population. 'Diseases of the circulatory system' and 'Diseases of the digestive system' resulted in the second and third largest absolute rate differences, with First Nations experiencing 35 and 26 more deaths per 100,000, respectively. Making the comparison with ratios, the First Nations mortality rate for 'Diseases of the musculoskeletal system and connective tissue', not shown in this figure, had the highest ratio at 4.2 times higher than the standardized general population rate for this category, although the number of deaths was too low for the category to appear on the graph. 'Certain infectious and parasitic diseases' had the second highest ratio, with First Nations 4.0 times higher than the standardized rate of the general population. 'Diseases of the digestive system' had the third highest ratio, with First Nations 3.9 times higher than the standardized rate of the general population.

These observed results are in line with findings from the Wilkins paper, in which rate differences for Registered Indian men and women aged 25 years and older in Canada from 1991 to 2001 were highest for deaths from external causes of morbidity and mortality and circulatory system diseases.<sup>32</sup>

The differences seem to be more useful in comparing disease groups: 'Diseases of the musculoskeletal system and connective tissue' may have the highest ratio, but it accounts for only 0.06 percent of the total excess in First Nations mortality (34 excess deaths), while 'External causes of morbidity and mortality' accounts for 38 percent of the total excess (620 excess deaths), despite having a much lower ratio. The difference in excess deaths suggests when prioritizing causes of death, differences are more useful than ratios.

Although mortality statistics are generally an insensitive indicator of population health in developed countries (being too close to the irreducible minimum), the data reported to First Nations and Inuit Health Branch suggest that there remain sufficiently large mortality gaps between the First Nations and corresponding general population in Western Canada to indicate that mortality remains a useful indicator.

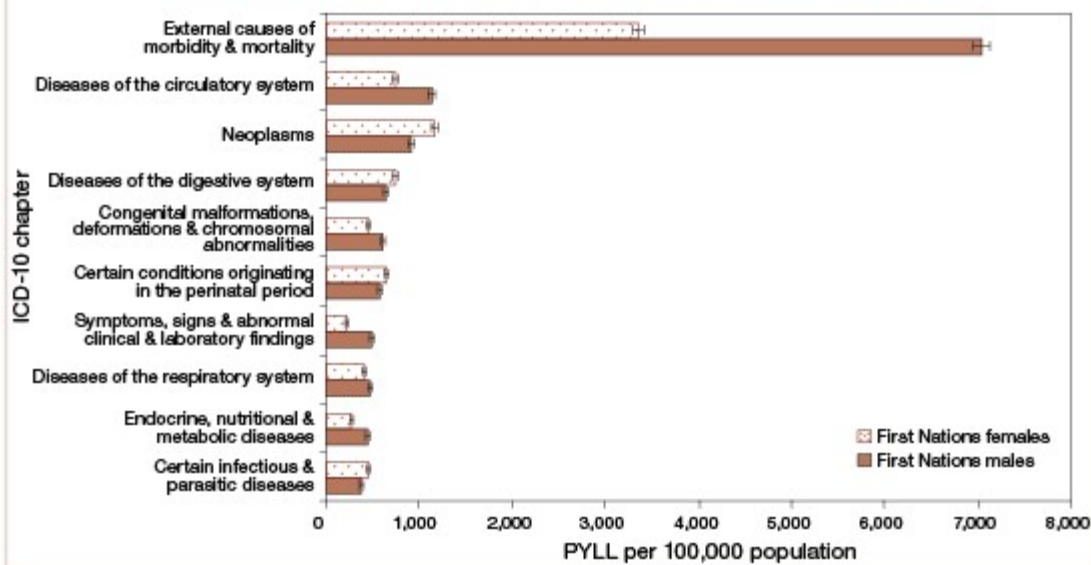
Age-specific mortality rates are higher in First Nations, and these give rise to their lower life expectancy. As was previously discussed, there is a more rapid improvement of life expectancy among First Nations and this may indicate that the gap is closing. However, it may also reflect their greater potential for improvement. Age-specific death rates are higher for males than for females, which is typical of most populations.

Cause-specific mortality rates begin to explain the gap in total mortality. By any measure, 'External causes of morbidity and mortality', especially poisoning, transport accidents and intentional self-harm, constitutes a more significant hazard for First Nations, especially males. Explaining over one-third of the overall gap in mortality, and approximately 40 percent of potential years of life lost, addressing these external causes needs to be a high priority for health improvement and health services of First Nations populations.

## Potential Years of Life Lost

The potential years of life lost provides an indicator for premature mortality, with premature being defined to mean death before the age of 75 years. Thus, potential years of life lost enhances the importance of conditions that cause death at relatively young ages. As shown in **Table A10** in **Appendix 3**, 'External causes of morbidity and mortality' was the leading cause of potential years of life lost among the Registered First Nations population in Western Canada (5,211.8 per 100,000 population). 'Neoplasms' and 'Diseases of the circulatory system' resulted in the second and third largest potential years of life lost (1,043.6 and 942.8 per 100,000 population, respectively). In 2001-2002, suicide accounted for approximately 1,274.2 potential years of life lost per 100,000 First Nations in Western Canada, representing greater premature mortality than either circulatory diseases or cancers.

**Figure 11. Potential Years of Life Lost (PYLL) per 100,000 population, by Sex and Cause of Death<sup>1</sup>, Registered First Nations<sup>2</sup>, Western Canada, 2001-2002 (average)**



1 Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.2 Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

**Notes:**

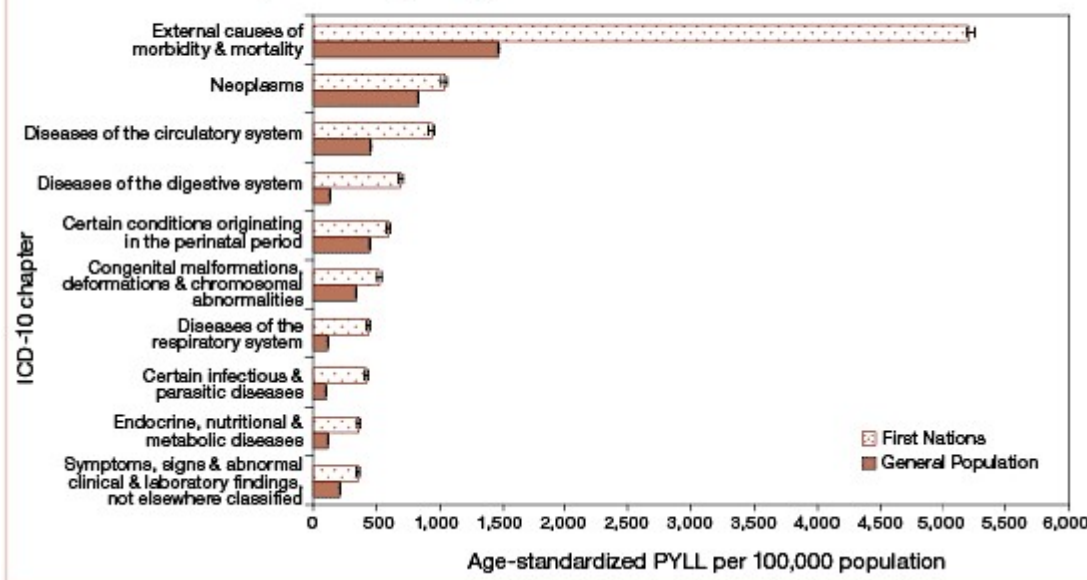
- a) PYLL has been derived based on average number of deaths for 2001 and 2002.
- b) Detailed estimates can be found in [Appendix 3](#).
- c) Bars represent 95 percent confidence intervals.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.

**Figure 11** provides the results for Registered First Nations, broken down by sex and cause of death. The leading cause of potential years of life lost in both First Nations males and females is 'External causes of morbidity and mortality' (7,052.6 and 3,357.6 per 100,000 population, respectively). This excess rate of 3,695.0 per 100,000 population in males accounts for the majority of the excess overall potential years of life lost in males, and the potential years of life lost for this category is approximately two times higher for males than females. The second and third leading causes of potential years of life lost for males were 'Diseases of the circulatory system' and 'Neoplasms'; while among females, the second and third leading causes of potential years of life lost were 'Neoplasms' and 'Diseases of the digestive system'. Differences between males and females existed for all chapters, excluding 'Diseases of the genitourinary system' ([Table A10](#) in [Appendix 3](#)).

Gender differences with respect to suicide attempts have been reported within the First Nations population, with a greater proportion of females reporting that they have attempted suicide at least once in their lifetime in comparison to males (18.5 percent versus 13.1 percent).<sup>34</sup> Though suicide attempts have been shown to occur more often in First Nations females; however, in this report, findings indicate there were more deaths due to suicide in males.

**Figure 12. Age-standardized Potential Years of Life Lost (PYLL) per 100,000 population by Cause of Death<sup>1</sup>, Registered First Nations<sup>2</sup> and General Population<sup>3</sup>, Western Canada, 2001-2002 (average)**



1 Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters.

2 First Nations data include on-reserve populations for Manitoba and Saskatchewan Regions, and on- and off-reserve population for Alberta and British Columbia Regions.

3 Includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia..

**Notes:**

- a) PYLL has been derived based on average number of deaths for 2001 and 2002.
- b) Detailed PYLLs can be found in [Appendix 3](#).
- c) Bars represent 95 percent confidence intervals.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Death Database, Statistics Canada, 2010.

**Figure 12** also presents potential years of life lost, this time in the form of age-standardized rates comparing the ten leading causes of potential years of life lost for Registered First Nations (10,600 potential years of life lost per year per 100,000) and the corresponding general population in Western Canada (4,234 per year per 100,000), for both sexes combined. Collectively, the ten leading causes of potential years of life lost are responsible for an excess of 6,366 potential years of life lost per year per 100,000 First Nations people, above the potential years that would be lost by the general population in Western Canada if it had the same age distribution. Premature mortality is higher for First Nations than for the corresponding general population in Western Canada for every International Classification of Diseases-10 chapter ([Table A11](#) in [Appendix 3](#)). The potential years of life lost for First Nations for 'External causes of morbidity and mortality' is 5,211.8 potential years of life lost per 100,000 population, the three leading causes within this category being accidental poisoning, transport accidents and intentional self-harm. There is a large absolute excess of 3,737.5 potential years of life lost per 100,000 population attributable to external causes. One of the reasons for the prominence of external causes is that the First Nations population is young, and young people are particularly vulnerable to these causes. But the comparison of the standardized rates indicates that the general population in Western Canada would experience far fewer deaths from external causes even if it was as young as the First Nations population.

The potential years of life lost statistics are often used to illustrate the causes of premature mortality--those that most often occur at younger ages. Even though cancer and circulatory diseases are among the leading causes of death, they usually occur at older ages and result in fewer potential years of lives lost. Even a partial reduction in the injury death rates (which, for the most part, are preventable) would have an important effect on premature death rates and the health of the population in general.

## Conclusion

The data presented in this report represent only a subset of the First Nations and Inuit Health regions: Atlantic (births only), British Columbia, Alberta, Saskatchewan and Manitoba, accounting for over half of the total Registered First Nations population in Canada. It is important to keep in mind that the data do not provide full coverage of all Registered First Nations in Canada and that the demographic indicators presented in this report may not be representative of all Registered First Nations in Canada. Therefore, the results in this report should be interpreted with caution. In addition, since demographic indicators for the general Canadian population include Aboriginal people, the reported differences may be smaller than the actual differences. The presence of First Nations in the general population indicators, for example, will have increased its mortality.

There is a need to improve national data, particularly to identify First Nations in vital statistics data, by developing means to better access First Nations vital statistics data that already exist in provincial vital statistics systems. Regardless, the data reported here are the best available estimates for this time period, and indicate the most accurate vital statistics available for First Nations as a whole (in the included regions).

In summary, the First Nations population is younger than the general Canadian population due to both higher fertility and higher premature mortality rates. This age difference greatly influences the patterns of perinatal health and mortality rates in the two populations, and necessitates the use of age-specific or age-standardized rates for most comparisons. From the data presented here, it is not possible to say whether the age difference between the populations is increasing or decreasing over time. The First Nations population is aging, but probably at a slower rate than the general Canadian population.

High fertility rates and a young population combine to produce a higher birth rate in the First Nations population. This in itself, apart from any higher incidence of reproductive health problems, means that maternal and child health services are in high demand for the First Nations population.

The disproportionate burden of mortality that First Nations people experience is well documented. Mortality differences can be explained by differences in the incidence and prevalence of disease, differences in the case-fatality from those diseases, or both. A previous report in this series documents striking differences in morbidity between First Nations and the general Canadian population.<sup>35</sup> The most striking gaps between First Nations and the general Canadian population concern the incidence of tuberculosis, human immunodeficiency virus risk factors and hepatitis C virus infections indicating that at least part of the mortality difference may be explained by differences in the frequency of disease. In addition, another earlier report in this series documenting hospitalization rates among First Nations in Western Canada, presents data indicating higher rates of health care utilization by First Nations than the Western Canadian population.<sup>36</sup>

It is currently not possible to present more reliable estimates of birth and death indicators for the First Nations population in Canada as a whole. In general, information based on provincial birth and death registrations (or certificates) is the most valid source of data for vital statistics, but the method of collecting and identifying birth and death data for the First Nations populations varies considerably across regions. Information on Aboriginal identity is collected on birth or death certificates for some provinces but this information is often an optional field, and is not consistently completed. Further, these data are subject to provincial policies and privacy legislation that govern access by external agencies.

There is a strong interest by First Nations, the federal government and the provinces, to have more complete, timely and accurate First Nations health statistics in order to guide policy and set priorities. Achieving this goal will require concerted cooperation among the federal government, First Nations and the provincial governments in order to establish mutually acceptable agreements on how First Nations within these systems can be identified, who will have access to these data, and how these data will be used.

In terms of infant mortality, the inability to provide reliable estimates of the most important indicator of infant health constitutes a major problem. Addressing this deficiency must be a high priority for improving



First Nations health statistics.

There are other limitations to the overall reliability of First Nations data including the inconsistent definition of on- and off-reserve; inclusion of off-reserve populations and, the inability to present longitudinal data comparing this to earlier reports due to changes in data collection methodology and data availability.

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## Glossary

**Aboriginal Peoples:** The descendants of the original inhabitants of North America. The Constitution of Canada recognizes three groups of Aboriginal peoples--Indians, Métis and Inuit. These three separate peoples have unique heritages, languages, cultural practices and spiritual beliefs.

**Age-Specific Rate:** The number of cases per 100,000 persons per year for a specific, usually a narrow age range. Five-year age groups are commonly used. For example, the age-specific mortality rate.

**Age-Standardized Mortality Rate:** In this report the standard population used is the 2001 and 2002 First Nations population, which is the reverse of the usual practice. To calculate age-standardized mortality rates for Canada, age-specific rates are calculated for each age group of the Canadian population. Next, the weighted average of the age-specific rates is calculated by summing  $[(\text{Canadian mortality rates for age}_i) * (\text{2001-2002 First Nations population for age}_i)]$  across all ages, then dividing that sum by the total 2001 and 2002 First Nations population.

**Age-Standardized Potential Years of Life Lost:** Similar to age-standardized mortality rates, age-standardized potential years of lives lost were calculated. Specifically, in this report the standard population used is the 2001 and 2002 First Nations population, which is the reverse of the usual practice. To calculate age-standardized potential years of life lost for Canada, age-specific rates are calculated for each age group of the Canadian population. Next, the weighted average of the age-specific rates is calculated by summing  $[(\text{Canadian potential years of life lost rate for age}_i) * (\text{2001-2002 First Nations population for age}_i)]$  across all ages, then dividing that sum by the total 2001 and 2002 First Nations population.

**Age-Standardized Rate:** A statistical method that allows comparisons of groups of people with different age structures.

**Average Rate:** In this report, an average rate was calculated by dividing the sum of the number of vital events, for example, deaths for 2001 and 2002, by the sum of the population for 2001 and 2002. It is expressed as either the number of deaths per 1,000 population or number of deaths per 100,000 population.

**Bill C-31:** The pre-legislation name of a 1985 amendment to the *Indian Act*. The amendment was designed to eliminate several discriminatory provisions from the *Indian Act* concerning the unjust removal of First Nations people from the Indian Register, such as the removal of a First Nations woman and her children if she were to marry a non-Indian. The major impact of Bill C-31 has been the restoration of Indian status to people who lost it under the Act's unjust provisions. Approximately 105,000 people have regained or acquired Indian Status since the passage of the bill in 1985.

**Census:** An enumeration of a population, originally intended for purposes of taxation and military service. Census enumeration of a population usually records identities of all persons in every place of residence, with age, or birth date, sex, occupation, national origin, language, marital status, income, and relationship to head of household in addition to information on the dwelling place.<sup>1</sup> The national Census of Population provides dwelling and population counts for Canada every five years, but it also provides a variety of demographic, social and economic information about the population of Canada. The most recent census was on May 16, 2006.

**Confidence Interval:** Illustrates the amount of chance error associated with a rate. Wide confidence intervals indicate high variability (low precision), thus, these rates should be interpreted and compared with due caution. Confidence intervals can also be used to determine whether a rate in one population is statistically below, above or no different than the rate for the same indicator in another population.

**Crude Rate:** The rate of occurrence of an event in an entire population.

**Denominator:** The lower portion of a fraction used to calculate a rate or ratio, for example, the population at risk in the calculation of a rate or ratio.<sup>[1](#)</sup>

**Determinant:** Any factor, whether event, characteristic, or other definable entity, that brings about change in a health condition or other defined characteristic.<sup>[1](#)</sup>

**Difference:** The value obtained by subtracting one quantity by another.

**Fertility Rate:** Calculated by dividing the number of live births by the number of women of reproductive age (15 to 44 years of age). Normally this is calculated for five-year age groups, producing age-specific rates. It reflects the reproductive performance of a population, and is not affected by the age distribution of the population if calculated for five-year age groups.

**First Nation:** A term that came into common usage in the 1970s to replace the word 'Indian' which many people found offensive. Although the term 'First Nation' is widely used, no legal definition of it exists. Many Indian people have also adopted the term 'First Nation' to replace the word 'Band' in the name of their community. Both Status and non-Status Indians in Canada are referred to as 'First Nations people(s)'. In the Canadian Census of Population, 'North American Indian' is the term used for both Status and non-Status Indians.

**Indian:** A term that describes all the Aboriginal people in Canada who are neither Inuit nor Métis. Indian peoples are one of three groups recognized as Aboriginal in the *Constitution Act* of 1982. The Act specifies that Aboriginal people in Canada comprise Indians, Inuit and Métis people. In addition, there are three legal definitions that apply to Indians in Canada: Status Indians, non-Status Indians and Treaty Indians. In the Canadian Census of Population, 'North American Indian' is the term used for this population.

**Indian Act:** Canadian federal legislation that sets out certain obligations of the federal government toward First Nations people. It also regulates the management of Indian reserve lands. The Act has been amended several times, most recently in 2010.

**Indian Register:** The official record kept by Indian and Northern Affairs Canada of all Status/Registered Indians in Canada.

**Infant Mortality Rate:** The number of infants who die during their first year of life for every thousand live born infants; and it has been calculated using a variety of methods, that is, cohort (gold standard) and cross-sectional (usual) methods.<sup>[2](#)</sup> The cohort method follows a defined group of infants for a one-year period, following their birth, in order to determine the number of deaths. The cross-sectional method includes all live births and all infant deaths during the same calendar year.

**International Classification of Diseases:** The World Health Organization's manual of the international classifications of diseases, injuries and causes of death. It is the international standard for recording the cause of mortality and morbidity, and is used in this report. In addition to the classification of different diseases, there is a separate classification of external causes of injury and poisoning.

**Inuit:** Aboriginal people in northern Canada who live above the tree line in Nunavut, the Northwest Territories, northern Quebec and Labrador. The word means 'people' in Inuktitut, the Inuit language. The singular of Inuit is Inuk.

**Life Expectancy:** The projected average age of death for infants born in a given year, provided that the age-specific mortality rates for that year persist throughout the lives of the infants, and is thus a hypothetical figure. Life expectancy is calculated in life tables, for which the only input is age-specific mortality rates. They can be validly compared across populations with different age distributions.

**Life Table:** A summarizing technique used to describe the pattern of mortality and survival in populations. The survival data are time-specific and cumulative probabilities of survival of a group of individuals subject, throughout life, to the age-specific death rates in question.<sup>[1](#)</sup>

**Live Birth Rate:** Calculated by dividing the number of live births in a given year by the Indian and Northern Affairs Canada population estimates for the same calendar year. The rate is expressed as the number of live births per 1,000 population. Since this is a crude rate, it is affected by the age distribution

of a population. It is useful for estimating the growth rate in a population, as well as planning for reproductive health care.

**Métis:** A person who self-identifies as Métis, is of historic Métis Nation Ancestry, is distinct from other Aboriginal Peoples and is accepted by the Métis Nation. For further information please see the [webpage](http://www.metisnation.ca/index.php/who-are-the-metis): (<http://www.metisnation.ca/index.php/who-are-the-metis>).

**Mortality:** The number of deaths due to a given disease or other condition in a given population at a designated time. It is often expressed as a rate per 1,000 for all-cause mortality, and a rate per 100,000 for *cause-specific mortality*.

**Non-Status Indian:** An Indian person who is not registered as an Indian under the *Indian Act*. This may be because his or her ancestors were never registered, or because he or she lost Indian status under former provisions of the *Indian Act*.

**Numerator:** The upper portion of a fraction, used to calculate a rate or a ratio.<sup>1</sup>

**Off-Reserve:** A term used to describe people, services or objects that are not part of a reserve but that relate to a First Nation.

**On-Reserve:** A term used to describe First Nations people that live on a reserve, land set aside by the Federal Government for the use and occupancy of an Indian group or band.

**Potential Years of Life Lost:** The potential years of life lost is a health gap indicator calculated by using the Canadian Institute for Health Information standard definition and is expressed as a rate per 100,000 population (crude or age-standardized). "Potential" life is lost when a person dies before the age of 75. Therefore, an individual's potential years of life lost is calculated by subtracting the age at death from 75. For example, a person who dies at the age of 65 years has lost 10 "potential" years of life. The population potential years of life lost is calculated by subtracting the midpoint age of each group from 75, and multiplying the result by the number of deaths in that group. Persons dying above the age of 75 do not contribute to potential years of life lost. Potential years of life lost can be calculated for all causes or for specific causes.

**Prevalence:** The number of cases of a given disease or other attribute (for example, drug use, obesity) that exists in a defined population at a specified time, sometimes referred to as the prevalence number.<sup>3</sup> Prevalence is usually expressed as a proportion.

**Rate:** A rate is an expression of the frequency with which an event occurs in a defined population in a specified period of time. The components of a rate are the numerator, the denominator, the specified time in which events occur, and usually a multiplier, a power of 10, that converts the rate from an awkward fraction or decimal to a whole number. In epidemiology, the denominator is person-time<sup>3</sup>. Person-time units are units of measure that combine the number of persons at risk of a specified outcome with their time at risk (for example, person-years). Total person-time units are calculated by summing each individual's time at risk in a population and comprise the denominators used in calculating person-time incidence rates.<sup>1</sup>

**Rate Difference:** The rate difference is obtained by subtracting one rate from another rate. Differences are absolute values. For example, subtracting the age-standardized mortality rate for the general population from the age-standardized mortality rate for the First Nations population.

**Rate of Natural Increase:** A measure of population growth (in the absence of migration). It is the difference between the crude birth rate and crude death rate.

**Rate Ratio:** Calculated by dividing one rate by another rate, for example, dividing the age-standardized mortality rate of the First Nations population by the age-standardized mortality rate of the general population. Ratios are relative comparisons.

**Ratio:** The value obtained by dividing one quantity by another; a general term of which rate, proportion, percentage, etcetera, are subsets.

**Region:** A Health Canada - First Nations and Inuit Health administrative area that in most cases corresponds to a province. Newfoundland and Labrador, Nova Scotia, New Brunswick and Prince Edward Island are grouped under the Atlantic Region. Similarly the Yukon, the Northwest Territories and Nunavut are grouped under the Northern Region (formerly the Northern Secretariat).

**Registered Indian:** See *Status Indian*.


**Reserve:** Land set aside by the Federal Government for the use and occupancy of an Indian group or band.

**Risk Factor:** A factor associated with an increased chance of getting a disease; it may be a cause or simply a risk marker. Factors associated with decreased risk are known as protective factors.

**Socio-Economic Status:** A person or group's position within a social hierarchy. Socio-economic status is determined by such indicators as education, income, occupation, wealth and place of residence, among others.

**Status (Registered) Indian:** An Indian person who is registered under the *Indian Act*. The act sets out requirements for determining who is a Status Indian.

**Status Verification System:** The Status Verification System is an administrative database operated by First Nations and Inuit Health Branch. The Status Verification System includes the population, First Nations and Inuit, eligible to receive benefits under the Non-Insured Health Benefits Program. Data are based on information provided by Indian and Northern Affairs Canada, the Governments of the Northwest Territories and Nunavut, and Inuit organizations such as the Inuvialuit Regional Corporation, the Nunavut Tunngavik Incorporated, the Labrador Inuit Association and the Makivik Corporation in Quebec.

**Sudden Infant Death Syndrome:** Also known as Crib Death, refers to the sudden and unexpected death of an apparently healthy infant under one year of age. Such deaths usually occur while the child is sleeping and remain unexplained even after a full investigation. For further information please see the  [website](http://www.phac-aspc.gc.ca/dca-dea/prenatal/sids_e.html): ([http://www.phac-aspc.gc.ca/dca-dea/prenatal/sids\\_e.html](http://www.phac-aspc.gc.ca/dca-dea/prenatal/sids_e.html)).

**Total Fertility Rate:** The sum of the age-specific fertility rates for women of reproductive age (15 to 44 years of age) during one year, and represents the average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children at the age-specific rates for that year. It indicates the extent to which a population is replacing itself.

**Vital Statistics:** Vital statistics are systematically tabulated information concerning births, marriages, divorces, separations, and deaths based on registrations of these vital events.<sup>1</sup>

<sup>1</sup> Last, JM. A Dictionary of Epidemiology. 4th edition. New York: Oxford University Press; 2001.

<sup>2</sup> Smylie J, Fell D, Ohlsson A; Joint Working Group on First Nations, Indian, Inuit, and Métis Infant Mortality of the Canadian Perinatal Surveillance System. A Review of Aboriginal Infant Mortality Rates in Canada: Striking and Persistent Aboriginal/non-Aboriginal Inequities. Canadian Journal of Public Health 2010;101(2):143-8.

<sup>3</sup> Oleckno, WA. Essential Epidemiology, Principles and Applications. Illinois: Waveland Press, Inc.; 2002.

## Acronyms Used in this Report

### AFN

Assembly of First Nations

### ARD

Absolute Rate Difference

### CI

Confidence Interval

### CIHI

Canadian Institute for Health Information

**FNIHB**  
First Nations and Inuit Health Branch

**ICD-10**  
International Classification of Diseases, Version 10

**IMR**  
Infant Mortality Rate

**INAC**  
Indian and Northern Affairs Canada

**JWG**  
Joint Working Group on Infant Mortality

**LCI**  
Lower Confidence Limit

**PHAC**  
Public Health Agency of Canada

**P/T**  
Provincial/Territorial

**PYLL**  
Potential Years of Life Lost

**RAPB**  
Regions and Programs Branch

**RHS**  
First Nations Regional Longitudinal Health Survey

**SIDS**  
Sudden Infant Death Syndrome

**UCI**  
Upper Confidence Limit

### Appendix 1: International Classification of Diseases-10 Chap-ters and Codes

The table below provides code groupings for International Classification of Diseases-10 chapters and frequently tabulated causes of death to be used as a guide when reading this report.

ICD -10 Chapter <sup>1</sup>	ICD -10 Chapter Title (Example) (Note: When space is limited in the report, the underlined text is used)	ICD -10 Codes
1	Certain infectious and parasitic diseases (for example, tuberculosis, human immunodeficiency virus (HIV) disease)	A00-B99
2	Neoplasms (for example, malignant neoplasms of the digestive organs, benign neoplasms)	C00-D48
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (for example, nutritional anaemias (iron deficiency anaemia), haemolytic anaemias (sickle-cell disorders))	D50-D89
4	Endocrine, nutritional and metabolic diseases (for example, diabetes mellitus, malnutrition)	E00-E90
5	Mental and behavioural disorders (for example, schizophrenia, mood (affective) disorders)	F00-F99
6	Diseases of the nervous system (for example, cerebral palsy, episodic and paroxysmal disorders (epilepsy))	G00-G99
7	Diseases of the eye and adnexa (for example, glaucoma, visual disturbances and blindness)	H00-H59
8	Diseases of the ear and mastoid process (for example, diseases of the external and inner ear)	H60-H95
9	Diseases of the circulatory system (for example, hypertensive and cerebrovascular diseases)	I00-I99



10	Diseases of the respiratory system (for example, influenza and pneumonia, acute upper respiratory infections)	J00-J99
11	Diseases of the digestive system (for example, hernia, diseases of the appendix)	K00-K93
12	Diseases of the skin and subcutaneous tissue (for example, infections of the skin (cellulitis), dermatitis and eczema)	L00-L99
13	Diseases of the musculoskeletal system and connective tissue (for example, arthropathies (rheumatoid arthritis), dorsopathies (scoliosis))	M00-M99
14	Diseases of the genitourinary system (for example, renal failure, glomerular diseases)	N00-N99
15	Pregnancy, childbirth and the puerperium (for example, pregnancy with abortive outcome, complications of labour and delivery)	O00-O99
16	Certain conditions originating in the perinatal period (for example, infections specific to the perinatal period (congenital viral diseases), birth trauma)	P00-P96
17	Congenital malformations, deformations and chromosomal abnormalities (for example, cleft lip and cleft palate, chromosomal abnormalities)	Q00-Q99
18	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (for example, abnormal findings on examination of blood, without diagnosis)	R00-R99
19	Injury, poisoning and certain other consequences of external causes (for example, injuries to the head, burns and corrosions)	S00-T98
20	External causes of morbidity and mortality (for example, transport accidents, accidental drowning)	V01-Y98
21	Factors influencing health status and contact with health services (for example, persons with potential health hazards related to communicable diseases, persons encountering health services in circumstances related to reproduction)	Z00-Z99

<sup>1</sup> Data for injuries can be analyzed using either International Classification of Diseases-10 chapter 19 or 20 codes. Chapter 19 indicates the type of injury (nature of injury codes), while chapter 20 indicates the mechanism and intent of injury. For the purpose of this report, data for chapter 20 are presented, instead of nature of injury codes (chapter 19), as they are deemed to be more relevant to health promotion and injury prevention. In addition, data for chapter 21 were excluded from the analyses. These codes are considered supplementary, and are used when a person who is not currently sick encounters the health services for some specific purpose or when some circumstance or problem is present which influences the person's health status but is not in itself a current illness or injury.

## Appendix 2: Confidence Intervals

The confidence intervals for proportions (for example, distribution of birth weights) were produced using the following method<sup>1</sup>:

$$p - [z_{1-\alpha/2} * SE(p)] \text{ to } p + [z_{1-\alpha/2} * SE(p)]$$

SE(p) = standard error of p =  $\sqrt{[p(1-p)/n]}$

p = r/n

n = size of sample

r = number of subjects with some feature in a sample of size n

$z_{1-\alpha/2}$  = 100(1-  $\alpha/2$ ) percentile from the standard Normal distribution = 1.96 for  $\alpha$  = 0.05

The confidence intervals for crude and age-specific rates were produced using the following method<sup>2</sup>:

$$I - z_{1-\alpha/2} \sqrt{I/R} \text{ to } I + z_{1-\alpha/2} \sqrt{I/R}, \text{ where}$$

I = A/R

$\alpha$  A = number of cases

R = population at risk

$z_{1-\alpha/2}$  = 100(1-  $\alpha/2$ ) percentile from the standard Normal distribution

The confidence intervals for age-standardized rates were produced using the following method<sup>3</sup>:

$$\exp(\ln \hat{R}_x - 1.96\sqrt{\hat{\Sigma}}) \text{ to } \exp(\ln \hat{R}_x + 1.96\sqrt{\hat{\Sigma}}), \text{ where}$$

$$\hat{R}_h = \sum_{j=1}^J c_j \frac{e_{hj}}{n_{hj}} \quad (\text{age-standardized rate})$$

$$Var(\hat{R}_h) = \sum_{j=1}^J (\frac{c_j}{n_{hj}})^2 e_{hj}$$

$$\hat{\Sigma} = \frac{1}{\hat{R}_h^2} Var(\hat{R}_h)$$

$c_j$  = proportion of the standard population that is in the  $j$ th age group  
 $n_{hj}$  = number of people or person-years at risk in age group  $j$  of population  $h$   
 $e_{hj}$  = number of people in age group  $j$  of population  $h$  who have the condition under study

<sup>1</sup> Altman DG, Machin D, Bryant TN, Gardner MJ. Statistics with Confidence. Confidence Intervals and Statistical Guidelines. Second Edition. Bristol: BMJ Books; 2000.

<sup>2</sup> Ahlbom A. Biostatistics for Epidemiologists. London: Lewis Publishers; 1993.

<sup>3</sup> Roberts G. Working with Age-standardized Rates (calculated from administrative data). Pages 2-3. Ottawa: Statistics Canada; 2005.

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### Appendix 3: Vital Statistics Tables

**Table A1. Age Distribution of Registered First Nations Population in Canada, 1987 and 2002**

Age group	Population Numbers		Percent of Population		Absolute Difference
	1987	2002	1987	2002	
0-4	62,899	75,395	14.4 percent	10.5 percent	-3.9 percent
5-9	51,596	76,159	11.8 percent	10.6 percent	-1.2 percent
10-14	47,720	75,766	10.9 percent	10.6 percent	-0.3 percent
15-19	48,576	65,953	11.1 percent	9.2 percent	-1.9 percent
20-24	47,142	58,770	10.8 percent	8.2 percent	-2.6 percent
25-29	41,699	55,781	9.5 percent	7.8 percent	-1.8 percent
30-34	32,761	58,281	7.5 percent	8.1 percent	0.6 percent
35-39	24,945	57,224	5.7 percent	8.0 percent	2.3 percent
40-44	19,692	51,420	4.5 percent	7.2 percent	2.7 percent
45-49	15,139	40,257	3.5 percent	5.6 percent	2.2 percent
50-54	12,140	29,958	2.8 percent	4.2 percent	1.4 percent
55-59	9,616	22,928	2.2 percent	3.2 percent	1.0 percent
60-64	7,340	16,879	1.7 percent	2.4 percent	0.7 percent
65-69	5,337	12,028	1.2 percent	1.7 percent	0.5 percent
70-74	3,957	8,322	0.9 percent	1.2 percent	0.3 percent
75-79	2,880	5,513	0.7 percent	0.8 percent	0.1 percent
80-84	1,825	3,408	0.4 percent	0.5 percent	0.1 percent
85+	2,038	3,234	0.5 percent	0.5 percent	0.0 percent
Total	437,302	717,276	100 percent	100 percent	

**Notes:**

a) The projected Indian Register population for 2002 is calculated using the base population from the Indian Register as of December 31, 2000. The base population has been adjusted for late / under reporting of births and deaths.

b) Due to rounding, percent of population columns may not add to total.

**Source:** Population Projections of Registered Indians, 2000-2021, Indian and Northern Affairs Canada, 2002.

**Table A2. Age Distribution of Registered First Nations Population in Canada, by Sex, 2002**

Age group	Population Numbers		Percent of Population		Absolute Difference
	Males	Females	Males	Females	
0-4	38,611	36,784	10.9 percent	10.1 percent	0.8 percent
5-9	39,123	37,036	11.1 percent	10.2 percent	0.9 percent
10-14	39,161	36,605	11.1 percent	10.1 percent	1.0 percent
15-19	34,039	31,914	9.6 percent	8.8 percent	0.9 percent
20-24	29,774	28,996	8.4 percent	8.0 percent	0.5 percent
25-29	27,988	27,793	7.9 percent	7.6 percent	0.3 percent
30-34	29,104	29,177	8.2 percent	8.0 percent	0.2 percent
35-39	28,043	29,181	7.9 percent	8.0 percent	-0.1 percent
40-44	24,448	26,972	6.9 percent	7.4 percent	-0.5 percent
45-49	18,452	21,805	5.2 percent	6.0 percent	-0.8 percent
50-54	13,592	16,366	3.8 percent	4.5 percent	-0.6 percent
55-59	10,134	12,794	2.9 percent	3.5 percent	-0.6 percent
60-64	7,276	9,603	2.1 percent	2.6 percent	-0.6 percent
65-69	5,058	6,970	1.4 percent	1.9 percent	-0.5 percent
70-74	3,534	4,788	1.0 percent	1.3 percent	-0.3 percent
75-79	2,235	3,278	0.6 percent	0.9 percent	-0.3 percent
80-84	1,300	2,108	0.4 percent	0.6 percent	-0.2 percent
85+	1,215	2,019	0.3 percent	0.6 percent	-0.2 percent
Total	353,087	364,189	100 percent	100 percent	

**Notes:**

a) The projected Indian Register population for 2002 was calculated using the base population from the Indian Register as of December 31, 2000. The base population has been adjusted for late / under reporting of births and deaths.

b) Due to rounding, percent of population columns may not add to total.

**Source:** Population Projections of Registered Indians, 2000-2021, Indian and Northern Affairs Canada, 2002.

**Table A3. Age distribution of Registered First Nations and Canadian Populations, 2002**

Age group	Population Numbers		Percent of Population		Absolute Difference
	Registered	Indians Canada	Registered Indians	Canada	
0-4	75,395	1,726,552	10.5 percent	5.5 percent	5.0 percent
5-9	76,159	1,982,027	10.6 percent	6.3 percent	4.3 percent
10-14	75,766	2,110,998	10.6 percent	6.7 percent	3.9 percent
15-19	65,953	2,128,803	9.2 percent	6.8 percent	2.4 percent
20-24	58,770	2,161,647	8.2 percent	6.9 percent	1.3 percent
25-29	55,781	2,105,919	7.8 percent	6.7 percent	1.1 percent
30-34	58,281	2,239,188	8.1 percent	7.1 percent	1.0 percent
35-39	57,224	2,553,592	8.0 percent	8.1 percent	-0.1 percent
40-44	51,420	2,700,789	7.2 percent	8.6 percent	-1.4 percent
45-49	40,257	2,469,690	5.6 percent	7.8 percent	-2.2 percent
50-54	29,958	2,151,905	4.2 percent	6.8 percent	-2.7 percent
55-59	22,928	1,770,967	3.2 percent	5.6 percent	-2.4 percent
60-64	16,879	1,352,644	2.4 percent	4.3 percent	-1.9 percent
65-69	12,028	1,143,848	1.7 percent	3.6 percent	-2.0 percent
70-74	8,322	1,036,189	1.2 percent	3.3 percent	-2.1 percent
75-79	5,513	832,050	0.8 percent	2.6 percent	-1.9 percent
80-84	3,408	562,441	0.5 percent	1.8 percent	-1.3 percent
85+	3,234	439,200	0.5 percent	1.4 percent	-0.9 percent
Total	717,276	31,468,449	100 percent	100 percent	

**Notes:**

- a) The projected Indian Register population for 2002 was calculated using the base population from the Indian Register as of December 31, 2000. The base population has been adjusted for late / under reporting of births and deaths.
- b) Due to rounding, percent of population columns may not add to total.

**Source:** Population Projections of Registered Indians, 2000-2021, Indian and Northern Affairs Canada, 2002; 2001 Census of Population, Statistics Canada, 2001.

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**Table A4. Age-specific Fertility Rates per 1,000, by Age Group of Mother, Registered First Nations<sup>1</sup> and General Population<sup>2</sup>, Atlantic and Western Canada, 2001-2002 (average)**

Age group of mother	First Nations <sup>1</sup> (2001-2002)		General Population <sup>2</sup> (2001-2002)		ARD (FN - Cdn)	Ratio (FN / Cdn)
	Rate per 1,000	95 percent CI (LCI, UCI)	Rate per 1,000	95 percent CI (LCI, UCI)		
15-19	<b>106.3</b>	<b>(102.9, 109.8)</b>	<b>19.3</b>	<b>(19.0, 19.7)</b>	87.0	5.5
20-24	<b>181.0</b>	<b>(176.1, 185.8)</b>	<b>62.4</b>	<b>(61.9, 63.0)</b>	118.5	2.9
25-29	<b>144.3</b>	<b>(139.9, 148.8)</b>	<b>98.8</b>	<b>(98.1, 99.5)</b>	45.5	1.5
30-34	88.2	(84.8, 91.7)	87.6	(87.0, 88.3)	0.6	1.0
35-39	<b>38.8</b>	<b>(36.5, 41.1)</b>	<b>34.7</b>	<b>(34.4, 35.1)</b>	4.1	1.1
40-44	<b>7.9</b>	<b>(6.8, 9.0)</b>	<b>5.8</b>	<b>(5.7, 6.0)</b>	2.1	1.4
Total fertility rate <sup>3</sup>	2.8 births per female	1.5 births per female	1.3	1.9		

<sup>1</sup> Includes on-reserve populations for Atlantic, Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

<sup>2</sup> Includes the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Alberta and British Columbia.

<sup>3</sup> Total fertility rate =  $[(\sum \text{live birth rate}_i) \times \text{width of age group}]/1,000$ ; where width of age group is five years.

**Notes:**

- a) Age-specific fertility rates for the First Nations and general populations are an average of the birth data for 2001 and 2002.
- b) First Nations population data exclude 131 births in 2001 and 177 births in 2002 where mother's age was not recorded.
- c) General population data were extracted by residence of mother.
- d) General population data exclude 11 births where mother's age was not recorded.
- e) ARD refers to the absolute rate difference; CI refers to confidence interval; LCI refers to the lower confidence limit; UCI refers to the upper confidence limit; FN refers to the First Nations population in Atlantic and Western Canada; and Cdn refers to the general Atlantic and Western population.
- f) Confidence intervals that do not overlap between populations are bolded.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Birth Database, Statistics Canada, 2010.

**Table A5. Percentage of Live Births, by Age Group of Mother, Registered First Nations<sup>1</sup> and General Population<sup>2</sup>, Atlantic and Western Canada, 2001-2002 (average)**

Age group of mother	First Nations <sup>1</sup> (2001-2002)		General Population <sup>2</sup> (2001-2002)		Absolute difference (FN - Cdn)	Ratio (FN / Cdn)
	Percentage of live births	95 percent CI (LCI, UCI)	Percentage of live births	95 percent CI (LCI, UCI)		
10-14	<b>0.3 percent</b>	<b>(0.2, 0.4)</b>	<b>0.1 percent</b>	<b>(0.0, 0.1)</b>	0.2 percent	3.0
15-19	<b>21.6 percent</b>	<b>(21.0, 22.2)</b>	<b>6.2 percent</b>	<b>(6.1, 6.3)</b>	15.4 percent	3.5
20-24	<b>31.9 percent</b>	<b>(31.2, 32.6)</b>	<b>19.6 percent</b>	<b>(19.4, 19.7)</b>	12.3 percent	2.6
25-29	<b>24.1 percent</b>	<b>(23.4, 24.7)</b>	<b>30.2 percent</b>	<b>(30.1, 30.4)</b>	-6.2 percent	0.8
30-34	<b>14.7 percent</b>	<b>(14.2, 15.2)</b>	<b>28.6 percent</b>	<b>(28.4, 28.7)</b>	-13.9 percent	0.5
35-39	<b>6.3 percent</b>	<b>(5.9, 6.6)</b>	<b>13.0 percent</b>	<b>(12.8, 13.1)</b>	-6.7 percent	0.5
40-49	<b>1.1 percent</b>	<b>(1.0, 1.3)</b>	<b>2.4 percent</b>	<b>(2.3, 2.4)</b>	-1.3 percent	0.5

<sup>1</sup> Includes on-reserve populations for Atlantic, Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

<sup>2</sup> Includes the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, Saskatchewan, Alberta and British Columbia.

# Notes:

- Percentages of live births for the First Nations and general populations are an average of the birth data for 2001 and 2002.
- First Nations population data exclude 131 births in 2001 and 177 births in 2002 where mother's age was not recorded, and one record where mother's age was invalid.
- General population data were extracted by residence of mother.
- General population data exclude 17 births where mother's age was not recorded or invalid.
- CI refers to confidence limit; LCI refers to the lower confidence interval; UCI refers to the upper confidence limit; FN refers to the First Nations population in Atlantic and Western Canada, and Cdn refers to the general Atlantic and Western population.
- Confidence intervals that do not overlap between populations are bolded.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Birth Database, Statistics Canada, 2010.

**Table A6. Age-specific Mortality Rates per 100,000, for (a) Males and (b) Females, Registered First Nations<sup>1</sup> and General Population<sup>2</sup>, Western Canada, 2001-2002 (average)**

## Males

Age Group	First Nations male deaths per 100,000 (95 percent CI; LCI, UCI)	General Population male deaths per 100,000 (95 percent CI; LCI, UCI)	ARD FN - Cdn	Ratio FN / Cdn	Percent of excess deaths
0-4	263.4 (213.9, 312.8)	144.6 (134.5, 154.6)	118.8	1.8	4.5
5-9	31.2 (14.2, 48.2)	14.9 (11.9, 18.0)	16.3	2.1	0.6
10-14	34.6 (16.5, 52.7)	18.5 (15.2, 21.8)	16.1	1.9	0.6
15-19	276.9 (221.5, 332.3)	76.7 (70.1, 83.2)	200.2	3.6	6.3
20-24	370.0 (300.6, 439.5)	99.5 (91.9, 107.0)	270.5	3.7	7.2
25-29	306.0 (240.2, 371.8)	89.9 (82.6, 97.2)	216.1	3.4	5.3
30-34	360.6 (288.9, 432.4)	118.2 (110.1, 126.4)	242.4	3.1	5.9
35-39	424.4 (343.6, 505.2)	142.2 (133.7, 150.7)	282.2	3.0	6.4
40-44	626.5 (520.4, 732.6)	190.4 (180.9, 200.0)	436.1	3.3	8.5
45-49	913.0 (763.9, 1,062.1)	289.6 (277.3, 302.0)	623.4	3.2	8.9
50-54	1,163.2 (966.2, 1,360.1)	429.8 (413.6, 446.1)	733.4	2.7	7.7
55-59	1,454.7 (1,198.7, 1,710.8)	683.6 (660.1, 707.1)	771.1	2.1	6.0
60-64	2,193.1 (1,821.8, 2,564.5)	1,122.1 (1,087.8, 1,156.4)	1,071.0	2.0	5.9
65-69	3,914.6 (3,317.3, 4,511.9)	1,798.4 (1,751.9, 1,844.9)	2,116.2	2.2	8.1
70-74	6,230.6 (5,322.9, 7,138.4)	2,888.3 (2,825.4, 2,951.3)	3,342.3	2.2	8.8
75-79	9,266.9 (7,821.9, 10,711.8)	4,788.8 (4,695.0, 4,882.6)	4,478.1	1.9	6.9
80-84	10,846.0 (8,720.2, 12,971.8)	7,936.3 (7,783.4, 8,089.3)	2,909.7	1.4	2.4
85+	15,462.4 (1,2532.6, 18,392.3)	16,477.8 (16,212.1, 16,743.5)	-1,015.4	0.9	n/a

## Females

Age Group	First Nations female deaths per 100,000 (95 percent CI; LCI, UCI)	General Population female deaths per 100,000 (95 percent CI; LCI, UCI)	ARD FN - Cdn	Ratio FN / Cdn	Percent of excess deaths
0-4	235.7 (187.8, 283.6)	113.5 (104.4, 122.6)	122.2	2.1	5.4
5-9	23.0 (8.0, 38.1)	10.0 (7.5, 12.6)	13.0	2.3	0.6
10-14	57.6 (33.6, 81.7)	14.9 (11.9, 17.9)	42.8	3.9	1.8
15-19	92.1 (59.1, 125.0)	36.6 (32.0, 41.3)	55.4	2.5	2.0
20-24	138.4 (94.9, 181.8)	41.2 (36.3, 46.2)	97.1	3.4	3.1
25-29	195.0 (142.0, 248.0)	37.0 (32.2, 41.8)	158.0	5.3	4.7
30-34	233.4 (175.3, 291.6)	51.8 (46.3, 57.3)	181.6	4.5	5.4
35-39	324.9 (255.4, 394.4)	84.3 (77.7, 90.8)	240.7	3.9	7.0
40-44	377.9 (298.1, 457.8)	112.6 (105.2, 120.0)	265.3	3.4	6.8
45-49	628.1 (510.7, 745.4)	177.7 (168.0, 187.4)	450.4	3.5	8.9
50-54	794.2 (639.3, 949.1)	272.0 (259.0, 285.0)	522.3	2.9	7.5
55-59	1,203.3 (984.3, 1,422.3)	445.8 (426.8, 464.9)	757.5	2.7	8.2
60-64	1,728.9 (1,424.6, 2,033.3)	716.7 (689.6, 743.9)	1,012.2	2.4	8.2
65-69	3,042.1 (2,553.6, 3,530.5)	1,077.0 (1,041.5, 1,112.5)	1,965.1	2.8	10.8

70-74	<b>3,642.7 (3,006.6, 4,278.7)</b>	<b>1,699.1 (1,653.1, 1,745.1)</b>	1,943.6	2.1	7.6
75-79	<b>6,399.3 (5,346.7, 7,451.8)</b>	<b>2,909.2 (2,845.1, 2,973.3)</b>	3,490.1	2.2	8.7
80-84	<b>6,145.7 (4,807.3, 7,484.1)</b>	<b>5,133.9 (5,035.6, 5,232.2)</b>	1,011.8	1.2	1.5
85+	<b>14,431.2 (12,261.9, 16,600.6)</b>	<b>13,081.0 (12,917.6, 13,244.5)</b>	1,350.2	1.1	1.8

<sup>1</sup> Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

<sup>2</sup> Includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

#### Notes:

- a) Age-specific mortality rates for the First Nations and general populations are an average of the death data for 2001 and 2002.  
b) General population data were extracted by the deceased's usual place of residence.  
c) ARD refers to the absolute rate difference; CI refers to confidence interval; LCI refers to the lower confidence limit; UCI refers to the upper confidence limit; FN refers to the First Nations population in Western Canada; Cdn refers to the general Western population; n/a refers to not applicable as observed number of deaths greater than expected number of deaths.  
d) Confidence intervals that do not overlap between populations are bolded.  
e) Percent of excess deaths = (Observed number of deaths FN - Expected number of deaths FN)/Σ(Observed number of deaths FN - Expected number of deaths FN), where Expected number of deaths FN = Cdn mortality rate\*FN population.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Death Database, Statistics Canada, 2010.

**Table A7. Age-specific Mortality Rates per 100,000, by Sex, Registered First Nations<sup>1</sup>, Western Canada, 2001-2002 (average)**

Age Group	First Nations male deaths per 100,000 (95 percent CI; LCI, UCI)	First Nations female deaths per 100,000 (95 percent CI; LCI, UCI)	ARD Males - Females	Ratio Males / Females
0-4	<b>263.4 (213.9, 312.8)</b>	<b>235.7 (187.8, 283.6)</b>	27.7	1.1
5-9	<b>31.2 (14.2, 48.2)</b>	<b>23.0 (8.0, 38.1)</b>	8.1	1.4
10-14	<b>34.6 (16.5, 52.7)</b>	<b>57.6 (33.6, 81.7)</b>	-23.1	0.6
15-19	<b>276.9 (221.5, 332.3)</b>	<b>92.1 (59.1, 125.0)</b>	184.8	3.0
20-24	<b>370.0 (300.6, 439.5)</b>	<b>138.4 (94.9, 181.8)</b>	231.7	2.7
25-29	<b>306.0 (240.2, 371.8)</b>	<b>195.0 (142.0, 248.0)</b>	111.0	1.6
30-34	<b>360.6 (288.9, 432.4)</b>	<b>233.4 (175.3, 291.6)</b>	127.2	1.5
35-39	<b>424.4 (343.6, 505.2)</b>	<b>324.9 (255.4, 394.4)</b>	99.5	1.3
40-44	<b>626.5 (520.4, 732.6)</b>	<b>377.9 (298.1, 457.8)</b>	248.6	1.7
45-49	<b>913.0 (763.9, 1,062.1)</b>	<b>628.1 (510.7, 745.4)</b>	284.9	1.5
50-54	<b>1,163.2 (966.2, 1,360.1)</b>	<b>794.2 (639.3, 949.1)</b>	369.0	1.5
55-59	<b>1,454.7 (1,198.7, 1,710.8)</b>	<b>1,203.3 (984.3, 1,422.3)</b>	251.4	1.2
60-64	<b>2,193.1 (1,821.8, 2,564.5)</b>	<b>1,728.9 (1,424.6, 2,033.3)</b>	464.2	1.3
65-69	<b>3,914.6 (3,317.3, 4,511.9)</b>	<b>3,042.1 (2,553.6, 3,530.5)</b>	872.5	1.3
70-74	<b>6,230.6 (5,322.9, 7,138.4)</b>	<b>3,642.7 (3,006.6, 4,278.7)</b>	2,588.0	1.7
75-79	<b>9,266.9 (7,821.9, 10,711.8)</b>	<b>6,399.3 (5,346.7, 7,451.8)</b>	2,867.6	1.5
80-84	<b>10,846.0 (8,720.2, 12,971.8)</b>	<b>6,145.7 (4,807.3, 7,484.1)</b>	4,700.3	1.8
85+	<b>15,462.4 (12,532.6, 18,392.3)</b>	<b>14,431.2 (12,261.9, 16,600.6)</b>	1,031.2	1.1

<sup>1</sup> Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

#### Notes:

- a) Age and sex-specific mortality rates for the First Nations and general populations are an average of the death data for 2001 and 2002.  
b) ARD refers to the absolute rate difference; CI refers to confidence interval; LCI refers to the lower confidence limit; and UCI refers to the upper confidence limit.  
c) Confidence intervals that do not overlap between sexes are bolded.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.

**Table A8. Leading Causes of Death<sup>1</sup> (crude rates per 100,000), by Sex, Registered First Nations<sup>2</sup>, Western Canada, 2001-2002 (average)**

ICD -10 Chapter Title (ICD -10 Chapter Number)	Deaths per 100,000 population (95 percent CI; LCI, UCI)
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	Males	Females	Both Sexes
External causes of morbidity and mortality(20)	173.6 (159.6, 187.6)	82.5 (72.8, 92.2)	128.1 (119.6, 136.6)
Diseases of the circulatory system (9)	107.5 (96.5, 118.5)	90.5 (80.3, 100.6)	99.0 (91.5, 106.5)
Neoplasms (2)	73.1 (64.1, 82.2)	79.0 (69.5, 88.4)	76.0 (69.5, 82.6)
Diseases of the digestive system (11)	31.7 (25.7, 37.7)	38.0 (31.4, 44.6)	34.9 (30.4, 39.3)
Diseases of the respiratory system (10)	40.0 (33.2, 46.7)	29.2 (23.4, 34.9)	34.6 (30.1, 39.0)
Endocrine, nutritional and metabolic diseases (4)	31.1 (25.2, 37.1)	24.2 (18.9, 29.4)	27.7 (23.7, 31.6)
Certain infectious and parasitic diseases (1)	14.4 (10.4, 18.4)	18.9 (14.2, 23.5)	16.6 (13.6, 19.7)
Mental and behavioural disorders (5)	16.5 (12.1, 20.8)	11.2 (7.6, 14.8)	13.8 (11.0, 16.6)
Diseases of the genitourinary system (14)	10.6 (7.1, 14.0)	12.7 (8.9, 16.5)	11.6 (9.1, 14.2)
Diseases of the nervous system (6)	10.6 (7.1, 14.0)	8.2 (5.2, 11.3)	9.4 (7.1, 11.7)
Certain conditions originating in the perinatal period (16)	7.6 (4.7, 10.6)	8.5 (5.4, 11.7)	8.1 (6.0, 10.2)
Congenital malformations, deformations and chromosomal (17)	8.8 (5.7, 12.0)	7.1 (4.2, 9.9)	7.9 (5.8, 10.1)
Symptoms, signs and abnormal clinical and laboratory findings (18)	10.9 (7.4, 14.4)	5.0 (2.6, 7.4)	7.9 (5.8, 10.1)
Diseases of the musculoskeletal system and connective (13)	3.5 (1.5, 5.5)	9.4 (6.2, 12.7)	6.5 (4.6, 8.4)
Diseases of the blood and blood-forming organs (3)	3.8 (1.7, 5.9)	2.1 (0.5, 3.6)	2.9 (1.7, 4.2)
Diseases of the skin and subcutaneous tissue (12)	NR	NR	0.9 (0.2, 1.6)
Pregnancy, childbirth and the puerperium (15)	NR	NR	NR
Diseases of the eye and adnexa (7)	NR	NR	NR
Diseases of the ear and mastoid process (8)	NR	NR	NR
Unknown	45.8 (38.6, 53.0)	41.8 (35.0, 48.7)	43.8 (38.9, 48.8)
Total	589.9 (564.1, 615.7)	470.2 (447.2, 493.3)	530.1 (512.8, 547.4)

1 Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.

2 Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

**Notes:**

- a) Crude mortality rates for the First Nations population are an average of the death data for 2001 and 2002.
- b) Ranking based on crude mortality rate (deaths per 100,000 population) for the entire First Nations population for 2001 and 2002.
- c) CI refers to confidence interval; LCI refers to the lower confidence limit; UCI refers to the upper confidence limit; and NR refers to non reportable as the sample size is too low to yield a stable estimate.
- d) Confidence intervals that do not overlap between sexes are bolded.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.

**Table A9. Leading Causes of Death<sup>1</sup> (age-standardized rates per 100,000), Combined Sexes, Registered First Nations<sup>2</sup> and General Population<sup>3</sup>, Western Canada, 2001-2002 (average)**

ICD -10 Chapter Title (ICD -10 Chapter Number) <sup>4</sup>	Obs (n)	Death rates per 100,000 95 percent CI (LCI, UCI)		Exp (n)	Exc (n)	ARD FN - Cdn (Rank)	Ratio FN / Cdn (Rank)	percent of excess deaths
		FN	Cdn					
External causes of morbidity and mortality (20)	871	128.1 (119.6, 136.6)	37.0 (36.1, 37.9)	251	620	91.1 (1)	3.5 (6)	37.0
Diseases of the circulatory system (9)	673	99.0 (91.5, 106.5)	63.9 (63.3, 64.6)	435	238	35.1 (2)	1.5 (11)	14.2
Neoplasms (2)	517	76.0 (69.5, 82.6)	65.8 (65.0, 66.6)	448	69	10.2 (7)	1.2 (13)	4.1
Diseases of the digestive system (11)	237	34.9 (30.4, 39.3)	9.0 (8.7, 9.3)	61	176	25.9 (3)	3.9 (3)	10.5
Diseases of the respiratory system (10)	235	34.6 (30.1, 39.0)	15.1 (14.8, 15.4)	103	132	19.5 (4)	2.3 (9)	7.9
Endocrine, nutritional and metabolic diseases (4)	188	27.7 (23.7, 31.6)	8.4 (8.1, 8.7)	57	131	19.3 (5)	3.3 (7)	7.8

Certain infectious and parasitic diseases (1)	113	16.6 (13.6, 19.7)	4.1 (3.9, 4.4)	28	85	12.5 (6)	4.0 (2)	5.1
Mental and behavioural disorders (5)	94	13.8 (11.0, 16.6)	4.8 (4.6, 5.0)	33	61	9.0 (8)	2.9 (8)	3.6
Diseases of the genitourinary system (14)	79	11.6 (9.1, 14.2)	3.3 (3.1, 3.4)	22	57	8.4 (9)	3.6 (5)	3.4
Diseases of the nervous system (6)	64	9.4 (7.1, 11.7)	8.8 (8.5, 9.1)	60	4	0.6 (14)	1.1 (14)	0.2
Certain conditions originating in the perinatal period (16)	55	8.1 (6.0, 10.2)	6.1 (5.6, 6.6)	41	14	2.0 (13)	1.3 (12)	0.8
Congenital malformations, deformations and chromosomal (17)	54	7.9 (5.8, 10.1)	5.1 (4.6, 5.5)	35	19	2.9 (11)	1.6 (10)	1.1
Symptoms, signs and abnormal clinical and laboratory findings (18)	54	7.9 (5.8, 10.1)	5.1 (4.7, 5.4)	34	20	2.9 (11)	1.6 (10)	1.2
Diseases of the musculoskeletal system and connective (13)	44	6.5 (4.6, 8.4)	1.5 (1.4, 1.7)	10	34	4.9 (10)	4.2 (1)	2.0
Diseases of the blood and blood-forming organs (3)	20	2.9 (1.7, 4.2)	0.8 (0.7, 0.9)	5	15	2.1 (12)	3.6 (4)	0.8
Total <sup>5</sup>	3,604	530.1 (512.8, 547.4)	239.1 (237.4, 240.8)	1,625	1,979	291.1	2.2	291.0

<sup>1</sup> Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.

<sup>2</sup> Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

<sup>3</sup> Includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

<sup>4</sup> Due to small samples sizes, the following chapters are not presented, 'Diseases of the eye and adnexa' (7), 'Diseases of the ear and mastoid process' (8), 'Diseases of the skin and subcutaneous tissue' (12), and 'Pregnancy, childbirth and the puerperium' (15). Excludes deaths where cause of death was unknown.

Total row includes all 19 chapters.

#### Notes:

- a) Rates are standardized to the 2001-2002 First Nations population in Western Canada.
- b) Mortality rates for the First Nations and General populations are an average of the death data for 2001 and 2002.
- c) Ranking based on mortality rate (number of deaths per 100,000 population) for First Nations population for 2001 and 2002.
- d) ARD refers to the absolute rate difference; CI refers to confidence interval; LCI refers to the lower confidence limit; UCI refers to the upper confidence limit; FN refers to the First Nations population in Western Canada; Cdn refers to the general Western population; (n) refers to the number of deaths; Obs refers to observed number of deaths; Exp refers to expected number of deaths; and Exc refers to excess number of deaths.
- e) Due to the exclusion of categories with small observations, columns may not add to total.
- f) Confidence intervals that do not overlap between populations are bolded.
- g) Percent of all excess deaths = (Observed number of deaths FN - Expected number of deaths FN)/Σ(Observed number of deaths FN - Expected number of deaths FN), where Expected number of deaths FN = Cdn mortality rate\*FN population. Calculation includes only chapters listed in table. Chapters with fewer First Nations deaths than the general Canadian population were excluded from this calculation.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Death Database, Statistics Canada, 2010.

**Table A10. Potential Years of Life Lost per 100,000, by Sex and Cause of Death<sup>1</sup>, Registered First Nations<sup>2</sup>, Western Canada, 2001-2002 (average)**

ICD -10 Chapter Title (ICD -10 Chapter Number) <sup>3</sup>	PYLL rates per 100,000 95 percent CI (LCI, UCI)			ARD Males - Females	Ratio Males/ Females
	Males	Females	Both Sexes		
External causes of morbidity and mortality (20)	7,052.6 (6,963.0, 7,142.3)	3,357.6 (3,295.5, 3,419.7)	5,211.8 (5,157.2, 5,266.4)	3,695.0	2.1
Neoplasms (2)	919.1 (886.7, 951.4)	1,169.0 (1,132.4, 1,205.7)	1,043.6 (1,019.2, 1,068.0)	-249.9	0.8
Diseases of the circulatory system (9)	1,138.5 (1,102.4, 1,174.5)	745.7 (716.6, 775.2)	942.8 (919.6, 966.0)	392.8	1.5

Diseases of the digestive system (11)	642.9 (615.8, 669.9)	745.9 (716.6, 775.2)	694.2 (674.3, 714.1)	-103.0	0.9
Certain conditions originating in the perinatal period (16)	564.6 (539.2, 589.9)	634.3 (607.3, 661.3)	599.3 (580.8, 617.8)	-69.7	0.9
Congenital malformations, deformations and chromosomal (17)	602.7 (576.5, 628.9)	451.7 (429.0, 474.5)	527.5 (510.1, 544.9)	151.0	1.3
Diseases of the respiratory system (10)	471.8 (448.7, 495.0)	410.3 (388.6, 432.0)	441.2 (425.3, 457.1)	61.5	1.1
Certain infectious and parasitic diseases (1)	381.6 (360.7, 402.5)	458.9 (435.9, 481.8)	420.1 (404.6, 435.6)	-77.3	0.8
Endocrine, nutritional and metabolic diseases (4)	448.9 (426.3, 471.5)	276.1 (258.3, 293.9)	362.8 (348.4, 377.2)	172.8	1.6
Symptoms, signs and abnormal clinical and laboratory findings (18)	490.5 (466.8, 514.1)	222.2 (206.3, 238.2)	356.8 (342.6, 371.1)	268.3	2.2
Mental and behavioural disorders (5)	379.0 (358.2, 399.7)	202.4 (187.2, 217.7)	291.0 (278.1, 303.9)	176.6	1.9
Diseases of the nervous system (6)	300.2 (281.7, 318.7)	241.4 (224.7, 258.0)	270.9 (258.5, 283.4)	58.8	1.2
Diseases of the genitourinary system (14)	122.4 (110.6, 134.2)	132.4 (120.1, 144.8)	127.4 (118.8, 135.9)	-10.0	0.9
Diseases of the musculoskeletal system and connective (13)	37.1 (30.6, 43.6)	156.9 (143.4, 170.3)	96.8 (89.3, 104.2)	-119.8	0.2
Diseases of the blood and blood-forming organs (3)	70.7 (61.7, 79.6)	31.4 (25.4, 37.4)	51.1 (45.7, 56.5)	39.3	2.3
Total <sup>4</sup>	14,796.2 (14,666.3, 14,926.0)	10,135.8 (10,028.0, 10,243.7)	12,474.4 (12,390.0, 12,558.9)	4,660.4	1.5

<sup>1</sup> Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.

<sup>2</sup> Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

<sup>3</sup> Due to small samples sizes, the following chapters are not presented, 'Diseases of the eye and adnexa' (7), 'Diseases of the ear and mastoid process' (8), 'Diseases of the skin and subcutaneous tissue' (12), and 'Pregnancy, childbirth and the puerperium' (15). Excludes deaths where cause of death was unknown.

<sup>4</sup> Total column includes all 19 chapters.

#### Notes:

- a) PYLL rates for the First Nations population are an average of the death data for 2001 and 2002.
- b) ARD refers to the absolute rate difference; CI refers to confidence interval; LCI refers to the lower confidence limit; and UCI refers to the upper confidence limit.
- c) Due to the exclusion of categories with small observations, columns may not add to total.
- d) Confidence intervals that do not overlap between sexes are bolded.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003.

**Table A11. Age-standardized Potential Years of Life Lost by Cause of Death<sup>1</sup>, Registered First Nations<sup>2</sup> and General Population<sup>3</sup>, Western Canada, 2001-2002 (average)**

ICD -10 Chapter Title (ICD -10 Chapter Number) <sup>4</sup>	PYLL rates per 100,000 95 percent CI (LCI, UCI)		ARD FN - Cdn (Rank)	Ratio FN / Cdn (Rank)	Percent of excess PYLL
	First Nations <sup>2</sup>	General Population <sup>3</sup>			
External causes of morbidity and mortality (20)	5,211.8 (5,157.2, 5,266.4)	1,474.3 (1,468.2, 1,480.3)	3,737.5 (1)	3.5 (7)	53.8
Neoplasms (2)	1,043.6 (1,019.2, 1,068.0)	834.6 (831.0, 838.2)	209.0 (8)	1.3 (15)	3.0
Diseases of the circulatory system (9)	942.8 (919.6, 966.0)	459.8 (457.2, 462.5)	483.0 (3)	2.1 (10)	6.9
Diseases of the digestive system (11)	694.2 (674.3, 714.1)	132.2 (130.7, 133.8)	562.0 (2)	5.2 (4)	8.1

Certain conditions originating in the perinatal period (16)	599.3 (580.8, 617.8)	449.2 (444.8, 453.6)	150.1 (10)	1.3 (14)	2.2
Congenital malformations, deformations and chromosomal (17)	527.5 (510.1, 544.9)	339.3 (335.6, 343.1)	188.2 (9)	1.6 (13)	2.7
Diseases of the respiratory system (10)	441.2 (425.3, 457.1)	115.6 (114.0, 117.3)	325.5 (4)	3.8 (6)	4.7
Certain infectious and parasitic diseases (1)	420.1 (404.6, 435.6)	100.3 (98.9, 101.9)	319.7 (5)	4.2 (5)	4.6
Endocrine, nutritional and metabolic diseases (4)	362.8 (348.4, 377.2)	117.1 (115.5, 118.7)	245.7 (6)	3.1 (9)	3.5
Symptoms, signs and abnormal clinical and laboratory findings (18)	356.8 (342.6, 371.1)	211.7 (209.0, 214.4)	145.2 (11)	1.7 (12)	2.1
Mental and behavioural disorders (5)	291.0 (278.1, 303.9)	52.4 (51.5, 53.4)	238.6 (7)	5.6 (2)	3.4
Diseases of the nervous system (6)	270.9 (258.5, 283.4)	145.4 (143.4, 147.4)	125.5 (12)	1.9 (11)	1.8
Diseases of the genitourinary system (14)	127.4 (118.8, 135.9)	21.0 (20.4, 21.6)	106.4 (13)	6.1 (1)	1.5
Diseases of the musculoskeletal system and connective (13)	96.8 (89.3, 104.2)	18.1 (17.5, 18.7)	78.7 (14)	5.3 (3)	1.1
Diseases of the blood and blood-forming organs (3)	51.1 (45.7, 56.5)	15.2 (14.6, 15.8)	35.9 (15)	.4 (8)	0.5
Total <sup>5</sup>	12,474.4 (12,390.0, 12,558.9)	4,490.6 (4,480.0, 4,501.2)	7,983.8	2.8	

<sup>1</sup> Refer to [Appendix 1](#) for a description of the International Classification of Diseases-10 chapters; only 19 of the 21 International Classification of Diseases-10 chapters were used in the analysis.

<sup>2</sup> Includes on-reserve populations for Manitoba and Saskatchewan, and on- and off-reserve populations for Alberta and British Columbia.

<sup>3</sup> Includes the provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

<sup>4</sup> Due to small samples sizes, the following chapters are not presented, 'Diseases of the eye and adnexa' (7), 'Diseases of the ear and mastoid process' (8), 'Diseases of the skin and subcutaneous tissue' (12), and 'Pregnancy, childbirth and the puerperium' (15). Excludes deaths where cause of death was unknown.

<sup>5</sup> Total column includes all 19 chapters.

**Notes:** a) PYLL rates for the First Nations and general populations are an average of the death data for 2001 and 2002. b) ARD refers to the absolute rate difference; CI refers to confidence interval; LCI refers to the lower confidence limit; UCI refers to the upper confidence limit; FN refers to the First Nations population in Western Canada; and Cdn refers to the general Western population. c) Due to the exclusion of categories with small observations, columns may not add to total. d) Confidence intervals that do not overlap between populations are bolded. e) Percent of excess PYLL =  $(\text{Observed PYLL FN} - \text{Expected PYLL FN}) / \Sigma(\text{Observed PYLL FN} - \text{Expected PYLL FN})$ , where Expected number of deaths FN = Cdn PYLL rate\*FN population. Calculation includes only chapters listed in table. Chapters with fewer First Nations deaths than the general Canadian population were excluded from this calculation.

**Source:** Health Canada, First Nations and Inuit Health Branch in-house statistics, Health Canada, 2003; Canadian Vital Statistics Death Database, Statistics Canada, 2010.

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## Health Canada, First Nations and Inuit Health Branch Headquarters (National Capital Region)

*Health Information, Analysis and Research Division*

Diane Badger, Emily De Rubeis, Rene Dion, Julie Fontaine, Karin Johnson, Cassandra Lei, Dan Lucas, Teresa Lukawiecki, Jennifer Pennock, Veeran-Anne Singh, Julie Stokes, Greg Stoodley and Susan Taylor-Clapp

*Community Programs Directorate*  
Matthew Peake

*Office of Community Medicine*  
Marene Gatali

*Primary Health Care and Public Health Directorate*  
Ulrick Auguste and Sophie Chen

## **Health Canada, Regions and Programs Branch**

---

*British Columbia Region*  
Shannon Waters and Joanne Nelson

*Alberta Region*  
Chandrani Wijayasinghe, Trincy Buwalda, Winkie Szeto, Grace Wang and Ibrahim Agyemang

*Saskatchewan Region*  
Sandi LeBoeuf, Carmen Bresch, Lynda Kushnir Pekrul and Erin Laing

*Manitoba Region*  
Cathy Menard, Suzanne Martel, Alison Supina and Mark Sagan

*Ontario Region*  
Corey Green and Shailee Tanna

*Quebec Region*  
Serge Desrosiers and Jean-Pierre Courteau

*Atlantic Region*  
Agatha Hopkins, Kelly Bower and Sarah Fleming

## **Assembly of First Nations**

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## **Public Health Agency of Canada**

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## **Additional Resources**


### **Federal Government**

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[First Nations and Inuit Health Branch:](http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/index-eng.php)  
[www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/index-eng.php](http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/index-eng.php)

[Non-Insured Health Benefits Program:](http://www.hc-sc.gc.ca/fniah-spnia/nihb-ssna/index-eng.php)  
[www.hc-sc.gc.ca/fniah-spnia/nihb-ssna/index-eng.php](http://www.hc-sc.gc.ca/fniah-spnia/nihb-ssna/index-eng.php)

 [Population Health, Public Health Agency of Canada:](http://www.phac-aspc.gc.ca/ph-sp/) [www.phac-aspc.gc.ca/ph-sp/](http://www.phac-aspc.gc.ca/ph-sp/)

 [Maternal and Infant Health Section](http://www.phac-aspc.gc.ca/rhs-ssg/index.html): [www.phac-aspc.gc.ca/rhs-ssg/index.html](http://www.phac-aspc.gc.ca/rhs-ssg/index.html)

 [Disease Surveillance on-line](http://www.phac-aspc.gc.ca/surveillance-eng.php): [www.phac-aspc.gc.ca/surveillance-eng.php](http://www.phac-aspc.gc.ca/surveillance-eng.php)

[Health Care System \(Reports and Publications\)](http://www.hc-sc.gc.ca): [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)

 [Aboriginal Canada portal \(Health and Social Services\)](http://www.aboriginalcanada.gc.ca/acp/site.nsf/en/ao20017.html): [www.aboriginalcanada.gc.ca/acp/site.nsf/en/ao20017.html](http://www.aboriginalcanada.gc.ca/acp/site.nsf/en/ao20017.html)

 [Indian and Northern Affairs Canada \(Publications\)](http://www.ainc-inac.gc.ca/pr/index-eng.asp): [www.ainc-inac.gc.ca/pr/index-eng.asp](http://www.ainc-inac.gc.ca/pr/index-eng.asp)


 [Statistics Canada](http://www.statcan.gc.ca): [www.statcan.gc.ca](http://www.statcan.gc.ca)

## Provincial Reports

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 [British Columbia Vital Statistics](http://www.vs.gov.bc.ca/stats/indian/index.html): [www.vs.gov.bc.ca/stats/indian/index.html](http://www.vs.gov.bc.ca/stats/indian/index.html)

 [Northwest Territories Health and Social Services](http://www.hlthss.gov.nt.ca/): [www.hlthss.gov.nt.ca/](http://www.hlthss.gov.nt.ca/)

 [Manitoba Centre for Health Policy \(Publications\)](http://mchp-appserv.cpe.umanitoba.ca/deliverablesList.html): <http://mchp-appserv.cpe.umanitoba.ca/deliverablesList.html>

## Aboriginal Organizations

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 [National Aboriginal Health Organization](http://www.naho.ca/english/): [www.naho.ca/english/](http://www.naho.ca/english/)

 [Assembly of First Nations](http://www.afn.ca/index.php/en): [www.afn.ca/index.php/en](http://www.afn.ca/index.php/en)

 [Inuit Tapiriit Kanatami](http://www.itk.ca/index.html): [www.itk.ca/index.html](http://www.itk.ca/index.html)

## International

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 [Indian Health Service Annual Report \(United States--American Indian and Alaska Natives\)](http://www.ihs.gov/NonMedicalPrograms/IHS_Stats/index.cfm): [http://www.ihs.gov/NonMedicalPrograms/IHS\\_Stats/index.cfm](http://www.ihs.gov/NonMedicalPrograms/IHS_Stats/index.cfm)

 [Australia Indigenous HealthInfoNet](http://www.healthinfonet.ecu.edu.au): [www.healthinfonet.ecu.edu.au](http://www.healthinfonet.ecu.edu.au)

 [New Zealand Ministry of Health, Maori Health](http://www.maorihealth.govt.nz/): [www.maorihealth.govt.nz/](http://www.maorihealth.govt.nz/)

## Health Canada, Regions and Programs Branch, First Nations and Inuit Health

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### *British Columbia Region*

Federal Building, Suite 405  
Sinclair Centre  
757 West Hastings Street  
Vancouver, British Columbia V6C 1A1  
Telephone: (604) 666-8871  
Facsimile: (604) 666-1391

### *Alberta Region*

Canada Place, Suite 730  
9700 Jasper Avenue  
Edmonton, Alberta T5J 4C3  
Telephone: (780) 495-2651  
Facsimile: (780) 495-3285

### *Saskatchewan Region*

2045 Broad Street, 1<sup>st</sup> Floor  
South Broad Plaza  
Regina, Saskatchewan S4P 3T7



Telephone: (306) 780-7661  
Facsimile: (306) 780-7137

*Manitoba Region*

391 York Avenue, Suite 300  
Winnipeg, Manitoba R3C 4W1  
Telephone: (204) 983-4199  
Facsimile: (204) 983-6018

*Ontario Region*

*Ottawa Office*

Emerald Plaza  
1547 Merivale Road  
Ottawa, Ontario K1A 0L3  
Telephone: (613) 954-9836  
Facsimile: (613) 946-4203

*Toronto Office*

180 Queen Street West, 8<sup>th</sup> Floor  
Toronto, Ontario M5V 3L7  
Telephone: (416) 954-6672  
Facsimile: (416) 973-4102

*Quebec Region*

Complexe Guy-Favreau, East Tower  
200 René Lévesque Boulevard West  
Montréal, Québec H2Z 1X4  
Telephone: 1-800-561-3350  
Facsimile: (514) 283-7392

*Atlantic Region*

1505 Barrington Street, Suite 1525  
Halifax, NS B3J 3Y6  
Telephone: (902) 426-6637  
Facsimile: (902) 426-8675

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Ottawa, Ontario K1A 0K9  
Telephone: (613) 946-8081  
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Ottawa, Ontario K1A 0K9

Facsimile: (613) 948-2110

E-mail: [fnihb\\_stats@hc-sc.gc.ca](mailto:fnihb_stats@hc-sc.gc.ca)

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