Alberta Reproductive Health
Pregnancies & Births

Surveillance Report
2009

Government of Alberta

Alberta

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Government of Alberta

ALBERTA Perinatal Health PROGRAM

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For more information contact:
Surveillance and Assessment
Community and Population Health
Alberta Health and Wellness
24th Floor, Telus Plaza North Tower
10025 Jasper Avenue
PO Box 1360 STN MAIN
Edmonton, Alberta T5J 2N3
CANADA

Phone: 1 (780) 427-4518
Toll Free: 310-0000 (in Alberta only)
Fax: 1 (780) 427-1470
Email: health.surveillance@gov.ab.ca
Internet: http://www.health.alberta.ca

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Working Group

Michael Sanderson (Project Lead)	Manager, Surveillance and Assessment, AHW
Fred Ackah	Statistician, Surveillance and Assessment, AHW
Nancy Bott	Coordinator, Information Management, APHP
Donna Boyd	Health Information Analyst, APHP
Gary Gilham	Information Analyst, Performance Measurement , AHW
Leslie Twilley	Consultant, Entelechy Resources
Fu-Lin Wang	Epidemiologist, Surveillance and Assessment, AHW

Expert Advisory Group

Michael Sanderson (Chair)	Manager, Surveillance and Assessment, AHW
Nancy Bott	Coordinator, Information Management, APHP
Nestor Demianczuk	Professor of Obstetrics and Gynecology, University of Alberta
Nonie Fraser-Lee	Manager, Alberta Health Services
Grace Guyon	Coordinator, Quality Improvement, APHP
Joan Ing	Information Resource Coordinator, Alberta Health Services
Irene Mazurenko	Project Manager, Public Health Strategic Policy and Planning, AHW
Celia Posyniak	Executive Director, Kensington Clinic
Suzanne Tough	Team Leader, Decision Support/Research Team, University of Calgary/Alberta Health Services
Leslie Twilley	Consultant, Entelechy Resources

AHW = Alberta Health and Wellness
APHP = Alberta Perinatal Health Program

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1. Executive Summary

1.1 Executive Summary

1.1 Executive Summary

Indicators of the reproductive health of the women of Alberta are strongly positive overall. With the rapid pace of change in reproductive health technologies and the evolving demographics of the population, it is important to monitor trends in order to continue to optimize the reproductive health of Albertans.

During the time period studied in this report, migration of workers into Alberta increased, and those workers were often of reproductive age. Fertility rates, independent of population size, also climbed. Both of these factors led to increasing numbers of pregnancies and births. The estimated pregnancy rate showed a strongly increasing trend. Some of the components of the pregnancy rate (live births and spontaneous abortions) increased, while others were stable over time (induced abortions and stillbirths). Rates of reproductive care services such as labour induction, epidural analgesia, and cesarean section continued to increase. The rate of vaginal birth after cesarean section decreased. The trend toward delayed childbearing continued in Alberta, although Alberta mothers were younger than the Canadian average. Maternal obesity rates were high but not increasing, and the rates of other less common pre-pregnancy maternal morbidities remained stable. Gestational diabetes and prenatal hypertension rates increased over time. Maternal prenatal smoking rates declined slowly, while prenatal alcohol consumption and drug dependence rates showed increases. Small-for-gestational-age and low birth weight rates increased, while large-for-gestational-age and high birth weight births were less common. The preterm birth rate decreased in 2006 and 2007 after years of increase. The multiple birth rate also stabilized. Some types of congenital anomalies showed increasing trends with time. Stillbirth and infant mortality rates were stable, with a decreasing trend in post-neonatal mortality. Maternal mortality was low. Postpartum depression was common but rates were stable over time. Breastfeeding initiation rates were high and unchanged over time.

Pregnancies

Estimated Pregnancies

Estimated pregnancies were especially high in 2006 and 2007.

- The estimated pregnancy rate climbed markedly in 2006 and 2007, after smaller increases between 2003 and 2005. In 2007, there were 74.6 estimated pregnancies for every 1,000 women between 15 and 49 years of age, compared with 67.9 in 1998.

Spontaneous Abortions

Spontaneous abortions increased with the increased pregnancy rate, but the proportion of pregnancies ending in spontaneous abortion was unchanged.

- Along with the increase in estimated pregnancies, the rate of spontaneous abortions (per 1,000 women 15-49) increased from 5.6 in 2002 to 6.5 in 2007.
- When measured as percent of estimated pregnancies, there was no time trend in the spontaneous abortion rate between 1998 and 2007. In 2007, there were 8.8 spontaneous abortions for every 100 estimated pregnancies.

1.1 Executive Summary

The rate of induced abortions did not increase with increasing pregnancy rates; the proportion of pregnancies ending in induced abortions decreased.

The labour induction rate increased from 1997 to 2005.

Epidural analgesia and cesarean section rates increased. Vaginal births after cesarean section decreased.

Forceps and vacuum extraction rates were stable.

Episiotomy rates decreased, while shoulder dystocia increased in frequency.

Average maternal age was 29.1 years in 2007, with a growing proportion of women giving birth after the age of 35 years.

Maternal obesity rates were high but stable.

Pre-pregnancy diabetes, heart disease, and hypertension were rare.

Reproductive Care Services

Induced abortions

- The rate of induced abortions (per 1,000 women 15-49) did not vary significantly with time between 1998 and 2007. The rate was 13.6 in 2007.
- As a proportion of estimated pregnancies, the induced abortion rate decreased over time. In 2007, 18.3% of estimated pregnancies ended in induced abortions in Alberta, compared with 20.2% in 2000.

Labour Induction

- In 2006, 26.8% of hospital deliveries involved induction of labour. This rate increased from 23.6% in 1997 to 29.2% in 2005 and dropped in 2006.

Deliveries

- In 2006, almost half (44.2%) of hospital deliveries included epidural analgesia in Alberta, up from 36.0% in 2000.
- Forceps deliveries have not increased in frequency over the last several years. In 2006, 5.6% of deliveries were assisted by forceps.
- The vacuum extraction rate has also been quite stable over several years. 11.4% of hospital deliveries had vacuum extraction in 2006.
- There was a steady increase in the cesarean section rate from 1997 to 2006. Just over one in four (26.7%) of hospital deliveries were by cesarean section in 2006, compared with 16.5% in 1997.
- Vaginal births after cesareans decreased between 1997 and 2006; in 2006, vaginal births occurred after 19.4% of previous cesearean deliveries, compared with 42.8% in 1997.
- There was a decrease in the episiotomy rate between 2000 and 2006. The rate was 13.1 (per 100 hospital deliveries) in 2006 and 20.4 in 2000.
- One in twenty hospital deliveries (4.7%) involved a case of shoulder dystocia in 2006. The incidence of shoulder dystocia increased from 1.5% in 1997.

Maternal Factors

Maternal Age

- The average age of all women giving birth to live infants increased from 28.6 years in 1998 to 29.1 years in 2007; the average age at first live birth increased from 26.7 to 27.4 years.
- Women 35 years of age or older made up 15.4% of all women giving birth to live infants in 2007 and 13.3% in 1998.

Maternal Pre-Pregnancy Conditions

- The maternal obesity rate increased from 2000 to 2002 and then stabilized. In 2006, 8.7% of Alberta women giving birth had a pre-pregnancy weight of more than 91 kg.
- Other pre-pregnancy conditions occurred in less than 1% of women in 2006 (diabetes 0.7%, heart disease 0.6%, hypertension 0.9%, renal disease 0.1%).
- There were no time trends in the rates of pre-pregnancy diabetes, heart disease, or hypertension from 2000 to 2006.

1.1 Executive Summary

Gestational diabetes and pregnancy-induced hypertension increased.

Maternal Prenatal Morbidity

- There was an increase in gestational diabetes from 3.2% of women delivering in 2000 to 3.9% in 2006.
- In 2006, 5.7% of women delivering had pregnancy-induced hypertension; this rate increased over time from 4.9% in 2000.
- Prenatal bleeding prior to 20 weeks gestation was reported by 5.8% of women in 2006, and 3.5% of women reported prenatal bleeding at or after 20 weeks. Bleeding both before and after 20 weeks was reported by 0.8% of women giving birth in 2006. There were no time trends in any of these rates.

Maternal prenatal smoking rates decreased, but alcohol consumption and drug dependence increased in frequency.

Maternal Prenatal Smoking

- There is a downward trend in prenatal smoking rates in Alberta. In 2006, 19.0% of women delivering in Alberta smoked at some point during their pregnancies, compared with 23.4% in 2000.

Maternal Prenatal Alcohol Consumption

- In 2006, 2.5% of women giving birth reported that they had consumed three or more drinks on any one occasion during pregnancy, or one or more drinks per day throughout pregnancy. This rate increased from 1.2% in 2000.

Maternal Prenatal Drug Dependence

- For 1.5% of births in Alberta in 2006, mothers reported being dependent on drugs. This is triple the rate of 0.5% in 2000.

Almost all pregnant women in Alberta were screened for HIV and Hepatitis B.

Maternal Prenatal HIV and HBV Screening

- The percentage of women receiving prenatal care who were screened for HIV increased from 92.2% in 1998 to 97.0% in 2006. 32 pregnant women tested positive for HIV in Alberta in 2006.
- All women receiving prenatal care in Alberta are screened for Hepatitis B virus (HBV). In 2006/07, 5.6 out of every 1,000 live births occurred to women who tested positive for HBV.
- In 2006, 4.5 out of every 1,000 pregnant women were found to be HBV carriers from an earlier infection. This rate increased from 3.2 in 1998.

Births

Fertility Rates

General fertility and total fertility rates increased. Alberta women had about 1.9 live births each in their lifetimes as of 2007.

- The general fertility rate was 54.0 live births (per 1,000 women 15-49 years) in 2007. This rate increased starting in 2003, with large jumps in 2006 and 2007. The ten-year low was 45.7, in 2000.
- In 2007, the Alberta total fertility rate was 1,922 (about 1.9 live births per women during her lifetime). This rate is also increasing; the ten-year low was 1,661 in 2000.

1.1 Executive Summary

Alberta had a record number of live births in 2007.

The home birth rate was stable, but more births were attended by midwives than in the past.

Rates of smaller birth weight babies increased, and rates of large birth weight babies decreased.

The preterm birth rate decreased in 2006 and 2007.

The multiple birth rate stabilized at just over 3% of live births.

Respiratory distress syndrome affected just over 1% of infants in 2006.

The rate of all congenital anomalies combined increased over time.

Live Births

- There were 48,348 live births in Alberta in 2007. This is the largest number ever recorded.
- The crude birth rate increased from 2003 to 2007, especially in 2006 and 2007. In 2007, the rate was 14.2 (live births per 1,000 population), compared to the ten-year low of 12.3 in 2000 and 2001.
- In 2007, there were 379 live home births in Alberta (0.8% of live births). This rate was stable between 1998 and 2007.
- The percentage of births attended by midwives is increasing. In 2007, 1.4% of live births were attended by midwives; just over half of these births occurred in hospitals. The rate was 0.5% in 1998.

Birth Weight

Small-for-Gestational Age

- The singleton small-for-gestational-age rate decreased from 9.1 (per 100 live singleton births) in 1998 to 7.6 in 2002 and 2003 and then increased. In 2007, the rate was 8.1

Low Birth Weight

- The low birth weight rate increased from a ten-year low of 5.9 in 1999 to 7.0 in 2006. In 2007, the rate was 6.6.

Large-for-Gestational-Age

- The large-for-gestational-age rate decreased after reaching 12. 5 (per 100 singleton live births) in 2001. In 2007, the rate was 11.0.

High Birth Weight

- The high birth weight rate decreased to 11.0 (per 100 live births) in 2007, after reaching a ten-year high of 12.9 in 2000 and 2001.

Preterm Births

- After increasing from 7.5 (per 100 live births) in 1998 to 9.1 in 2004 and 2005, the preterm birth rate in Alberta decreased in 2006 and 2007. The rate was 8.4% of live births in 2007.

Multiple Births

- The multiple birth rate also increased from 1998 to 2004 (from 2.7 to 3.4 per 100 live births), and then leveled off. There were 1,574 multiple live births in Alberta in 2007, or 3.3% of live births.

Infant Morbidity

Respiratory Distress Syndrome

- The rate of respiratory distress syndrome in infants was 12.6 (per 1,000 hospital deliveries) in 2006. This rate increased from 11.6 in 1997 to 15.8 in 2002 and was variable after that time.

Congenital Anomalies

- Congenital anomalies increased in frequency overall. In 2006, there were 1,634 babies with anomalies reported, for a rate of 36.3 (per 1,000 total births), compared with 31.1 in 1997. Down Syndrome and urinary obstructive defects showed increasing trends between 1997 and 2006.

1.1 Executive Summary

Stillbirths, perinatal deaths, neonatal deaths, and infant deaths did not show time trends. The post-neonatal mortality rate decreased.

Maternal mortality rates were low and stable.

Early postpartum hemorrhage rates increased.

Postpartum depression rates were stable. About one in ten Alberta women was diagnosed with depression within 12 months of giving birth.

The large majority of newborns were breastfeeding at discharge from hospital.

Mortality

Stillbirths

- There was no change over time in the stillbirth rate in Alberta from 1998 to 2007. In 2007, there were 342 stillbirths (7.1 per 1,000 total births).

Perinatal Mortality

- There were 532 perinatal deaths in 2007, for a rate of 10.5 (per 1,000 total births). There was no significant time trend between 1998 and 2007.

Neonatal Mortality

- The neonatal mortality rate increased from 2.8 (per 1,000 live births) in 1998 to a ten-year high of 5.2 in 2002. In 2007, there were 220 neonatal deaths (4.6 per 1,000 live births).

Post-Neonatal Mortality

- The post-neonatal mortality rate decreased in Alberta from a high of 2.4 (per 1,000 live births) in 2000, to 1.9 (70 deaths) in 2007.

Infant Mortality

- There was no change over time in the infant mortality rate from 1998 to 2007. In 2007 there were 290 infant deaths in Alberta (6.0 per 1,000 live births).

Maternal Mortality

- There were three maternal deaths in Alberta in 2006. The rate of maternal mortality is very low in Alberta, and has been stable since the mid-1970s.

Maternal Factors

Maternal Postnatal Morbidity

- The postpartum hemorrhage rate increased from 10.6 (per 100 live births) in 1997 to 12.5 in 2000, before stabilizing between 11.8 and 12.0 from 2001 to 2004. In 2006, the postpartum hemorrhage rate was 13.4 (per 100 live births). The rate increase is due to an increase in early postpartum hemorrhages.
- Postpartum depression rates did not vary with time between 2000 and 2006. In 2006, 6.8% of women were diagnosed with depression within six months of delivery, and 10.0% within 12 months of delivery.

Breastfeeding

- Most Alberta infants born in hospitals are breastfeeding when they are discharged from hospital. The rate (86.0% of newborns in 2006) increased slightly over time (from 85.3% in 2000).

For further information on any aspect of this report, please contact the Surveillance and Assessment branch of Alberta Health and Wellness.

2. Introduction

2.1 Background

This report follows the Alberta Reproductive Health: Pregnancies and Births 2006 report, and the Alberta Reproductive Health: Pregnancies and Births Table Update 2007.

This report has been produced by Alberta Health and Wellness in collaboration with the Alberta Perinatal Health Program.

The Alberta Reproductive Health: Pregnancies and Birth report has been produced since 1997 (previously titled Reproductive Health: Pregnancy Outcomes Alberta). Full editions were published in April 1999, December 1999, 2001, 2002, 2004 and 2006. An update of selected tables was published in 2005 and 2007. This edition will be followed by a table update later in 2009.

The report is intended to provide an overview of the reproductive health of Albertan women and their infants. Extensive information is provided on pregnancies and births, including outcomes, determinants, and care services.

2. Introduction

2.2.1 General Methodology Notes and Limitations

Populations Used

Populations used for the calculations of some rates are derived from the Alberta Health Care Insurance Plan Registration Files. Population figures used in calculations are in Appendix 6.4.1. All populations are by calendar year, and were based on mid-year estimates (June 30).

Only Alberta residents are included in analyses unless otherwise stated. Provincial rates include Alberta residents with an 'unknown' regional health authority (RHA) code.

Data Sources

National comparisons are made where possible. Where Canada and Alberta data are compared, a single data source (usually Statistics Canada data) is used to ensure that data collection and extraction are consistent. The Alberta data used in these comparisons may differ from those provided in other analyses that do not involve national comparisons.

Live birth statistics and some of the stillbirth statistics are derived from Vital Statistics Birth Registration Files and post-neonatal and infant death statistics are derived from Vital Statistics Death Registration Files. Registration of births and deaths in Alberta is legally required, and the files are believed to be virtually complete. Births, stillbirths, and deaths to non-Alberta residents occurring in Alberta have been excluded, except where otherwise mentioned.

The Alberta Perinatal Health Program reviews cases of perinatal, neonatal and maternal mortality. Case information is received from the health records departments of Alberta hospitals, hospital perinatal review committees, offices of medical examiners, vital statistics, and physicians. Collaboration and cooperation from health records staff, hospital perinatal review committees and office of medical examiners help to ensure that case information is complete. Variables from case reviews are entered into a mortality database and form the basis for the mortality analysis part of this report. A validation process with Vital Statistics, Alberta Health and Wellness, and health records departments ensures that all cases are received for review.

2.2.1 General Methodology Notes and Limitations

Statistical Notes

Wherever possible and appropriate, data are stratified by factors such as regional health authorities (RHAs), age groups, time periods, birth weight groupings, and risk factors. 'Residence RHA' refers to the regional health authority in which the mother resided at the time of the relevant event. All analyses reflect the December 2003 RHA boundaries.

Appendix 6.3.1 contains a detailed description of the procedure for generating maps, figures and cartograms for the interpretation of regional rates. Rates that are significantly lower than the provincial mean are denoted in green in regional maps, figures, and cartograms, while significantly higher rates are shown in red. Because more than two-thirds of all women of reproductive age in Alberta reside in either Capital or Calgary Health Region, the provincial means are strongly influenced by these two RHAs. Significant differences from the provincial mean do not necessarily indicate areas of concern; differences must be interpreted in the context of all relevant factors.

The statistical analyses included here are mainly descriptive, including frequencies, rates, percentages, means, and standard errors. Differences are interpreted in terms of confidence intervals. Confidence intervals are plotted on figures and are not always easily visible when they are very small. With rare events (such as mortalities) or detailed break-downs, rates may be based on small numbers, which reduces their statistical reliability. Caution should always be exercised in interpreting these rates. Data are often combined across three-year or longer periods to increase reliability of rates.

In some cases, linear or quadratic effects are described. Linear effects refer to a straight-line relationship between two variables (either an increasing or a decreasing trend). Quadratic effects are non-linear: The relationship between two variables in this case is captured by a second-order (quadratic) polynomial. A quadratic function results in a curve with one change of direction, for example a decrease followed by an increase (a U-shaped curve). Note that these effects are simply descriptions of trends, and are not intended to be predictive of future relationships.

Because of differences in definitions and dates of extracting data for analyses, the statistics in this report may not be the same as those previously published by Alberta Health and Wellness.

2.2.1 General Methodology Notes and Limitations

Interpretation Cautions

Beginning with April 2002 data, new coding systems for classification of diseases (International Statistical Classification of Diseases and Related Health Problems Tenth Revision, Canada (ICD-10-CA)) and interventions (Canadian Classification of Health Interventions (CCI)) are in use for Hospital Inpatient Files and the Ambulatory Care Classification System files. For data prior to April 2002, the International Classification of Disease – 9th Revision – Clinical Modification (ICD-9-CM)) Codes were used for these databases (these codes are still used in the Fee-for-Service Claims files). Because the coding systems are different, there may be discrepancies between 2002 data and data for prior years. Comparisons of data coded with ICD-10-CA or CCI and those coded with ICD-9-CM should be undertaken with caution.

Reporting tends to improve with time, so time trends must be interpreted with caution for those datasets in which reporting variability is possible. There may also be regional differences in reporting and coding for those data that are acquired from the health regions.

Diagnostic criteria for diseases and conditions may change over time, affecting the interpretation of time trends.

Increased awareness of diseases and conditions may lead to increased diagnosis rates. There is always a possibility that diseases and conditions are misdiagnosed, though such occasions are expected to be rare.

The rates for conditions and diseases represent only those patients seeking care. The rates may therefore be expected to be underestimates of the true underlying rates.

There may be access issues that apply to more remote regions of the province, with some services (such as epidural analgesia and induced abortions) being less available in those areas. Any known discrepancies in access should be taken into account when interpreting regional rates.

The reader is reminded that population statistics cannot be applied to individuals. Not every member of a population will exhibit the characteristics that define the population.

2.2.1 General Methodology Notes and Limitations

RHA 5 contains the city of Lloydminster, which is on the Alberta-Saskatchewan border. The hospital in Lloydminster is on the Saskatchewan side of the border, and births and services received at this hospital by Alberta residents are recorded in Saskatchewan's administrative databases. These data are not included in this report, *with the exception of data obtained from the Alberta Perinatal Health Program (APHP), which do contain births to Alberta residents occurring in Lloydminster* (see Section 2.2.3 Data Sources).

This means that a substantial portion (approximately one quarter) of births and services occurring to Alberta residents in RHA 5 are missing from the tables, figures, and maps in this report (those that do not use APHP data). Interpretation of RHA 5 data should be carried out with caution. Of particular concern are measures in which the denominator is based on the population of RHA 5, rather than the number of births occurring in RHA 5. Even when the denominator is the number of births occurring in RHA 5, there is the opportunity for bias, as RHA 5 residents that have births at Lloydminster Hospital may be different from RHA 5 residents that have births within RHA 5.

As an example, consider the figure titled 'Crude Birth Rate by Residence RHA, Alberta, 2005 to 2007' on page 113 (table 4.2.1.2). Note that the crude birth rate for RHA 5 (8.8 per 1000 population) was much lower than any other RHA. When calculating the crude birth rate, births that occurred in Lloydminster Hospital to RHA 5 residents to were not included in the numerator. It has been estimated that in 2005, 2006 and 2007 there were approximately 400 births per year at Lloydminster Hospital to Alberta residents, and that approximately 350 were to residents of RHA 5. If an additional 350 births per year are included in the numerator of the crude birth rate for RHA 5 from 2005 to 2007, the adjusted crude birth rate becomes (2959 + 1050) / 335,784 = 11.9 births per 1000 population. While still lower than all other RHAs the adjusted crude birth rate is much closer to the provincial average.

Because the number of births at the Lloydminster hospital to Alberta residents can only be estimated from indirect sources, similar attempts to adjust measures for RHA 5 have not been included elsewhere in the report.

2.2.2 Contents

Data consist of pregnancy and birth data primarily for the calendar years 1997 to 2006 or 1998 to 2007 (or subsets thereof), including:

- spontaneous abortions
- induced abortions
- labour inductions
- deliveries (epidural analgesia, forceps, vacuum extraction, cesarean section, vaginal birth after cesarean section, episiotomy, shoulder dystocia)
- maternal factors (age, pre-pregnancy conditions, prenatal morbidity, prenatal smoking, alcohol consumption and drug dependence, prenatal screening)
- fertility
- live births
- birth weight
- preterm births
- multiple births
- infant morbidity
- stillbirths
- perinatal, neonatal, and infant mortality
- maternal mortality
- maternal postnatal morbidity
- breastfeeding

2.2.3 Data Sources

Data sources appear below; in the left column are the indicators generated from these sources.

Indicators from AHCIP registry:
- Populations for rate calculations throughout the report
- Demographic information (age, gender, region of residence)

Alberta Health Care Insurance Plan (AHCIP) Registry

The AHCIP Registry was established to enable premium collection and assessment of registrant eligibility for services claimed by medical practitioners. The current report used demographic information from this database. The **Alberta Stakeholder Registry Population Files** are derived from the Registry and were used to estimate the population of the province and its regions. Region of residence is determined by the resident's postal code.

Indicators from ACASS:
- Congenital anomalies

Alberta Congenital Anomalies Surveillance System (ACASS)

ACASS is a congenital anomalies registry system that is funded by the Surveillance and Assessment Branch, Alberta Health and Wellness. ACASS obtains information about infants (under one year of age) with congenital anomalies from a variety of sources, including the Notice of a Live birth or a Stillbirth and the Notice of Birth (NOB), medical certificates of stillbirth, and medical certificates of death. A notification form called the Congenital Anomaly(ies) Reporting Form is completed by hospital health records personnel following the birth or an admission of an affected child. Because many children with congenital anomalies are not admitted to hospital, out-patient information is also obtained (Alberta Health and Wellness, 2001).

Indicators from national sources:
- National comparisons throughout report

Statistics Canada/Public Health Agency of Canada/Health Canada

Data on a variety of topics from various branches of the federal government were used throughout the report, primarily to provide comparisons between Alberta and Canada on selected measures. Readers are referred to the cited sources for these data.

Indicators from Vital Statistics:
- Live births
- Stillbirths
- Maternal age
- General fertility
- Age-specific fertility
- Birth attendant
- Location of birth
- Life expectancy
- Birth weight
- Preterm birth
- Multiple birth
- Infant mortality (including neonatal, post-neonatal)

Vital Statistics

Vital Statistics data are managed by Service Alberta. Vital Statistics data used in this report include records of live births, stillbirths, and deaths before one year of age.

2.2.3 Data Sources

Indicators from clinic files:
- Induced abortions

Indicators from hospital inpatient files:
- Labour inductions
- Deliveries indicators (forceps, vacuum extraction, cesarean section, vaginal birth after cesarean section)
- Breastfeeding at hospital discharge
- Shoulder dystocia
- Respiratory distress syndrome
- Postpartum hemorrhage
- Postpartum depression

Indicators from ACCS:
- Shoulder dystocia
- Respiratory distress syndrome
- Postpartum hemorrhage
- Postpartum depression

Indicators from AHCIP Fee-for-Service Claims:
- Spontaneous abortions
- Hospital induced abortions
- Shoulder dystocia
- Respiratory distress syndrome
- Postpartum hemorrhage
- Postpartum depression

Indicators from APHP:
- Epidural analgesia
- Episiotomy
- Maternal pre-pregnancy conditions(obesity, diabetes, heart disease, hypertension, chronic renal disease)
- Maternal prenatal morbidity (gestational diabetes, pregnancy-induced hypertension, , prenatal bleeding)
- Maternal prenatal smoking, alcohol consumption, and drug dependency
- Mortality (stillbirth, perinatal, neonatal, maternal)

Clinic Files, Alberta Health and Wellness

The Clinic files provided data on gestational week and facility for induced abortions in Alberta. This is an administrative database maintained by Alberta Health and Wellness.

Hospital Inpatient (Morbidity) Files

Hospital morbidity data consist of one record for each inpatient separation (discharge, transfer, or death) in acute care hospitals in Alberta. Prior to 2002, inpatient data was collected by hospitals and submitted to the Canadian Institute for Health Information (CIHI). CIHI edited and delivered files to AHW. AHW performed certain edits and appended additional data elements. In April 2002, AHW implemented a new system for collecting inpatient data, the Morbidity and Ambulatory Care Abstracting Record (MACAR) system. In MACAR, the hospitals submit data directly to AHW and an edited file is then delivered from AHW to CIHI. This file is returned from CIHI to AHW.

Ambulatory Care Classification System (ACCS)

ACCS is a system for the collection and costing of data on facility-based ambulatory care, such as same-day surgery, day procedures, emergency room visits, and community rehabilitation program services occurring in publicly-funded facilities. Like the Hospital Inpatient files, ACCS is part of MACAR.

Alberta Health Care Insurance Plan (AHCIP) Fee-For-Service Claims

The AHCIP registers Albertans for billable services and pays providers of those services. A detailed database of provider claims for payment is kept (the Fee-For-Service Claims database). Data on services rendered was used in several sections of this report.

Alberta Perinatal Health Program (APHP) databases

The Alberta Perinatal Health Program collects data on a number of indicators related to perinatal health and mortality. For this report, we used data provided by the APHP from delivery records and from mortality case reviews.

2.2.3 Data Sources

Indicators from PLPH Prenatal Screening Database:

- HIV and HBV screening for pregnant women

Indicators from CDRS Database:

- HIV and HBV screening for pregnant women

Provincial Laboratory for Public Health (PLPH) Prenatal Screening Database

During routine prenatal care in Alberta, blood samples from pregnant women who access prenatal care are sent to the PLPH, where they are tested for HIV (unless declined by the patient), HBV, syphilis, rubella immunity and varicella immunity. Blood samples are also sent to the Canadian Blood Services (CBS) Laboratories, where they are tested for blood typing and Rh factors. (Prior to August 2002, prenatal screening was completed by the CBS, and confirmatory syphilis, HIV and HBV testing was done by the PLPH.) Prenatal screening data in the current report were extracted from the PLPH prenatal screening database.

Communicable Disease Reporting System (CDRS)

Communicable disease case reports are centrally collected and maintained in the CDRS, which is a secure database managed by the Provincial Program Development and Disease Control Branch of Alberta Health and Wellness.

For each newly diagnosed case, the laboratory report is submitted from the Provincial Laboratory for Public Health (PLPH) or the Medical Officer of Health to the RHA that the patient resides in, and to the CDRS. A reporting form (Notifiable Disease Report (NDR) or HIV/AIDS Case Report) is submitted to the CDRS by the RHA reporting the case (usually the RHA of diagnosis). There is a legal requirement that notification occur. A case only becomes counted as a case in the CDRS upon receipt of both a confirmatory laboratory report and the relevant reporting form.

The CDRS has two systems: the Sexually Transmitted Disease System and the Notifiable Disease System. The Notifiable Disease System was the source for the HIV and HBV data used in this report.

2. Introduction

2.3.1 Summary Table

Selected Indicators for Pregnancies and Births, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live Births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Estimated Pregnancies[1]	52,542	52,721	51,802	52,375	53,975	55,720	56,445	57,815	61,875	66,740
Estimated Pregnancy Rate (per 1,000 women 15-49)	67.9	66.6	64.6	64.2	64.9	66.3	66.6	67.7	71.1	74.6
Spontaneous Abortions	4,694	4,581	4,464	4,403	4,659	4,768	4,859	5,219	5,431	5,855
Spontaneous Abortion Rate (per 1,000 women 15-49)	6.1	5.8	5.6	5.4	5.6	5.7	5.7	6.1	6.2	6.5
Spontaneous Abortion Rate (per 100 estimated pregnancies)	8.9	8.7	8.6	8.4	8.6	8.6	8.6	9.0	8.8	8.8
Induced abortions	10,131	10,095	10,476	10,511	10,774	10,825	11,008	10,700	11,486	12,195
Induced Abortion Rate (per 1,000 women 15-49)	13.1	12.7	13.1	12.9	13.0	12.9	13.0	12.5	13.2	13.6
Induced Abortion Rate (per 100 estimated pregnancies)	19.3	19.1	20.2	20.1	20.0	19.4	19.5	18.5	18.6	18.3
Total Labour Induction Rate[2] (per 100 hospital deliveries)	24.1	25.4	25.9	27.0	25.8	29.0	29.2	29.1	26.8	-
Cesarean Section Rate (per 100 hospital deliveries)	17.3	19.1	20.2	22.5	23.2	24.1	25.4	26.1	26.7	-
Mean Maternal Age at Delivery	28.6	28.7	28.8	28.8	28.9	29.0	29.1	29.1	29.1	29.1
General Fertility Rate (per 1,000 women 15-49)	48.5	47.7	45.7	45.6	46.0	47.4	47.6	48.7	51.3	54.0
Total Fertility Rate (per 1,000 women 15-49)	1,728	1,717	1,661	1,670	1,687	1,736	1,740	1,777	1,855	1,922
Crude Birth Rate (per 1,000 population)	13.1	12.9	12.3	12.3	12.4	12.7	12.7	12.9	13.5	14.2
Singleton Small for Gestational Age Rate (per 100 singleton live births)	9.1	8.3	7.9	7.8	7.6	7.6	7.7	7.9	8.1	8.1
Low Birth Weight Rate (per 100 live births)	6.2	5.9	6.1	6.1	6.5	6.3	6.4	6.6	7.0	6.6
Large for Gestational Age Rate (per 100 singleton live births)	11.4	11.6	12.3	12.5	12.1	11.9	11.9	11.1	11.1	11.0
High Birth Weight Rate (per 100 live births)	12.3	12.6	12.9	12.9	12.5	12.1	11.6	11.2	11.2	11.0
Preterm Birth Rate (per 100 live births)	7.5	7.8	8.5	8.3	8.6	8.8	9.1	9.1	8.9	8.4
Multiple Birth Rate (per 100 live births)	2.7	2.7	3.0	3.1	3.2	3.2	3.4	3.2	3.2	3.3
Congenital Anomalies Rate (per 1,000 total births)	32.2	32.2	35.5	37.4	36.3	38.4	38.9	39.1	36.3	37.3
Stillbirths	188	267	237	235	249	259	286	309	299	342
Stillbirth Rate (per 1,000 total births)	5.0	7.1	6.5	6.3	6.5	6.5	7.1	7.4	6.7	7.1
Perinatal Mortality rate (per 1,000 total births)	7.1	10.0	9.7	9.2	10.6	10.5	10.9	11.6	10.1	10.9
Neonatal Mortality Rate (per 1,000 live births)	2.8	3.7	4.1	3.9	5.2	4.9	4.4	5.0	4.0	4.6
Post-Neonatal Mortality Rate (per 1,000 live births)	1.9	2.0	2.4	1.7	2.0	1.8	1.3	1.7	1.6	1.4
Infant Mortality Rate (per 1,000 live births)	4.7	5.7	6.5	5.6	7.3	6.7	5.8	6.7	5.6	6.0

Sources: Vital Statistics, Birth, Death, and Stillbirth Files, Service Alberta, May & August 2008 releases.
Fee-for-Services Claims Files, Alberta Health and Wellness, May 08 release.
Hospital Inpatient Files, Alberta Health and Wellness, May 08 release.
Alberta Congenital Anomalies Surveillance System, October 08 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: 1. Estimated pregnancies include livebirths, stillbirths, spontaneous abortions, and induced abortions.
2. Labour inductions were under-reported from April 2002 to March 2003.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

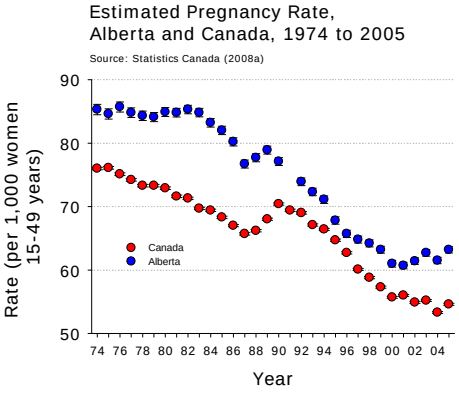
3. Pregnancies

3.1.1 Estimated Pregnancies

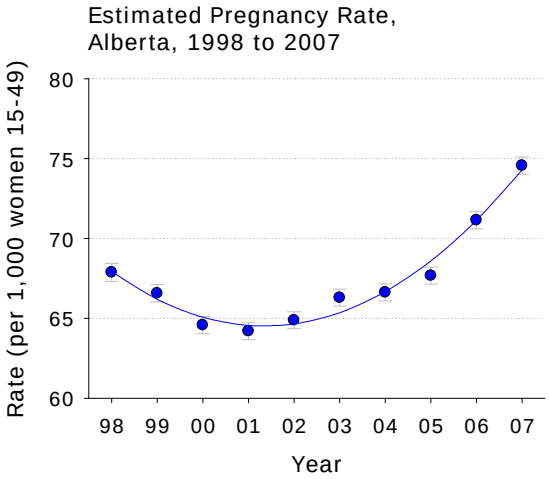
Estimated pregnancies: *The sum of live births, stillbirths, spontaneous abortions, and induced abortions in a population in a given time period.* Few live births, stillbirths, or induced abortions are unreported in Alberta. However, spontaneous abortions that have not been reported to physicians (whether physician care was not sought or the pregnancy went unnoticed) are unaccounted for. Pregnancy rate estimates therefore underestimate true pregnancy rates.

Estimated pregnancy rate: *Number of estimated pregnancies per 1,000 women between 15 and 49 years of age.*

The estimated pregnancy rate is consistently higher in Alberta than in Canada. The rate declined markedly in both Canada and Alberta between 1974 and 2000. Slight declines occurred in 2004 in both Canada and Alberta, followed by small increases in 2005. The Alberta-Canada gap narrowed in the early 1990s and then widened again in the late 1990s. In 2005, the estimated pregnancy rate was 63.2 (per 1,000 women) in Alberta, compared with 54.6 in Canada (Statistics Canada, 2008a).

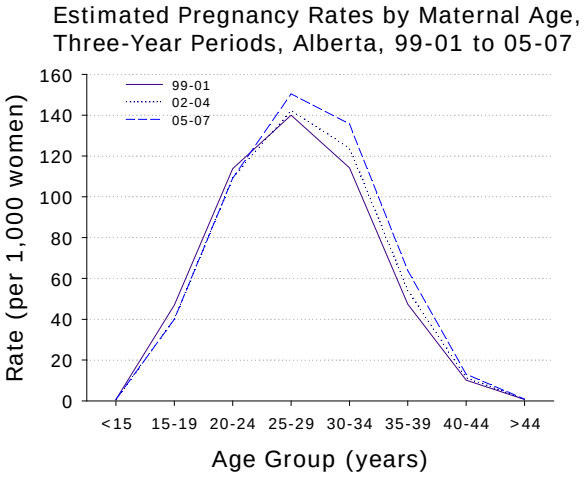


Time Trends (see Table 3.1.1.1)



- The estimated pregnancy rate in Alberta decreased in the late 1990s, and reached a low in 2001. The rate increased from 2002 on, with large increases in 2006 and 2007.
- In 2007, there were 66,740 estimated pregnancies in Alberta, for a rate of 74.6. (per 1,000 women 15-49).

Age Effects (see Tables 3.1.1.2, 3.1.1.4, 3.1.1.6)

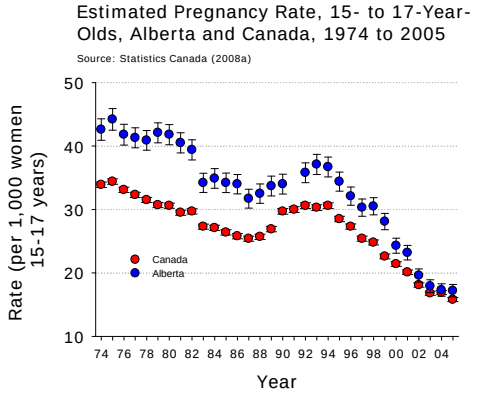


- Women aged 25-29 years continue to have the highest pregnancy rates of all age groups in Alberta (150.4 for 2005 to 2007 combined), followed by women aged 30-34 (135.7) and then women 20-24 years old (109.0).
- The figure above shows that recent increases in estimated pregnancy rates occurred in mothers 25 to 44 years old, especially the 30 to 34 year age group.

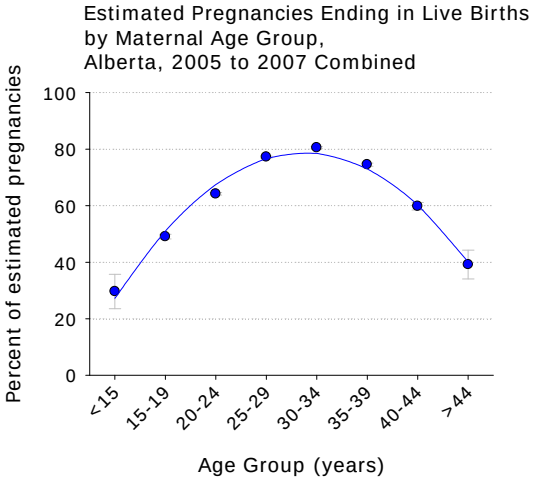
3.1.1 Estimated Pregnancies

Pregancy rates are influenced by an interesting mix of factors, including psychological, social, cultural, economic, and biological influences. As many as one half of pregnancies are unintended (Finer and Henshaw, 2006). On the other hand, approximately one in twelve Canadian couples is unable to conceive (Collins, Feeny, and Gunby, 1997). Seven percent of Canadians between the ages of 20 and 34 intend to remain childless (Stobert and Kemeny, 2003).

Teenage pregnancy rates are of interest because of the increased risk of adverse outcomes in pregnancies and births to teenagers. Teenage pregnancy rates in Canada in 2005 decreased to half of the 1974 rates; Alberta rates in 1974 were almost 2.5 times as high as they were in 2005. Similar to overall pregnancy rates, the Alberta teenage pregnancy rate has historically been higher than Canada's. However, since 2003 the teen pregnancy rates in Canada and Alberta have been essentially the same. In 2005, the pregnancy rate for Alberta 15- to 17-year-olds was 17.2 (per 1,000 15- to 17-year olds), compared with 15.8 in Canada (Statistics Canada, 2008a).



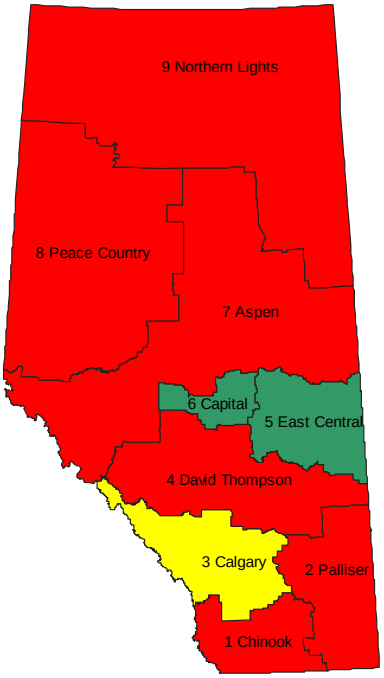
Age Effects continued (see Tables 3.1.1.2, 3.1.1.4, 3.1.1.6)



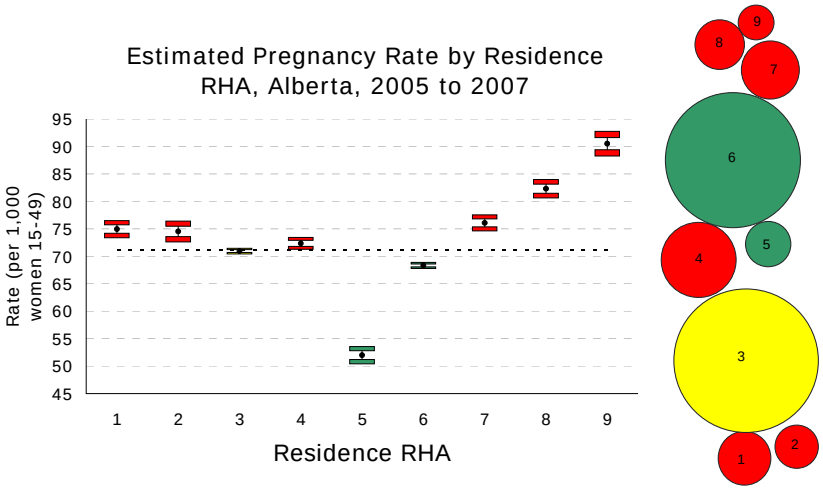
- Women in the age groups with the highest pregnancy rates tend to have the highest percentages of pregnancies ending in live births. For 2005 to 2007, this percentage varied from 29.6% for mothers under 15 years, to 80.5% for 30 to 34 year old mothers, to 39.2% for mothers 45 and older.
- For the youngest mothers, rates of induced abortion are highest, lowering the percent of live births. For mothers 45 and older, rates of induced abortion are also relatively high, but the rate of spontaneous abortion is highest in this age group as well, further lowering the percentage of estimated pregnancies that result in live birth for the oldest mothers.

3.1.1 Estimated Pregnancies

Estimated Pregnancy Rate (per 1,000 women), 2005-07 Combined



Regional Data (see Table 3.1.1.4)



- Estimated pregnancy rates vary by residence RHA in Alberta. The rate was significantly lower than the provincial average in RHAs 5 and 6 for 2005 to 2007 combined. The lowest rate (RHA 5) was 52.0 (per 1,000 women 15-49).
- The estimated pregnancy rate was significantly higher than the provincial average in all other RHAs, with the exception of RHA 3, between 2005 and 2007. The highest rate was in RHA 9 (90.5 per 1,000 women 15-49).
- Increases in the pregnancy rate were seen in every RHA in 2006 and 2007, compared with 2005.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 estimated pregnancy data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.1.1.1 Estimated Pregnancies and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated pregnancies	52,542	52,721	51,802	52,375	53,975	55,720	56,445	57,815	61,875	66,740
Women 15-49	774,059	791,981	802,182	815,913	831,964	840,560	847,174	854,349	869,776	895,127
Rate (per 1,000 women 15-49)	67.9	66.6	64.6	64.2	64.9	66.3	66.6	67.7	71.1	74.6
Standard Error (SE)	0.29	0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.28	0.28

Table 3.1.1.2 Estimated Pregnancies and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<15	15-17	18-19	15-19	20-24	25-29	30-34	35-39	40-44	>44	Total
Estimated pregnancies	216	4,598	9,404	14,002	40,060	55,120	48,271	23,111	5,290	355	186,427
Women	330,472	210,932	140,397	351,329	367,550	366,464	355,677	362,132	405,501	410,599	2,619,252
Rate (per 1,000 women)	0.7	21.8	67.0	39.9	109.0	150.4	135.7	63.8	13.0	0.9	71.2
Standard Error (SE)	0.04	0.32	0.67	0.33	0.51	0.59	0.57	0.41	0.18	0.05	0.16

Table 3.1.1.3 Estimated Pregnancies and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Estimated pregnancies	8,545	5,684	70,500	16,480	4,112	56,024	10,198	8,966	5,921	186,425
Women 15-49	114,014	76,283	993,644	227,771	79,086	819,860	134,053	108,945	65,423	2,619,252
Rate (per 1,000 women 15-49)	74.9	74.5	71.0	72.4	52.0	68.3	76.1	82.3	90.5	71.2
Standard Error (SE)	0.78	0.95	0.26	0.54	0.79	0.28	0.72	0.83	1.12	0.16

Source: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May & August 2008 releases.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.1.1.4 Estimated Pregnancies and Rate by Year and Maternal Age Group, Alberta, 1998 to 2007

Estimated pregnancies	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	94	75	69	76	80	66	68	57	69	90
15-17	1,972	1,904	1,697	1,624	1,480	1,459	1,430	1,424	1,555	1,619
18-19	3,439	3,301	3,365	3,341	3,244	3,063	3,009	3,054	3,087	3,263
15-19	5,411	5,205	5,062	4,965	4,724	4,522	4,439	4,478	4,642	4,882
20-24	11,799	11,976	11,783	11,785	12,241	12,613	12,502	12,520	13,428	14,112
25-29	15,072	15,038	14,766	14,774	15,287	15,920	16,441	16,966	18,260	19,894
30-34	12,932	12,805	12,502	13,032	13,640	14,214	14,545	14,974	16,040	17,257
35-39	5,949	6,227	6,239	6,314	6,489	6,638	6,739	7,035	7,622	8,454
40-44	1,179	1,302	1,334	1,344	1,424	1,649	1,613	1,685	1,681	1,924
>44	91	90	47	84	89	95	95	99	133	123
All	52,542	52,721	51,802	52,375	53,975	55,720	56,445	57,815	61,875	66,740

Rate (per 1,000 women 15-49)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	0.9	0.7	0.6	0.7	0.7	0.6	0.6	0.5	0.6	0.8
15-17	31.6	29.5	25.9	24.4	21.9	21.6	21.0	20.6	22.0	22.7
18-19	86.8	80.6	78.8	75.3	71.3	66.7	65.1	65.9	66.7	68.3
15-19	53.0	49.3	46.8	44.7	41.8	39.9	38.8	38.8	39.7	41.0
20-24	119.9	117.3	113.8	110.5	110.8	110.7	107.2	105.7	110.0	111.1
25-29	144.7	142.2	139.3	138.3	139.3	142.8	144.5	146.0	150.4	154.4
30-34	112.8	113.6	112.6	116.3	120.2	124.1	126.9	129.8	136.4	140.5
35-39	44.7	46.5	47.1	48.7	51.4	54.3	56.6	59.7	63.4	68.2
40-44	9.6	10.2	10.2	10.0	10.4	11.9	11.6	12.3	12.4	14.5
>44	0.9	0.9	0.4	0.7	0.7	0.7	0.7	0.7	1.0	0.9
All	67.9	66.6	64.6	64.2	64.9	66.3	66.6	67.7	71.1	74.6

Table 3.1.1.5 Estimated Pregnancies and Rate by Year and Residence RHA, Alberta, 1998 to 2007

Estimated pregnancies	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	2,596	2,629	2,462	2,472	2,499	2,618	2,658	2,648	2,851	3,046
Palliser	1,579	1,561	1,646	1,605	1,627	1,661	1,672	1,786	1,822	2,076
Calgary	19,033	19,214	19,234	19,341	19,990	21,084	21,253	22,009	23,334	25,157
David Thompson	4,636	4,720	4,631	4,669	4,825	4,941	5,042	5,082	5,537	5,861
East Central	1,339	1,267	1,220	1,202	1,314	1,210	1,304	1,275	1,378	1,459
Capital	16,117	16,113	15,755	15,980	16,361	16,786	17,060	17,188	18,566	20,270
Aspen	3,300	3,277	2,990	3,116	3,199	3,161	3,147	3,161	3,434	3,603
Peace Country	2,545	2,537	2,420	2,456	2,521	2,616	2,633	2,829	3,034	3,103
Northern Lights	1,393	1,397	1,440	1,528	1,637	1,641	1,673	1,837	1,919	2,165
Alberta	52,542	52,721	51,802	52,375	53,975	55,720	56,445	57,815	61,875	66,740

Rate (per 1,000 women 15-49)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	70.8	70.8	65.8	66.0	66.7	69.7	70.6	70.4	75.4	79.0
Palliser	68.4	66.0	68.6	65.5	65.4	66.9	66.9	71.0	72.0	80.4
Calgary	67.9	66.4	65.3	64.1	64.5	67.1	66.8	68.2	70.6	73.9
David Thompson	68.0	67.7	65.5	65.0	66.1	67.2	68.0	68.2	73.3	75.5
East Central	52.2	49.3	47.2	46.1	49.9	46.0	49.8	48.7	52.7	54.5
Capital	65.5	64.2	62.2	62.2	62.5	63.5	64.2	64.3	68.3	72.3
Aspen	75.0	73.8	67.3	69.6	70.9	70.6	70.7	71.4	77.2	79.6
Peace Country	77.2	75.4	71.4	72.0	72.9	75.4	75.1	80.0	83.7	83.1
Northern Lights	81.6	80.2	81.0	83.5	85.0	81.9	81.2	87.2	89.1	94.9
Alberta	67.9	66.6	64.6	64.2	64.9	66.3	66.6	67.7	71.1	74.6

Source: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May & August 2008 releases.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.1.1.6 Estimated Pregnancy Rate (per 1,000 women) by Residence RHA and Maternal Age Group, Alberta, 2005 to 2007

2005	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15	0.4	0.6	0.4	0.8	0.5	0.4	0.4	1.3	1.3	0.5
15-17	23.0	19.3	16.8	27.4	9.9	19.8	24.2	31.9	37.9	20.6
18-19	56.1	71.7	53.7	81.0	42.0	64.0	97.7	93.8	103.1	65.9
15-19	36.5	40.3	31.3	49.3	22.4	37.8	53.2	57.3	64.5	38.8
20-24	122.6	132.1	90.4	127.3	85.0	95.4	145.8	150.9	169.7	105.7
25-29	161.3	172.9	133.9	176.0	139.3	137.5	175.9	177.6	183.2	146.0
30-34	127.0	115.5	143.5	108.2	97.8	126.7	110.3	125.7	118.4	129.8
35-39	54.0	45.1	73.3	42.8	34.8	56.7	44.0	44.4	49.3	59.7
40-44	9.9	8.2	15.6	6.7	4.7	12.3	10.0	8.7	9.0	12.3
>44	0.5	0.5	1.1	0.3	0.5	0.6	0.6	0.6	0.3	0.7
All	70.4	71.0	68.2	68.2	48.7	64.3	71.4	80.0	87.2	67.7

2006	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15	0.5	1.5	0.5	0.8	0.3	0.7	0.9	0.6	0.3	0.6
15-17	18.1	14.3	18.8	28.5	17.4	21.7	31.7	28.6	34.7	22.0
18-19	58.2	75.3	53.0	81.8	49.4	64.7	102.2	101.3	99.5	66.7
15-19	34.0	38.7	32.2	50.3	29.7	38.9	58.8	57.4	60.6	39.7
20-24	128.9	136.8	92.9	138.3	92.7	98.5	149.3	160.3	165.8	110.0
25-29	180.1	178.1	136.8	176.8	143.1	141.3	194.4	188.9	171.5	150.4
30-34	137.8	113.4	146.7	122.9	94.2	136.3	124.7	121.1	130.4	136.4
35-39	51.0	36.5	77.0	40.9	43.3	63.1	43.9	45.1	61.7	63.4
40-44	10.8	7.7	15.4	8.9	5.3	12.4	8.1	7.8	13.2	12.4
>44	0.7	0.8	1.2	1.0	0.7	0.8	0.6	0.8	1.0	1.0
All	75.4	72.0	70.6	73.3	52.7	68.3	77.2	83.7	89.1	71.1

2007	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15	1.3	1.5	0.5	0.6	0.5	0.9	1.3	0.8	2.3	0.8
15-17	23.3	24.7	18.9	24.9	11.2	21.6	38.7	31.4	39.1	22.7
18-19	72.7	85.3	56.5	80.7	50.5	62.9	94.6	106.2	114.1	68.3
15-19	43.3	49.3	33.9	47.5	26.3	38.4	60.3	60.9	70.0	41.0
20-24	134.8	145.4	94.8	133.8	104.8	99.5	150.7	149.5	169.3	111.1
25-29	173.1	191.8	138.7	178.6	147.1	150.3	193.1	179.2	184.4	154.4
30-34	136.7	120.3	152.1	127.8	94.7	140.7	124.5	120.7	132.6	140.5
35-39	53.9	48.2	81.6	49.6	33.5	68.6	49.8	47.7	61.2	68.2
40-44	14.3	8.1	17.6	9.1	9.0	14.4	8.6	12.4	14.8	14.5
>44	0.8	0.5	1.1	0.6	0.4	0.8	0.7	0.4	1.0	0.9
All	79.0	80.4	73.9	75.5	54.5	72.3	79.6	83.1	94.9	74.6

Source: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May & August 2008 releases.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

3. Pregnancies

3.2.1 Spontaneous Abortions

Spontaneous abortion (miscarriage): *Naturally occuring premature expulsion from the uterus of the products of conception – of the embryo, or of a nonviable fetus* (Dorland, 2000). In Alberta, the legal definition of spontaneous abortions refers to those occurring prior to 20 weeks gestation. Included in this category are clinical spontaneous abortions treated by physicians, excluding unreported or undetected spontaneous abortions. A two-month time lag between physician visits was used as the cutoff point for separate pregnancy events.

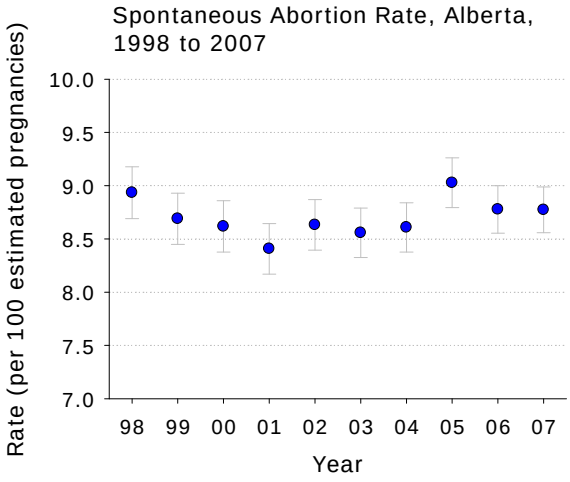
Spontaneous abortion rate: *Number of spontaneous abortions treated by physicians per 1,000 women aged 15-49, or per 100 estimated pregnancies.*

The likelihood of conceiving during a single menstrual cycle is about 30 percent. About 50 to 60 percent of those conceptions last beyond 20 weeks gestation (Norwitz, Schust, & Fisher, 2001). The majority (50 – 65%) of spontaneous abortions result from chromosomal abnormalities (Reindollar, 2000).

Known risk factors for spontaneous abortion include advanced maternal age, previous history of spontaneous abortion, and uterine malformations (Andersen, Wohlfahrt, Christens et al., 2000; de la Rochebrochard & Thonneau, 2002; Garcia-Enguidanos et al., 2002).

Time Trends (see Table 3.2.1.1)

- The spontaneous abortion rate (per 1,000 women 15-49) fell to a low in 2001 and increased to 2007, following the same time trend as the estimated pregnancy rate. In 2007, the spontaneous abortion rate was 6.5 (per 1,000 women 15-49).



- The spontaneous abortion rate (per 100 estimated pregnancies) was stable over time from 1998 to 2007. In 2007, the rate was 8.8.

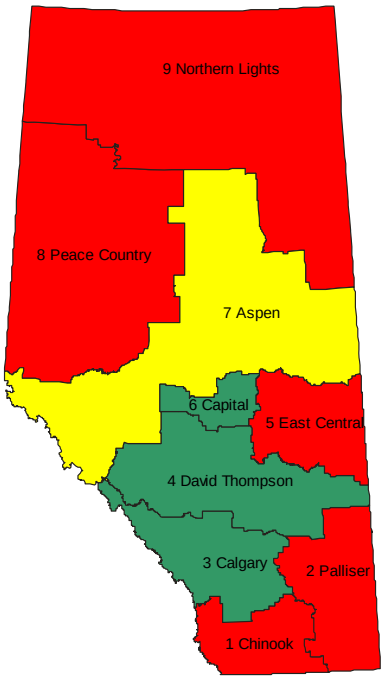
Maternal Age Effects (see Tables 3.2.1.2, 3.2.1.4)

- Spontaneous abortion rates for women under 15 and over 44 years are not reliable due to low numbers of spontaneous abortions in these age groups; these rates must be interpreted with caution.
- The highest rates of spontaneous abortion (per 1,000 women) occur in those age groups with high rates of estimated pregnancy. The highest rate for 2005 to 2007 combined was 12.4, for 25 to 29 year old mothers.

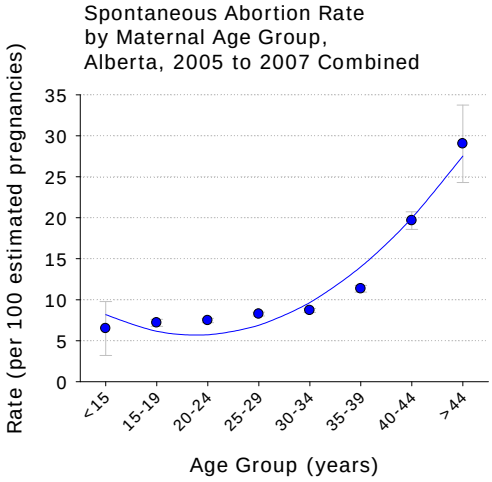
3.2.1 Spontaneous Abortions

About 1% of women suffer from recurrent (three or more consecutive) spontaneous abortions. Causes include chromosomal abnormalities, thrombophilia (increased tendency to form internal blood clots), metabolic disorders (e.g., hormonal disorders), anatomical abnormalities, infection, and immune system factors (Horne and Alexander, 2005; Kalumbi, Farquharson and Quenby, 2005).

Spontaneous Abortion Rate (per 100 estimated pregnancies), 2005-07 Combined

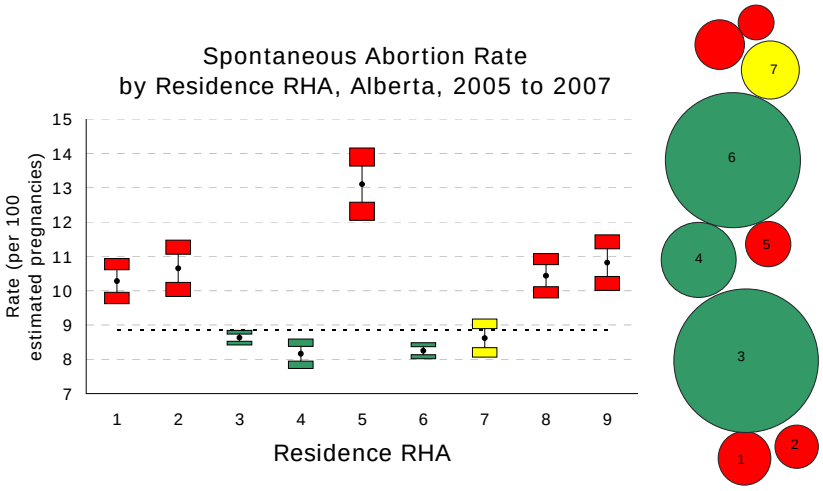


Maternal Age Effects continued (see Tables 3.2.1.2, 3.2.1.4,)



- The spontaneous abortion rate (per 100 estimated pregnancies) was under 9% for women up to age 35 for 2005 to 2007 combined. The rate increases notably with maternal age over 35; for women 45 and older, the rate is more than three times higher than women under 35.

Regional Data (see Tables 3.2.1.3, 3.2.15)



- The spontaneous abortion rate (per 100 estimated pregnancies) was significantly lower than the provincial average in RHAs 3, 4, and 6, and higher than the provincial average in RHAs 1, 2, 5, 8, and 9 for 2005 to 2007 combined. The lowest rate was 8.2 (RHAs 4 and 6), while the highest rate was 13.1 (RHA 5).
- The spontaneous abortion rate (per 1,000 women aged 15-49) was significantly lower than the provincial average in RHAs 3, 4, and 6, and significantly higher than the provincial average in RHAs 1, 2, 8, and 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

3.2.1 Spontaneous Abortions

Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

A two-month time lag between repeat pregnancies was used as a cutoff point to define separate pregnancy events.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 spontaneous abortion data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.2.1.1 Spontaneous Abortions and Rates by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Spontaneous abortions	4,694	4,581	4,464	4,403	4,659	4,768	4,859	5,219	5,431	5,855
Women 15-49	774,059	791,981	802,182	815,913	831,964	840,560	847,174	854,349	869,776	895,127
Rate (per 1,000 women 15-49)	6.1	5.8	5.6	5.4	5.6	5.7	5.7	6.1	6.2	6.5
Standard Error (SE)	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09
Estimated pregnancies	52,542	52,721	51,802	52,375	53,975	55,720	56,445	57,815	61,875	66,740
Rate (per 100 estimated pregnancies)	8.9	8.7	8.6	8.4	8.6	8.6	8.6	9.0	8.8	8.8
Standard Error (SE)	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.11

Table 3.2.1.2 Spontaneous Abortions and Rates by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<15[1]	15-17	18-19	15-19	20-24	25-29	30-34	35-39	40-44	>44[1]	Total
Spontaneous abortions	14	314	691	1,005	2,986	4,546	4,193	2,619	1,039	103	16,505
Women	330,472	210,932	140,397	351,329	367,550	366,464	355,677	362,132	405,501	410,599	2,619,252
Rate (per 1,000 women)	0.0	1.5	4.9	2.9	8.1	12.4	11.8	7.2	2.6	0.3	6.3
Standard Error (SE)	0.01	0.08	0.19	0.09	0.15	0.18	0.18	0.14	0.08	0.02	0.05
Estimated pregnancies	216	4,598	9,404	14,002	40,060	55,120	48,271	23,111	5,290	355	186,425
Rate (per 100 estimated pregnancies)	6.5	6.8	7.3	7.2	7.5	8.2	8.7	11.3	19.6	29.0	8.9
Standard Error (SE)	1.68	0.37	0.27	0.22	0.13	0.12	0.13	0.21	0.55	2.41	0.07

Table 3.2.1.3 Spontaneous Abortions and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Spontaneous abortions	877	604	6077	1343	538	4616	877	934	639	16,505
Women 15-49	114,014	76,283	993,644	227,771	79,086	819,860	134,053	108,945	65,423	2,619,252
Rate (per 1,000 women 15-49)	7.7	7.9	6.1	5.9	6.8	5.6	6.5	8.6	9.8	6.3
Standard Error (SE)	0.26	0.32	0.08	0.16	0.29	0.08	0.22	0.28	0.38	0.05
Estimated pregnancies	8,533	5,672	70,445	16,456	4,107	55,956	10,179	8,952	5,909	186,425
Rate (per 100 estimated pregnancies)	10.3	10.6	8.6	8.2	13.1	8.2	8.6	10.4	10.8	8.9
Standard Error (SE)	0.33	0.41	0.11	0.21	0.53	0.12	0.28	0.32	0.40	0.07

Sources: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: 1. The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively.
Totals for age groups and RHAs include unknown ages or RHAs.
Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.2.1.4 Spontaneous Abortions and Rate by Year and Maternal Age Group, Alberta, 1998 to 2007

Spontaneous abortions	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	9	7	9	12	15	7	11	2	4	8
15-17	154	157	140	124	115	99	101	110	94	110
18-19	285	239	261	239	254	238	219	252	227	212
15-19	439	396	401	363	369	337	320	362	321	322
20-24	923	871	888	838	918	898	931	979	953	1,054
25-29	1,243	1,218	1,179	1,140	1,211	1,262	1,263	1,450	1,553	1,543
30-34	1,105	1,096	1,030	1,050	1,135	1,206	1,271	1,276	1,392	1,525
35-39	681	700	694	743	739	725	753	785	855	979
40-44	257	264	250	233	245	310	278	338	315	386
>44	37	29	13	24	27	23	32	27	38	38
Total	4,694	4,581	4,464	4,403	4,659	4,768	4,859	5,219	5,431	5,855

Rate (per 1,000 women)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1
15-17	2.5	2.4	2.1	1.9	1.7	1.5	1.5	1.6	1.3	1.5
18-19	7.2	5.8	6.1	5.4	5.6	5.2	4.7	5.4	4.9	4.4
15-19	4.3	3.8	3.7	3.3	3.3	3.0	2.8	3.1	2.7	2.7
20-24	9.4	8.5	8.6	7.9	8.3	7.9	8.0	8.3	7.8	8.3
25-29	11.9	11.5	11.1	10.7	11.0	11.3	11.1	12.5	12.8	12.0
30-34	9.6	9.7	9.3	9.4	10.0	10.5	11.1	11.1	11.8	12.4
35-39	5.1	5.2	5.2	5.7	5.8	5.9	6.3	6.7	7.1	7.9
40-44	2.1	2.1	1.9	1.7	1.8	2.2	2.0	2.5	2.3	2.9
>44	0.4	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Total	6.1	5.8	5.6	5.4	5.6	5.7	5.7	6.1	6.2	6.5

Rate (per 100 estimated pregnancies)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	9.6	9.3	13.0	15.8	18.8	10.6	16.2	3.5	5.8	8.9
15-17	7.8	8.2	8.2	7.6	7.8	6.8	7.1	7.7	6.0	6.8
18-19	8.3	7.2	7.8	7.2	7.8	7.8	7.3	8.3	7.4	6.5
15-19	8.1	7.6	7.9	7.3	7.8	7.5	7.2	8.1	6.9	6.6
20-24	7.8	7.3	7.5	7.1	7.5	7.1	7.4	7.8	7.1	7.5
25-29	8.2	8.1	8.0	7.7	7.9	7.9	7.7	8.5	8.5	7.8
30-34	8.5	8.6	8.2	8.1	8.3	8.5	8.7	8.5	8.7	8.8
35-39	11.4	11.2	11.1	11.8	11.4	10.9	11.2	11.2	11.2	11.6
40-44	21.8	20.3	18.7	17.3	17.2	18.8	17.2	20.1	18.7	20.1
>44	40.7	32.2	27.7	28.6	30.3	24.2	33.7	27.3	28.6	30.9
Total	9.0	8.7	8.6	8.4	8.6	8.6	8.6	9.0	8.8	8.8

Sources: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: 1. The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively.
Totals for age groups include unknown ages or RHAs.
Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.2.1.5 Spontaneous Abortions and Rate by Year and Residence RHA, Alberta, 1998 to 2007

Spontaneous abortions	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	312	248	223	213	238	236	258	261	299	317
Palliser	135	141	159	147	160	174	173	208	192	204
Calgary	1,664	1,678	1,551	1,554	1,654	1,885	1,848	1,926	2,023	2,128
David Thompson	402	400	409	417	418	397	414	446	420	477
East Central	139	135	128	137	137	131	162	178	176	184
Capital	1,364	1,299	1,343	1,322	1,330	1,314	1,330	1,404	1,504	1,708
Aspen	280	287	280	273	302	265	255	257	306	314
Peace Country	276	258	243	224	257	243	281	337	315	282
Northern Lights	122	135	128	116	163	123	138	202	196	241
Alberta	4,694	4,581	4,464	4,403	4,659	4,768	4,859	5,219	5,431	5,855

Rate (per 1,000 women 15-49)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	8.5	6.7	6.0	5.7	6.4	6.3	6.9	6.9	7.9	8.2
Palliser	5.8	6.0	6.6	6.0	6.4	7.0	6.9	8.3	7.6	7.9
Calgary	5.9	5.8	5.3	5.1	5.3	6.0	5.8	6.0	6.1	6.3
David Thompson	5.9	5.7	5.8	5.8	5.7	5.4	5.6	6.0	5.6	6.1
East Central	5.4	5.2	5.0	5.3	5.2	5.0	6.2	6.8	6.7	6.9
Capital	5.5	5.2	5.3	5.1	5.1	5.0	5.0	5.2	5.5	6.1
Aspen	6.4	6.5	6.3	6.1	6.7	5.9	5.7	5.8	6.9	6.9
Peace Country	8.4	7.7	7.2	6.6	7.4	7.0	8.0	9.5	8.7	7.6
Northern Lights	7.1	7.8	7.2	6.3	8.5	6.1	6.7	9.6	9.1	10.6
Alberta	6.1	5.8	5.6	5.4	5.6	5.7	5.7	6.1	6.2	6.5

Rate (per 100 estimated pregnancies)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	12.0	9.4	9.1	8.6	9.5	9.0	9.7	9.9	10.5	10.4
Palliser	8.6	9.0	9.7	9.2	9.8	10.5	10.4	11.7	10.6	9.9
Calgary	8.8	8.7	8.1	8.0	8.3	8.9	8.7	8.8	8.7	8.5
David Thompson	8.7	8.5	8.8	8.9	8.7	8.0	8.2	8.8	7.6	8.1
East Central	10.4	10.7	10.5	11.4	10.4	10.8	12.4	14.0	12.8	12.6
Capital	8.5	8.1	8.5	8.3	8.1	7.8	7.8	8.2	8.1	8.4
Aspen	8.5	8.8	9.4	8.8	9.5	8.4	8.1	8.1	8.9	8.7
Peace Country	10.9	10.2	10.0	9.2	10.2	9.3	10.7	11.9	10.4	9.1
Northern Lights	8.8	9.7	8.9	7.6	10.0	7.5	8.3	11.0	10.2	11.2
Alberta	9.0	8.7	8.6	8.4	8.6	8.6	8.6	9.0	8.8	8.8

Sources: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: Totals for RHAs include unknown RHAs.
Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

3. Pregnancies

3.3.1 Induced Abortions

Induced abortion: *Intentional premature expulsion from the uterus of the products of conception – of the embryo, or of a nonviable fetus* (Dorland, 2000).

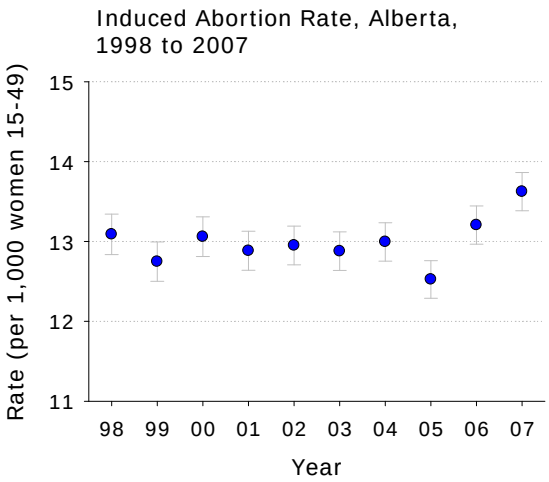
Induced abortion rate: *Number of induced abortions per 1,000 women aged 15-49, or per 100 estimated pregnancies.*

Abortions can be induced surgically or medically. Surgical abortions involve the use of instruments, including manual vacuum aspiration (up to eight weeks after the last menstrual period), suction curettage (six to 14 weeks) or dilation and evacuation (14-20 weeks). Medical abortions involve the use of drugs (methotrexate and misoprostol), and are usually done up to seven weeks after the last menstrual period (Sunnybrook and Women's College Health Sciences Centre, 2005).

In Alberta, induced abortions can be obtained in clinics or in hospitals. Clinics have been operating in Alberta since 1991, and the majority of induced abortions now occur in clinics.

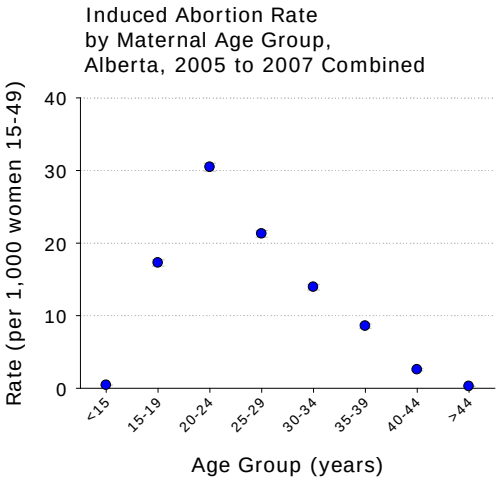
Women who have induced abortions tend to be young (18 to 24 years) and in the very early stages of pregnancy (12 weeks or less) (Statistics Canada, 2006; Grimes & Creinin, 2004). Women having repeat induced abortions tend to be older, more likely to be using oral contraceptives, more likely to report physical abuse by a male partner, and more likely to report a history of sexual abuse or sexual violence than women having their first induced abortion (Fisher et al., 2005).

Time Trends (see Table 3.3.1.1, 3.3.1.4, 3.3.1.5)



- The induced abortion rate (per 1,000 women 15-49) did not vary significantly with time between 1998 and 2007. In 2007, the rate was 13.6.
- The induced abortion rate (per 100 estimated pregnancies) increased in 2000 and then decreased to 2007. In 2007, 18.3% of estimated pregnancies ended in induced abortion.
- The proportion of induced abortions occurring in private clinics (rather than acute care hospitals) increased steadily from 1998 to 2007. In 2007, 70.3% of induced abortions in Alberta occurred in clinics.
- In 2007, 52.3% of induced abortions occurred in Calgary, 46.2% in Edmonton, and 1.5% elsewhere in the province.

Maternal Age Effects (see Tables 3.3.1.2, 3.3.1.9)



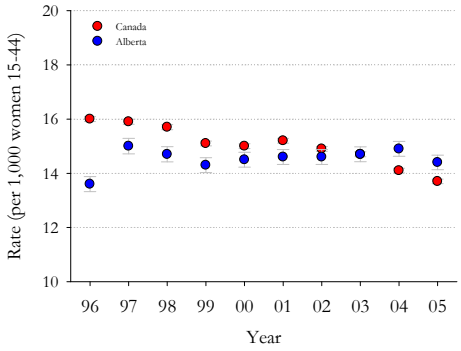
- The induced abortion rate (per 1,000 women) was highest for women between 20 and 24 years of age for 2005 to 2007 combined. During this time period, 30.5 out of every 1,000 women 20-24 years old obtained an induced abortion.

3.3.1 Induced Abortions

In 2005, there were 13.7 abortions for every 1,000 women aged 15 to 44 residing in Canada. The Alberta rate was 14.4. While the rate has been stable in Alberta over several years, the Canadian rate has declined slowly and was significantly lower than the Albertan rate in 2005. Rates were highest in the 20 to 24 year age group in Alberta and in Canada as a whole (Statistics Canada, 2007).

Induced Abortion Rate, Canada and Alberta, 1996 to 2005

Source: Statistics Canada (2007b)



In 2005, induced abortion rates (per 100 live births) were higher in Canada than in Alberta in young women, particularly in women under 15 years (Statistics Canada, 2007).

Maternal Age Effects **continued** (see Tables 3.3.1.2, 3.3.1.9)

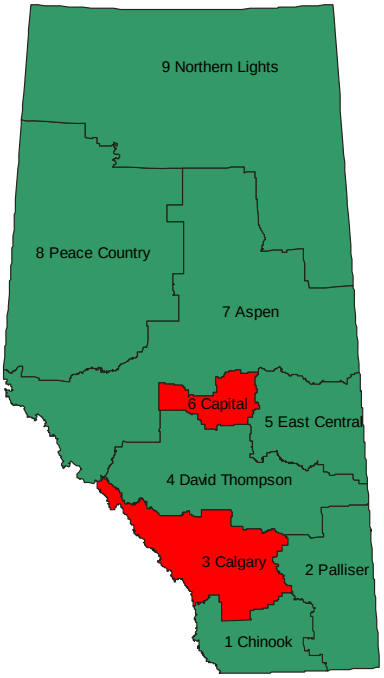
- The induced abortion rate (per 100 estimated pregnancies), was highest for women under 15 years between 2005 and 2007; 63.4% of pregnancies in this age group ended in induced abortion. The rate declined to a low of 10.3% in women 30 to 34 years old, and then increased to 29.6% for women over 44 years old.

Gestational Age Data (see Tables 3.3.1.6, 3.3.1.7, 3.3.1.8)

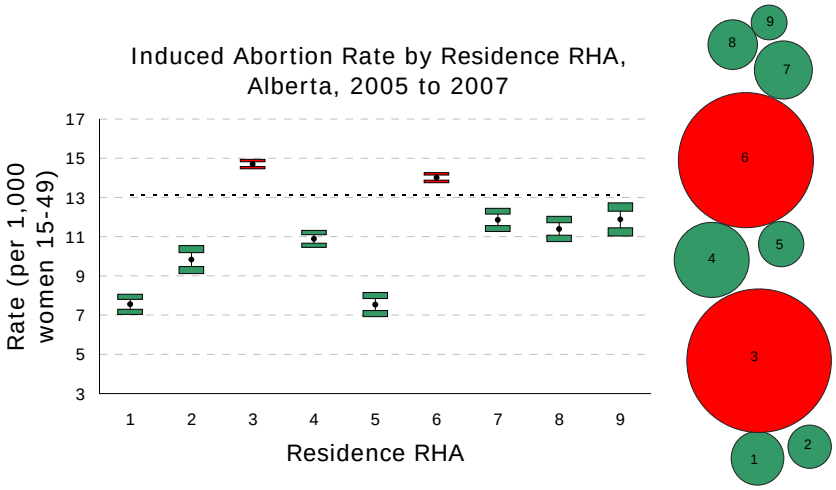
- In 2007, 84.9% of induced abortions occurred before 13 weeks gestation, and 14.5% occurred between 13 and 20 weeks gestation.
- Induced abortions in acute care hospitals occurred prior to 13 weeks 81.1% of the time in 2007, compared with 86.4% in private clinics.
- Younger women tend to have induced abortions at later gestational ages than older women. For example, in 2007, 32.8% of induced abortions in women 15 to 19 occurred prior to 9 weeks gestation, compared to 47.5% of induced abortions in women 35 to 39 years old.

3.3.1 Induced Abortions

Induced Abortion Rate (per 1,000 women 15-49), 2005-07 Combined



Regional Data (see Tables 3.3.1.3, 3.3.1.5, 3.3.1.10)



- For 2005 to 2007 combined, induced abortion rates (per 1,000 women 15-49) were significantly higher than the provincial mean in Calgary (RHA 3) and Capital (RHA 6) health regions, and significantly lower than the provincial mean in all other RHAs. As with any medical service, access affects the rate of use, and induced abortion services are clustered in Edmonton and Calgary.
- The same pattern occurred in the rate per 100 estimated pregnancies.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Induced abortion case identification procedures were updated for this edition of the report. Notably, the use of both diagnostic and billing codes for the Fee-for-Service database analyses resulted in greater case ascertainment than in past reports (for which billing codes were not used). The result is a larger reported number of induced abortion events in this edition of the report, compared with previous editions.

Detailed criteria for data extraction are provided in Appendix 6.1.1.

A two-month time lag between repeat pregnancies was used as a cutoff point to define separate pregnancy events.

Totals for facility and gestational age analyses differ from those for other analyses due to use of a different database.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 induced abortion data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.3.1.1 Induced Abortions and Rates by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Induced abortions	10,131	10,095	10,476	10,511	10,774	10,825	11,008	10,700	11,486	12,195
Women 15-49	774,059	791,981	802,182	815,913	831,964	840,560	847,174	854,349	869,776	895,127
Rate (per 1,000 women 15-49)	13.1	12.7	13.1	12.9	13.0	12.9	13.0	12.5	13.2	13.6
Standard Error (SE)	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Estimated pregnancies	52,542	52,721	51,802	52,375	53,975	55,720	56,445	57,815	61,875	66,740
Rate (per 100 estimated pregnancies)	19.3	19.1	20.2	20.1	20.0	19.4	19.5	18.5	18.6	18.3
Standard Error (SE)	0.17	0.17	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.15

Table 3.3.1.2 Induced Abortions and Rates by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<15[1]	15-17	18-19	15-19	20-24	25-29	30-34	35-39	40-44	>44[1]	Total[2]
Induced abortions	137	2,232	3,833	6,065	11,193	7,791	4,952	3,102	1,036	105	34,381
Women 15-49	330,472	210,932	140,397	351,329	367,550	366,464	355,677	362,132	405,501	410,599	2,619,252
Rate (per 1,000 women 15-49)	0.4	10.6	27.3	17.3	30.5	21.3	13.9	8.6	2.6	0.3	13.1
Standard Error (SE)	0.04	0.22	0.43	0.22	0.28	0.24	0.20	0.15	0.08	0.02	0.07
Estimated pregnancies	216	4,598	9,404	14,002	40,060	55,120	48,271	23,111	5,290	355	186,425
Rate (per 100 estimated pregnancies)	63.4	48.5	40.8	43.3	27.9	14.1	10.3	13.4	19.6	29.6	18.4
Standard Error (SE)	3.28	0.74	0.51	0.42	0.22	0.15	0.14	0.22	0.55	2.42	0.09

Table 3.3.1.3 Induced Abortions and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Induced abortions	861	750	14604	2479	596	11484	1589	1241	777	34,381
Women 15-49	114,014	76,283	993,644	227,771	79,086	819,860	134,053	108,945	65,423	2,619,252
Rate (per 1,000 women 15-49)	7.6	9.8	14.7	10.9	7.5	14.0	11.9	11.4	11.9	13.1
Standard Error (SE)	0.26	0.36	0.12	0.22	0.31	0.13	0.30	0.32	0.42	0.07
Estimated pregnancies	8,533	5,672	70,445	16,456	4,107	55,956	10,179	8,952	5,909	186,425
Rate (per 100 estimated pregnancies)	10.1	13.2	20.7	15.1	14.5	20.5	15.6	13.9	13.1	18.4
Standard Error (SE)	0.33	0.45	0.15	0.28	0.55	0.17	0.36	0.37	0.44	0.09

Source: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: 1. The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively.
2. Total rate = total Induced abortions / number of women aged 15-49 x 1,000.
Totals for age groups and RHAs include unknown ages or RHAs.
Data include Alberta residents only, with the exception of spontaneous abortion data (included in estimated pregnancies) prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.4 Induced Abortions by Year and Facility Type, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Induced abortions at acute care hospitals	6,053	5,904	5,895	5,447	5,169	4,800	4,894	3,868	3,445	3,534
Induced abortions at private clinics	4,293	4,260	4,522	5,142	5,377	5,730	5,907	6,659	7,857	8,359
Induced abortions at all facilities	10,346	10,164	10,417	10,589	10,546	10,530	10,801	10,527	11,302	11,893
Percent at hospitals	58.5	58.1	56.6	51.4	49.0	45.6	45.3	36.7	30.5	29.7
Percent at clinics	41.5	41.9	43.4	48.6	51.0	54.4	54.7	63.3	69.5	70.3

Table 3.3.1.5 Induced Abortions by Year and Facility Region, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Induced abortions in Edmonton	4,297	4,326	4,477	4,653	4,765	4,878	5,011	4,827	5,225	5,499
Induced abortions in Calgary	5,668	5,483	5,636	5,734	5,565	5,469	5,638	5,506	5,874	6,220
Induced abortions in other areas	381	355	304	202	216	183	152	194	203	174
Induced abortions at all facilities	10,346	10,164	10,417	10,589	10,546	10,530	10,801	10,527	11,302	11,893
Percent in Edmonton	41.5	42.6	43.0	43.9	45.2	46.3	46.4	45.9	46.2	46.2
Percent in Calgary	54.8	53.9	54.1	54.2	52.8	51.9	52.2	52.3	52.0	52.3
Percent in other areas	3.7	3.5	2.9	1.9	2.0	1.7	1.4	1.8	1.8	1.5

Sources: Hospital Inpatient Files, October 2008 extraction.
Ambulatory Care Classification System, Alberta Health and Wellness, October 2008 extraction.

Notes: Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.6 Induced Abortions by Week of Gestation and Facility Type, Alberta, 1998 to 2007

All Facilities	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<9	4,585	4,137	4,518	4,307	4,765	5,320	5,006	4,247	4,427	5,121
9 - 12	4,570	4,690	4,656	4,937	4,441	3,862	4,271	4,571	5,159	4,967
13 - 16	786	910	800	886	871	877	1,011	1,118	1,154	1,226
17 - 20	375	402	431	449	388	391	438	509	486	495
>20	24	25	12	9	39	55	62	79	74	83
Total	10,352	10,164	10,417	10,590	10,588	10,530	10,801	10,527	11,302	11,893

Acute Care Hospitals	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<9	2,338	2,053	2,424	2,068	2,160	2,414	2,196	1,518	1,054	1,353
9 - 12	3,115	3,212	2,933	2,844	2,497	1,949	2,120	1,763	1,807	1,512
13 - 16	380	421	342	309	255	215	340	306	319	402
17 - 20	203	197	191	222	182	167	179	208	190	191
>20	17	21	5	3	33	43	57	70	73	75
Total	6,053	5,904	5,895	5,448	5,211	4,800	4,894	3,868	3,445	3,534

Private Clinics	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<9	2,247	2,084	2,094	2,239	2,605	2,906	2,810	2,729	3,373	3,768
9 - 12	1,455	1,478	1,723	2,093	1,944	1,913	2,151	2,808	3,352	3,455
13 - 16	406	489	458	577	616	662	671	812	835	824
17 - 20	172	205	240	227	206	224	259	301	296	304
>20	7	4	7	6	6	12	5	9	1	8
Total	4,299	4,260	4,522	5,142	5,377	5,730	5,907	6,659	7,857	8,359

Table 3.3.1.7 Percent of Induced Abortions by Week of Gestation and Facility Type, Alberta, 1998 to 2007

All Facilities	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<9	44.3	40.7	43.4	40.7	45.0	50.5	46.3	40.3	39.2	43.1
9 - 12	44.1	46.1	44.7	46.6	41.9	36.7	39.5	43.4	45.6	41.8
13 - 16	7.6	9.0	7.7	8.4	8.2	8.3	9.4	10.6	10.2	10.3
17 - 20	3.6	4.0	4.1	4.2	3.7	3.7	4.1	4.8	4.3	4.2
>20	0.2	0.2	0.1	0.1	0.4	0.5	0.6	0.8	0.7	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Acute Care Hospitals	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<9	38.6	34.8	41.1	38.0	41.5	50.3	44.9	39.2	30.6	38.3
9 - 12	51.5	54.4	49.8	52.2	47.9	40.6	43.3	45.6	52.5	42.8
13 - 16	6.3	7.1	5.8	5.7	4.9	4.5	6.9	7.9	9.3	11.4
17 - 20	3.4	3.3	3.2	4.1	3.5	3.5	3.7	5.4	5.5	5.4
>20	0.3	0.4	0.1	0.1	0.6	0.9	1.2	1.8	2.1	2.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Private Clinics	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<9	52.3	48.9	46.3	43.5	48.4	50.7	47.6	41.0	42.9	45.1
9 - 12	33.8	34.7	38.1	40.7	36.2	33.4	36.4	42.2	42.7	41.3
13 - 16	9.4	11.5	10.1	11.2	11.5	11.6	11.4	12.2	10.6	9.9
17 - 20	4.0	4.8	5.3	4.4	3.8	3.9	4.4	4.5	3.8	3.6
>20	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Hospital Inpatient Files, October 2008 extraction.
Ambulatory Care Classification System, Alberta Health and Wellness, October 2008 extraction.

Notes: Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.8 Induced Abortions by Week of Gestation and Maternal Age Group, Alberta, 2005 to 2007

Induced abortions							Percent of induced abortions						
2005	**< 9**	**9 -12**	**13 -16**	**17-20**	**>20**	**Alberta**	**2005**	**< 9**	**9 -12**	**13 -16**	**17-20**	**>20**	**Alberta**
<15	8	11	9	2	0	30	**<15**	26.7	36.7	30.0	6.7	0.0	100.0
15-17	208	358	103	45	1	716	**15-17**	29.1	50.0	14.4	6.3	0.1	100.0
18-19	416	593	161	68	3	1,241	**18-19**	33.5	47.8	13.0	5.5	0.2	100.0
15-19	624	951	264	113	4	1,957	**15-19**	31.9	48.6	13.5	5.8	0.2	100.0
20-24	1,301	1,594	384	158	16	3,453	**20-24**	37.7	46.2	11.1	4.6	0.5	100.0
25-29	963	974	234	95	22	2,288	**25-29**	42.1	42.6	10.2	4.2	1.0	100.0
30-34	728	580	130	72	16	1,528	**30-34**	47.6	38.0	8.5	4.7	1.0	100.0
35-39	451	340	77	49	17	934	**35-39**	48.3	36.4	8.2	5.2	1.8	100.0
40-44	165	115	18	19	3	320	**40-44**	51.6	35.9	5.6	5.9	0.9	100.0
>44	7	6	2	1	1	17	**>44**	41.2	35.3	11.8	5.9	5.9	100.0
All	4,247	4,571	1,118	509	79	10,527	**All**	40.3	43.4	10.6	4.8	0.8	100.0

2006	**< 9**	**9 -12**	**13 -16**	**17-20**	**>20**	**Alberta**	**2006**	**< 9**	**9 -12**	**13 -16**	**17-20**	**>20**	**Alberta**
<15	9	14	10	2	0	35	**<15**	25.7	40.0	28.6	5.7	0.0	100.0
15-17	224	368	111	44	2	749	**15-17**	29.9	49.1	14.8	5.9	0.3	100.0
18-19	419	572	172	71	1	1,235	**18-19**	33.9	46.3	13.9	5.7	0.1	100.0
15-19	643	940	283	115	3	1,984	**15-19**	32.4	47.4	14.3	5.8	0.2	100.0
20-24	1,398	1,823	396	139	7	3,764	**20-24**	37.1	48.4	10.5	3.7	0.2	100.0
25-29	1,054	1,204	225	92	22	2,598	**25-29**	40.6	46.3	8.7	3.5	0.8	100.0
30-34	694	675	134	69	31	1,603	**30-34**	43.3	42.1	8.4	4.3	1.9	100.0
35-39	478	371	77	47	9	982	**35-39**	48.7	37.8	7.8	4.8	0.9	100.0
40-44	137	128	26	22	2	315	**40-44**	43.5	40.6	8.3	7.0	0.6	100.0
>44	14	4	3	0	0	21	**>44**	66.7	19.0	14.3	0.0	0.0	100.0
All	4,427	5,159	1,154	486	74	11,302	**All**	39.2	45.6	10.2	4.3	0.7	100.0

2007	**< 9**	**9 -12**	**13 -16**	**17-20**	**>20**	**Alberta**	**2007**	**< 9**	**9 -12**	**13 -16**	**17-20**	**>20**	**Alberta**
<15	8	23	7	2	0	40	**<15**	20.0	57.5	17.5	5.0	0.0	100.0
15-17	248	357	108	41	0	754	**15-17**	32.9	47.3	14.3	5.4	0.0	100.0
18-19	433	623	199	66	2	1,323	**18-19**	32.7	47.1	15.0	5.0	0.2	100.0
15-19	681	980	307	107	2	2,077	**15-19**	32.8	47.2	14.8	5.2	0.1	100.0
20-24	1,654	1,624	394	140	16	3,828	**20-24**	43.2	42.4	10.3	3.7	0.4	100.0
25-29	1,268	1,107	263	107	23	2,768	**25-29**	45.8	40.0	9.5	3.9	0.8	100.0
30-34	797	655	133	74	22	1,681	**30-34**	47.4	39.0	7.9	4.4	1.3	100.0
35-39	526	436	84	48	13	1,108	**35-39**	47.5	39.4	7.6	4.3	1.2	100.0
40-44	172	134	36	17	7	366	**40-44**	47.0	36.6	9.8	4.6	1.9	100.0
>44	15	8	2	0	0	25	**>44**	60.0	32.0	8.0	0.0	0.0	100.0
All	5,121	4,967	1,226	495	83	11,893	**All**	43.1	41.8	10.3	4.2	0.7	100.0

Sources: Hospital Inpatient Files, October 2008 extraction.
Ambulatory Care Classification System, Alberta Health and Wellness, October 2008 extraction.

Notes: Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.9 Induced Abortions and Rate by Year and Maternal Age Group, Alberta, 1998 to 2007

Induced abortions	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	60	45	44	39	50	45	37	42	43	52
15-17	951	898	811	810	743	760	734	717	764	751
18-19	1,407	1,312	1,410	1,481	1,388	1,296	1,289	1,239	1,254	1,340
15-19	2,358	2,210	2,221	2,291	2,131	2,056	2,023	1,956	2,018	2,091
20-24	3,136	3,196	3,375	3,371	3,487	3,627	3,651	3,500	3,791	3,902
25-29	2,058	2,077	2,234	2,122	2,187	2,275	2,412	2,334	2,633	2,824
30-34	1,312	1,368	1,373	1,428	1,535	1,488	1,497	1,551	1,620	1,781
35-39	904	882	903	912	984	937	989	956	1,016	1,130
40-44	270	289	306	319	368	367	375	332	325	379
>44	33	28	20	29	32	30	24	29	40	36
Total	10,131	10,095	10,476	10,511	10,774	10,825	11,008	10,700	11,486	12,195

Rate (per 1,000 women)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	0.6	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.5
15-17	15.2	13.9	12.4	12.2	11.0	11.3	10.8	10.4	10.8	10.5
18-19	35.5	32.0	33.0	33.4	30.5	28.2	27.9	26.7	27.1	28.1
15-19	23.1	20.9	20.5	20.6	18.9	18.1	17.7	16.9	17.3	17.6
20-24	31.9	31.3	32.6	31.6	31.6	31.8	31.3	29.6	31.0	30.7
25-29	19.8	19.6	21.1	19.9	19.9	20.4	21.2	20.1	21.7	21.9
30-34	11.4	12.1	12.4	12.7	13.5	13.0	13.1	13.4	13.8	14.5
35-39	6.8	6.6	6.8	7.0	7.8	7.7	8.3	8.1	8.4	9.1
40-44	2.2	2.3	2.3	2.4	2.7	2.7	2.7	2.4	2.4	2.8
>44	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3
Total	13.1	12.7	13.1	12.9	13.0	12.9	13.0	12.5	13.2	13.6

Rate (per 100 estimated pregnancies)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	63.8	60.0	63.8	51.3	62.5	68.2	54.4	73.7	62.3	57.8
15-17	48.2	47.2	47.8	49.9	50.2	52.1	51.3	50.4	49.1	46.4
18-19	40.9	39.7	41.9	44.3	42.8	42.3	42.8	40.6	40.6	41.1
15-19	43.6	42.5	43.9	46.1	45.1	45.5	45.6	43.7	43.5	42.8
20-24	26.6	26.7	28.6	28.6	28.5	28.8	29.2	28.0	28.2	27.7
25-29	13.7	13.8	15.1	14.4	14.3	14.3	14.7	13.8	14.4	14.2
30-34	10.1	10.7	11.0	11.0	11.3	10.5	10.3	10.4	10.1	10.3
35-39	15.2	14.2	14.5	14.4	15.2	14.1	14.7	13.6	13.3	13.4
40-44	22.9	22.2	22.9	23.7	25.8	22.3	23.2	19.7	19.3	19.7
>44	36.3	31.1	42.6	34.5	36.0	31.6	25.3	29.3	30.1	29.3
Total	19.3	19.2	20.3	20.1	20.0	19.5	19.5	18.5	18.6	18.3

Source: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: 1. Total rate = total Induced abortions / number of women aged 15-49 x 1,000.
2. The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively.
Totals for age groups include unknown ages.
Data include Alberta residents only, with the exception of spontaneous abortion data (included in estimated pregnancies) prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.10 Induced Abortions and Rate by Year and Residence RHA, Alberta, 1998 to 2007

Induced abortions	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	263	299	285	288	282	275	337	268	301	292
Palliser	194	176	255	220	232	225	215	216	254	280
Calgary	4,393	4,458	4,531	4,598	4,668	4,632	4,687	4,531	4,863	5,210
David Thompson	653	648	725	744	766	794	809	781	833	865
East Central	195	162	179	176	194	175	183	167	207	222
Capital	3,517	3,418	3,555	3,539	3,657	3,691	3,739	3,597	3,833	4,054
Aspen	413	430	410	426	477	494	478	497	528	564
Peace Country	342	316	349	310	330	326	379	403	409	429
Northern Lights	161	188	187	210	168	213	181	240	258	279
Alberta	10,131	10,095	10,476	10,511	10,774	10,825	11,008	10,700	11,486	12,195

Rate (per 1,000 women 15-49)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	7.2	8.1	7.6	7.7	7.5	7.3	9.0	7.1	8.0	7.6
Palliser	8.4	7.4	10.6	9.0	9.3	9.1	8.6	8.6	10.0	10.8
Calgary	15.7	15.4	15.4	15.2	15.1	14.7	14.7	14.0	14.7	15.3
David Thompson	9.6	9.3	10.3	10.4	10.5	10.8	10.9	10.5	11.0	11.1
East Central	7.6	6.3	6.9	6.7	7.4	6.7	7.0	6.4	7.9	8.3
Capital	14.3	13.6	14.0	13.8	14.0	14.0	14.1	13.5	14.1	14.5
Aspen	9.4	9.7	9.2	9.5	10.6	11.0	10.7	11.2	11.9	12.5
Peace Country	10.4	9.4	10.3	9.1	9.5	9.4	10.8	11.4	11.3	11.5
Northern Lights	9.4	10.8	10.5	11.5	8.7	10.6	8.8	11.4	12.0	12.2
Alberta	13.1	12.7	13.1	12.9	13.0	12.9	13.0	12.5	13.2	13.6

Rate (per 100 estimated pregnancies)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	10.2	11.4	11.6	11.7	11.3	10.5	12.7	10.1	10.6	9.6
Palliser	12.3	11.3	15.5	13.7	14.3	13.6	12.9	12.1	14.0	13.5
Calgary	23.1	23.2	23.6	23.8	23.4	22.0	22.1	20.6	20.9	20.7
David Thompson	14.1	13.8	15.7	16.0	15.9	16.1	16.1	15.4	15.1	14.8
East Central	14.6	12.8	14.7	14.7	14.8	14.5	14.0	13.1	15.0	15.2
Capital	21.9	21.2	22.6	22.2	22.4	22.0	21.9	20.9	20.7	20.0
Aspen	12.5	13.1	13.7	13.7	14.9	15.6	15.2	15.7	15.4	15.7
Peace Country	13.5	12.5	14.4	12.7	13.1	12.5	14.4	14.3	13.5	13.8
Northern Lights	11.6	13.5	13.0	13.8	10.3	13.0	10.8	13.1	13.5	12.9
Alberta	19.3	19.2	20.3	20.1	20.0	19.5	19.5	18.5	18.6	18.3

Source: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: Totals for RHAs include unknown RHAs.
Data include Alberta residents only, with the exception of spontaneous abortion data (included in estimated pregnancies) prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

3.3.2 Labour Induction

Induced labour: *Initiation of labour prior to spontaneous onset, for the purpose of accomplishing delivery*. Inductions can be performed after admission to hospital (inpatient inductions) or prior to admission (outpatient inductions). Most outpatient inductions are medical inductions.

Medical induction: *Induction with oxytocic agents, non-pharmaceutical agents, and/or nipple stimulation.*

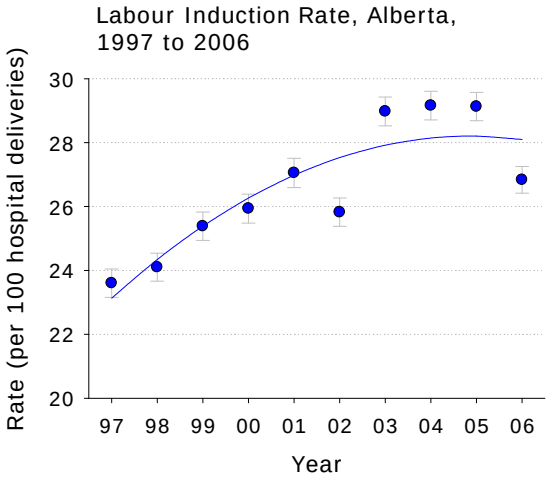
Surgical induction: *Induction of labour by membrane stripping, artificial rupture of membranes, and/or mechanical cervical ripening.*

Combined induction: *Induction by any combination of medical and surgical means.*

Rates for the above procedures are per 100 hospital deliveries.

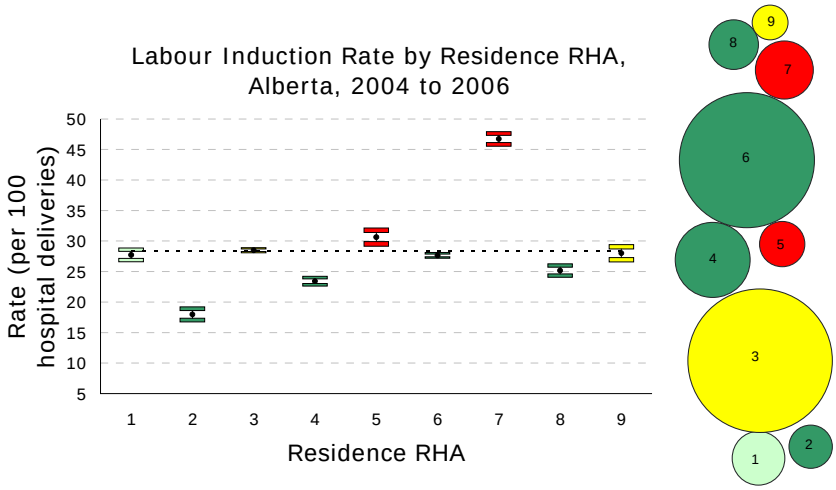
Labour induction has been practiced for centuries. The earliest inductions were performed to enable delivery after fetal death, but labour inductions today are carried out for a wider variety of reasons, including threats to fetal or maternal health and availability of specialist services (e.g., fetal surgery, anaesthesia). Common methods involve the administration of prostoglandins or oxytocin (medical inductions) and membrane sweeping and amniotomy (surgical inductions; MacKenzie, 2006).

Time Trends (see Table 3.3.2.1)



- The total induction rate increased from 1997 to 2005, with a drop in 2006. Inductions were undercounted from April 2002 to March 2003 (see Limitations and Methodology Notes). In 2006, 26.8% of hospital deliveries in Alberta involved labour induction.
- Most inductions are medical inductions.

Regional Data (see Tables 3.3.2.2, 3.3.2.3)



- The rate of labour induction (total inductions) was lower than the provincial average in RHAs 2, 4, 6, and 8 for 2004 to 2006 combined. The rate was lowest in RHA 2 (18.0 per 100 hospital deliveries).
- The rate was higher than the provincial average in RHAs 5 and 7, with the highest rate in RHA 7 (46.7 per 100 hospital deliveries, or almost half of deliveries).
- Rates in many RHAs show decreasing trends from 2004 to 2006.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

3.3.2 Labour Induction

Common indications for labour induction include post-term pregnancy, pre-labour rupture of membranes, fetal compromise, and maternal medical conditions. Risks of labour induction include increased rates of cesarean birth, operative vaginal delivery, and excessive uterine activity. Induction for convenience remains a controversial issue (Crane, 2001).

Labour Induction Rate (per 100 hospital deliveries), 2004-06 Combined

Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

From April 2002 to March 2003, inductions performed on outpatient bases were not captured, resulting in under-estimation of induction rates for this time period. From April 2003 onward, outpatient inductions were included in total inductions but were not categorized as medical, surgical, or combined. Consequently, "total inductions" is greater than the sum of medical, surgical, and combined from 2003 onward.

Rates are calculated based on hospital deliveries only; out-of-hospital deliveries are not included in total deliveries in this section.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 Deliveries data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.3.2.1 Labour Inductions and Rates, Alberta, 1997 to 2006[1]

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Hospital deliveries	35,553	36,672	36,985	35,825	36,315	37,351	38,865	39,377	40,449	43,104
Total inductions[2]	8,391	8,838	9,388	9,291	9,823	9,645	11,261	11,482	11,782	11,567
Total inductions rate (per 100 hospital deliveries)	23.6	24.1	25.4	25.9	27.0	25.8	29.0	29.2	29.1	26.8
Medical inductions	6,278	6,813	7,153	7,146	7,275	6,786	6,677	6,229	6,125	6,503
Medical induction rate (per 100 hospital deliveries)	17.7	18.6	19.3	19.9	20.0	18.2	17.2	15.8	15.1	15.1
Surgical inductions	636	546	596	532	578	717	801	654	794	860
Surgical inductions rate (per 100 hospital deliveries)	1.8	1.5	1.6	1.5	1.6	1.9	2.1	1.7	2.0	2.0
Combined inductions	1,477	1,479	1,639	1,613	1,970	2,142	2,211	2,822	2,734	2,398
Combined inductions rate (per 100 hospital deliveries)	4.2	4.0	4.4	4.5	5.4	5.7	5.7	7.2	6.8	5.6

Table 3.3.2.2 Total Labour Inductions and Rates by Residence RHA, Alberta, 2004 to 2006[1] Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Total inductions	1,726	697	12,670	2,703	1,164	9,875	3,330	1,537	1,129	34,831
Hospital deliveries	6,227	3,877	44,485	11,543	3,799	35,731	7,125	6,110	4,033	122,930
Rate (per 100 hospital deliveries)	27.7	18.0	28.5	23.4	30.6	27.6	46.7	25.2	28.0	28.3
Standard Error (SE)	0.57	0.62	0.21	0.39	0.75	0.24	0.59	0.56	0.71	0.13

Sources: Hospital Inpatient Files, May 2008 extraction.
Ambulatory Care Classification System, Alberta Health and Wellness, May 2008 extraction.

Notes: 1. From April 2002 to March 2003, inductions performed on outpatient bases were not captured, resulting in under-estimation of induction rates for this time period.
2. From April 2003 onward, outpatient inductions were included in total inductions but were not categorized as medical, surgical, or combined. Consequently, "total inductions" is greater than the sum of medical, surgical, and combined from 2003 onward.
Totals for Alberta include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.2.3 Labour Inductions and Rates by Residence RHA and Year, Alberta, 2004 to 2006

2004	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,008	1,239	14,105	3,692	1,248	11,538	2,314	1,907	1,326	39,377
Total inductions	557	236	4,132	898	372	3,207	1,222	510	348	11,482
Total inductions rate (per 100 hospital deliveries)	27.7	19.0	29.3	24.3	29.8	27.8	52.8	26.7	26.2	29.2
Medical inductions	463	105	1,779	577	208	1,964	416	456	261	6,229
Medical induction rate (per 100 hospital deliveries)	23.1	8.5	12.6	15.6	16.7	17.0	18.0	23.9	19.7	15.8
Surgical inductions	41	8	266	52	41	171	37	23	15	654
Surgical inductions rate (per 100 hospital deliveries)	2.0	0.6	1.9	1.4	3.3	1.5	1.6	1.2	1.1	1.7
Combined inductions	18	19	1,685	195	88	685	75	19	38	2,822
Combined inductions rate (per 100 hospital deliveries)	0.9	1.5	11.9	5.3	7.1	5.9	3.2	1.0	2.9	7.2

2005	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,038	1,302	14,830	3,746	1,229	11,635	2,341	2,002	1,326	40,449
Total inductions	583	244	4,229	874	387	3,335	1,216	508	406	11,782
Total inductions rate (per 100 hospital deliveries)	28.6	18.7	28.5	23.3	31.5	28.7	51.9	25.4	30.6	29.1
Medical inductions	484	100	1,708	573	199	2,010	411	403	237	6,125
Medical induction rate (per 100 hospital deliveries)	23.7	7.7	11.5	15.3	16.2	17.3	17.6	20.1	17.9	15.1
Surgical inductions	50	5	329	37	31	209	41	50	42	794
Surgical inductions rate (per 100 hospital deliveries)	2.5	0.4	2.2	1.0	2.5	1.8	1.8	2.5	3.2	2.0
Combined inductions	11	21	1,557	177	122	650	65	29	102	2,734
Combined inductions rate (per 100 hospital deliveries)	0.5	1.6	10.5	4.7	9.9	5.6	2.8	1.4	7.7	6.8

2006	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,181	1,336	15,550	4,105	1,322	12,558	2,470	2,201	1,381	43,104
Total inductions	586	217	4,309	931	405	3,333	892	519	375	11,567
Total inductions rate (per 100 hospital deliveries)	26.9	16.2	27.7	22.7	30.6	26.5	36.1	23.6	27.2	26.8
Medical inductions	496	71	1,932	720	225	1,987	405	418	249	6,503
Medical induction rate (per 100 hospital deliveries)	22.7	5.3	12.4	17.5	17.0	15.8	16.4	19.0	18.0	15.1
Surgical inductions	43	5	404	42	35	223	38	51	19	860
Surgical inductions rate (per 100 hospital deliveries)	2.0	0.4	2.6	1.0	2.6	1.8	1.5	2.3	1.4	2.0
Combined inductions	14	11	1,274	113	105	697	67	33	84	2,398
Combined inductions rate (per 100 hospital deliveries)	0.6	0.8	8.2	2.8	7.9	5.6	2.7	1.5	6.1	5.6

Sources: Hospital Inpatient Files, May 2008 extraction.
Ambulatory Care Classification System, Alberta Health and Wellness, May 2008 extraction.

Notes: Totals for Alberta include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

3.3.3 Deliveries

Epidural analgesia: *A method of pain relief consisting of continuous bathing of lumbar or thoracic nerve roots within the epidural space with an injected anesthetic solution* (Dorland, 2000).

Forceps delivery: *Extraction of a fetus by application of forceps to the child's head* (Dorland, 2000).

Vacuum extraction: *A suction cup is placed on the fetus' head and vacuum pressure is applied to pull the baby out of the vagina* (Morgan, 1990).

Cesarean section: *Incision through the abdominal and uterine walls for delivery of a fetus* (Dorland, 2000).

Shoulder dystocia: *Dystocia is defined as abnormal or difficult labour due to the shape, size or position of the fetus (Dorland, 2000). In the case of shoulder dystocia, there is an impaction of the shoulder of the fetus against the symphysis pubis after the head has been delivered.*

Rates for the above procedures are per 100 hospital deliveries.

Episiotomy: *Surgical incision into the perineum and vagina to facilitate delivery.*

Episiotomy rate: *Number of episiotomies per 100 vaginal deliveries.*

Vaginal birth after cesarean section (VBAC): *A vaginal birth following a previous cesarean.*

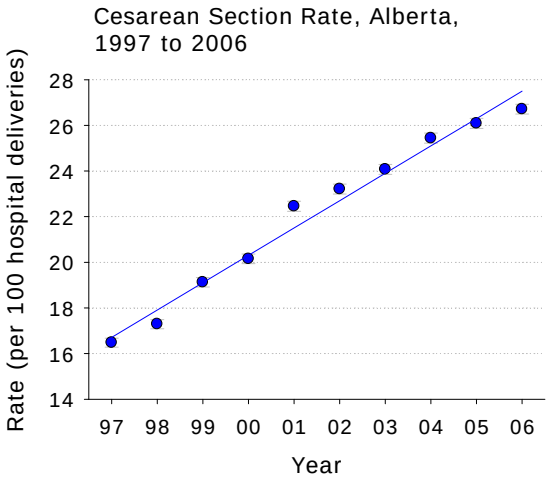
VBAC attempt rate: *Number of attempted VBACs per 100 repeat cesareans + VBACs.*

VBAC occurrence rate: *Number of VBACs per 100 repeat cesareans + VBACs.*

VBAC success rate: *Number of VBACs per 100 trials of labour.*

Time Trends (see Tables 3.3.3.1, 3.3.3.4, 3.3.3.7, 3.3.3.10)

- The epidural analgesia rate (per 100 hospital deliveries) increased steadily between 2000 and 2006, from 36.0% to.44.2% of hospital deliveries.
- The forceps delivery rate has been stable since 2001. In 2006, 5.6% of deliveries had forceps assistance. The vacuum delivery rate increased slightly in 2003 and 2004 to 12.1% but has also been quite stable over several years. In 2006, 11.4% of hospital deliveries were vacuum assisted.



- The cesarean section rate in Alberta increased steadily between 1997 and 2006. In 2006, there were 11,512 cesarean sections performed, for a rate of 26.7 (per 100 hospital deliveries). Repeat cesareans comprised 38.7% of cesarean section deliveries in 2006.
- The vaginal birth after cesarean section (VBAC) attempt rate and occurrence rate both declined over time between 1997and 2006. In 2006, VBACs were attempted after 25.5% of previous cesarean deliveries. VBACs actually occurred after 19.4% of previous cesareans.
- The VBAC success rate was stable from 1997 to 1999 and decreased from 2000 to 2004 before increasing again in 2005 and 2006. In 2006, 76.1% of attempted VBACs were successful, down from 81.9% in 1997.
- The episiotomy rate decreased between 2000 and 2006. The 2006 episiotomy rate was 13.1 (per 100 vaginal deliveries), compared with 17.2 in 2000.
- The shoulder dystocia rate increased steadily between 1997 and 2006. In 2006, there were 2,079 cases of shoulder dystocia, for a rate of 4.7 (per 100 hospital deliveries). The rate in 2006 was more than triple that of 1997.

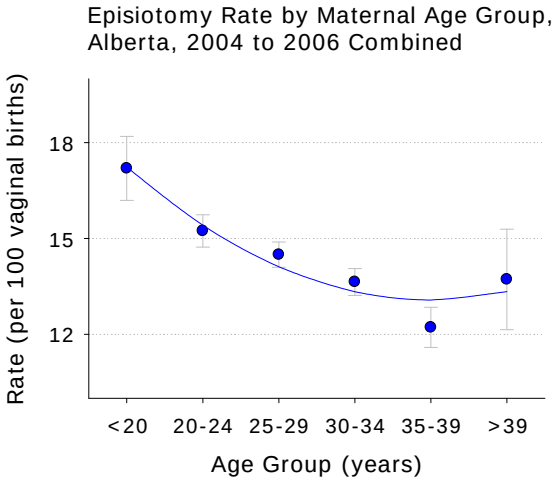
3.3.3 Deliveries

About half of all vaginal deliveries in Canada involve epidural analgesia. Epidural analgesia tends to be most common in large urban hospitals and for first births, older mothers, and Caucasian mothers (Canadian Institute for Health Information, 2004; Truman, Jin, & Johnson, 2002). Epidural analgesia is an effective pain control method, however its use is associated with longer labour, increased incidence of fever in mothers, and increased rates of instrument-assisted (e.g., forceps, vacuum) deliveries (Canadian Institute for Health Information, 2007).

Instrumental deliveries (with forceps or vacuum) occur more often with older mothers and pregnancies with complications such as previous cesarean section, delayed labour, fetal distress, maternal hypertension, etc. Maternal injury is more common with forceps than with vacuum extraction. Some fetal injuries occur more often after vacuum extraction (e.g., bruising on the skull and retinal hemorrhages), while others are more frequent following forceps use (e.g., external eye injuries and facial nerve palsies; Cargill, MacKinnon, et al., 2004; Wen et al, 2001).

The Society of Obstetricians and Gynaecologists of Canada states that routine episiotomy "does not reduce and may increase the incidence of maternal trauma". Episiotomy is indicated in the rare case where the perineum is preventing delivery (Cargill, MacKinnon, et al., 2004).

Maternal Age Effects (see Tables 3.3.3.8, 3.3.3.11)



- Teenage mothers were most likely to have an episiotomy for 2004 to 2006 combined, and the episiotomy rate decreased with increasing maternal age. The rate for women under 20 was 17.2 (per 100 vaginal deliveries).
- There was only small variation in shoulder dystocia rates with maternal age between 2004 and 2006, with some tendency for higher rates in younger mothers and lower rates in older mothers.
- Maternal age data are not available for the other delivery indicators.

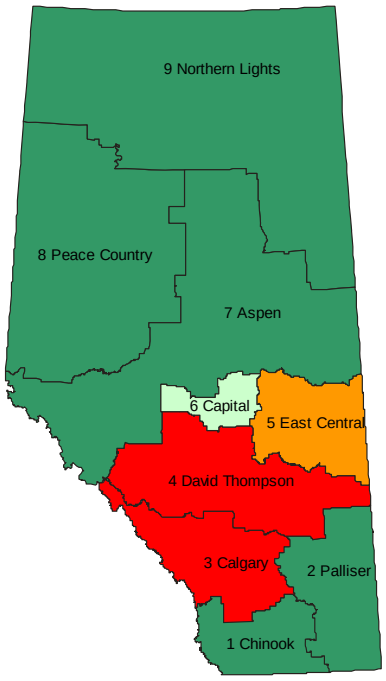
Regional Data (see Tables 3.3.3.2, 3.3.3.3, 3.3.3.5, 3.3.3.6, 3.3.3.9, 3.3.3.12)

- For 2004 to 2006 combined, the epidural analgesia rate was higher than the provincial average in RHAs 3 and 6, and lower in all other RHAs. The rate varied greatly, from 6.9% (RHA 2) of hospital deliveries to 55.0% (RHA 6).
- The forceps delivery rate for 2004 to 2006 combined was lower than the provincial average in RHAs 1, 2, 3, 7, and 8, with the lowest rate in RHA 8 (1.5 per 100 hospital deliveries). The rate was higher than the provincial average in RHAs 5, 6, and 9; the highest rate was in RHA 9 (8.1).
- The vacuum extraction rate was significantly lower than the provincial average in RHAs 1, 2, 4, 6, 7, and 8 for 2004 to 2006 combined. The lowest rate was in RHA 4 (4.6 per 100 hospital deliveries). The vacuum extraction rate was significantly higher than the provincial average in RHAs 3, 5, and 9, with the highest rate (17.0) in RHA 3.
- The cesarean section rate was lower than the provincial average in RHAs 1, 2, 7, 8, and 9, and higher in RHAs 3 and 4 for 2004 to 2006 combined. The rate did not vary greatly, from 23.1 (per 100 hospital deliveries) in RHAs 1 and 8, to 27.5 in RHA 3.

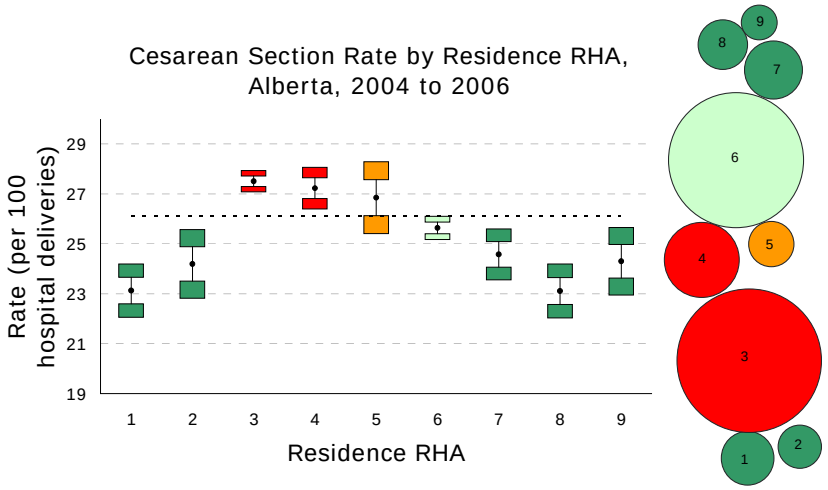
3.3.3 Deliveries

Cesarean section rates show an increasing trend over the last several years in many industrialized countries. Delayed childbearing and rising maternal obesity rates contribute to the increase. Shortage of maternal care providers and changing attitudes toward childbirth may also play roles (Society of Obstetricians and Gynaecologists of Canada, 2008). Elective cesarean delivery by maternal request is a current topic of debate.

Cesarean Section Rate (per 100 hospital deliveries), 2004-06 Combined



Regional Data continued (see Tables 3.3.3.2, 3.3.3.3, 3.3.3.5, 3.3.3.6, 3.3.3.9, 3.3.3.12)

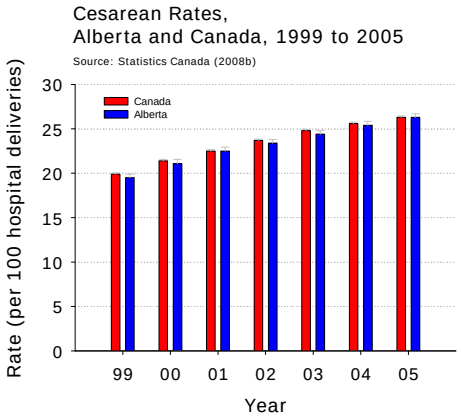


- The VBAC occurrence rate was lower than the provincial average in RHA 2 between 2004 and 2006. The rate was higher than the provincial average in RHAs 1, 5, and 9 during that time period. Rates varied from 18.4 (per 100 VBACs + repeat cesareans) in RHA 7 to 30.1 in RHA 9.
- Episiotomy rates were lower than the provincial average in RHAs 1, 3, 7, and 8, and higher than the provincial average in RHAs 5, 6, and 9 for 2004 to 2006 combined. Regional rates ranged from 11.1% of hospital deliveries (RHA 3) to 24.9% (RHA 9).
- For 2004 to 2006 combined, the shoulder dystocia rate was lower than the provincial average in RHAs 4 and 6, with the lowest rate in RHA 4 (3.1 per 100 hospital deliveries). The rate was higher than the provincial average in RHAs 2, 5, and 9, with the highest rate in RHA 2 (10.2).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

3.3.3 Deliveries

The cesarean section rate was similar in Alberta and Canada between 1999 and 2005, with similar increases in the two jurisdictions during that time period (Statistics Canada, 2008b).



VBAC success rates are lower in the case of dystocia, malpresentation, or gestational hypertension in a prior delivery, labour induction, and maternal obesity, and are higher with a previous vaginal delivery (Landon, Leindecker, Spong, et al., 2005; Martel and MacKinnon, 2005).

Shoulder dystocia occurs most often (but not always) with macrosomic babies. Prediction of macrosomia is unreliable; cases of shoulder dystocia are often unexpected and represent an obstetric emergency. Brachial plexus nerve injury and occasionally death can result, but most cases do not result in chronic morbidity (Benjamin, 2005; Chauhan et al., 2005; Gherman, 2005).

Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

Maternal age data are unavailable for all measures except episiotomy and shoulder dystocia.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 deliveries data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.3.3.1 Epidural Analgesia, Forceps and Vacuum Extraction Deliveries Cases and Rates, Alberta, 1997 to 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Hospital deliveries	35,553	36,672	36,985	35,825	36,315	37,351	38,865	39,377	40,449	43,104
Epidural analgesia cases	-	-	-	12,904	13,958	14,781	16,253	16,651	17,748	19,064
Epidural analgesia rate (per 100 hospital deliveries)	-	-	-	36.0	38.4	39.6	41.8	42.3	43.9	44.2
Forceps deliveries	2,573	2,384	2,389	2,180	2,001	2,001	2,174	2,215	2,203	2,398
Forceps delivery rate (per 100 hospital deliveries)	7.2	6.5	6.5	6.1	5.5	5.4	5.6	5.6	5.4	5.6
Vacuum extraction deliveries	3,817	4,015	4,083	3,826	3,867	4,226	4,688	4,768	4,437	4,893
Vacuum extraction rate (per 100 hospital deliveries)	10.7	10.9	11.0	10.7	10.6	11.3	12.1	12.1	11.0	11.4

Table 3.3.3.2 Epidural Analgesia and Vacuum Extraction Deliveries and Rates by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	6,227	3,877	44,485	11,543	3,799	35,731	7,125	6,110	4,033	122,930
Epidural analgesia cases	2,079	268	23,145	2,365	1,545	19,646	1,948	827	1,342	53,463
Epidural analgesia rate (per 100 hospital deliveries)	33.4	6.9	52.0	20.5	40.7	55.0	27.3	13.5	33.3	43.5
Standard Error (SE)	0.60	0.41	0.24	0.38	0.80	0.26	0.53	0.44	0.74	0.14
Forceps deliveries	289	75	2,100	609	269	2,793	260	94	327	6,816
Forceps delivery rate (per 100 hospital deliveries)	4.6	1.9	4.7	5.3	7.1	7.8	3.6	1.5	8.1	5.5
Standard Error (SE)	0.27	0.22	0.10	0.21	0.42	0.14	0.22	0.16	0.43	0.07
Vacuum extractions	608	281	7,552	532	483	2,892	732	417	601	14,098
Vacuum extraction rate (per 100 hospital deliveries)	9.8	7.2	17.0	4.6	12.7	8.1	10.3	6.8	14.9	11.5
Standard Error (SE)	0.38	0.42	0.18	0.20	0.54	0.14	0.36	0.32	0.56	0.09

Source: Epidural analgesia: Alberta Perinatal Health Program, July 2008 extraction.
Forceps, Vacuum extraction: Hospital Inpatient Files, May 2008 extraction.

Notes: Totals for Alberta include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.3.3 Epidural Analgesia, Forceps, and Vacuum Extraction Deliveries and Rates by Residence RHA and Year, Alberta, 2004 to 2006

2004	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,008	1,239	14,105	3,692	1,248	11,538	2,314	1,907	1,326	39,377
Epidural analgesia cases	637	92	7,326	641	412	6,269	642	188	444	16,651
Epidural analgesia rate (per 100 hospital deliveries)	31.7	7.4	51.9	17.4	33.0	54.3	27.7	9.9	33.5	42.3
Forceps deliveries	68	28	705	221	84	901	90	21	97	2,215
Forceps delivery rate (per 100 hospital deliveries)	3.4	2.3	5.0	6.0	6.7	7.8	3.9	1.1	7.3	5.6
Vacuum extraction deliveries	212	113	2,463	176	160	1,113	240	106	185	4,768
Vacuum extraction rate (per 100 hospital deliveries)	10.6	9.1	17.5	4.8	12.8	9.6	10.4	5.6	14.0	12.1

2005	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,038	1,302	14,830	3,746	1,229	11,635	2,341	2,002	1,326	40,449
Epidural analgesia cases	697	94	7,704	791	536	6,363	681	322	432	17,748
Epidural analgesia rate (per 100 hospital deliveries)	34.2	7.2	51.9	21.1	43.6	54.7	29.1	16.1	32.6	43.9
Forceps deliveries	112	19	676	179	88	901	89	36	103	2,203
Forceps delivery rate (per 100 hospital deliveries)	5.5	1.5	4.6	4.8	7.2	7.7	3.8	1.8	7.8	5.4
Vacuum extraction deliveries	203	81	2,390	170	174	847	239	161	172	4,437
Vacuum extraction rate (per 100 hospital deliveries)	10.0	6.2	16.1	4.5	14.2	7.3	10.2	8.0	13.0	11.0

2006	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,181	1,336	15,550	4,105	1,322	12,558	2,470	2,201	1,381	43,104
Epidural analgesia cases	745	82	8,115	933	597	7,014	625	317	466	19,064
Epidural analgesia rate (per 100 hospital deliveries)	34.2	6.1	52.2	22.7	45.2	55.9	25.3	14.4	33.7	44.2
Forceps deliveries	109	28	719	209	97	991	81	37	127	2,398
Forceps delivery rate (per 100 hospital deliveries)	5.0	2.1	4.6	5.1	7.3	7.9	3.3	1.7	9.2	5.6
Vacuum extraction deliveries	193	87	2,699	186	149	932	253	150	244	4,893
Vacuum extraction rate (per 100 hospital deliveries)	8.8	6.5	17.4	4.5	11.3	7.4	10.2	6.8	17.7	11.4

Source: Epidural analgesia: Alberta Perinatal Health Program, July 2008 extraction.
Forceps, Vacuum extraction: Hospital Inpatient Files, May 2008 extraction.

Notes: Totals for Alberta include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.3.4 Primary and Repeat Cesareans and VBACs and Rates, Alberta, 1997 to 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Hospital deliveries	35,553	36,672	36,985	35,825	36,315	37,351	38,865	39,377	40,449	43,104
Cesarean sections	5,858	6,340	7,073	7,219	8,154	8,669	9,355	10,017	10,551	11,512
Cesarean rate (per 100 hospital deliveries)	16.5	17.3	19.1	20.2	22.5	23.2	24.1	25.4	26.1	26.7
Primary cesareans	3,848	4,177	4,719	4,829	5,401	5,655	6,088	6,395	6,637	7,055
Primary cesarean rate (per 100 hospital deliveries)	10.8	11.4	12.8	13.5	14.9	15.1	15.7	16.2	16.4	16.4
Repeat cesareans	2,010	2,163	2,354	2,390	2,753	3,014	3,267	3,622	3,914	4,457
Repeat cesarean rate (per 100 hospital deliveries)	5.7	5.9	6.4	6.7	7.6	8.1	8.4	9.2	9.7	10.3
VBAC attempts	1,836	1,880	1,702	1,594	1,594	1,445	1,511	1,458	1,418	1,412
VBAC attempt rate (per 100 VBACs and repeat cesareans)	52.3	51.0	45.6	43.8	40.1	35.6	34.7	31.3	28.6	25.5
VBAC occurrences	1,503	1,522	1,378	1,246	1,227	1,046	1,091	1,035	1,051	1,075
VBAC occurrence rate (per 100 VBACs and repeat cesareans)	42.8	41.3	36.9	34.3	30.8	25.8	25.0	22.2	21.2	19.4
VBAC success rate (per 100 attempted VBACs)	81.9	81.0	81.0	78.2	77.0	72.4	72.2	71.0	74.1	76.1

Table 3.3.3.5 VBACs and Cesarean Sections and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	6,227	3,877	44,485	11,543	3,799	35,731	7,125	6,110	4,033	122,930
Cesarean sections	1,440	938	12,236	3,143	1,020	9,160	1,751	1,412	980	32,080
Rate (per 100 hospital deliveries)	23.1	24.2	27.5	27.2	26.8	25.6	24.6	23.1	24.3	26.1
Standard Error (SE)	0.53	0.69	0.21	0.41	0.72	0.23	0.51	0.54	0.68	0.13
VBAC occurrences	190	74	1,108	293	137	895	160	144	160	3,161
VBAC occurrence rate (per 100 VBACs and repeat cesareans)	24.5	18.6	20.0	19.1	23.7	21.2	18.4	20.0	30.1	20.9
Standard Error (SE)	0.22	0.22	0.07	0.15	0.30	0.08	0.18	0.19	0.31	0.05

Source: Hospital Inpatient Files, May 2008 extraction.

Notes: VBAC = vaginal birth after cesarean section.

Data include Alberta residents only.

Totals for Alberta include unknown RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.3.6 Primary and Repeat Cesareans and VBACs and Rates, by Residence RHA, Alberta, 2004 to 2006

2004	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,008	1,239	14,105	3,692	1,248	11,538	2,314	1,907	1,326	39,377
Cesarean sections	446	292	3,757	1,019	364	2,868	540	436	295	10,017
Cesarean rate (per 100 hospital deliveries)	22.2	23.6	26.6	27.6	29.2	24.9	23.3	22.9	22.2	25.4
Primary cesareans	265	187	2,488	613	222	1,851	320	266	183	6,395
Primary cesarean rate (per 100 hospital deliveries)	13.2	15.1	17.6	16.6	17.8	16.0	13.8	13.9	13.8	16.2
Repeat cesareans	181	105	1,269	406	142	1,017	220	170	112	3,622
Repeat cesarean rate (per 100 hospital deliveries)	9.0	8.5	9.0	11.0	11.4	8.8	9.5	8.9	8.4	9.2
VBAC attempts	69	36	543	127	45	446	70	48	74	1,458
VBAC attempt rate (per 100 VBACs and repeat cesareans)	29.1	28.3	33.0	25.5	24.7	33.8	25.7	23.3	43.8	31.3
VBAC occurrences	56	22	376	93	40	303	52	36	57	1,035
VBAC ocurrence rate (per 100 VBACs and repeat cesareans)	23.6	17.3	22.9	18.6	22.0	23.0	19.1	17.5	33.7	22.2
VBAC success rate (per 100 attempted VBACs)	81.2	61.1	69.2	73.2	88.9	67.9	74.3	75.0	77.0	71.0

2005	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,038	1,302	14,830	3,746	1,229	11,635	2,341	2,002	1,326	40,449
Cesarean sections	459	308	4,118	987	333	3,005	584	453	304	10,551
Cesarean rate (per 100 hospital deliveries)	22.5	23.7	27.8	26.3	27.1	25.8	24.9	22.6	22.9	26.1
Primary cesareans	279	203	2,644	600	185	1,899	360	284	183	6,637
Primary cesarean rate (per 100 hospital deliveries)	13.7	15.6	17.8	16.0	15.1	16.3	15.4	14.2	13.8	16.4
Repeat cesareans	180	105	1,474	387	148	1,106	224	169	121	3,914
Repeat cesarean rate (per 100 hospital deliveries)	8.8	8.1	9.9	10.3	12.0	9.5	9.6	8.4	9.1	9.7
VBAC attempts	85	36	510	129	57	404	70	66	61	1,418
VBAC attempt rate (per 100 VBACs and repeat cesareans)	34.1	27.5	27.9	26.5	29.5	29.0	24.6	29.3	35.5	28.6
VBAC occurrences	69	26	356	99	45	288	61	56	51	1,051
VBAC ocurrence rate (per 100 VBACs and repeat cesareans)	27.7	19.8	19.5	20.4	23.3	20.7	21.4	24.9	29.7	21.2
VBAC success rate (per 100 attempted VBACs)	81.2	72.2	69.8	76.7	78.9	71.3	87.1	84.8	83.6	74.1

2006	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	2,181	1,336	15,550	4,105	1,322	12,558	2,470	2,201	1,381	43,104
Cesarean sections	535	338	4,361	1,137	323	3,287	627	523	381	11,512
Cesarean rate (per 100 hospital deliveries)	24.5	25.3	28.0	27.7	24.4	26.2	25.4	23.8	27.6	26.7
Primary cesareans	310	225	2,683	686	173	2,089	362	285	242	7,055
Primary cesarean rate (per 100 hospital deliveries)	14.2	16.8	17.3	16.7	13.1	16.6	14.7	12.9	17.5	16.4
Repeat cesareans	225	113	1,678	451	150	1,198	265	238	139	4,457
Repeat cesarean rate (per 100 hospital deliveries)	10.3	8.5	10.8	11.0	11.3	9.5	10.7	10.8	10.1	10.3
VBAC attempts	85	32	533	126	60	375	60	68	73	1,412
VBAC attempt rate (per 100 VBACs and repeat cesareans)	29.3	23.0	25.9	22.8	29.7	25.0	19.2	23.4	38.2	25.5
VBAC occurrences	65	26	376	101	52	304	47	52	52	1,075
VBAC ocurrence rate (per 100 VBACs and repeat cesareans)	22.4	18.7	18.3	18.3	25.7	20.2	15.1	17.9	27.2	19.4
VBAC success rate (per 100 attempted VBACs)	76.5	81.3	70.5	80.2	86.7	81.1	78.3	76.5	71.2	76.1

Source: Hospital Inpatient Files, May 2008 extraction.

Notes: VBAC = vaginal birth after cesarean section.

Totals for Alberta include unknown RHAs.

Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.3.7 Episiotomy Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	5,875	5,625	5,215	5,017	4,684	4,383	4,263
Number of vaginal deliveries	28,865	28,468	29,075	30,076	30,184	30,638	32,427
Rate (per 100 vaginal deliveries)	20.4	19.8	17.9	16.7	15.5	14.3	13.1
Standard Error (SE)	0.24	0.24	0.23	0.21	0.21	0.20	0.19

Table 3.3.3.8 Episiotomy Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	935	2,973	4,380	3,513	1,263	252	13,330
Number of vaginal deliveries	5,438	19,515	30,219	25,757	10,338	1,837	93,212
Rate (per 100 vaginal deliveries)	17.2	15.2	14.5	13.6	12.2	13.7	14.3
Standard Error (SE)	0.51	0.26	0.20	0.21	0.32	0.80	0.11

Table 3.3.3.9 Episiotomy Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	541	441	3,711	1,207	519	4,865	672	523	759	13,330
Number of vaginal deliveries	4,824	2,992	33,344	8,433	2,765	27,127	5,329	4,690	3,051	93,249
Rate (per 100 vaginal deliveries)	11.2	14.7	11.1	14.3	18.8	17.9	12.6	11.2	24.9	14.3
Standard Error (SE)	0.45	0.65	0.17	0.38	0.74	0.23	0.45	0.46	0.78	0.11

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.3.10 Shoulder Dystocia Cases and Rate by Year, Alberta, 1997 to 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Shoulder dystocia cases	546	659	786	986	1,129	1,222	1,418	1,433	1,674	2,079
Live births	36,550	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659
Rate (per 100 live births)	1.5	1.8	2.1	2.7	3.0	3.2	3.6	3.6	4.0	4.7
Standard Error (SE)	0.06	0.07	0.07	0.08	0.09	0.09	0.09	0.09	0.10	0.10

Table 3.3.3.11 Shoulder Dystocia Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Shoulder dystocia cases	272	965	1,713	1,422	612	102	5,186
Live births	6,545	24,482	39,808	36,692	15,904	3,105	126,539
Rate (per 100 live births)	4.2	3.9	4.3	3.9	3.8	3.3	4.1
Standard Error (SE)	0.25	0.12	0.10	0.10	0.15	0.32	0.06

Table 3.3.3.12 Shoulder Dystocia Cases and Rate by RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Live births	6,396	3,991	46,379	11,863	2,871	37,152	7,365	6,333	4,186	126,539
Shoulder dystocia cases	240	406	1,960	370	230	1,182	334	248	216	5,186
Rate (per 100 live births)	3.8	10.2	4.2	3.1	8.0	3.2	4.5	3.9	5.2	4.1
Standard Error (SE)	0.24	0.48	0.09	0.16	0.51	0.09	0.24	0.24	0.34	0.06

Sources: Alberta Health and Wellness**.** Fee for Service Claims File, August 2008 extraction.
Alberta Health and Wellness. Ambulatory Care Classification System (ACCS), August 2008 extraction.
Alberta Health and Wellness. Inpatient Hospital Morbidity Data, August 2008 extraction.
Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File, August 2008 extraction.

Notes: Data include Alberta residents only.
Totals for age groups include unknown ages.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

3. Pregnancies

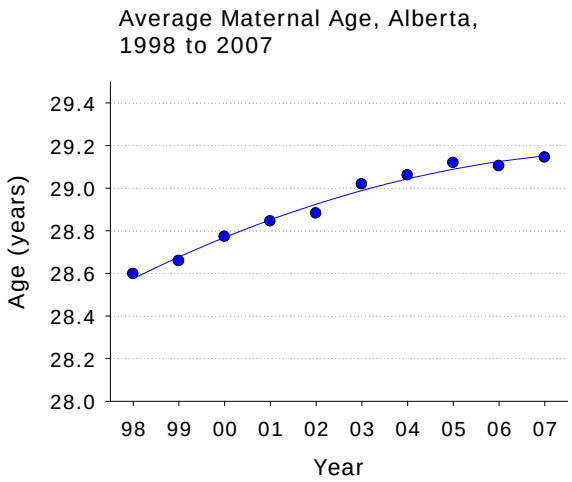
3.4.1 Maternal Age

Maternal age refers to *the age of the mother in years at the time of the event in question (i.e., live birth, stillbirth, spontaneous abortion, etc.)*. Average maternal age calculations used exact maternal age (e.g., 28.2 years), whereas groupings by maternal age group used mother's age at last birthday (e.g., 28 years).

A Canadian study showed that teenage first-time mothers were more likely than 25 to 29 year old first-time mothers to have high school education or less, to live in low income households, to be single parents, to smoke throughout pregnancy, to never breastfeed, and were less likely to breastfeed for more than six months if they did breastfeed. Teenage mothers were less likely to have gestational diabetes than 25 to 29 year old mothers, however. First-time mothers 35 or older, compared to 25 to 29 year old first time mothers, were more likely to have gestational hypertension, cesarean delivery, preterm birth, and were more likely to breastfeed for more than 6 months (Bushnik & Garner, 2008). Mothers 35 and older have also been found to have decreased fertility and increased rates of spontaneous abortion, chromosomal abnormalities, multiple birth, and stillbirth (Heffner, 2004; Tough, Newburn-Cook, Johnston, Svenson, Rose, & Belik, 2002).

U.S. data suggest that adolescents are delaying sexual activity longer, using contraception more often, and using more effective methods of contraception, resulting in declining teen pregnancy rates (Abma, Martinez, Mosher, & Dawson, 2004).

Time Trends (see Table 3.4.1.1)



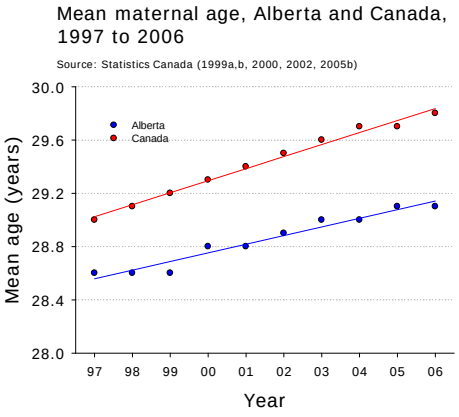
- The average maternal age for all live births increased from 28.6 years in 1998 to 29.1 years in 2007.
- The average age at first live birth was 27.4 years in 2007, up from 26.7 in 1998.
- In 2007, the average maternal age for multiple live births was 31.0, compared with 29.1 for singleton live births.
- The percentage of women over 35 giving birth to live infants increased from 13.3% in 1998 to 15.4% in 2007.

Relationships to Other Indicators (see Table 3.4.1.2)

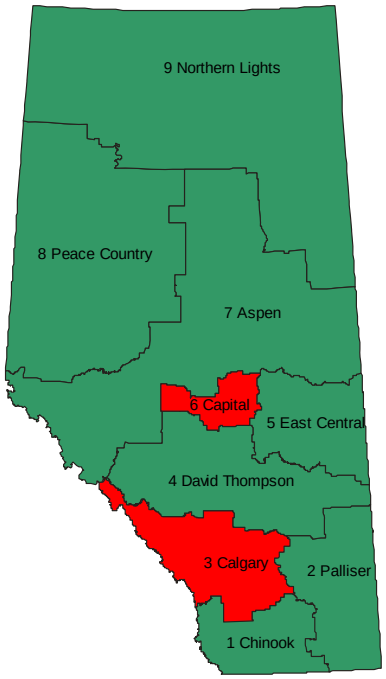
- Some measures decrease with maternal age for women under 35. This applies to prenatal smoking, alcohol consumption, and drug dependence. Mothers under 25 years of age (especially teen mothers) are most likely to engage in these risk behaviours.
- Some indicators show an increase with increasing maternal age. This can be seen in the rates of multiple birth and midwife attendance, both of which are most common in the oldest mothers. Large-for-gestational-age infants are slightly more common with increasing maternal age.
- Other indicators have a U-shaped relationship with maternal age, such as small-for-gestational age, low birth weight, preterm birth, and stillbirth. In these cases, the highest rates occur in the younger and older mothers, with lower rates for intermediate maternal age groups.

3.4.1 Maternal Age

Maternal age has increased in both Alberta and Canada over recent years. Women giving birth to live infants are about 8 months younger in Alberta than in Canada, on average. In 2006, the mean maternal age was 29.8 years in Canada and 29.1 years in Alberta (Statistics Canada, 2008a).

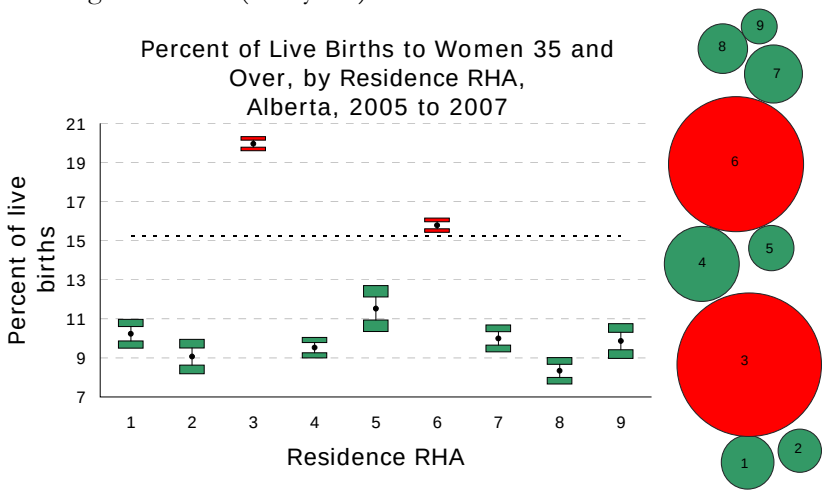


Percent of Live Births to Women 35 Years Old and Over, 2005-07 Combined



Regional Data (see Tables 3.4.1.3, 3.4.1.4)

- For 2005 to 2007 combined, average maternal age was lower than the provincial average in all RHAs except RHAs 3 and 6 (the major metropolitan areas), where it was higher than the provincial mean.
  - The highest average maternal age for all live births was in RHA 3 (30.4 years); this was more than three years higher than the average in RHA 8 (27.2 years).



- The highest percentage of of live births to women 35 and over was also highest in RHAs 3 and 6, particularly 3, where one in five women giving birth between 2005 and 2007 was at least 35 years old.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.4.1.1 Mean Maternal Age for Selected Types of Birth and Percent of Women 35 and Older Giving Birth to Live Infants, by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
All live births	28.6	28.7	28.8	28.8	28.9	29.0	29.1	29.1	29.1	29.1
First live birth	26.7	26.7	26.9	27.0	27.0	27.3	27.4	27.4	27.4	27.4
Singleton live birth	28.5	28.6	28.7	28.8	28.8	29.0	29.0	29.1	29.0	29.1
Multiple live birth	30.5	30.6	30.5	30.6	30.5	30.6	30.9	30.7	30.8	31.0
Stillbirth	28.7	29.1	28.9	29.8	29.5	28.7	29.1	29.5	30.2	30.4
Percent of live births to women 35+	13.3	14.2	14.7	14.6	14.5	14.9	14.8	15.1	15.2	15.4

Table 3.4.1.2 Selected Indicators by Maternal Age Group, Alberta, 2005 - 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	Total
Smoking during pregnancy rate (per 100 women delivering)[1]	48.8	34.4	17.2	10.1	10.6	11.2	19.1
Alcohol consumption during pregnancy rate (per 100 women delivering)[1]	8.3	4.3	1.7	1.1	1.3	1.0	2.3
Drug dependence rate (per 100 women delivering)[1]	5.3	2.9	0.9	0.6	0.8	0.7	1.4
Small-for-gestational-age singleton rate (per 100 singleton live births)	8.9	8.9	8.0	7.5	7.5	8.5	8.0
Large for gestational age singleton rate (per 100 singleton live births)	10.9	10.2	10.8	11.3	12.4	12.0	11.1
Mean birth weight for singleton term births	3,334	3,347	3,360	3,350	3,332	3,274	3,348
Low birth weight rate (per 100 live births)	7.8	6.4	6.0	6.8	7.7	9.7	6.7
High birth weight rate (per 100 live births)	11.4	10.9	11.2	11.0	11.3	11.0	11.1
Preterm rate (per 100 live births)	9.6	8.2	8.1	8.9	9.9	12.2	8.8
Multiple birth rate (per 100 live births)	1.8	2.1	2.8	3.9	4.4	6.1	3.2
Midwife attendant rate (per 1,000 live births)	2.3	5.3	9.7	13.1	15.3	18.4	10.2
Stillbirths (per 1,000 total births)	9.6	6.5	5.2	6.6	10.0	17.8	7.0

Table 3.4.1.3 Mean Maternal Age and Percent of Live Births to Women 35 and Older, by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
All live births	27.8	27.6	30.4	27.6	28.3	29.3	27.3	27.2	27.5	29.1
Percent of live births to women 35+	10.2	9.1	20.0	9.5	11.5	15.8	10.0	8.3	9.9	15.2

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.
Alberta Perinatal Health Program, August 2008 release.

Notes: Only births for which maternal age is known are included.
1. Only live births with available information on maternal smoking, alcohol consumption, or drug dependence are included.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.1.4 Mean Maternal Age and Percent of Births to Women 35 and Older by Residence RHA, Alberta, 1998 to 2007

Mean maternal age	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	27.4	27.4	27.8	27.6	27.7	27.7	27.8	27.9	27.8	27.6
Palliser	27.5	27.4	27.4	27.6	27.5	27.8	27.7	27.8	27.6	27.6
Calgary	29.7	29.8	29.8	30.0	30.0	30.2	30.2	30.4	30.4	30.4
David Thompson	27.6	27.4	27.5	27.4	27.7	27.5	27.7	27.6	27.5	27.7
East Central	28.4	28.4	28.4	28.5	28.6	28.3	28.4	28.3	28.5	28.0
Capital	28.8	29.0	29.0	29.1	29.1	29.3	29.3	29.3	29.4	29.4
Aspen	27.2	27.0	27.3	27.3	27.4	27.4	27.2	27.4	27.2	27.3
Peace Country	26.7	26.9	26.9	27.1	27.1	27.0	27.3	27.2	27.1	27.3
Northern Lights	26.7	26.6	27.0	27.1	26.9	27.4	27.3	27.3	27.6	27.5
Alberta	28.6	28.7	28.8	28.8	28.9	29.0	29.1	29.1	29.1	29.1

Percent of live births to women 35+	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	9.3	9.7	11.4	10.8	11.4	10.7	11.5	11.3	9.6	9.9
Palliser	8.9	8.3	7.9	8.9	10.0	9.1	9.9	9.8	8.4	9.0
Calgary	17.1	18.5	18.6	18.7	18.3	19.3	18.7	19.7	19.8	20.3
David Thompson	9.5	9.8	10.0	10.0	10.5	9.5	10.1	9.9	9.0	9.7
East Central	11.1	11.0	12.9	12.2	12.2	11.7	11.6	11.4	13.4	9.9
Capital	14.1	15.6	15.3	15.2	15.3	15.6	15.5	15.2	16.1	16.0
Aspen	8.7	8.1	11.0	9.4	9.7	10.1	9.2	10.7	9.4	9.9
Peace Country	8.0	8.6	9.2	9.0	8.5	8.2	9.0	8.4	7.9	8.8
Northern Lights	8.5	6.8	9.6	9.6	7.9	9.8	8.9	8.9	10.8	9.9
Alberta	13.3	14.2	14.7	14.6	14.5	14.9	14.8	15.1	15.2	15.4

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

3.4.2 Maternal Pre-Pregnancy Conditions

Maternal obesity: *Pre-pregnancy weight of more than 91 kg.*

Diabetes (diabetes mellitus): *A chronic syndrome of impaired carbohydrate, protein, and fat metabolism owing to insufficient secretion of insulin or to target tissue insulin resistance. Diabetes occurs in two major forms: Type 1 diabetes mellitus and Type 2 diabetes mellitus* (Dorland, 2000).

Heart disease: *Any organic, mechanical, or functional abnormality of the heart, its structures, or the coronary arteries (Dorland, 2000).* This category includes women diagnosed with asymptomatic or symptomatic heart disease.

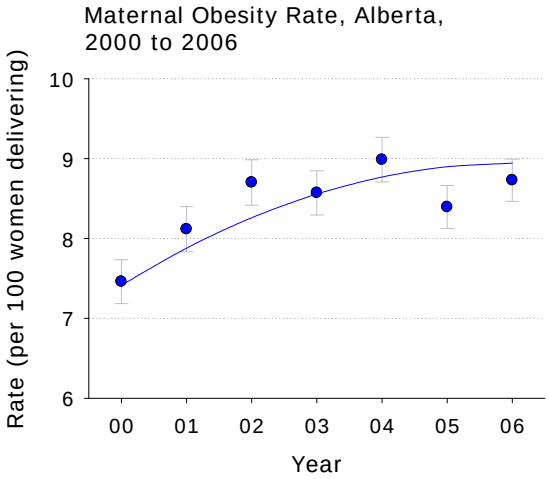
Hypertension: *High arterial blood pressure, diagnosed prior to pregnancy.* In this case, this includes women who had blood pressure of 140/90 or higher, or women who were using antihypertensive drugs.

Chronic renal disease: *Any disease of the kidney persisting over a long period of time.*

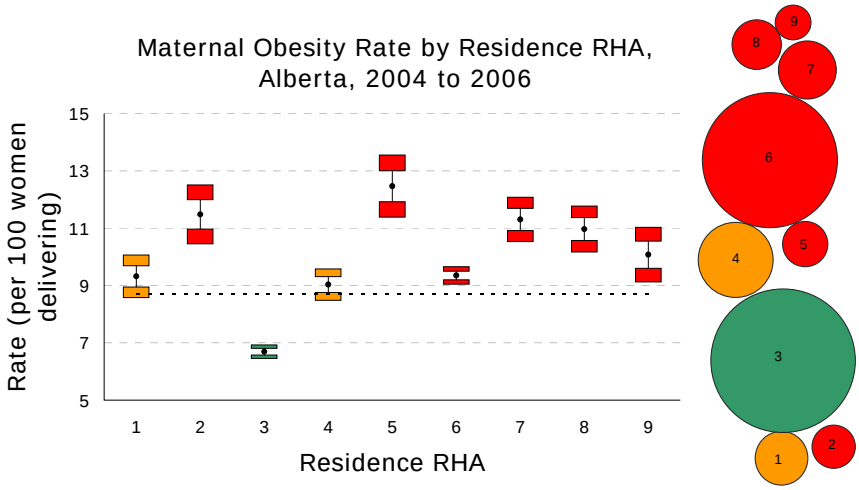
Rates for the above measures are expressed in percent of women delivering (live births or stillbirths).

Obesity during pregnancy is associated with increased rates of infertility, hypertension, gestational diabetes, postpartum hemorrhage, and cesarean section in mothers. Fetal complications associated with obesity include increase risk of macrosomia, fetal death, stillbirth, congenital anomalies, and admission to neonatal intensive care. Obese mothers are less likely to initiate breastfeeding and discontinue sooner than non-obese women (Arendas, Qiu, & Gruslin, 2008).

Pre-Pregnancy Maternal Obesity (see Tables 3.4.2.1 to .3)



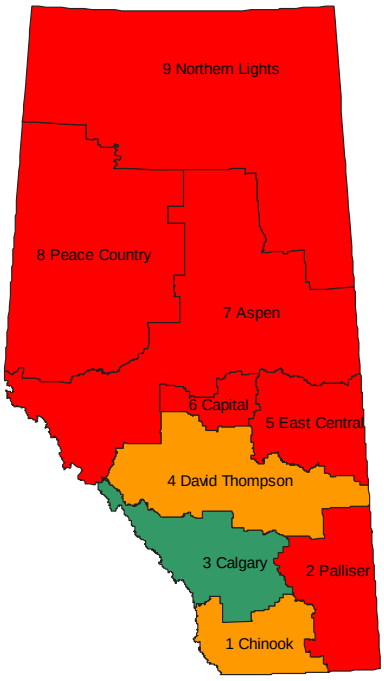
- While the rate of maternal obesity increased from 2000 to 2002, it has been fairly stable since then. 8.7% of Alberta women giving birth in 2006 weighed more than 91 kg prior to pregnancy.
- The rate of maternal obesity was lowest in mothers under the age of 20 and over the age of 39 between 2004 and 2006.



- The rate of maternal obesity for 2004 to 2006 combined was lower than the provincial average in RHA 3 (6.7% of women). The maternal obesity rate was higher than the provincial average in RHAs 2, 5, 6, 7, 8, and 9, with the highest rate (12.5%) in RHA 5.

3.4.2 Maternal Pre-Pregnancy Conditions

Pre-Pregnancy Maternal Obesity Rate, 2004-06 Combined



Women with pre-pregnancy diabetes have increased risk of pregnancy complications (e.g., preterm delivery, macrosomic infants, hypoglycemia) and adverse birth outcomes (e.g., congenital anomalies, stillbirth, perinatal mortality; CEMACH, 2007).

Women with heart disease have elevated rates of neonatal risk and cardiac events during pregnancy. In one study of Canadian women with cardiac disease, 13% had a cardiac event during pregnancy (primarily pulmonary edema or cardiac arrhythmia), and the rates of fetal or neonatal death and preterm birth were elevated (Siu et al., 2001).

Pre-Pregnancy Diabetes (see Tables 3.4.2.4 to.5)

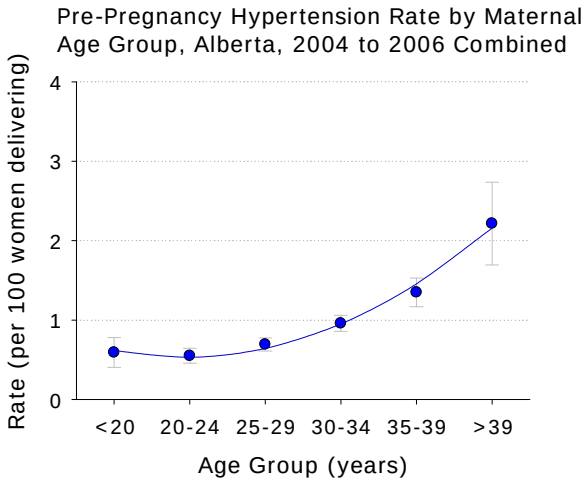
- Pre-pregnancy diabetes was reported in 0.7% of women giving birth in Alberta in 2006. This rate did not vary between 2000 and 2006.
- Rates of pre-pregnancy diabetes increased with increasing maternal age for 2004 to 2006 combined. Women over 39 years of age had a rate of pre-conception diabetes of 1.2%.

Pre-pregnancy heart disease (see Tables 3.4.2.6 to .7)

- The rate of pre-pregnancy heart disease in women giving birth between 2004 and 2006 in Alberta was 0.6%. There was no time trend in this rate between 2000 and 2006.
- There was little variation in pre-pregnancy heart disease rates across maternal age groups for 2004 to 2006 combined.

Pre-pregnancy hypertension (see Tables 3.4.2.8 to .9)

- Pre-existing hypertension occurred in 0.9% of Alberta women giving birth in 2006; the rate did not vary with time.



- Pre-pregnancy hypertension was clearly more common in older mothers, with a rate of 2.2% in women over 39 for 2004 to 2006 combined, compared with 0.6% for women under 25 years of age.

3.4.2 Maternal Pre-Pregnancy Conditions

Hypertension in pregnancy is a risk factor for preeclampsia, gestational diabetes, and placental abruption (Zetterstrom et al., 2005). In a large study of women giving birth in Nova Scotia, women with pre-existing hypertension were 2.5 times more likely to give birth to an infant who was small-for-gestational age and 3.2 times more likely to have a stillbirth than women without hypertension (Allen, Joseph, Murphy, Magee, and Ohlsson, 2004).

Kidney disease can result in maternal morbidity (including maternal hypertension, pre-eclampsia, and abruptio placenta), perinatal morbidity (e.g., preterm birth, low birth weight) or mortality (maternal or perinatal). Risks are proportional to the severity of renal dysfunction (Fischer et al., 2004; Sanders & Lucas, 2001). Maternal renal function may decline after pregnancy in women with kidney disease (Davison, 2001).

Pre-pregnancy renal disease (see Table 3.4.2.10)

- Chronic renal disease prior to pregnancy was very rare, with a rate of 0.1% each year from 2000 to 2006.

Limitations and Methodology Notes

Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Regional data were excluded for all measures except Maternal Obesity due to low numbers of cases.

Table 3.4.2.1 Pre-Pregnancy Maternal Obesity Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	2,619	2,939	3,278	3,367	3,599	3,418	3,794
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	7.5	8.1	8.7	8.6	9.0	8.4	8.7
Standard Error (SE)	0.14	0.14	0.15	0.14	0.14	0.14	0.14

Table 3.4.2.2 Pre-Pregnancy Maternal Obesity Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	335	2,038	3,657	3,161	1,378	230	10,811
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	5.2	8.5	9.4	8.8	8.8	7.5	8.7
Standard Error (SE)	0.28	0.18	0.15	0.15	0.23	0.48	0.08

Table 3.4.2.3 Pre-Pregnancy Maternal Obesity Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	574	441	3,047	987	464	3,400	756	667	401	10,811
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	9.3	11.5	6.7	9.0	12.5	9.3	11.3	11.0	10.1	8.7
Standard Error (SE)	0.37	0.51	0.12	0.27	0.54	0.15	0.39	0.40	0.48	0.08

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.4 Pre-Pregnancy Diabetes Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	257	279	217	233	236	253	313
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	0.7	0.8	0.6	0.6	0.6	0.6	0.7
Standard Error (SE)	0.05	0.05	0.04	0.04	0.04	0.04	0.04

Table 3.4.2.5 Pre-Pregnancy Diabetes Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	11	138	183	276	156	38	802
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	0.2	0.6	0.5	0.8	1.0	1.2	0.6
Standard Error (SE)	0.05	0.05	0.03	0.05	0.08	0.20	0.02

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups include unknown ages.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.6 Pre-Pregnancy Heart Disease Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	246	284	275	329	287	296	250
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	0.7	0.8	0.7	0.8	0.7	0.7	0.6
Standard Error (SE)	0.04	0.05	0.04	0.05	0.04	0.04	0.04

Table 3.4.2.7 Pre-Pregnancy Heart Disease Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	28	127	252	266	136	23	832
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	0.4	0.5	0.6	0.7	0.9	0.7	0.7
Standard Error (SE)	0.08	0.05	0.04	0.05	0.07	0.16	0.02

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups include unknown ages.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.8 Pre-Pregnancy Hypertension Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	227	289	324	324	311	367	387
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	0.6	0.8	0.9	0.8	0.8	0.9	0.9
Standard Error (SE)	0.04	0.05	0.05	0.05	0.04	0.05	0.05

Table 3.4.2.9 Pre-Pregnancy Hypertension Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	38	132	271	344	211	68	1,065
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	0.6	0.6	0.7	1.0	1.3	2.2	0.9
Standard Error (SE)	0.10	0.05	0.04	0.05	0.09	0.27	0.03

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups include unknown ages.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.10 Pre-Pregnancy Renal Disease Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	39	34	42	33	39	38	45
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Standard Error (SE)	0.02	0.02	0.02	0.01	0.02	0.02	0.02

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

3.4.3 Maternal Prenatal Morbidity

Gestational diabetes: *Diabetes mellitus with onset or first recognition during pregnancy; this category does not include diabetics who become pregnant* (Dorland, 2000).

Pregnancy-induced hypertension: *High arterial blood pressure with onset during pregnancy.*

Prenatal bleeding: *Vaginal bleeding during pregnancy.* In this case, bleeding is classified as occurring prior to 20 weeks gestation, at 20 weeks gestation or later, or at both before and after 20 weeks gestation.

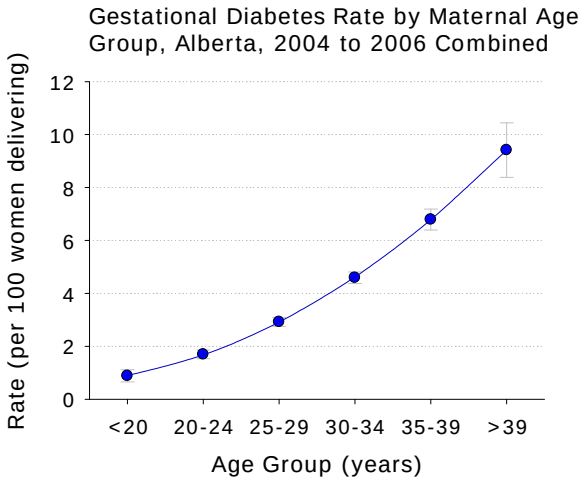
Rates for the above measures are expressed in percent of women delivering (live births or stillbirths).

Mothers with gestational diabetes are at increased risk for recurrence in a subsequent pregnancy, and for development of type 2 diabetes. Children of women with gestational diabetes are at increased risk for obesity and abnormal glucose metabolism (Metzger, 2007). Lifestyle and dietary habits as well as genetic factors are associated with the rising prevalence of gestational diabetes (Bottalico, 2007).

Pregnancy-induced hypertension (PIH) is more common than pre-existing hypertension. A large study of women giving birth in Nova Scotia found that women with PIH were 1.6 times more likely to give birth to a small-for-gestational-age infant and 1.4 times more likely to have a stillbirth than women without hypertension (Allen, Joseph, Murphy, Magee, and Ohlsson, 2004).

Gestational diabetes (see Tables 3.4.3.1 to .3)

- The provincial gestational diabetes rate was 3.9% in 2006, up from 3.2% in 2000.



- Gestational diabetes rates clearly increase with increasing maternal age. Between 2004 and 2006, the rate for women over 39 was 9.4%, more than ten times the rate for teen mothers (0.9%).
- For 2004 to 2006 combined, the rate of gestational diabetes was higher than the provincial average in RHAs 3 and 6 and lower than the provincial average in all other RHAs except RHA 2.

Pregnancy-Induced hypertension (see Tables 3.4.3.4 to .6)

- Pregnancy-induced hypertension was reported for 5.7% of Alberta women giving birth in 2006. The rate rose slightly in 2005 and 2006 compared to 2001 to 2004, when it was steady at 5.4%.
- The rate of pregnancy-induced hypertension increased with maternal age for 2004 to 2006 combined, from 5.1% in women under 20 to 6.9% in women over 39.
- Between 2004 and 2006, the rate of pregnancy-induced hypertension was lower than the provincial average in RHAs 1, 2, 6, and 8, with the lowest rate in RHA 2 (4.0%). The rate was higher than the provincial average in RHAs 3 and 5, with the highest rate in RHA 5 (6.6%).

3.4.3 Maternal Prenatal Morbidity

Bleeding during early pregnancy may be indicative of ectopic pregnancy, spontaneous abortion, incompetent cervix, placental abnormalities, genital infection, trauma or systemic disease. Adverse outcomes include preterm birth, low birth weight, and perinatal death. Older mothers, mothers with prior preterm births, and women exposed to cigarette smoke are at risk (Yang et al., 2005).

Bleeding late in pregnancy may caused by serious conditions such as placenta previa (in which the placenta is implanted near or over the cervical opening), placental abruption (in which the placenta separates from the uterus prior to delivery), and, less commonly, vasa previa (in which fetal blood vessels are between the cervix and the fetus). Each of these conditions has the potential for maternal or fetal death if not properly diagnosed and treated (Sakornbut, Leeman, and Fontaine, 2007).

Prenatal bleeding (see Tables 3.4.3.7 to .12)

- Prenatal bleeding before 20 weeks gestation was reported in 5.8% of women giving birth in 2006. This rate did not vary greatly with maternal age, though teen mothers were least likely to report this condition (4.0%). The rate was below the provincial average in the northern half of the province (RHAs 6, 7, 8, and 9), and above the provincial average in the southern half of the province (RHAs 1, 2, 3, and 4).
- Prenatal bleeding after 20 weeks gestation was reported in fewer women—3.5% in 2006, with no time trend from 2000 to 2006. Women over 39 years of age were most likely to report bleeding after 20 weeks gestation (5.1%) between 2004 and 2006. Rates were lower than the provincial average in RHAs 6, 7, and 9 during this time period, and higher in RHAs 1, 2, and 4.
- Just 0.8% of women experienced prenatal bleeding both before and after 20 weeks gestation, with very little variation in the rate over time, maternal age, or RHA.

Limitations and Methodology Notes

Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Table 3.4.3.1 Gestational Diabetes Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	1,133	1,123	1,371	1,282	1,462	1,432	1,713
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	3.2	3.1	3.6	3.3	3.7	3.5	3.9
Standard Error (SE)	0.09	0.09	0.10	0.09	0.09	0.09	0.09

Table 3.4.3.2 Gestational Diabetes Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	57	407	1,142	1,648	1,062	289	4,607
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	0.9	1.7	2.9	4.6	6.8	9.4	3.7
Standard Error (SE)	0.12	0.08	0.09	0.11	0.20	0.53	0.05

Table 3.4.3.3 Gestational Diabetes Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	192	148	1,926	307	93	1,484	174	168	90	4,607
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	3.1	3.9	4.2	2.8	2.5	4.1	2.6	2.8	2.3	3.7
Standard Error (SE)	0.22	0.31	0.09	0.16	0.26	0.10	0.19	0.21	0.24	0.05

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.3.4 Pregnancy-Induced Hypertension Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	1,716	1,955	2,017	2,135	2,147	2,241	2,497
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	4.9	5.4	5.4	5.4	5.4	5.5	5.7
Standard Error (SE)	0.12	0.12	0.12	0.11	0.11	0.11	0.11

Table 3.4.3.5 Pregnancy-Induced Hypertension Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	329	1,213	2,132	2,034	963	211	6,885
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	5.1	5.1	5.5	5.7	6.2	6.9	5.5
Standard Error (SE)	0.27	0.14	0.11	0.12	0.19	0.46	0.06

Table 3.4.3.6 Pregnancy-Induced Hypertension Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	282	152	2,809	604	245	1,889	359	254	232	6,885
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	4.6	4.0	6.2	5.5	6.6	5.2	5.4	4.2	5.8	5.5
Standard Error (SE)	0.27	0.31	0.11	0.22	0.41	0.12	0.28	0.26	0.37	0.06

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.3.7 Bleeding Before 20 Weeks Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	2,072	2,021	2,222	2,418	2,426	2,291	2,517
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 1,000 women)	5.9	5.6	5.9	6.2	6.1	5.6	5.8
Standard Error (SE)	0.13	0.12	0.12	0.12	0.12	0.11	0.11

Table 3.4.3.8 Bleeding Before 20 Weeks Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	258	1,285	2,360	2,173	958	198	7,324
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 1,000 women)	4.0	5.4	6.0	6.1	6.1	6.4	5.9
Standard Error (SE)	0.24	0.15	0.12	0.13	0.19	0.44	0.07

Table 3.4.3.9 Bleeding Before 20 Weeks Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	809	388	2,809	816	203	1,527	199	319	116	7,234
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 1,000 women)	13.1	10.1	6.2	7.5	5.5	4.2	3.0	5.2	2.9	5.8
Standard Error (SE)	0.43	0.49	0.11	0.25	0.37	0.11	0.21	0.29	0.27	0.07

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.3.9 Bleeding After 20 Weeks Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	1,195	1,172	1,229	1,518	1,437	1,428	1,509
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	3.4	3.2	3.3	3.9	3.6	3.5	3.5
Standard Error (SE)	0.10	0.09	0.09	0.10	0.09	0.09	0.09

Table 3.4.3.10 Bleeding After 20 Weeks Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	260	858	1,324	1,199	574	156	4,374
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	4.0	3.6	3.4	3.3	3.7	5.1	3.5
Standard Error (SE)	0.25	0.12	0.09	0.09	0.15	0.40	0.05

Table 3.4.3.12 Bleeding After 20 Weeks Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	392	185	1,663	455	113	1,110	168	193	67	4,374
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	6.4	4.8	3.7	4.2	3.0	3.1	2.5	3.2	1.7	3.5
Standard Error (SE)	0.31	0.35	0.09	0.19	0.28	0.09	0.19	0.22	0.20	0.05

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.3.11 Bleeding Before and After 20 Weeks Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	249	239	244	324	313	311	345
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	0.7	0.7	0.6	0.8	0.8	0.8	0.8
Standard Error (SE)	0.04	0.04	0.04	0.05	0.04	0.04	0.04

Table 3.4.3.12 Bleeding Before and After 20 Weeks Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	36	171	318	272	142	29	969
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	0.6	0.7	0.8	0.8	0.9	0.9	0.8
Standard Error (SE)	0.09	0.05	0.05	0.05	0.08	0.17	0.02

Table 3.4.3.15 Bleeding Before and After 20 Weeks Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	125	38	348	112	25	237	31	35	12	969
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	2.0	1.0	0.8	1.0	0.7	0.7	0.5	0.6	0.3	0.8
Standard Error (SE)	0.18	0.16	0.04	0.10	0.13	0.04	0.08	0.10	0.09	0.02

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

3.4.4 Maternal Prenatal Smoking

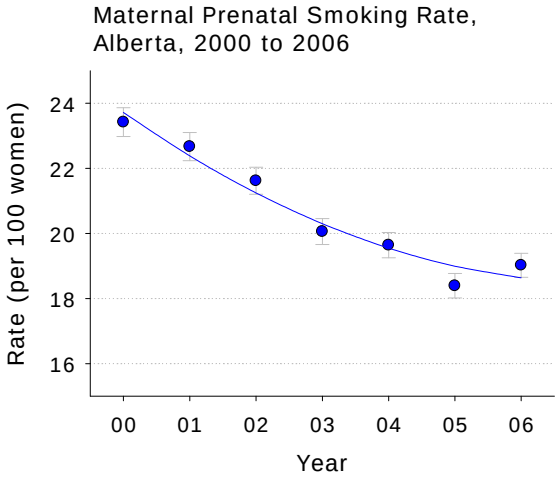
Smokers are *women who reported smoking cigarettes at some point during pregnancy.* The rate of maternal prenatal smoking is reported as percent of women delivering.

Among smokers, fertility rates are lower while rates of ectopic pregnancy, spontaneous abortion, placental abruption, and placenta previa are higher than among non-smokers. Children of mothers who smoke during pregnancy are at increased risk of fetal growth restriction, preterm birth, perinatal and neonatal mortality, oral-facial clefts, sudden infant death syndrome, and later problems such as conduct disorder, substance abuse, depression, hyperactivity, attention, and cognitive impairments (Cnattingus, 2004; Shea and Steiner, 2008).

Risk factors for smoking during pregnancy in Canada include Aboriginal ethnicity, low income, young maternal age (particularly under 20), and heavy smoking prior to pregnancy (Devries & Greaves, 2004).

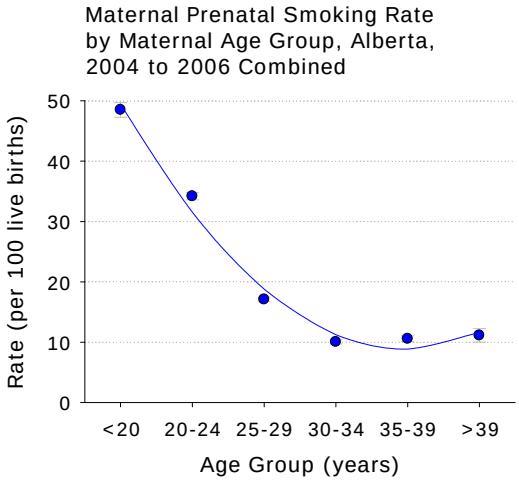
Smoking cessation programs during pregnancy are most successful when they consist of a combination of counseling and behavioural interventions. Smoking cessation during pregnancy has positive effects on low birth weight, preterm birth, and infant morbidity rates (Crawford, Tolosa, and Goldenberg, 2008).

Time Trends (see Table 3.4.4.1)



- The maternal prenatal smoking rate declined from 23.4% in 2000 to 18.4% in 2005. In 2006, 8,268 mothers reported smoking during pregnancy, for a rate of 19.0%.

Maternal Age Trends (see Table 3.4.4.2)

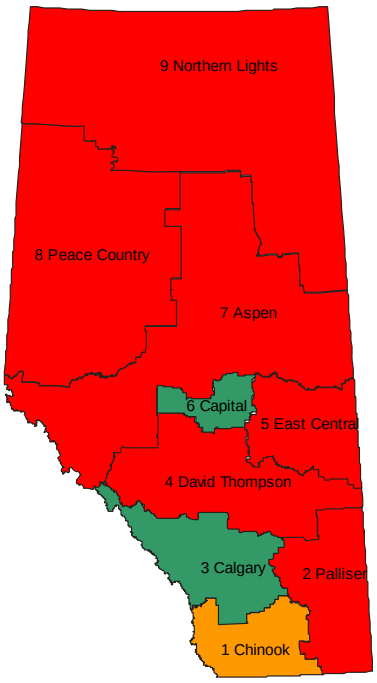


- Young mothers are far more likely to report smoking during pregnancy than are older mothers. For 2004 to 2006 combined, 48.5% of teenage mothers smoked during pregnancy. In the 20 to 24 year age group, one in three women (34.2%) reported prenatal smoking. The lowest rate was for women 30 to 34 years of age (10.1%).

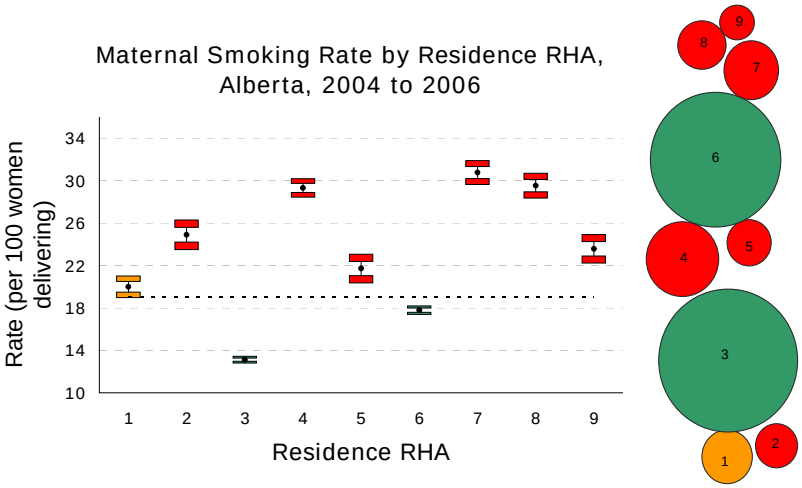
3.4.4 Maternal Prenatal Smoking

In a 2007 survey, 23.1% of 20-24 year old women who had been pregnant in the last five years reported smoking during pregnancy, compared with 8.5% of women over 24 (Health Canada, 2008a).

Maternal Prenatal Smoking Rate, 2004-06 Combined



Regional Data (see Table 3.4.4.3)



- For 2004 to 2006 combined, maternal prenatal smoking rates were lower than the provincial average in RHAs 3 and 6, with the lowest rate in RHA 3 (13.1 per 100 live births).
- The rate was higher than the provincial average in RHAs 2, 4, 5, 7, 8, and 9. The highest rate was 30.8, in RHA 7.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Maternal prenatal smoking data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Table 3.4.4.1 Maternal Prenatal Smoking Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	8,223	8,209	8,144	7,879	7,866	7,490	8,268
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	23.4	22.7	21.6	20.1	19.6	18.4	19.0
Standard Error (SE)	0.23	0.22	0.21	0.20	0.20	0.19	0.19

Table 3.4.4.2 Maternal Prenatal Smoking Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	3,118	8,199	6,681	3,608	1,653	342	23,624
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	48.5	34.2	17.1	10.1	10.6	11.1	19.0
Standard Error (SE)	0.62	0.31	0.19	0.16	0.25	0.57	0.11

Table 3.4.4.3 Maternal Prenatal Smoking Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	1,231	956	5,976	3,203	808	6,467	2,057	1,795	938	23,624
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	20.0	24.9	13.1	29.3	21.7	17.8	30.8	29.5	23.6	19.0
Standard Error (SE)	0.51	0.70	0.16	0.44	0.68	0.20	0.56	0.58	0.67	0.11

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

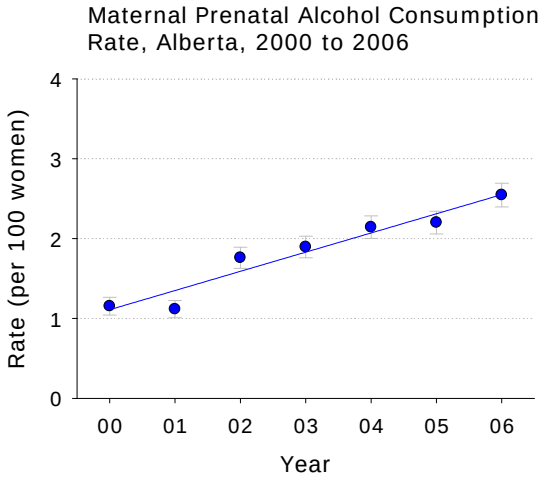
3.4.5 Maternal Prenatal Alcohol Consumption

Maternal prenatal alcohol consumption: *Self-report of three or more drinks on any one occasion during pregnancy or one or more drink per day throughout pregnancy* . The rate of maternal prenatal alcohol consumption is reported as percent of women delivering.

The proportion of infants exposed to alcohol prenatally is substantial. Some women consume alcohol after they are aware they are pregnant. Tough Tofflemire, Clarke, and Newburn-Cook (2005) found that 50% of first-time Alberta mothers reported alcohol consumption before their pregnancies were recognized, including 11% of women who reported binge drinking (5 or more drinks during a 24 hour period). After their pregnancies were confirmed, 18% of women (almost one in five) continued to consume alcohol. These women were more likely to be between 30 and 39 years old, Caucasian, and smokers, than women who did not drink once their pregnancies were confirmed.

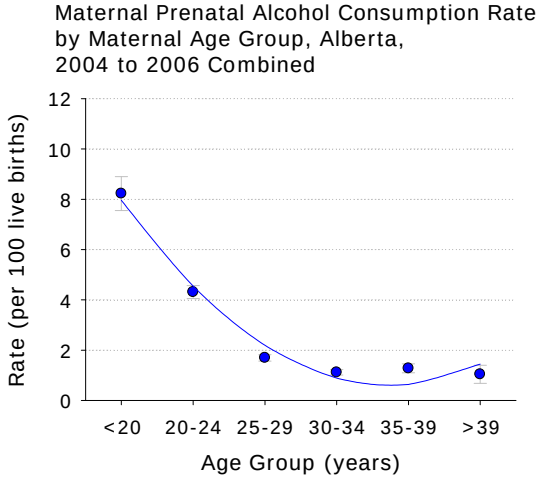
Among the most severe outcomes of maternal prenatal alcohol consumption is fetal alcohol spectrum disorder (FASD). FASD can result in lifelong physical, mental, behavioural, and learning disabilities, including growth restriction, intellectual disability, birth defects, and dysmorphic facial features (Chudley et al., 2005). FASD is the leading preventable cause of mental disorder in the western world (Tough, Clarke, and Clarren, 2005).

Time Trends (see Table 3.4.5.1)



- In 2006, 2.5% of women giving birth reported that they had had three or more drinks on any one occasion during pregnancy or one or more drinks per day throughout pregnancy. This rate increased from 1.2% in 2000.
- These rates are lower than figures reported in the Background. This is likely due in part to differences in data collection methods and definitions of alcohol use.

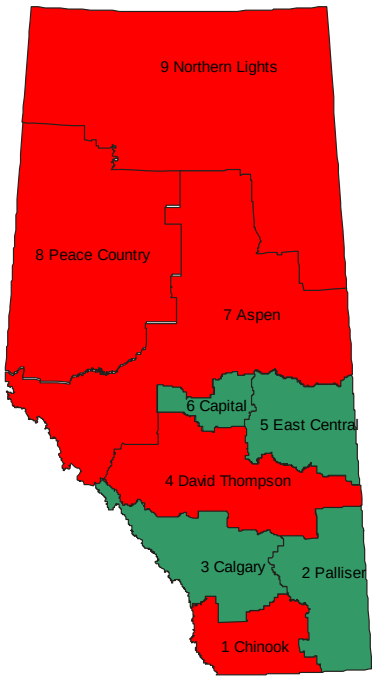
Age Effects (see Table 3.4.5.2)



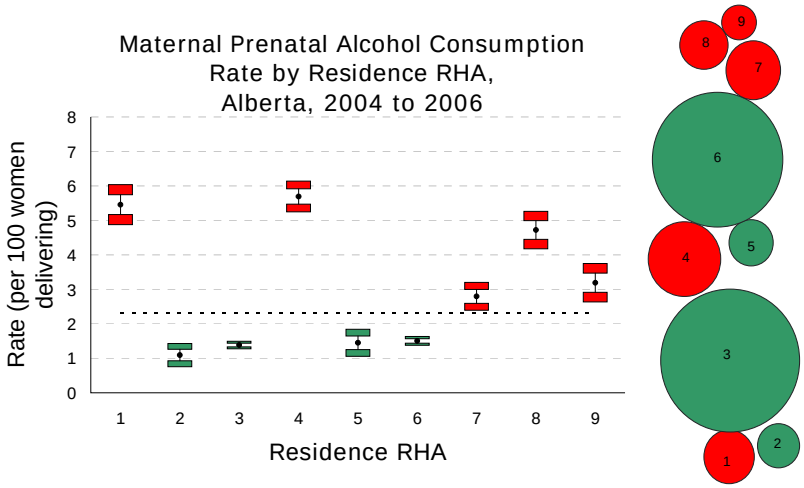
- Young mothers are more likely than older mothers to report drinking alcohol when pregnant.
- Between 2004 and 2006, 8.2% of teenage mothers reported drinking while pregnant, compared with less than 2% of mothers 25 and older.

3.4.5 Maternal Prenatal Alcohol Consumption

Maternal Prenatal Alcohol Consumption Rate, 2004-06 Combined



Regional Data (See Table 3.4.5.3)



- Between 2004 and 2006, the rate of alcohol consumption during pregnancy was lower than the provincial average in RHAs 2, 3, 5, and 6. The lowest reported rate was in RHA 2 (1.1%)
- The prenatal alcohol consumption rate was higher than the provincial average in RHAs 1, 4, 7, 8, and 9. The highest rate was in RHA 4 (5.7% of live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Maternal prenatal alcohol consumption data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Table 3.4.5.1 Maternal Prenatal Alcohol Consumption Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	405	404	663	744	858	896	1,106
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	1.2	1.1	1.8	1.9	2.1	2.2	2.5
Standard Error (SE)	0.06	0.06	0.07	0.07	0.07	0.07	0.08

Table 3.4.5.2 Maternal Prenatal Alcohol Consumption Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	529	1,034	662	402	200	32	2,860
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	8.2	4.3	1.7	1.1	1.3	1.0	2.3
Standard Error (SE)	0.34	0.13	0.07	0.06	0.09	0.18	0.04

Table 3.4.5.3 Maternal Prenatal Alcohol Consumption Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	336	42	631	622	54	547	187	287	127	2,860
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	5.5	1.1	1.4	5.7	1.5	1.5	2.8	4.7	3.2	2.3
Standard Error (SE)	0.29	0.17	0.05	0.22	0.20	0.06	0.20	0.27	0.28	0.04

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

3.4.6 Maternal Prenatal Drug Dependence

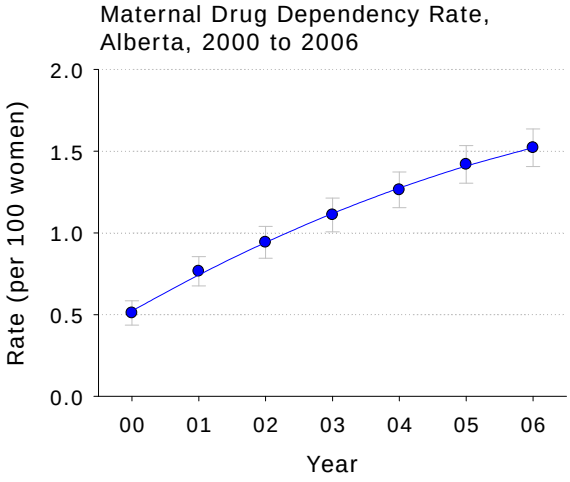
Maternal prenatal street drug use: *Self-report of drug dependency during pregnancy.* The rate of maternal prenatal drug dependence is reported as percent of women delivering.

Drug lifestyles, abusive relationships, employment problems, depression, child care issues, poverty, and homelessness are some of the ongoing health, social, mental health, and legal problems faced by women who use drugs during pregnancy (AADAC, 2004, 2006). Many use more than one substance, making it difficult to associate outcomes with a single drug.

Marijuana and cocaine are the drugs most often used by women using street drugs during pregnancy. Infants born to marijuana users may be lethargic, with impaired visual responses, and decreased startle reflexes (Wagner et al., 1998). Tetrahydrocannabinol (THC; the active ingredient in marijuana) crosses the placenta and levels in breast milk are up to eight times higher than in maternal blood (Kozer & Koren, 2001).

In a large study, infants exposed to cocaine in utero were, on average, born 1.2 weeks earlier, weighed 536 grams less, were 2.6 cm shorter, and had head circumferences 1.5 cm smaller than infants not exposed to cocaine. The cocaine-exposed infants displayed more nervous system symptoms (e.g, jitteriness, irritability) and had more infections (e.g., hepatitis, HIV, and syphilis). Long-term neurodevelopment, behaviour, and learning effects of cocaine exposure are also documented (Bauer et al., 2005).

Time Trends (see Table 3.4.6.1)



- In 2006, 1.5% of Alberta women who gave birth (661 women) reported drug dependence during pregnancy. This is triple the rate of 0.5% reported in 2000. The rate increased every year from 2000 to 2006.
- This is an alarming increase in the rate of a dangerous prenatal maternal behaviour.

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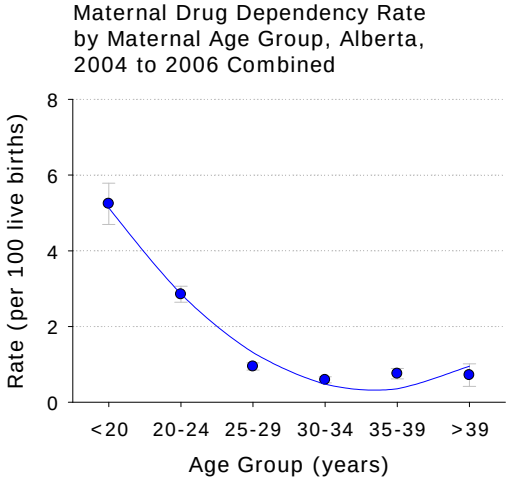


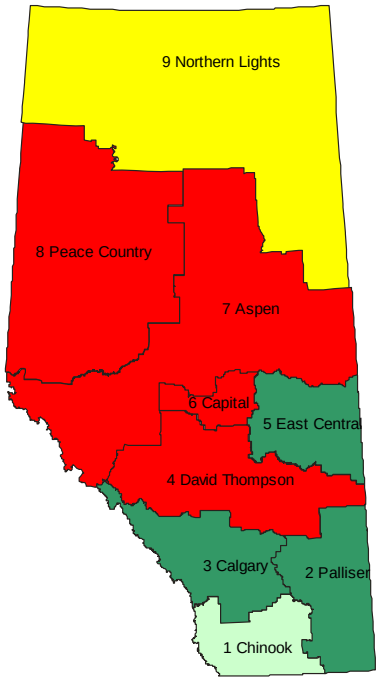
Age Effects (see Table 3.4.6.2)

- Among women under the age of 20, 5.2% reported drug dependence for 2004 to 2006 combined, or more than one in twenty women.
- The rate of drug dependence was less than one percent in mothers 25 years old and older during this time period.

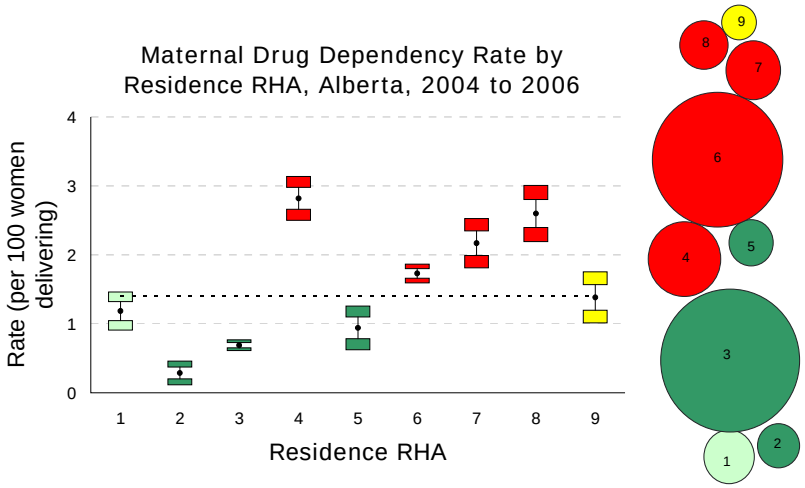
3.4.6 Maternal Prenatal Drug Dependence

Women who abuse substances face a number of barriers to effective treatment, including denial that there is a problem, denying the risks involved, not knowing how or where to get treatment, and fear of having their children taken away if they seek treatment. These barriers may lead them to avoid prenatal care entirely. Many physicians do not effectively screen their patients for substance use, or are uncertain about how to help such women (AADAC, 2006).

Maternal Prenatal Drug Dependence Rate, 2004-06 Combined



Regional Data (See Table 3.4.6.3)



- Between 2004 and 2006, the rate of maternal drug dependence was lower than the provincial average in RHAs 2, 3, and 5, with the lowest rate in RHA 3 (0.7%).
- The rate was higher than the provincial average in RHAs 4, 6, 7, and 8. RHA 4 had the highest rate (2.8%).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Prenatal drug dependence data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Table 3.4.6.1 Maternal Prenatal Drug Dependency Cases and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Number of cases	179	277	355	436	506	578	661
Number of women	35,114	36,215	37,675	39,283	40,054	40,727	43,465
Rate (per 100 women delivering)	0.5	0.8	0.9	1.1	1.3	1.4	1.5
Standard Error (SE)	0.04	0.05	0.05	0.05	0.06	0.06	0.06

Table 3.4.6.2 Maternal Prenatal Drug Dependency Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Number of cases	337	684	369	212	118	22	1,745
Number of women	6,430	23,988	39,082	35,894	15,639	3,070	124,246
Rate (per 100 women delivering)	5.2	2.9	0.9	0.6	0.8	0.7	1.4
Standard Error (SE)	0.28	0.11	0.05	0.04	0.07	0.15	0.03

Table 3.4.6.3 Maternal Prenatal Drug Dependency Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Number of cases	73	11	314	308	35	629	145	158	55	1,745
Number of women	6,160	3,841	45,553	10,929	3,722	36,366	6,688	6,081	3,980	124,246
Rate (per 100 women delivering)	1.2	0.3	0.7	2.8	0.9	1.7	2.2	2.6	1.4	1.4
Standard Error (SE)	0.14	0.09	0.04	0.16	0.16	0.07	0.18	0.20	0.19	0.03

Source: Alberta Perinatal Health Program, September 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

3.4.7 Maternal Prenatal HIV and HBV Screening

Note: This section of the report was excerpted from the Alberta Blood-Borne Pathogens and Sexually Transmitted Infections Surveillance Report 2008 (Alberta Blood-borne Pathogens and Sexually Transmitted Infections Surveillance Working Group, 2008).

Human Immunodeficiency Virus (HIV) infection causes immune system suppression and leaves infected persons vulnerable to opportunistic infections and malignancies (Canadian AIDS Society and Health Canada, 2002).

Mother-to-child transmission of HIV can occur during pregnancy, delivery, or via breast-feeding. The risk of transmission is greatly reduced when antiretroviral drugs are used before and during delivery and are provided to the infant following birth. Cesarean section also has the potential to reduce mother-to-child transmission of HIV.

A prenatal screening program for HIV was established in Alberta in September 1998. All pregnant women who present for prenatal care are screened for HIV infection unless the women decline testing (i.e., it is an "opt-out" program).

Hepatitis B is caused by hepatitis B virus (HBV). Chronic HBV infection is associated with a 15-25% risk of premature death from cirrhosis and liver cancer (World Health Organization, 2004).

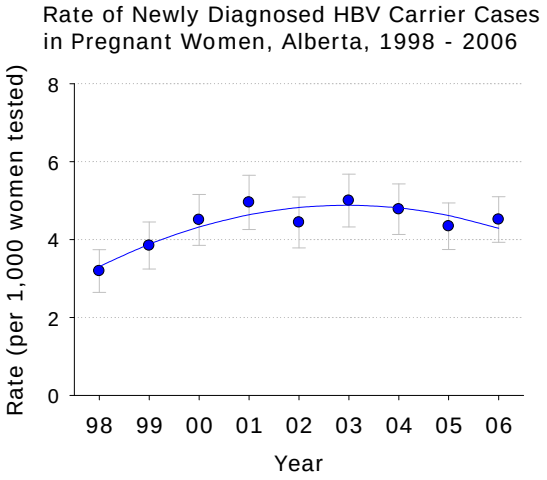
Prenatal Screening for HIV (see Table 3.4.7.1)

- Almost all women who received prenatal care in Alberta were screened for HIV infection between 1998 and 2006.
- The percentage of pregnant women screened increased from 92.2% to 97.0% from 1998 to 2006.
- For 1998 to 2006 combined, 0.5 pregnant women tested positive for HIV for every 1,000 live births in Alberta. There were 32 pregnant women who tested positive for HIV in 2006.
- Note that prenatal screening data include both newly diagnosed and previously diagnosed infections.

Prenatal Screening for HBV (see Table 3.4.7.2)

- Nearly every pregnant woman receiving prenatal care in Alberta between fiscal years 1998/99 and 2006/07 was tested for HBV infection. The rate increased between 1998/99 and 2001/02, and has been at virtually 100% since 2005/06.
- Each year, approximately 5 out of every 1,000 live births occur to mothers who have tested positive for HBV during prenatal screening. In 2006/07, 252 pregnant women tested positive for HBV, for a rate of 5.6 (per 1,000 live births).

Pregnant HBV Carriers (see Table 3.4.7.3)



- The rate of newly diagnosed HBV carrier cases among pregnant women increased from 1998 to 2001 and decreased somewhat in 2005 and 2006.
- In 2006, 228 pregnant women were found to be HBV carriers, for a rate of 4.5 (per 1,000 pregnant women).

3.4.7 Maternal Prenatal HIV and HBV Screening

In Canada, persons at high risk of being infected with HBV include drug users who share injecting equipment, those who snort drugs, and those who have unprotected sex with multiple partners. Almost all untreated infants who are born to HBV-positive mothers will be infected with HBV (Health Canada, 2003b).

HBV infection is preventable via a safe and effective vaccine. In Alberta, a grade 5 school based immunization program was put in place in 1995.

Since 1985, all pregnant women who access prenatal care have received HBV screening in Alberta. Infants who are born to HBV positive mothers in Alberta are given treatment to prevent mother-to-child transmission of HBV.

Limitations and Methodology Notes

Prenatal screening and carrier cases are analyzed by date of diagnosis.

Prenatal screening rates of positive tests are based on live births, whereas pregnant HBV carrier rates are based on pregnant women. Because there are substantially more pregnant women than live births (due to spontaneous abortions, induced abortions, and stillbirths), the rates for pregnant HBV carriers are lower than rates for prenatal HBV screening.

All rates reported in text and figures are age-adjusted (see Methodology section), with the exception of age group effects.

* HIV reporting became mandatory as of May 1998, so 1998 data may be incomplete.

Table 3.4.7.1 Number and Percent of Pregnant Women Tested for HIV by Year, Alberta, September 1998 to August 2007

	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Sep98-Aug07
Women eligible for testing[1]	47,606	42,522	41,026	38,988	39,943	41,635	43,352	46,551	50,528	392,151
Women tested[2]	43,907	39,729	39,872	38,011	38,447	40,246	41,902	45,059	48,994	376,167
% of eligible women tested	92.2	93.4	97.2	97.5	96.3	96.7	96.7	96.8	97.0	95.9
Women declining[3]	1,904	988	563	731	1,714	1,588	1,628	1,673	1,770	12,559
% of eligible women declining	4.0	2.3	1.4	1.9	4.3	3.8	3.8	3.6	3.5	3.2
Women tested positive[4]	15	18	21	18	12	16	29	15	32	176
Rate of positive tests (per 1,000 live births)[5]	0.40	0.48	0.57	0.48	0.31	0.40	0.72	0.36	0.72	0.50

Sources: Alberta Health and Wellness. CDRS database, August 2007 release.
Provincial Lab for Public Health - Prenatal Screening Database, as of Oct 12/07.
Canadian Blood Services. Alberta Routine Prenatal Care Blood Testing Database, Sep 1998-Aug 2002. October 2002 release.
Alberta Reproductive Health:Pregnancies & Births Table Update 2007, Alberta Health and Wellness.

Notes: 1. Pregnant women receiving prenatal care with a proper Requisition Form and registered with the Alberta Health Care Insurance Plan. Each woman was counted only once in a 12 month period (regardless of how many times she was tested).
2. Pregnant women who received an HIV screening test during the 12 month period. Repeated tests were excluded.
3. The estimated number of pregnant women who declined HIV testing, excluding women who were not registered with the Alberta Health Care Insurance Plan at the time of receiving prenatal care.
4. The number of pregnant women confirmed positive for HIV for the first time by Provincial Lab for Public Health and/or with a HIV case report. Cases reported in previous pregnancies were excluded.
5. The number of pregnant women confirmed positive for HIV per 1,000 live births in Alberta.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.7.2 Number and Percent of Pregnant Women Tested for HBV by Year, Alberta, September 1998 to August 2007

	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Sep98-Aug07
Women eligible for testing[1]	47,606	42,522	41,026	38,988	39,943	41,635	43,352	46,551	50,528	392,151
Women tested[2]	41,037	40,563	40,408	38,960	39,886	41,594	43,324	46,537	50,508	382,817
% of eligible women tested	86.2	95.4	98.5	99.9	99.9	99.9	99.9	100.0	100.0	97.6
Women tested positive[3]	**196**	**195**	**198**	**208**	**180**	**192**	**202**	**217**	**252**	**1,840**
Rate of positive tests (per 1,000 live births)[4]	5.2	5.2	5.4	5.6	4.7	4.8	5.0	5.2	5.6	5.2

Sources: Provincial Lab for Public Health - Prenatal Screening Database, as of Oct 12/07.
Alberta Reproductive Health:Pregnancies & Births Table Update 2007, Alberta Health and Wellness.

Notes: 1. Pregnant women receiving prenatal care with a proper Requisition Form and registered with the Alberta Health Care Insurance Plan. Each woman was counted only once (regardless of how many times she was tested) in a 12 month period (from September to August).
2. Pregnant women who received an HBV screening test during the 12 month period. Repeated tests were excluded.
3. The number of pregnant women confirmed positive for HBV by Provincial Lab for Public Health and/or with an HBV case report. Cases reported in previous pregnancies were included.
4. The number of pregnant women confirmed positive for HBV per 1,000 live births in Alberta.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.7.3 Newly Diagnosed HBV Carrier Cases and Rates among Pregnant Women by Year, Alberta, 1998 to 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006	98-06
HBV carrier cases in pregnant women[1]	131	156	182	193	177	208	207	202	228	1,684
Pregnant women tested for HBV[2]	41,037	40,563	40,408	38,960	39,886	41,594	43,324	46,537	50,508	382,817
Rate per 1,000 pregnant women tested[3]	3.2	3.8	4.5	5.0	4.4	5.0	4.8	4.3	4.5	4.4
Standard error (SE)	**0.3**	**0.3**	**0.3**	**0.4**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.1**

Sources: Alberta Health and Wellness. CDRS database, August 2007 release.
Provincial Lab for Public Health - Prenatal Screening Database, as of Oct 12/07.

Notes: 1. The number of pregnant women reported as HBV carriers, with a lab confirmation of HBsAg positive, in the CDRS database.
2. Pregnant women who received an HBV screening test during the 12 month period. Repeated tests were excluded.
3. The number of HBV carriers among pregnant women per 1,000 pregnant women tested for HBV in Alberta.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

4. Births

4.1.1 Fertility

General fertility rate: *Number of live births per 1,000 women aged 15-49 in a given year.*

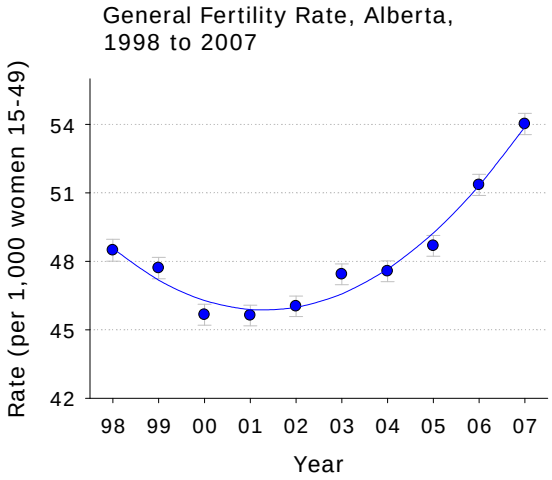
Age-specific fertility rate: *Number of live births per 1,000 women in a given age group in a given year.*

Total fertility rate*: Number of live births per 1,000 women aged 15-49 over a lifetime.* This rate is equal to the sum of the age-specific fertility rates for each year of age between 15 and 49. Total fertility rate provides an estimate of "the average number of children that would be born to each woman if all women lived to the end of their childbearing years and bore children according to the fertility patterns of the current year" (Health Canada, 2006, p. 2). For example, a total fertility rate of 1,500 would represent an average of 1.5 live births per woman. Total fertility rates differ from *completed fertility* rates, which describe the actual number of children born to women who have completed their childbearing.

A total fertility rate of 2,100 is the "replacement rate" needed to maintain the current population. The last time Canada's total fertility rate reached 2,100 was 1971 (Health Canada, 2008a).

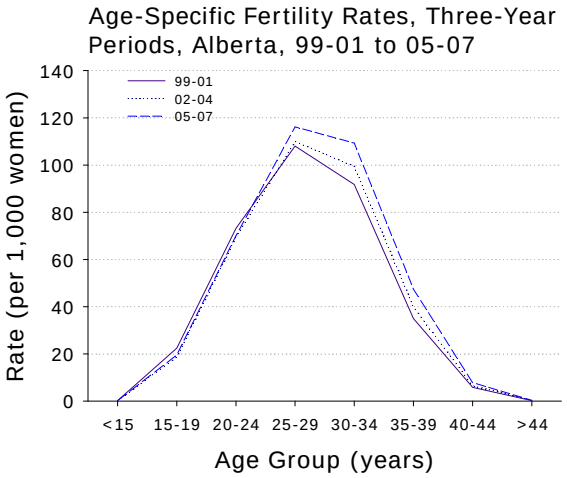
Age-specific fertility rates for women over 30 have increased since the late 1970s in Canada, reflecting a tendency to delay childbearing. For the past several decades, women 25 to 29 have had the highest fertility rates, but in 2005, the age-specific fertility rate for women 30 to 34 was the highest of all age groups for the first time (among data collected since 1926; Health Canada, 2006, 2008b).

Time Trends (see Tables 4.1.1.1, 4.1.1.4)



- Following many years of decrease, the general fertility rate in Alberta was at a low point between 2000 and 2002 and then increased, with large increases in 2006 and 2007. In 2007, the general fertility rate was 54.0 (per 1,000 women 15-49).
- The total fertility rate followed a similar pattern.. The total fertility rate was 1,922 in 2007, or about 1.9 children per woman.

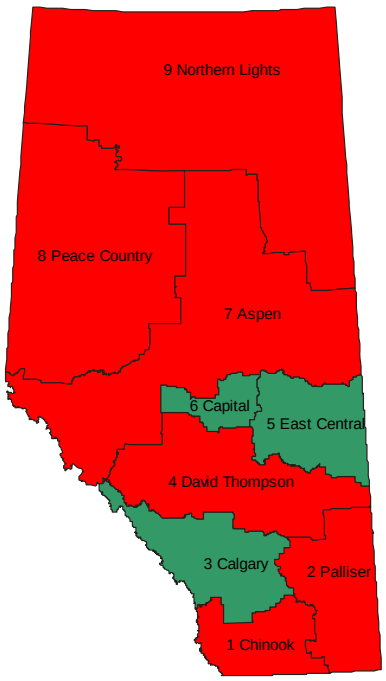
Age Effects (see Tables 4.1.1.2, 4.1.1.4, and 4.1.1.6)



- For 2005 to 2007 combined, age-specific fertility rates were highest for women between 25 and 29 years of age (111.6 per 1,000 women), and were almost as high for women between 30 and 34 (109.3).
- The curves in the figure above show two main trends over time: fertility rates are increasing, and women are giving birth later in life. Note that fertility rates are still low relative to the middle of the 20th century.

4.1.1 Fertility

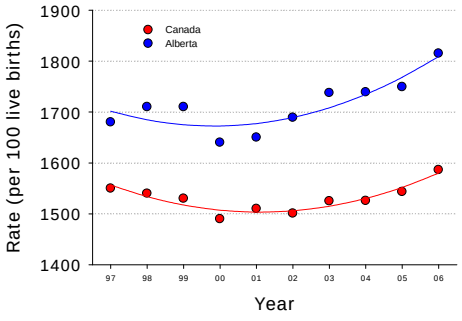
General Fertility Rate, 2005-07 Combined



Total fertility rates declined in both Alberta and Canada through the 1990s and rose in the 2000s. In 2006, Canada's total fertility rate was 1,586 and Alberta's was 1,815, continuing the longstanding pattern of higher fertility rates in Alberta than in the nation as a whole (Statistics Canada, 2008c). In 2005, Calgary and Edmonton had the second and third highest total fertility rates of all the census metropolitan areas in Canada (Health Canada, 2008b).

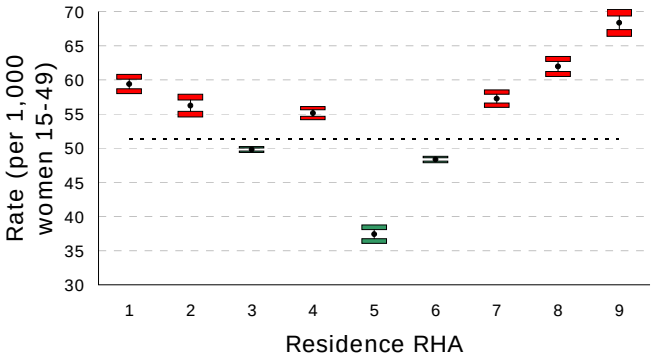
Total Fertility Rate, Alberta and Canada, 1997 to 2006

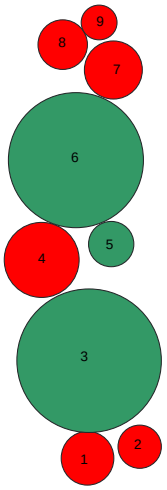
Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)



Regional Data (see Tables 4.1.1.3, 4.1.1.5, 4.1.1.6)

General Fertility Rate by Residence RHA, Alberta, 2005 to 2007





- The general fertility rate was lower than the provincial average in RHAs 3, 5, and 6 between 2005 and 2007. The lowest rate was in RHA 5 (37.4 per 1,00 women 15-49).
- The general fertility rate was higher than the provincial average in the remaining RHAs. RHA 9 had the highest general fertility rate (68.3) for 2005 to 2007 combined.
- The total fertility rate for 2005 to 2007 combined was higher than replacement level (2.1) in RHAs 1, 7, 8, and 9. In 2005, only RHA 9 was at replacement.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.1.1.1 Live Births, General Fertility Rate, and Total Fertility Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Women 15-49	774,059	791,981	802,182	815,913	831,964	840,560	847,174	854,349	869,776	895,127
General Fertility Rate (per 1,000 women 15-49)	48.5	47.7	45.7	45.6	46.0	47.4	47.6	48.7	51.3	54.0
Standard Error (SE)	0.24	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.24	0.24
Total Fertility Rate (per 1,000 women 15-49)	1,728	1,717	1,661	1,670	1,687	1,736	1,740	1,777	1,855	1,922

Table 4.1.1.2 Live Births and Age-Specific Fertility Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<15[1]	15-17	18-19	15-19	20-24	25-29	30-34	35-39	40-44	>44[1]
Live births	64	2,031	4,835	6,866	25,713	42,562	38,866	17,216	3,163	139
Women 15-49	330,472	210,932	140,397	351,329	367,550	366,464	355,677	362,132	405,501	410,599
Age-Specific Fertility Rate (per 1,000 women)	0.2	9.6	34.4	19.5	70.0	116.1	109.3	47.5	7.8	0.3
Standard Error (SE)	0.02	0.21	0.49	0.23	0.42	0.53	0.52	0.35	0.14	0.03

Table 4.1.1.3 Live Births, General Fertility Rate, and Total Fertility Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,594
Women 15-49	114,014	76,283	993,644	227,771	79,086	819,860	134,053	108,945	65,423	2,619,252
General Fertility Rate (per 1,000 women 15-49)	59.4	56.2	49.8	55.1	37.4	48.3	57.2	62.0	68.3	51.4
Standard Error (SE)	0.70	0.83	0.22	0.48	0.67	0.24	0.63	0.73	0.99	0.14
Total Fertility Rate (per 1,000 women 15-49)	2,141	2,009	1,756	2,045	1,468	1,739	2,158	2,160	2,306	1,853

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellnesse.

Notes: 1. Age-specific fertility rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 45-49 age groups, respectively.
Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.1.1.4 Live Births and Age-Specific Fertility Rate by Year and Maternal Age Group, and Total Fertility Rate by Year, Alberta, 1998 to 2007

Number of live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15[1]	25	23	16	24	14	14	20	13	22	29
15-17	862	842	740	685	615	592	593	587	693	751
18-19	1,731	1,737	1,680	1,608	1,589	1,518	1,481	1,546	1,590	1,699
15-19	2,593	2,579	2,420	2,293	2,204	2,110	2,074	2,133	2,283	2,450
20-24	7,709	7,857	7,476	7,530	7,791	8,029	7,861	7,981	8,640	9,092
25-29	11,718	11,664	11,287	11,461	11,829	12,310	12,692	13,111	14,003	15,448
30-34	10,464	10,275	10,032	10,491	10,902	11,454	11,697	12,064	12,931	13,871
35-39	4,338	4,606	4,613	4,618	4,724	4,945	4,958	5,239	5,707	6,270
40-44	646	738	768	778	799	961	948	1,004	1,021	1,138
>44[1]	21	33	13	30	29	42	39	41	52	46
All	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348

Age Specific Fertility Rate (per 1,000 women)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15[1]	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.3
15-17	13.8	13.0	11.3	10.3	9.1	8.8	8.7	8.5	9.8	10.5
18-19	43.7	42.4	39.3	36.2	34.9	33.0	32.0	33.3	34.4	35.6
15-19	25.4	24.4	22.4	20.7	19.5	18.6	18.1	18.5	19.5	20.6
20-24	78.4	77.0	72.2	70.6	70.5	70.5	67.4	67.4	70.8	71.6
25-29	112.5	110.3	106.5	107.3	107.8	110.4	111.6	112.8	115.4	119.9
30-34	91.3	91.2	90.4	93.6	96.1	100.0	102.1	104.6	110.0	113.0
35-39	32.6	34.4	34.8	35.6	37.4	40.4	41.6	44.4	47.4	50.6
40-44	5.2	5.8	5.9	5.8	5.8	7.0	6.8	7.3	7.6	8.5
>44[1]	0.2	0.3	0.1	0.3	0.2	0.3	0.3	0.3	0.4	0.3
Total Fertility Rate (per 1,000 women 15-49)	1,728	1,717	1,661	1,670	1,687	1,736	1,740	1,777	1,855	1,922

Table 4.1.1.5 Live Births, General Fertility Rate, and Total Fertility Rate by Year and Residence RHA, Alberta, 1998 to 2007

Live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	2,018	2,064	1,945	1,960	1,969	2,093	2,047	2,106	2,243	2,422
Palliser	1,243	1,232	1,221	1,230	1,226	1,258	1,278	1,349	1,364	1,576
Calgary	12,900	12,990	13,064	13,109	13,588	14,473	14,606	15,432	16,342	17,715
David Thompson	3,567	3,648	3,474	3,482	3,616	3,727	3,786	3,824	4,253	4,479
East Central	996	961	908	882	971	898	954	925	992	1,042
Capital	11,189	11,320	10,790	11,054	11,293	11,702	11,915	12,106	13,131	14,398
Aspen	2,594	2,540	2,285	2,404	2,408	2,386	2,396	2,386	2,583	2,705
Peace Country	1,918	1,947	1,818	1,907	1,921	2,037	1,959	2,075	2,298	2,377
Northern Lights	1,101	1,070	1,116	1,192	1,299	1,292	1,348	1,384	1,453	1,634
Alberta	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348

General Fertility Rate (per 1,000 women 15-49)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	55.0	55.6	52.0	52.3	52.6	55.8	54.4	56.0	59.3	62.8
Palliser	53.8	52.1	50.9	50.2	49.3	50.7	51.1	53.6	53.9	61.0
Calgary	46.0	44.9	44.3	43.4	43.9	46.0	45.9	47.8	49.4	52.1
David Thompson	52.3	52.3	49.1	48.5	49.5	50.7	51.1	51.3	56.3	57.7
East Central	38.8	37.4	35.1	33.8	36.9	34.1	36.4	35.3	38.0	38.9
Capital	45.5	45.1	42.6	43.0	43.2	44.3	44.8	45.3	48.3	51.3
Aspen	59.0	57.2	51.5	53.7	53.4	53.3	53.8	53.9	58.0	59.8
Peace Country	58.2	57.8	53.7	55.9	55.5	58.7	55.9	58.7	63.4	63.7
Northern Lights	64.5	61.4	62.8	65.1	67.4	64.5	65.4	65.7	67.4	71.7
Alberta	48.5	47.7	45.7	45.6	46.0	47.4	47.6	48.7	51.3	54.0

Total Fertility Rate (per 1,000 women 15-49)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	2,013.7	2,055.7	1,937.1	1,947.4	1,954.4	2,051.8	1,990.4	2,049.1	2,148.6	2,222.0
Palliser	1,975.2	1,924.5	1,899.5	1,875.8	1,833.2	1,888.2	1,879.0	1,951.5	1,925.1	2,142.6
Calgary	1,598.6	1,571.2	1,568.7	1,544.2	1,563.9	1,639.2	1,636.6	1,703.3	1,746.5	1,815.2
David Thompson	1,934.3	1,958.4	1,866.3	1,847.6	1,892.6	1,937.8	1,940.8	1,942.3	2,086.9	2,101.9
East Central	1,478.7	1,461.0	1,399.9	1,355.0	1,482.8	1,369.4	1,454.3	1,413.0	1,490.6	1,498.9
Capital	1,620.5	1,621.0	1,548.8	1,573.6	1,580.2	1,616.0	1,638.1	1,648.0	1,741.0	1,823.0
Aspen	2,113.1	2,092.0	1,910.7	2,026.2	2,034.3	2,033.4	2,050.7	2,055.1	2,192.8	2,222.0
Peace Country	2,026.8	2,042.5	1,914.0	2,003.3	1,996.6	2,102.3	2,002.5	2,081.9	2,207.9	2,187.3
Northern Lights	2,172.5	2,091.5	2,156.9	2,247.5	2,329.4	2,222.2	2,248.6	2,242.4	2,286.3	2,384.6
Alberta	1,728.3	1,716.9	1,661.1	1,669.5	1,686.7	1,736.0	1,739.9	1,776.7	1,855.3	1,922.3

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellnesse.

Notes: 1. Age-specific fertility rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 45-49 age groups, respectively.
Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.1.1.6 Age-Specific Fertility Rate by Residence RHA and Maternal Age Group and Total Fertility Rate by Residence RHA, Alberta, 2005 to 2007

2005	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15[1]	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.8	0.3	0.1
15-17	12.2	6.9	5.3	14.2	2.4	7.2	13.7	18.7	17.6	8.5
18-19	35.6	41.4	20.5	45.4	21.9	29.8	62.3	61.4	73.5	33.3
15-19	21.8	20.7	11.3	26.9	10.0	16.4	32.9	36.3	40.4	18.5
20-24	95.5	95.8	50.4	89.8	58.0	57.9	105.3	105.0	120.9	67.4
25-29	136.8	139.5	99.6	145.5	113.9	104.4	143.5	137.7	145.6	112.8
30-34	106.8	95.1	115.2	88.6	72.4	101.7	89.1	101.2	98.1	104.6
35-39	41.5	32.9	54.6	33.7	25.4	41.6	33.1	32.1	38.6	44.4
40-44	7.3	6.4	9.1	3.9	2.7	7.3	7.0	3.7	5.0	7.3
>44[1]	0.2	0.0	0.5	0.1	0.2	0.3	0.2	0.4	0.0	0.3
Total Fertility Rate	2,049	1,952	1,703	1,942	1,413	1,648	2,055	2,082	2,242	1,777

2006	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15[1]	0.2	0.3	0.1	0.4	0.0	0.2	0.9	0.2	0.0	0.2
15-17	9.5	8.3	5.8	15.0	7.9	9.3	17.4	17.6	23.9	9.8
18-19	39.2	41.4	20.9	51.1	27.2	29.3	67.8	67.9	62.8	34.4
15-19	21.3	21.6	11.7	29.8	15.3	17.3	36.8	37.5	39.4	19.5
20-24	98.4	97.2	52.4	101.2	55.6	59.6	110.5	117.4	120.9	70.8
25-29	151.2	142.3	100.8	145.4	113.2	107.1	150.0	149.0	137.6	115.4
30-34	114.0	90.4	118.0	103.6	76.8	108.2	101.9	100.3	105.5	110.0
35-39	38.7	29.1	56.7	31.3	34.2	48.1	33.5	33.1	43.9	47.4
40-44	5.9	4.2	9.3	5.4	3.0	7.6	5.4	4.3	9.5	7.6
>44[1]	0.3	0.3	0.4	0.7	0.0	0.4	0.4	0.0	0.3	0.4
Total Fertility Rate	2,149	1,925	1,747	2,087	1,491	1,741	2,193	2,208	2,286	1,855

2007	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15[1]	0.5	0.9	0.1	0.2	0.5	0.2	0.4	0.2	1.0	0.3
15-17	16.9	12.6	6.7	11.8	4.2	9.2	23.5	18.4	23.0	10.5
18-19	50.8	46.7	22.0	52.2	25.2	29.3	63.7	70.8	75.0	35.6
15-19	30.6	26.5	12.8	28.2	12.3	17.3	39.0	39.0	44.4	20.6
20-24	103.5	106.7	53.6	97.0	69.5	59.9	108.4	113.0	122.3	71.6
25-29	146.3	155.3	103.6	148.1	115.4	114.6	154.5	147.9	150.1	119.9
30-34	115.0	99.1	121.6	104.7	74.4	112.9	99.3	95.8	107.1	113.0
35-39	39.0	36.0	60.5	36.7	22.7	51.2	38.0	34.9	44.1	50.6
40-44	9.2	4.6	10.5	5.5	5.2	8.3	5.0	6.9	8.9	8.5
>44[1]	0.8	0.5	0.4	0.2	0.2	0.3	0.1	0.0	0.0	0.3
Total Fertility Rate	2,222	2,143	1,815	2,102	1,499	1,823	2,222	2,187	2,385	1,922

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: 1. Age-specific fertility rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 45-49 age groups, respectively.
Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

4. Births

4.2.1 Live Births

Live birth: *"The complete expulsion or extraction from the mother, irrespective of the duration of the pregnancy, of a fetus in which, after expulsion or extraction, there is breathing, beating of the heart, pulsation of the umbilical cord or unmistakable movement of voluntary muscle, whether or not the umbilical cord has been cut or the placenta is attached."* (Alberta Vital Statistics Act, RSA 1980 cV-4 s1).

Total births: *The sum of live births and stillbirths in a given year.*

Crude birth rate: *Number of live births per 1,000 population in a given year.*

Life expectancy: *The expected number of years of life remaining to a person of a given age if current mortality rates continue to apply.*

Home birth: *A birth for which the location is listed on the Registration of Birth as "home"* (rather than hospital, en route, or some other location). This variable does not distinguish between planned and unplanned home births. Only live births are included.

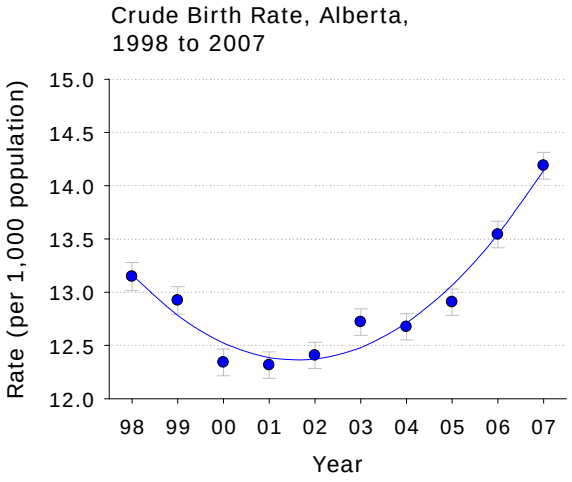
Home birth rate: *Number of live home births per 100 live births.*

Midwife-attended birth: *A birth in which the primary attendant at birth is listed on the Registration of Birth as "midwife"*. Only live births are included.

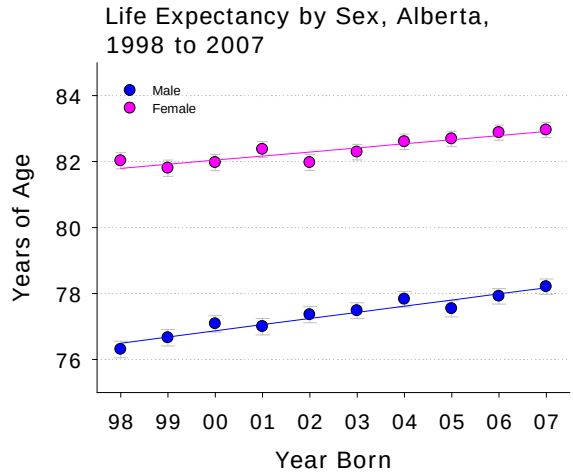
Midwife-attended birth rate: *Number of live births with midwife as attendant, per 100 live births.*

Time Trends (see Tables 4.2.1.1, 4.2.1.3, 4.2.1.4, 4.2.1.7, 4.2.1.10)

- There were 48,348 live births in Alberta in 2007, the largest number in Alberta's history. Contributing to this increase are increasing fertility rates (see previous section) and a high rate of migration into the province by people of reproductive age.



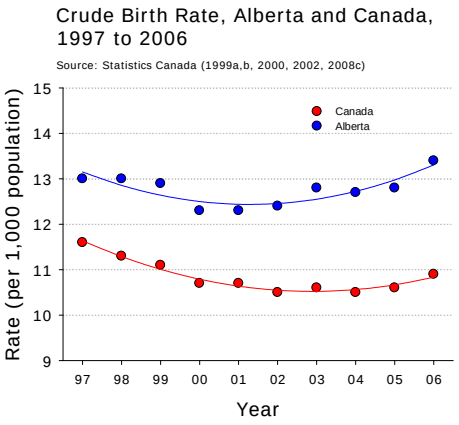
- The crude birth rate was at a low point between 2000 and 2002 after declining throughout the 1990s. Increases in 2006 and 2007 were particularly large. In 2007, the crude birth rate was 14.2 (per 1,000 population).



- The life expectancy of a female infant born in Alberta in 2007 was 83.0 years on average. Males born in 2007 could expect to live 78.2 years on average. Life expectancy continues to climb for both males and females, although the rate increased more rapidly for males than for females between 1998 and 2007.

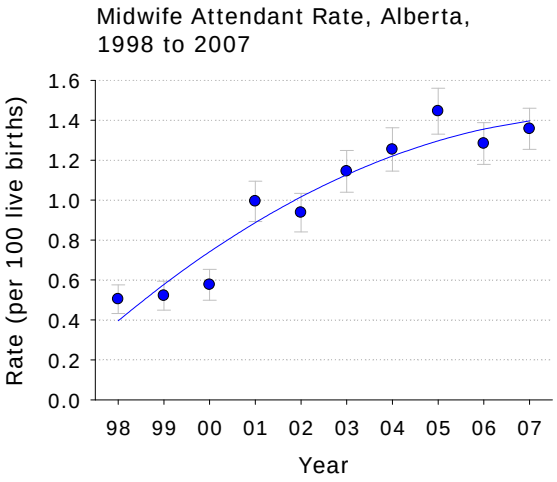
4.2.1 Live Births

Crude birth rates in Canada declined through the last half of the 1990s, and were fairly stable to 2005 before increasing in 2006. In Alberta, declines in the 1990s were followed by an increasing trend, with notable increases in 2003 and 2006, widening the gap in crude birth rates between Canada and Alberta. In 2006, the Canadian crude birth rate was 10.9, and the Albertan rate was 13.4 (Statistics Canada, 2008c).



Time Trends continued (see Tables 4.2.1.1, 4.2.1.3, 4.2.1.4, 4.2.1.7, 4.2.1.10)

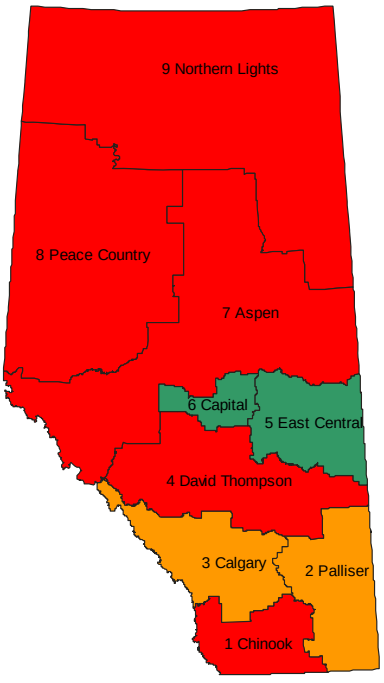
- In 2007, there were 379 live home births in Alberta (0.8% of live births). This rate did not vary significantly over time between 1998 and 2007.



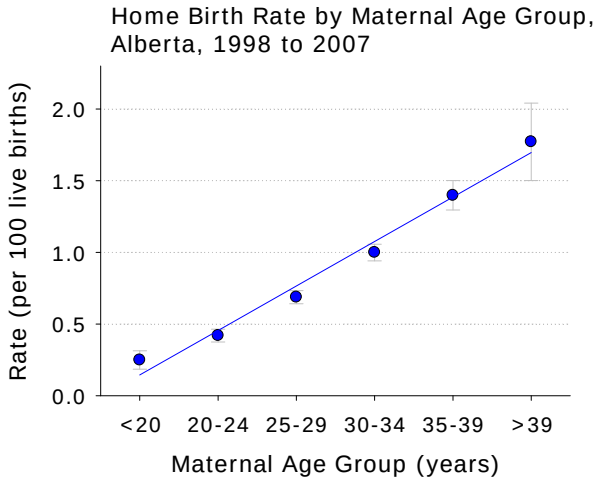
- From 1998 to 2005, the midwife attendant rate increased; it decreased slightly in 2006 and remained about the same in 2007. In 2007, 1.4% of live births in Alberta (656 live births) were attended by midwives.
- Midwives attend births in hospitals, birth centres, and private homes. Hospital admitting privileges were extended to midwives in some RHAs in 1999. Prior to 2001, the percentage of midwife-attended live births that occurred in hospitals was less than 10%. In 2007, 54.4% of midwife-attended live births occurred in hospitals.
- From 2001 to 2007, mean birth weight decreased by 42 grams. Mean birth weight for live births in Alberta was 3,347 grams in 2007.

4.2.1 Live Births

Crude Birth Rate, 2005-07 Combined

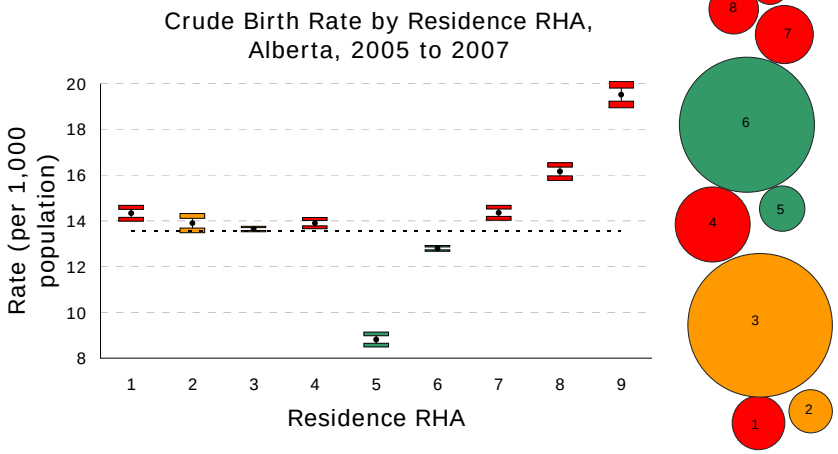


Age Effects (see Tables 4.2.1.5, 4.2.1.8)



- Older mothers are much more likely than younger mothers to give birth at home. For 1998 to 2007 combined, mothers 40 years old and older had a home birth rate of 1.8 (per 100 live births), compared with 0.2 for teen mothers.
- Older mothers are also more likely to use the services of midwives, with a midwife attendant rate of 1.8 (per 100 live births) for women over 39 and a rate of 0.2 for women under 20 between 1998 and 2007.

Regional Data (see Tables 4.2.1.2, 4.2.1.6, 4.2.1.9)



- For 2005 to 2007 combined, the crude birth rate was lower than the provincial average in RHAs 5 and 6, with the lowest rate in RHA 5 (8.8 per 1,000 population).
- The crude birth rate was significantly higher than the provincial average in RHAs 1, 4, 7, 8, and 9 between 2005 and 2007. The highest rate was 19.5, in RHA 9.

4.2.1 Live Births

In a review of planned home births with "first level" care (a facilitating environment at the place of birth, skilled birth attendance, and a continuum of perinatal care for women and infants), Fullerton, Navarro, and Young (2007) found consistently favourable maternal and newborn outcomes, in comparison to reference groups such as planned hospital births and vital statistics databases.

As of September 1 2007, there were 31 Registered Midwives and 6 Student Midwives in Alberta. The Alberta Government has announced that, as of April 1, 2009, midwifery services will be fully funded. This means that the province will pay for midwifery services for women with low-risk pregnancies who choose to deliver with the assistance of midwives, in their homes, in community birthing centres, or in hospitals. This funding change is expected to "provide better access and more choice for expectant women and will relieve pressure on doctors, nurses and hospitals" (Alberta Health and Wellness, 2008).

In Canada in 2006, mean birth weight was 3,370 grams; the mean for Alberta was 3,345 grams (Statistics Canada, 2008c). Male babies weighed a little more than 100 grams more than female babies on average.

Regional Data **continued** (see Tables 4.2.1.2, 4.2.1.6, 4.2.1.9)

- For 1998 to 2007, the home birth rate was significantly lower than the provincial average in RHAs 1, 2, 7, 8, and 9, with the lowest rate (0.2% of live births) in RHA 9. The rate of home births was higher than the provincial average in RHA 3 during that time period (1.1% of live births).
- The midwife-attendant rate was higher than the provincial average in the metropolitan centres (RHAs 3 and 6), and lower than the provincial average in all other RHAs for 1998 to 2007 combined. This pattern reflects availability of midwifery services.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.2.1.1 Live Births and Crude Birth Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Total population	2,854,621	2,923,449	2,967,755	3,022,891	3,086,646	3,134,337	3,179,036	3,222,191	3,298,028	3,407,742
Crude Birth Rate (per 1,000 population)	13.1	12.9	12.3	12.3	12.4	12.7	12.7	12.9	13.5	14.2
Standard Error (SE)	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06

Table 4.2.1.2 Live Births and Crude Birth Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,594
Total population	472,544	308,608	3,627,640	903,360	335,784	3,097,553	534,728	417,801	229,081	9,927,961
Crude Birth Rate (per 1,000 population)	14.3	13.9	13.6	13.9	8.8	12.8	14.4	16.2	19.5	13.6
Standard Error (SE)	0.17	0.21	0.06	0.12	0.16	0.06	0.16	0.20	0.29	0.04

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, May 2008 release.

Notes: Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.3 Life Expectancy by Year and Sex, Alberta, 1998 to 2007

Females	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Life Expectancy	82.0	81.8	82.0	82.4	82.0	82.3	82.6	82.7	82.9	83.0
Standard Error (SE)	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Males	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Life Expectancy	76.3	76.7	77.1	77.0	77.4	77.5	77.8	77.5	77.9	78.2
Standard Error (SE)	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12

Source: Vital Statistics, Death File, Service Alberta, extracted January 2008.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, extracted January 2008.

Notes: Data include Alberta residents only.
Totals for RHAs include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.4 Home Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Home births	283	304	302	349	332	341	274	315	378	379
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	0.8	0.8	0.8	0.9	0.9	0.9	0.7	0.8	0.8	0.8
Standard Error (SE)	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04

Table 4.2.1.5 Home Births and Rate by Maternal Age Group, Alberta, 1998 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Home births	58	335	862	1,140	699	162	3,256
Live births	23,339	79,966	125,523	114,181	50,018	9,147	402,174
Rate (per 100 live births)	0.2	0.4	0.7	1.0	1.4	1.8	0.8
Standard Error (SE)	0.03	0.02	0.02	0.03	0.05	0.14	0.01

Table 4.2.1.6 Home Births and Rate by Residence RHA, Alberta, 1998 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Home births	84	38	1,563	318	62	977	105	80	30	3,257
Live births	20,867	12,977	144,219	37,856	9,529	118,898	24,687	20,257	12,889	402,179
Rate (per 100 live births)	0.4	0.3	1.1	0.8	0.7	0.8	0.4	0.4	0.2	0.8
Standard Error (SE)	0.04	0.05	0.03	0.05	0.08	0.03	0.04	0.04	0.04	0.01

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.7 Midwife-attended Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Midwife-attended live births	189	197	211	370	359	456	505	601	573	656
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Midwife attendant rate (per 100 live birth	0.5	0.5	0.6	1.0	0.9	1.1	1.3	1.4	1.3	1.4
Standard Error (SE)	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.05	0.05
Midwife-attended live hospital births	12	5	18	91	92	186	279	344	290	357
% of midwive-attended live births occurring in hospital	6.3	2.5	8.5	24.6	25.6	40.8	55.2	57.2	50.6	54.4

Table 4.2.1.8 Midwife-attended Births and Rate by Maternal Age Group, Alberta, 1998 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Midwife-attended live births	53	420	1,212	1,497	767	168	4,117
Live births	23,339	79,966	125,523	114,181	50,018	9,147	402,193
Rate (per 100 live births)	0.2	0.5	1.0	1.3	1.5	1.8	1.0
Standard Error (SE)	0.03	0.03	0.03	0.03	0.05	0.14	0.02

Table 4.2.1.9 Midwife-attended Births and Rate by Residence RHA, Alberta, 1998 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Midwife-attended live births	19	10	1,799	339	56	1,709	128	37	20	4,117
Live births	20,867	12,977	144,219	37,856	9,529	118,898	24,687	20,257	12,889	402,207
Rate (per 100 live births)	0.1	0.1	1.2	0.9	0.6	1.4	0.5	0.2	0.2	1.0
Standard Error (SE)	0.02	0.02	0.03	0.05	0.08	0.03	0.05	0.03	0.03	0.02

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.10 Mean Birth Weight for Selected Categories of Live Births, Alberta, 1998 to 2007

Mean birth weight (in grams)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
All Live Births	3,377	3,388	3,386	3,389	3,380	3,374	3,362	3,352	3,344	3,347
Preterm Births	2,328	2,333	2,360	2,365	2,339	2,349	2,359	2,323	2,306	2,289
Term Births	3,462	3,477	3,481	3,483	3,478	3,473	3,463	3,454	3,445	3,444
Singleton Births	3,405	3,415	3,417	3,421	3,414	3,409	3,398	3,384	3,376	3,380
Multiple Births	2,363	2,401	2,363	2,387	2,331	2,342	2,343	2,372	2,377	2,383

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release

Notes: Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.11 Live Births by Year and Maternal Age Group, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<15	25	23	16	24	14	14	20	13	22	29
15-17	862	842	740	685	615	592	593	587	693	751
18-19	1,731	1,737	1,680	1,608	1,589	1,518	1,481	1,546	1,590	1,699
15-19	2,593	2,579	2,420	2,293	2,204	2,110	2,074	2,133	2,283	2,450
20-24	7,709	7,857	7,476	7,530	7,791	8,029	7,861	7,981	8,640	9,092
25-29	11,718	11,664	11,287	11,461	11,829	12,310	12,692	13,111	14,003	15,448
30-34	10,464	10,275	10,032	10,491	10,902	11,454	11,697	12,064	12,931	13,871
35-39	4,338	4,606	4,613	4,618	4,724	4,945	4,958	5,239	5,707	6,270
40-44	646	738	768	778	799	961	948	1,004	1,021	1,138
>44	21	33	13	30	29	42	39	41	52	46
All	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348

Table 4.2.1.12 Live Births by Year and Residence RHA, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	2,018	2,064	1,945	1,960	1,969	2,093	2,047	2,106	2,243	2,422
Palliser	1,243	1,232	1,221	1,230	1,226	1,258	1,278	1,349	1,364	1,576
Calgary	12,900	12,990	13,064	13,109	13,588	14,473	14,606	15,432	16,342	17,715
David Thompson	3,567	3,648	3,474	3,482	3,616	3,727	3,786	3,824	4,253	4,479
East Central	996	961	908	882	971	898	954	925	992	1,042
Capital	11,189	11,320	10,790	11,054	11,293	11,702	11,915	12,106	13,131	14,398
Aspen	2,594	2,540	2,285	2,404	2,408	2,386	2,396	2,386	2,583	2,705
Peace Country	1,918	1,947	1,818	1,907	1,921	2,037	1,959	2,075	2,298	2,377
Northern Lights	1,101	1,070	1,116	1,192	1,299	1,292	1,348	1,384	1,453	1,634
Alberta	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, May 2008 release.

Notes: Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.13 Live Births by Residence RHA and Maternal Age Group, Alberta, 2005 to 2007

2005	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15	0	0	0	2	0	5	1	4	1	13
15-17	43	15	126	97	6	150	60	58	32	587
18-19	87	60	319	214	35	428	178	133	92	1,546
15-19	130	75	445	311	41	578	238	191	124	2,133
20-24	570	354	2,109	968	206	2,205	637	558	374	7,981
25-29	686	480	4,463	1,352	345	3,892	752	669	472	13,111
30-34	483	308	5,376	812	228	3,586	502	479	290	12,064
35-39	195	107	2,537	330	92	1,515	203	152	108	5,239
40-44	41	25	479	48	12	312	52	20	15	1,004
>44	1	0	23	1	1	12	1	2	0	41
All	2,106	1,349	15,432	3,824	925	12,106	2,386	2,075	1,384	41,587

2006	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15	1	1	2	4	0	7	6	1	0	22
15-17	34	18	144	102	20	198	77	56	44	693
18-19	93	60	331	239	43	418	187	142	77	1,590
15-19	127	78	475	341	63	616	264	198	121	2,283
20-24	593	366	2,251	1,143	198	2,340	694	662	393	8,640
25-29	790	513	4,730	1,419	356	4,148	815	764	468	14,003
30-34	516	291	5,644	965	242	3,907	560	492	314	12,931
35-39	182	98	2,735	309	120	1,775	202	158	128	5,707
40-44	32	16	485	63	13	322	39	23	28	1,021
>44	2	1	20	9	0	16	3	0	1	52
All	2,243	1,364	16,342	4,253	992	13,131	2,583	2,298	1,453	44,659

2007	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
<15	3	3	4	2	2	8	3	1	3	29
15-17	60	27	166	81	11	199	105	59	43	751
18-19	123	69	363	244	41	434	179	148	98	1,699
15-19	183	96	529	325	52	633	284	207	141	2,450
20-24	645	416	2,394	1,140	260	2,455	697	661	424	9,092
25-29	806	587	5,144	1,561	376	4,712	894	808	560	15,448
30-34	545	332	6,047	1,015	249	4,286	560	492	345	13,871
35-39	186	123	3,031	371	80	1,944	229	172	134	6,270
40-44	49	17	541	63	22	347	36	36	27	1,138
>44	5	2	22	2	1	13	1	0	0	46
All	2,422	1,576	17,715	4,479	1,042	14,398	2,705	2,377	1,634	48,348

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, May 2008 release.

Notes: Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

4. Births

4.3.1 Small-for Gestational-Age

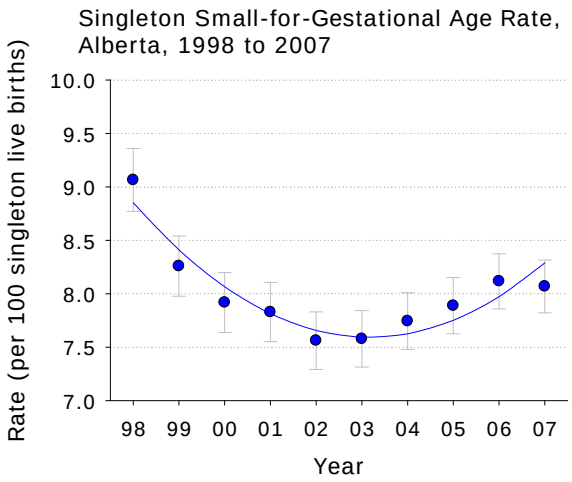
Small-for-gestational-age infants *have a birth weight below the 10th percentile of appropriate for gestational age infants* (see Alberta norms in Robertson, Svenson, & Kyle, 2002). Some infants are simply genetically small; others are affected by intrauterine growth restriction.

Singleton small-for-gestational-age rate: *Number of singleton small-for-gestational-age live births per 100 singleton live births.* Rates may also be calculated for multiple births.

In a study of 76,444 Alberta births, researchers found that small-for-gestational-age births were associated with a number of modifiable risk factors, including maternal prenatal smoking, multiple gestation (which may be modifiable in pregnancies involving assisted reproduction), low pre-pregnancy weight, inadequate prenatal weight gain, and older maternal age (35 years or older) (Newburn-Cook et al., 2002). Multiple gestations and older maternal age are both increasing in frequency.

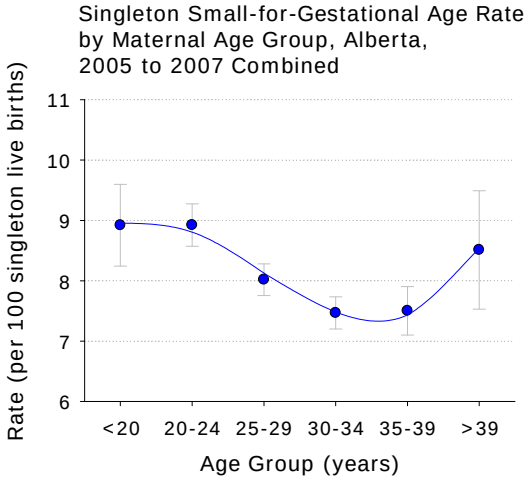
Millar and Chen (1998) found that small-for-gestational age births were more prevalent among women with low levels of education, even when maternal smoking (which tends to be more prevalent among women with low education) was factored out.

Time Trends (see Table 4.3.1.1, 4.3.1.2, 4.3.1.3)



- The singleton small-for-gestational-age rate decreased between 1998 and 2002 and increased slightly between 2004 and 2006. In 2007, the rate was 8.1 (per 100 live singleton births) in Alberta.
- In 2007, the singleton small-for-gestational-age rate was 11.0 (per 100 singleton live births) for preterm births, compared with 7.9 for term births. Both term and preterm rates increased in the last few years.
- In 2007, the small-for-gestational-age rate rate for multiples was 7.7 (per 100 multiple live births). This rate is quite variable due to the small number of multiple births, and there are no significant time trends between 1998 and 2007.

Age Effects (see Tables 4.3.1.4, 4.3.1.6)

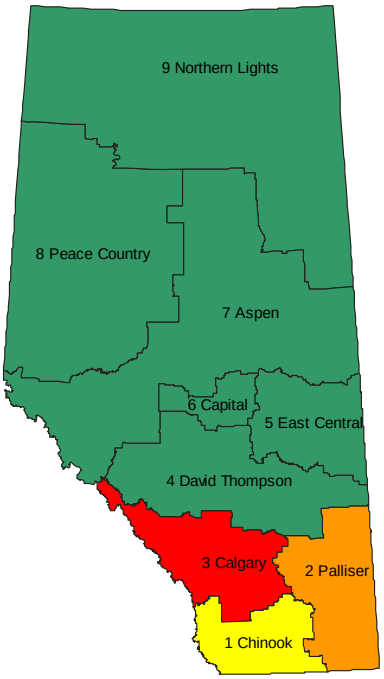


- For 2005 to 2007 combined, the singleton small-for-gestational-age rate was lowest for women between 30 and 39, and highest for women under 25 and over 39 years of age.

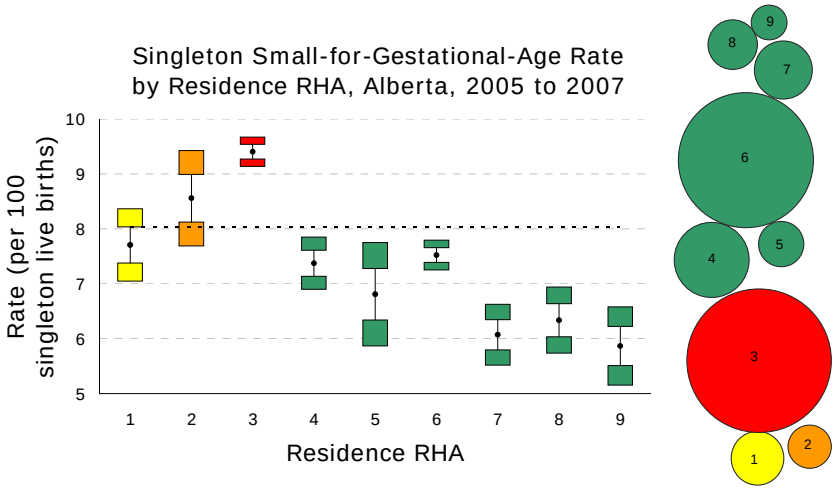
4.3.1 Small-for-Gestational-Age

When studied at the age of eight, children who were small-for-gestational age at birth did not differ from appropriate-for-gestational children in terms of general health status, behavioural status, or cognitive or academic achievement. Small-for-gestational-age children did remain physically smaller than the appropriate-for-gestational-age children (Casey, Whiteside-Mansell, Barrett, Bradley, and Gargus, 2006).

Singleton Small-for-Gestational-Age Rate, 2005-07 Combined



Regional Data (see Tables 4.3.1.5, 4.3.1.7)



- For 2005 to 2007 combined, the small-for-gestational-age rate was significantly lower than the provincial average in RHAs 4 though 9. The lowest rate was 5.9 (per 100 singleton live births) in RHA 9.
- The rate was significantly higher than the provincial average in RHA 3 (9.4 per 100 singleton live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.3.1.1 Singleton Small-for-Gestational-Age Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Singleton small-for-gestational-age live births	3,311	3,035	2,813	2,825	2,803	2,923	3,015	3,175	3,508	3,774
Singleton live births	36,527	36,749	35,527	36,086	37,072	38,574	38,933	40,249	43,217	46,774
Rate (per 100 singleton live births)	9.1	8.3	7.9	7.8	7.6	7.6	7.7	7.9	8.1	8.1
Standard Error (SE)	0.15	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.13	0.13

Table 4.3.1.2 Singleton Small-for-Gestational-Age Births and Rate by Preterm/Term, Alberta, 1998 to 2007

Preterm	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Singleton small-for-gestational-age preterm live births	242	244	228	239	245	233	283	311	331	348
Singleton preterm live births	2,281	2,393	2,487	2,488	2,606	2,712	2,854	3,053	3,122	3,170
Rate (per 100 singleton preterm live births)	10.6	10.2	9.2	9.6	9.4	8.6	9.9	10.2	10.6	11.0
Standard Error (SE)	0.64	0.62	0.58	0.59	0.57	0.54	0.56	0.55	0.55	0.56

Term	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Singleton small-for-gestational-age term live births	3,067	2,788	2,579	2,581	2,556	2,690	2,730	2,863	3,175	3,426
Singleton term live births	34,221	34,331	33,009	33,577	34,451	35,843	36,065	37,177	40,088	43,597
Rate (per 100 singleton term live births)	9.0	8.1	7.8	7.7	7.4	7.5	7.6	7.7	7.9	7.9
Standard Error (SE)	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13

Table 4.3.1.3 Multiple Small-for-Gestational-Age Births and Rate, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Multiple small-for-gestational-age live births	91	80	95	90	107	81	87	90	100	121
Multiple live births	1,002	1,029	1,098	1,140	1,221	1,294	1,359	1,338	1,442	1,574
Rate (per 100 multiple live births)	9.1	7.8	8.7	7.9	8.8	6.3	6.4	6.7	6.9	7.7
Standard Error (SE)	0.91	0.83	0.85	0.80	0.81	0.67	0.66	0.68	0.67	0.67

Table 4.3.1.4 Singleton Small-for-Gestational-Age Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Singleton small-for-gestational-age live births	607	2,245	3,318	2,788	1,234	264	10,456
Singleton live births	6,806	25,161	41,380	37,338	16,450	3,102	130,237
Rate (per 100 singleton live births)	8.9	8.9	8.0	7.5	7.5	8.5	8.0
Standard Error (SE)	0.35	0.18	0.13	0.14	0.21	0.50	0.08

Table 4.3.1.5 Singleton small-for-Gestational-Age Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Singleton small-for-gestational-age live births	505	356	4,503	897	195	2,878	453	415	255	10,457
Singleton live births	6,553	4,160	47,880	12,165	2,864	38,260	7,462	6,549	4,347	130,247
Rate (per 100 singleton live births)	7.7	8.6	9.4	7.4	6.8	7.5	6.1	6.3	5.9	8.0
Standard Error (SE)	0.33	0.43	0.13	0.24	0.47	0.13	0.28	0.30	0.36	0.08

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.1.6 Singleton Small-for-Gestational-Age Live Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

Singleton small-for-gestational-age live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	294	237	239	216	196	189	179	173	211	223
20-24	720	706	622	646	628	661	646	679	769	797
25-29	1,005	899	847	818	824	883	947	996	1,122	1,200
30-34	831	723	702	725	719	750	770	844	939	1,005
35-39	392	393	346	336	354	345	373	399	379	456
>39	66	75	57	84	82	95	99	84	88	92
All	3,311	3,035	2,813	2,825	2,803	2,923	3,015	3,175	3,508	3,774

Rate (per 100 singleton live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	11.4	9.2	10.0	9.5	9.0	9.1	8.7	8.2	9.3	9.2
20-24	9.5	9.1	8.5	8.8	8.3	8.4	8.4	8.7	9.1	9.0
25-29	8.8	7.9	7.7	7.3	7.2	7.4	7.7	7.8	8.2	8.0
30-34	8.2	7.3	7.2	7.2	6.9	6.8	6.9	7.3	7.6	7.5
35-39	9.4	8.9	7.9	7.6	7.9	7.4	7.9	8.0	6.9	7.6
>39	10.3	10.1	7.7	10.9	10.3	9.8	10.7	8.6	8.6	8.4
All	9.1	8.3	7.9	7.8	7.6	7.6	7.7	7.9	8.1	8.1

Table 4.3.1.7 Singleton Small-for-Gestational-Age Live Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

Singleton small-for-gestational-age live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	151	149	117	137	115	142	142	157	165	183
Palliser	134	105	105	105	98	102	95	117	118	121
Calgary	1,298	1,133	1,074	1,113	1,113	1,215	1,243	1,389	1,474	1,640
David Thompson	313	260	251	224	261	254	262	252	325	320
East Central	73	74	66	65	76	41	68	63	71	61
Capital	924	888	830	827	773	810	843	837	983	1,058
Aspen	193	182	143	162	149	137	164	143	153	157
Peace Country	139	141	146	121	140	133	121	137	141	137
Northern Lights	86	102	80	71	78	89	77	80	78	97
Alberta	3,311	3,035	2,813	2,825	2,803	2,923	3,015	3,175	3,508	3,774

Rate (per 100 singleton live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	7.6	7.4	6.3	7.2	6.0	7.0	7.2	7.7	7.6	7.8
Palliser	11.0	8.8	8.9	8.8	8.3	8.4	7.7	9.0	8.9	7.9
Calgary	10.4	9.0	8.5	8.8	8.5	8.7	8.8	9.3	9.3	9.6
David Thompson	9.0	7.3	7.4	6.6	7.5	7.0	7.2	6.9	7.9	7.3
East Central	7.4	8.0	7.6	7.6	8.0	4.7	7.4	7.1	7.4	6.0
Capital	8.5	8.1	7.9	7.7	7.0	7.1	7.3	7.2	7.7	7.6
Aspen	7.6	7.3	6.4	6.9	6.3	6.0	7.0	6.1	6.1	6.0
Peace Country	7.5	7.4	8.2	6.5	7.5	6.7	6.4	6.8	6.3	6.0
Northern Lights	8.0	9.7	7.4	6.1	6.2	7.1	5.8	5.9	5.5	6.2
Alberta	9.1	8.3	7.9	7.8	7.6	7.6	7.7	7.9	8.1	8.1

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

4.3.2 Low Birth Weight

Low birth weight: *Birth weight of less than 2,500 grams.*

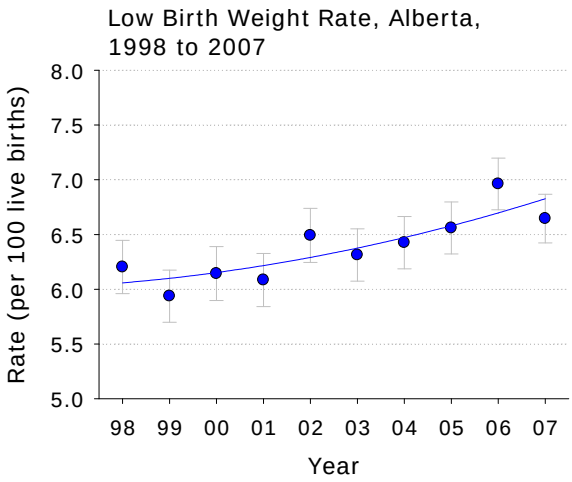
Low birth weight rate: *Number of low birth weight live births per 100 live births.* Since 1990, the rate has included birth weights under 500 grams.

Low birth weight infants may be small-for-gestational-age, or preterm, or both. These types of low birth weight have different underlying causes and different effects on later development (Millar & Chen, 1998; Wallace & McCarton, 1997). Care should be taken in the interpretation of simple low birth weight rates, which reflect the combined effects of restricted growth for gestational age and preterm birth.

The Consensus Statement on Healthy Mothers/Healthy Babies: How to Prevent Low Birth Weight (Institute of Health Economics et al., 2007) makes a number of recommendations on how to reduce low birth weight rates in Alberta.

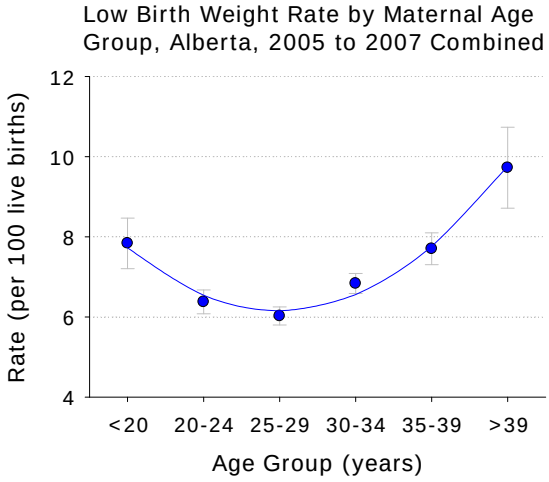
Low birth weight is associated with many negative outcomes, the severity of which depends on both gestational age and birth weight (with more serious outcomes for very small or very preterm babies). Outcomes include fetal and neonatal morbidity and mortality, restricted growth, impaired cognitive development, and chronic diseases in later life (such as asthma, diabetes, hypertension, and cardiovascular disease) (United Nations Children's Fund and World Health Organization, 2004; Wilcox, 2001).

Time Trends (see Tables 4.3.2.1, 4.3.2.2, 4.3.2.3, 4.3.2.6)



- Overall, the low birth weight rate increased between 1998 and 2007, although the 2007 rate was slightly lower than the 2006 rates. In 2007, 6.6% of live births in Alberta were low birth weight.
- While only 2.0% of terms births in 2007 were low birth weight, more than half (57.5%) of preterm births were low birth weight.
- Multiple births are also far more likely to be low birth weight than singleton births. In 2007, the 53.0% of live multiple births were low birth weight, compared with 5.1% of singleton births.

Age Effects (see Table 4.3.2.4, 4.3.2.7)

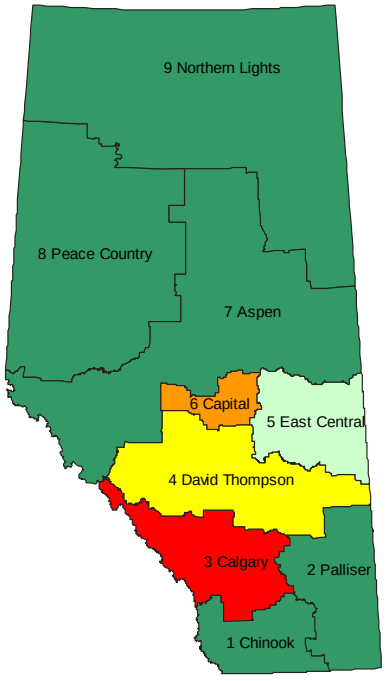


- Women in their 20s have the lowest rates of low birth weight, with elevated rates for women 35 and older (especially 40 and older) and teen mothers. Almost one in ten live births to women 40 and older between 2005 and 2007 were low birth weight.

4.3.2 Low Birth Weight

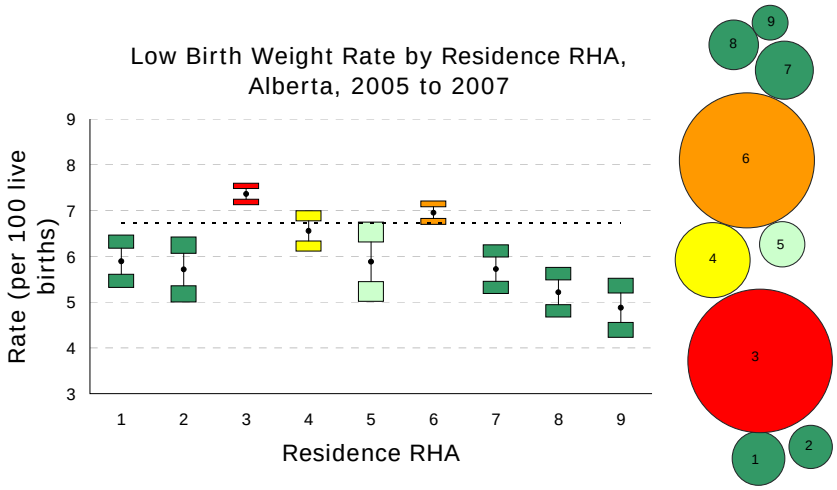
Maternal risk factors for low birth weight include (but are not limited to) smoking, age under 20 or over 35, interval between pregnancies of less than 18 months or more than 60 months, previous preterm birth, underweight prior to pregnancy, stress, physically demanding work, sexually transmitted infection, pre-existing or pregnancy-induced medical conditions, use of assisted reproductive technology, and multiple gestation (Institute for Health Economics, et al., 2007).

Low Birth Weight Rate, 2005-07 Combined



Regional Data (see Table 4.3.2.5, 4.3.2.8)

- The low birth weight rate was lower than the provincial average for 2005 to 2007 combined in RHAs 1, 2, 7, 8, and 9, with the lowest rate in RHA 9 (4.9% of live births).
- The rate was higher than the provincial average in RHA 3 (7.1% of live births).



See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

4.3.2 Low Birth Weight

The low birth weight rate is increasing in both Canada and Alberta. In 2006, the rate was 6.9 (per 100 live births) in Alberta and 6.1 in Canada (Statistics Canada, 2008c).

Low Birth Weight Rate,
Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)

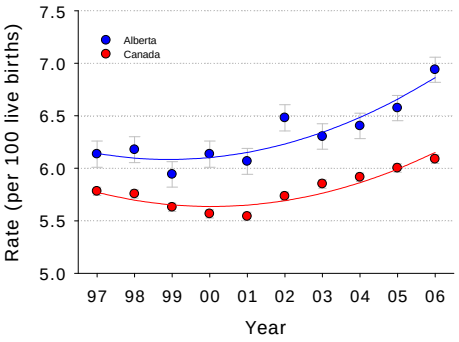


Table 4.3.2.1 Low Birth Weight Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Low birth weight live births	2,328	2,243	2,250	2,265	2,486	2,517	2,589	2,728	3,109	3,213
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	6.2	5.9	6.1	6.1	6.5	6.3	6.4	6.6	7.0	6.6
Standard Error (SE)	0.12	0.12	0.13	0.12	0.13	0.12	0.12	0.12	0.12	0.11

Table 4.3.2.2 Low Birth Weight Births and Rate by Preterm/Term, Alberta, 1998 to 2007

Preterm	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Low birth weight preterm live births	1,578	1,605	1,619	1,632	1,778	1,896	1,929	2,032	2,269	2,331
Preterm live births	2,815	2,936	3,098	3,108	3,300	3,521	3,666	3,781	3,957	4,054
Rate (per 100 preterm live births)	56.1	54.7	52.3	52.5	53.9	53.8	52.6	53.7	57.3	57.5
Standard Error (SE)	0.94	0.92	0.90	0.90	0.87	0.84	0.82	0.81	0.79	0.78

Term	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Low birth weight term live births	750	638	630	631	708	621	660	696	840	882
Term live births	34,689	34,817	33,496	34,097	34,978	36,328	36,612	37,787	40,695	44,287
Rate (per 100 term live births)	2.2	1.8	1.9	1.9	2.0	1.7	1.8	1.8	2.1	2.0
Standard Error (SE)	0.08	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07	0.07

Table 4.3.2.3 Low Birth Weight Births and Rate by Plurality, Alberta, 1998 to 2007

Multiple	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Low birth weight multiple live births	535	510	565	576	679	702	720	696	764	834
Multiple live births	1,002	1,029	1,098	1,140	1,221	1,294	1,359	1,338	1,442	1,574
Rate (per 100 multiple live births)	53.4	49.6	51.5	50.5	55.6	54.3	53.0	52.0	53.0	53.0
Standard Error (SE)	1.58	1.56	1.51	1.48	1.42	1.38	1.35	1.37	1.31	1.26

Singleton	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Low birth weight singleton live births	1,793	1,733	1,685	1,689	1,807	1,815	1,869	2,032	2,345	2,379
Singleton live births	36,527	36,749	35,527	36,086	37,072	38,574	38,933	40,249	43,217	46,774
Rate (per 100 singleton live births)	4.9	4.7	4.7	4.7	4.9	4.7	4.8	5.0	5.4	5.1
Standard Error (SE)	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10

Table 4.3.2.4 Low Birth Weight Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Low birth weight live births	543	1,639	2,564	2,656	1,326	321	9,049
Live births	6,930	25,713	42,562	38,866	17,216	3,302	134,591
Rate (per 100 live births)	7.8	6.4	6.0	6.8	7.7	9.7	6.7
Standard Error (SE)	0.32	0.15	0.12	0.13	0.20	0.52	0.07

Table 4.3.2.5 Low Birth Weight Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Low birth weight live births	399	245	3,644	823	174	2,756	439	352	218	9,050
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,601
Rate (per 100 live births)	5.9	5.7	7.4	6.6	5.9	7.0	5.7	5.2	4.9	6.7
Standard Error (SE)	0.29	0.35	0.12	0.22	0.43	0.13	0.27	0.27	0.32	0.07

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.2.6 Low Birth Weight Live Births by Birth Weight Categories, Alberta, 1998 to 2007

<500 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births <500 grams	30	31	48	45	64	65	75	71	66	77
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	0.08	0.08	0.13	0.12	0.17	0.16	0.19	0.17	0.15	0.16
Standard Error (SE)	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

<1000 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births <1000 grams	166	184	214	196	226	214	230	266	255	270
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	0.4	0.5	0.6	0.5	0.6	0.5	0.6	0.6	0.6	0.6
Standard Error (SE)	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03

<1500 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births <1500 grams	369	375	424	412	448	442	453	522	528	546
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	1.0	1.0	1.2	1.1	1.2	1.1	1.1	1.3	1.2	1.1
Standard Error (SE)	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05

<2500 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births <2500 grams	2330	2243	2251	2267	2486	2517	2589	2728	3109	3214
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	6.2	5.9	6.1	6.1	6.5	6.3	6.4	6.6	7.0	6.6
Standard Error (SE)	0.12	0.12	0.13	0.12	0.13	0.12	0.12	0.12	0.12	0.11

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.2.7 Low Birth Weight Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

Low birth weight live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	206	152	170	159	155	154	136	165	200	178
20-24	449	451	447	458	538	532	531	460	613	566
25-29	650	614	605	605	677	691	710	822	849	893
30-34	622	651	599	583	679	699	688	768	922	966
35-39	340	317	352	384	360	352	417	410	425	491
>39	59	57	77	75	77	89	107	103	100	118
All	2,328	2,243	2,250	2,265	2,486	2,517	2,589	2,728	3,109	3,213

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	7.9	5.8	7.0	6.9	7.0	7.3	6.5	7.7	8.7	7.2
20-24	5.8	5.7	6.0	6.1	6.9	6.6	6.8	5.8	7.1	6.2
25-29	5.5	5.3	5.4	5.3	5.7	5.6	5.6	6.3	6.1	5.8
30-34	5.9	6.3	6.0	5.6	6.2	6.1	5.9	6.4	7.1	7.0
35-39	7.8	6.9	7.6	8.3	7.6	7.1	8.4	7.8	7.4	7.8
>39	8.8	7.4	9.9	9.3	9.3	8.9	10.8	9.9	9.3	10.0
All	6.2	5.9	6.1	6.1	6.5	6.3	6.4	6.6	7.0	6.6

Table 4.3.2.8 Low Birth Weight Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

Low birth weight live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	95	128	118	114	99	111	111	112	146	141
Palliser	72	75	58	73	82	82	57	79	80	86
Calgary	891	806	861	873	992	990	1,046	1,133	1,222	1,289
David Thompson	210	199	184	215	229	204	214	238	307	278
East Central	49	49	56	57	65	66	73	63	65	46
Capital	711	670	676	669	722	753	774	837	920	999
Aspen	138	148	136	120	138	149	155	119	162	158
Peace Country	105	100	103	91	94	95	106	91	130	131
Northern Lights	56	68	57	53	65	67	53	56	77	85
Alberta	2,328	2,243	2,250	2,265	2,486	2,517	2,589	2,728	3,109	3,213

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	4.7	6.2	6.1	5.8	5.0	5.3	5.4	5.3	6.5	5.8
Palliser	5.8	6.1	4.8	5.9	6.7	6.5	4.5	5.9	5.9	5.5
Calgary	6.9	6.2	6.6	6.7	7.3	6.8	7.2	7.3	7.5	7.3
David Thompson	5.9	5.5	5.3	6.2	6.3	5.5	5.7	6.2	7.2	6.2
East Central	4.9	5.1	6.2	6.5	6.7	7.3	7.7	6.8	6.6	4.4
Capital	6.4	5.9	6.3	6.1	6.4	6.4	6.5	6.9	7.0	6.9
Aspen	5.3	5.8	6.0	5.0	5.7	6.2	6.5	5.0	6.3	5.8
Peace Country	5.5	5.1	5.7	4.8	4.9	4.7	5.4	4.4	5.7	5.5
Northern Lights	5.1	6.4	5.1	4.4	5.0	5.2	3.9	4.0	5.3	5.2
Alberta	6.2	5.9	6.1	6.1	6.5	6.3	6.4	6.6	7.0	6.6

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

4.3.3 Large-for-Gestational-Age

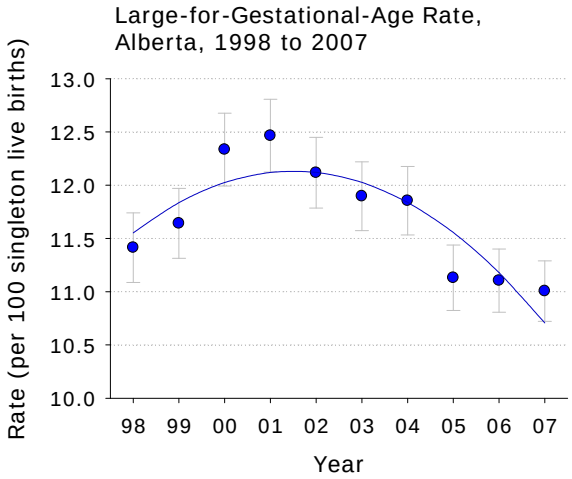
Large-for-gestational-age infants have *a birth weight above the 90th percentile of appropriate for gestational age infants* (see Alberta norms in Robertson, Svenson, & Kyle, 2002 for Alberta norms).

Large-for-gestational-age rate: *Number of singleton large-for-gestational-age live births per 100 singleton live births.*

Macrosomic infants (whether large-for-gestational-age or high birth weight) have increased risk of infant mortality and shoulder dystocia. Macrosomic infants are more likely than normal weight infants to become overweight children. Maternal morbidity associated with delivery of a macrosomic infant includes genital tract injury, prolonged labour, postpartum bleeding, and cesarean delivery (Surkan, Chung-Cheng, Johansson, Dickman, & Cnattingius, 2005).

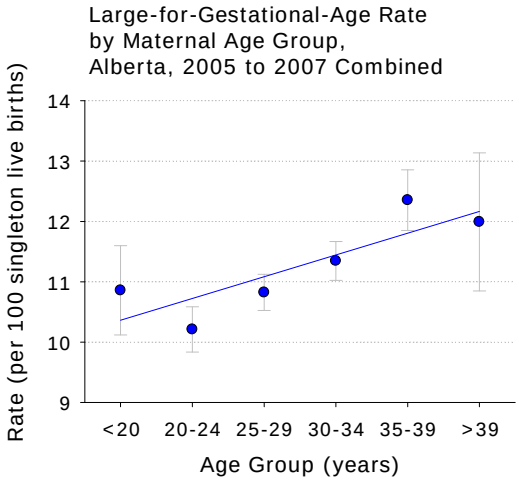
Both genetic and environmental factors influence rates of macrosomia. Recent increases in macrosomia rates worldwide are related to increases in maternal overweight and diabetes (whether pre-existing or gestational; Henriksen, 2008).

Time Trends (see Tables 4.3.3.1)



- The singleton large-for-gestational-age rate in Alberta increased to 2001, then decreased to 2005, and stabilized. In 2007, the rate was 11.0 (per 100 singleton live births).

Age Effects (see Table 4.3.3.2)

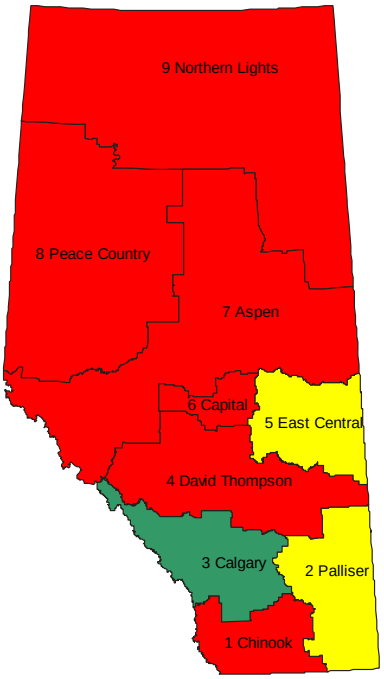


- Large-for-gestational-age births are more likely as maternal age increases, but the effect of maternal age is not substantial.

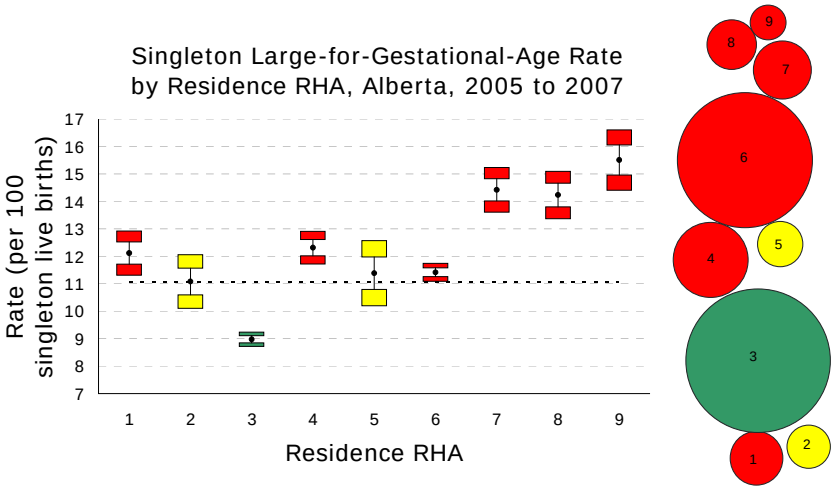
4.3.3 Large-for-Gestational-Age

The increase in large-for-gestational-age birth in Canada between 1976 and 1996 was associated with increases in maternal weight, weight gain during pregnancy, and gestational diabetes rates, in concert with decreasing maternal smoking and post-term delivery rates (Kramer, Morin, Yang, Platt, Usher, McNamara et al., 2002).

Large-for-Gestational-Age Rate, 2005-07 Combined



Regional Data (see Table 4.3.3.3)



- Between 2005 and 2007, the singleton large-for-gestational-age rate was significantly lower than the provincial average in RHA 3 (9.0 per 100 singleton live births).
- The rate was significantly higher than the provincial average in RHAs 1, 4, 6, 7, 8, and 9 during that time period, and the highest rate was in RHA 7 (15.5 per 100 singleton live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.3.3.1 Singleton Large-for-Gestational-Age Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Singleton large-for-gestational-age live births	4,169	4,278	4,382	4,498	4,492	4,589	4,615	4,480	4,799	5,148
Singleton live births	36,527	36,749	35,527	36,086	37,072	38,574	38,933	40,249	43,217	46,774
Rate (per 100 singleton live births)	11.4	11.6	12.3	12.5	12.1	11.9	11.9	11.1	11.1	11.0
Standard Error (SE)	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.14

Table 4.3.3.2 Singleton Large-for-Gestational-Age Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Singleton large-for-gestational-age live births	739	2,569	4,479	4,236	2,032	372	14,427
Singleton live births	6,806	25,161	41,380	37,338	16,450	3,102	130,237
Rate (per 100 singleton live births)	10.9	10.2	10.8	11.3	12.4	12.0	11.1
Standard Error (SE)	0.38	0.19	0.15	0.16	0.26	0.58	0.09

Table 4.3.3.3 Singleton Large-for-Gestational-Age Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Singleton large-for-gestational-age live births	794	461	4,298	1,498	326	4,368	1,076	932	674	14,428
Singleton live births	6,553	4,160	47,880	12,165	2,864	38,260	7,462	6,549	4,347	130,247
Rate (per 100 singleton live births)	12.1	11.1	9.0	12.3	11.4	11.4	14.4	14.2	15.5	11.1
Standard Error (SE)	0.40	0.49	0.13	0.30	0.59	0.16	0.41	0.43	0.55	0.09

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.3.4 Singleton Large-for-Gestational-Age Live Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

Singleton large-for-gestational-Age live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	240	222	240	249	217	211	227	241	258	240
20-24	711	788	789	814	842	827	800	823	834	912
25-29	1,359	1,352	1,363	1,416	1,368	1,389	1,422	1,366	1,499	1,614
30-34	1,233	1,263	1,293	1,327	1,371	1,450	1,447	1,331	1,426	1,479
35-39	530	554	581	610	592	582	612	594	664	774
>39	93	99	116	81	102	130	106	125	118	129
All	4,169	4,278	4,382	4,498	4,492	4,589	4,615	4,480	4,799	5,148

Rate (per 100 singleton live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	9.3	8.6	10.0	10.9	9.9	10.1	11.0	11.4	11.4	9.9
20-24	9.4	10.2	10.8	11.1	11.1	10.6	10.4	10.5	9.9	10.3
25-29	11.9	11.9	12.4	12.7	11.9	11.6	11.5	10.7	11.0	10.7
30-34	12.2	12.8	13.3	13.1	13.1	13.2	12.9	11.5	11.5	11.1
35-39	12.7	12.5	13.2	13.9	13.2	12.4	13.0	11.9	12.2	12.9
>39	14.6	13.3	15.6	10.5	12.8	13.4	11.4	12.7	11.6	11.7
All	11.4	11.6	12.3	12.5	12.1	11.9	11.9	11.1	11.1	11.0

Table 4.3.3.5 Singleton Large-for-Gestational-Age Live Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

Singleton large-for-gestational-Age live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	274	253	290	237	251	258	270	263	263	268
Palliser	119	120	141	142	143	139	127	134	167	160
Calgary	1,186	1,271	1,329	1,317	1,316	1,375	1,370	1,353	1,432	1,513
David Thompson	443	445	460	518	483	481	491	470	511	517
East Central	125	104	102	111	118	112	114	97	100	129
Capital	1,310	1,362	1,327	1,332	1,376	1,387	1,388	1,368	1,390	1,610
Aspen	356	339	337	348	364	360	357	320	372	384
Peace Country	217	225	226	305	259	299	294	273	338	321
Northern Lights	138	158	170	188	181	178	203	202	226	246
Alberta	4,169	4,278	4,382	4,498	4,492	4,589	4,615	4,480	4,799	5,148

Rate (per 100 singleton live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	13.8	12.6	15.5	12.5	13.2	12.6	13.6	12.9	12.1	11.4
Palliser	9.8	10.0	12.0	12.0	12.1	11.4	10.3	10.3	12.5	10.5
Calgary	9.5	10.1	10.5	10.4	10.0	9.9	9.7	9.0	9.1	8.8
David Thompson	12.8	12.6	13.6	15.3	13.9	13.3	13.4	12.8	12.4	11.8
East Central	12.7	11.2	11.7	13.0	12.4	12.9	12.5	11.0	10.4	12.6
Capital	12.0	12.3	12.7	12.4	12.5	12.2	12.1	11.7	11.0	11.6
Aspen	14.0	13.7	15.1	14.9	15.5	15.7	15.3	13.7	14.9	14.6
Peace Country	11.6	11.9	12.7	16.4	13.9	15.1	15.4	13.5	15.1	14.0
Northern Lights	12.8	15.0	15.7	16.0	14.5	14.2	15.3	14.9	15.9	15.7
Alberta	11.4	11.6	12.3	12.5	12.1	11.9	11.9	11.1	11.1	11.0

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

4.3.4 High Birth Weight

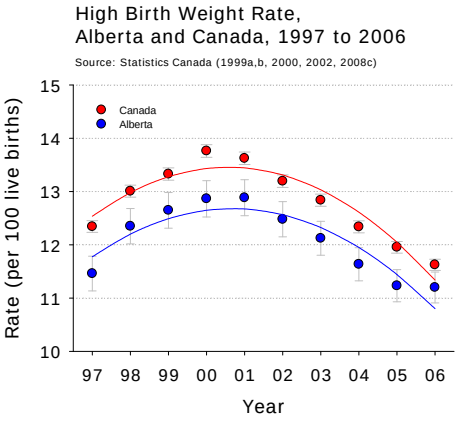
High birth weight infants *weigh 4,000 grams or more at birth.*

Very high birth weight infants *weigh 4,500 grams or more at birth.*

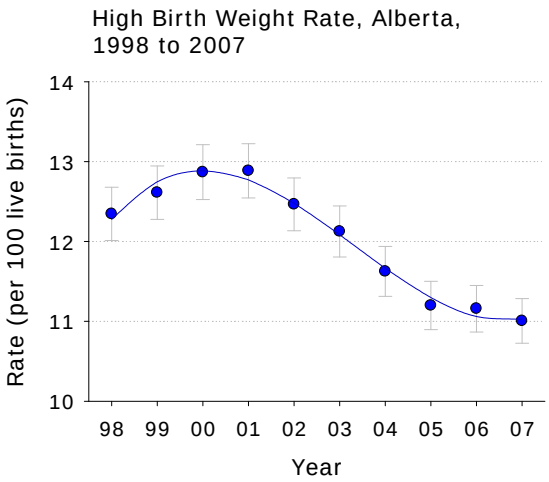
High birth weight rate: *Number of high birth weight live births per 100 live births.*

Almost three-quarters of high birth weight infants are large-for-gestational-age; the remaining one-quarter of high birth weight infants are between the 50th and 90th percentiles of weight for gestational age. Virtually all high birth weight infants are born at term or post-term, whereas large-for-gestational-age infants span the range of gestational ages.

The high birth weight rate followed a similar trend in Alberta and Canada between 1997 and 2006, but the Alberta rate was consistently lower than the overall rate for Canada. The rate peaked in 2000 and 2001, and declined thereafter. In 2006, the high birth weight rate was 11.2 in Alberta and 11.6 in Canada (Statistics Canada, 2008c).

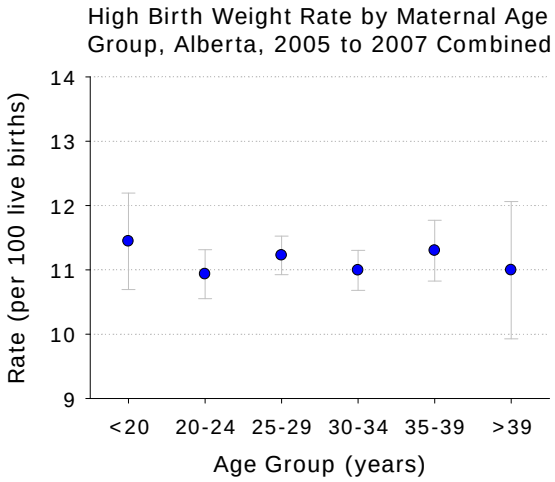


Time Trends (see Table 4.3.4.1)



- The high birth weight rate increased slightly from 1998 to 2000, and decreased from 2002 to 2005 before stabilizing in 2006 and 2007. In 2007, the rate was 11.0 (per 100 live births).
- The rate of births 4,500 grams or over (very high birth weight births) showed a similar pattern, with a rate of 1.8 in 2007.

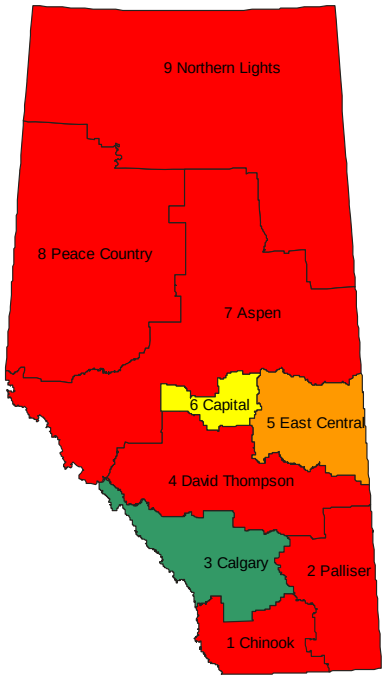
Age Effects (see Table 4.3.4.2)



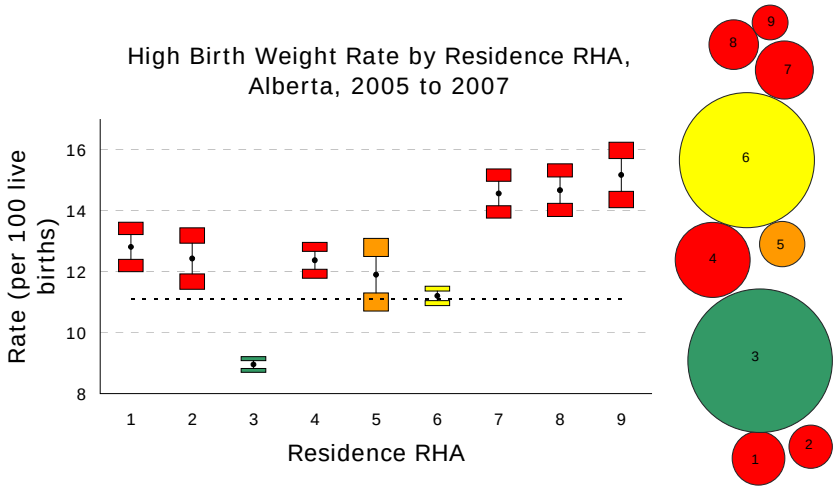
- Maternal age was unrelated to the rate of high birth weight in Alberta between 2005 and 2007.

4.3.4 High Birth Weight

High Birth Weight Rate, 2005-07 Combined



Regional Data (see Table 4.3.4.3)



- For 2005 to 2007 combined, the high birth weight rate was significantly lower than the provincial average in RHA 3 (9.0 per 100 live births).
- The rate was significantly higher than the provincial average in RHAs 1, 2, 4, 7, 8, and 9 between 2005 and 2007, with the highest rate (15.2) in RHA 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.3.4.1 High Birth Weight Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
High birth weight live births	4,633	4,764	4,713	4,796	4,773	4,834	4,684	4,657	4,983	5,321
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	12.3	12.6	12.9	12.9	12.5	12.1	11.6	11.2	11.2	11.0
Standard Error (SE)	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.14

Table 4.3.4.2 High Birth Weight Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
High birth weight live births	793	2,811	4,777	4,272	1,945	363	14,961
Live births	6,930	25,713	42,562	38,866	17,216	3,302	134,591
Rate (per 100 live births)	11.4	10.9	11.2	11.0	11.3	11.0	11.1
Standard Error (SE)	0.38	0.19	0.15	0.16	0.24	0.54	0.09

Table 4.3.4.3 High Birth Weight Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
High birth weight live births	867	533	4,431	1,553	352	4,440	1,117	990	678	14,961
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,601
Rate (per 100 live births)	12.8	12.4	9.0	12.4	11.9	11.2	14.6	14.7	15.2	11.1
Standard Error (SE)	0.41	0.50	0.13	0.29	0.60	0.16	0.40	0.43	0.54	0.09

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.4.4 High Birth Weight Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

High birth weight live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	274	237	247	291	240	245	258	268	254	271
20-24	819	925	894	914	928	902	869	895	940	976
25-29	1,518	1,530	1,461	1,494	1,470	1,481	1,441	1,448	1,594	1,735
30-34	1,373	1,363	1,409	1,417	1,433	1,473	1,435	1,359	1,427	1,486
35-39	554	599	602	600	600	613	581	566	652	727
>39	93	110	100	80	102	120	100	121	116	126
All	4,633	4,764	4,713	4,796	4,773	4,834	4,684	4,657	4,983	5,321

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	10.5	9.1	10.1	12.6	10.8	11.5	12.3	12.5	11.0	10.9
20-24	10.6	11.8	12.0	12.1	11.9	11.2	11.1	11.2	10.9	10.7
25-29	13.0	13.1	12.9	13.0	12.4	12.0	11.4	11.0	11.4	11.2
30-34	13.1	13.3	14.0	13.5	13.1	12.9	12.3	11.3	11.0	10.7
35-39	12.8	13.0	13.1	13.0	12.7	12.4	11.7	10.8	11.4	11.6
>39	13.9	14.3	12.8	9.9	12.3	12.0	10.1	11.6	10.8	10.6
All	12.3	12.6	12.9	12.9	12.5	12.1	11.6	11.2	11.2	11.0

Table 4.3.4.5 High Birth Weight Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

High birth weight live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	290	283	318	269	286	282	264	278	285	304
Palliser	142	150	171	162	173	160	153	161	190	182
Calgary	1,381	1,456	1,427	1,414	1,387	1,490	1,380	1,442	1,480	1,509
David Thompson	507	509	487	553	509	490	527	480	527	546
East Central	135	115	115	110	123	120	105	104	120	128
Capital	1,364	1,430	1,363	1,371	1,395	1,408	1,359	1,360	1,407	1,673
Aspen	400	378	369	367	387	373	361	338	391	388
Peace Country	266	278	262	337	300	316	322	297	355	338
Northern Lights	147	164	201	212	212	195	213	197	228	253
Alberta	4,633	4,764	4,713	4,796	4,773	4,834	4,684	4,657	4,983	5,321

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	14.4	13.7	16.3	13.7	14.5	13.5	12.9	13.2	12.7	12.6
Palliser	11.4	12.2	14.0	13.2	14.1	12.7	12.0	11.9	13.9	11.5
Calgary	10.7	11.2	10.9	10.8	10.2	10.3	9.4	9.3	9.1	8.5
David Thompson	14.2	14.0	14.0	15.9	14.1	13.1	13.9	12.6	12.4	12.2
East Central	13.6	12.0	12.7	12.5	12.7	13.4	11.0	11.2	12.1	12.3
Capital	12.2	12.6	12.6	12.4	12.4	12.0	11.4	11.2	10.7	11.6
Aspen	15.4	14.9	16.1	15.3	16.1	15.6	15.1	14.2	15.1	14.3
Peace Country	13.9	14.3	14.4	17.7	15.6	15.5	16.4	14.3	15.4	14.2
Northern Lights	13.4	15.3	18.0	17.8	16.3	15.1	15.8	14.2	15.7	15.5
Alberta	12.3	12.6	12.9	12.9	12.5	12.1	11.6	11.2	11.2	11.0

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.4.6 Very High Birth Weight Births[1] and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Very High birth weight live births	644	767	778	797	743	782	697	683	734	881
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	1.7	2.0	2.1	2.1	1.9	2.0	1.7	1.6	1.6	1.8
Standard Error (SE)	0.07	0.07	0.08	0.08	0.07	0.07	0.06	0.06	0.06	0.06

Table 4.3.4.7 Very High Birth Weight Births[1] and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Very High birth weight live births	149	441	698	651	294	62	2,295
Live births	6,930	25,713	42,562	38,866	17,216	3,302	134,594
Rate (per 100 live births)	2.2	1.7	1.6	1.7	1.7	1.9	1.7
Standard Error (SE)	0.17	0.08	0.06	0.07	0.10	0.24	0.04

Table 4.3.4.8 Very High Birth Weight Births[1] and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Very High birth weight live births	144	87	578	285	43	657	238	148	115	2,295
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,594
Rate (per 100 live births)	2.1	2.0	1.2	2.3	1.5	1.7	3.1	2.2	2.6	1.7
Standard Error (SE)	0.18	0.22	0.05	0.13	0.22	0.06	0.20	0.18	0.24	0.04

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: 1. Very high birth weight births are those over 4,499 grams.

Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.4.9 Very High Birth Weight Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

Very high birth weight live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	32	43	32	32	34	37	39	51	47	51
20-24	112	131	128	144	138	143	114	123	142	176
25-29	202	245	243	255	237	236	210	200	231	267
30-34	194	222	244	250	219	250	225	203	201	247
35-39	86	104	112	99	96	90	92	82	94	118
>39	16	21	19	16	17	24	17	22	18	22
All	642	766	778	796	741	780	697	681	733	881

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	1.2	1.7	1.3	1.4	1.5	1.7	1.9	2.4	2.0	2.1
20-24	1.5	1.7	1.7	1.9	1.8	1.8	1.5	1.5	1.6	1.9
25-29	1.7	2.1	2.2	2.2	2.0	1.9	1.7	1.5	1.6	1.7
30-34	1.9	2.2	2.4	2.4	2.0	2.2	1.9	1.7	1.6	1.8
35-39	2.0	2.3	2.4	2.1	2.0	1.8	1.9	1.6	1.6	1.9
>39	2.4	2.7	2.4	2.0	2.1	2.4	1.7	2.1	1.7	1.9
All	1.7	2.0	2.1	2.1	1.9	2.0	1.7	1.6	1.6	1.8

Table 4.3.4.10 Very High Birth Weight Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

Very high birth weight live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	45	48	43	50	44	51	39	44	52	48
Palliser	28	25	35	29	28	16	22	22	33	32
Calgary	171	212	222	223	188	221	187	183	170	225
David Thompson	70	78	70	104	88	87	92	73	105	107
East Central	20	22	16	15	17	20	20	13	13	17
Capital	184	230	243	213	226	218	184	192	197	268
Aspen	59	73	70	61	68	66	62	81	65	92
Peace Country	38	54	45	67	46	67	63	41	62	45
Northern Lights	27	24	34	34	35	34	28	32	36	47
Alberta	642	766	778	796	741	780	697	681	733	881

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	2.2	2.3	2.2	2.6	2.2	2.4	1.9	2.1	2.3	2.0
Palliser	2.3	2.0	2.9	2.4	2.3	1.3	1.7	1.6	2.4	2.0
Calgary	1.3	1.6	1.7	1.7	1.4	1.5	1.3	1.2	1.0	1.3
David Thompson	2.0	2.1	2.0	3.0	2.4	2.3	2.4	1.9	2.5	2.4
East Central	2.0	2.3	1.8	1.7	1.8	2.2	2.1	1.4	1.3	1.6
Capital	1.6	2.0	2.3	1.9	2.0	1.9	1.5	1.6	1.5	1.9
Aspen	2.3	2.9	3.1	2.5	2.8	2.8	2.6	3.4	2.5	3.4
Peace Country	2.0	2.8	2.5	3.5	2.4	3.3	3.2	2.0	2.7	1.9
Northern Lights	2.5	2.2	3.0	2.9	2.7	2.6	2.1	2.3	2.5	2.9
Alberta	1.7	2.0	2.1	2.1	1.9	2.0	1.7	1.6	1.6	1.8

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: 1. Very high birth weight births are those over 4,499 grams.

Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

4. Births

4.4.1 Preterm Births

Preterm births *occur prior to 37 completed weeks of gestation* (Dorland, 2000). Gestation is measured in complete weeks from the date of the last menstrual period. Ultrasound is typically used to determine gestational age and is generally more accurate than other methods.

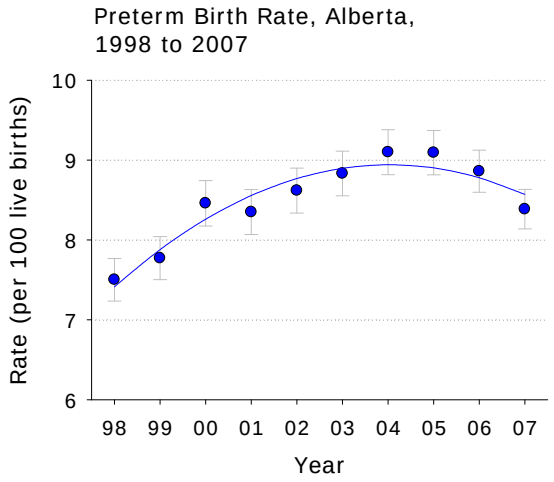
Preterm birth rate: *Number of preterm births per 100 live births in a given year.*

In 2005 dollars, direct medical costs alone of singleton preterm births have been estimated at $20 million per year in Alberta. Preterm births account for more than 80% of complications and mortality around the time of birth (Institute of Health Economics, et al., 2007; note that the cost estimate excluded indirect, social, and other costs, and only included a portion of direct medical costs).

For babies that are very preterm, outcomes include respiratory problems, motor and sensory complications (e.g., cerebral palsy, visual system disorders, hearing disorders), and neurocognitive problems (e.g., lower IQ, lower academic achievement, behaviour issues; Institute of Health Economics, et al., 2007). Medical advances have resulted in higher survival rates, at the cost of increased severe morbidity rates (Wen, Smith, Yang, and Walker, 2004). Even babies born close to term have been shown to have deficits in reading and spelling (Kirkegaard, Obel, Hedegaard, and Henriksen, 2006).

Time Trends (see Tables 4.4.1.1, 4.4.1.2, 4.4.1.3, 4.4.1.6)

- Over 90% of live births in Alberta are term births (37 to 42 weeks gestation), and almost none are post-term (more than 42 weeks gestation). The remaining births are preterm (less than 37 weeks gestation).
- More than 90% of the preterm births occur between 27 and 36 weeks gestation, and the vast majority occurs at 35 or 36 weeks gestation.



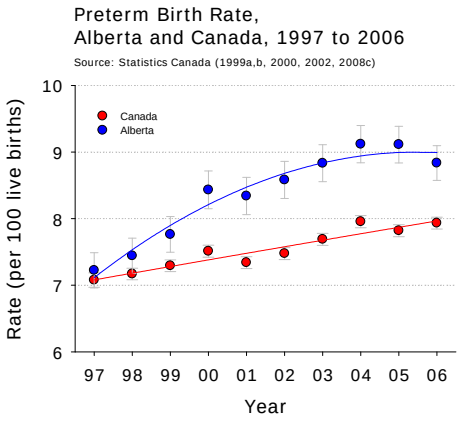
- The preterm birth rate increased from 1998 to 2004, and declined in 2006 and 2007. The rate was 8.4 (per 100 live births) in 2007; this represents 4,054 preterm live births, compared to 2,815 preterm live births in 1998.
- Among low birth weight births, 72.5% were preterm, while just 3.8% of non-low birth weight births were preterm in 2007.
- Multiple live births occurred prior to term 56.2% of the time in 2007, compared to a preterm rate of 6.8% for singleton births.

4.4.1 Preterm Births

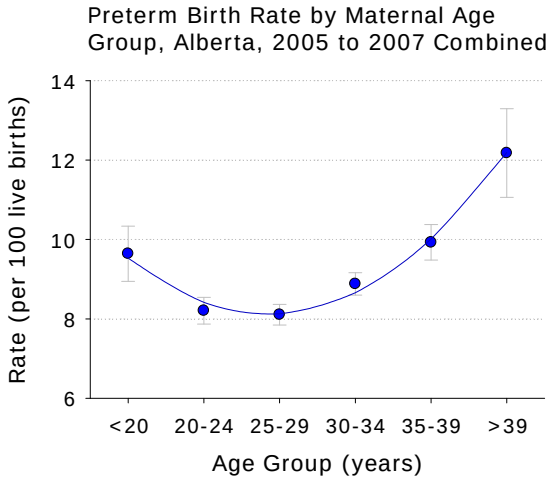
Risk factors for preterm birth include maternal smoking, genital tract infection, preeclampsia, incompetent cervix, prior preterm birth, placental abruption, high maternal age, assisted reproduction, multiple pregnancy, low socioeconomic status, substance abuse, and psychological factors such as stress and depression (e.g., Slattery and Morrison, 2002; Tough et al., 2003).

Rising preterm birth rates are partially due to increases in rates of assisted and multiple pregnancy, accuracy of estimations of gestational age, and rates of registration of extremely preterm or extremely low birth weight infants, as well as changes in maternal risk factor patterns (Wen, Smith, Yang, and Walker, 2004).

The preterm birth rate was similar in Canada and Alberta in the late 1990s. The rate increased to 2004 in both Canada and Alberta, but the increase was greater in Alberta. By 2006, the preterm birth rate was 8.8 (per 100 live births) in Alberta and 7.9 in Canada (Statistics Canada, 2008c).



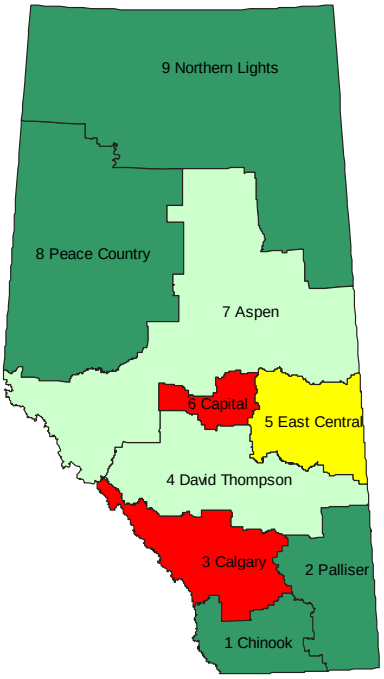
Age Effects (see Tables 4.4.1.4, 4.4.1.7)



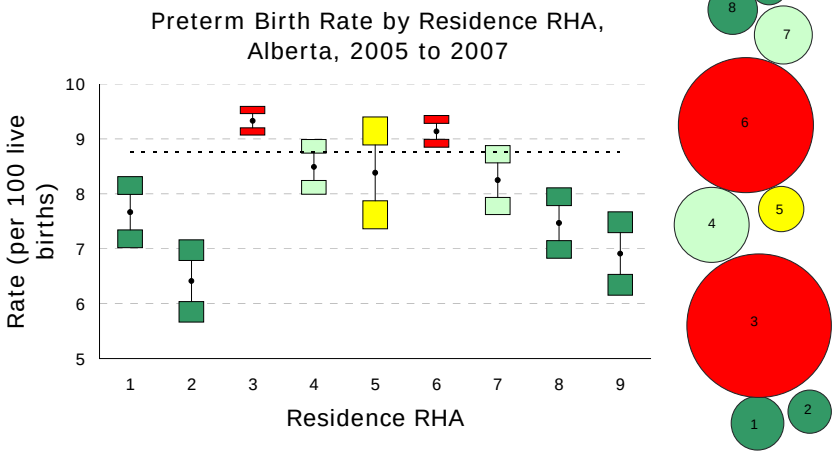
- Preterm births were most common in mothers 35 and older, especially mothers older than 39 years of age, between 2005 and 2007. The lowest rates occurred in women between 20 and 29 years of age.
- For 2005 to 2007 combined, the preterm birth rate was 12.2 (per 100 live births) for mothers over 39 years of age, and 8.1 for mothers 25 to 29 years of age.

4.4.1 Preterm Births

Preterm Birth Rate, 2005-07 Combined



Regional Data (see Tables 4.4.1.5, 4.4.1.8)



- Between 2005 and 2007, preterm birth rates were lower than the provincial average in RHAs 1, 2, 8, and 9. The lowest rate was 6.4 (per 100 live births) in RHA 2.
- The preterm birth rate was higher than the provincial average in the two major metropolitan areas (RHAs 3 and 6) during that time period. The highest rate was 9.3, in RHA 3.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.4.1.1 Preterm Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Preterm live births	2,815	2,936	3,098	3,108	3,300	3,521	3,666	3,781	3,957	4,054
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	7.5	7.8	8.5	8.3	8.6	8.8	9.1	9.1	8.9	8.4
Standard Error (SE)	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.13	0.13

Table 4.4.1.2 Preterm Births and Rate by Low Birth Weight Status, Alberta, 1998 to 2007

Birth weight <2500 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Preterm low birth weight live births	1,578	1,605	1,619	1,632	1,778	1,896	1,929	2,032	2,269	2,331
Low birth weight live births	2,328	2,243	2,250	2,265	2,486	2,517	2,589	2,728	3,109	3,213
Rate (per 100 low birth weight live births)	67.8	71.6	72.0	72.1	71.5	75.3	74.5	74.5	73.0	72.5
Standard Error (SE)	0.97	0.95	0.95	0.94	0.91	0.86	0.86	0.83	0.80	0.79

Birth weight >2499 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Preterm non-low birth weight live births	1,237	1,331	1,478	1,476	1,522	1,625	1,737	1,749	1,688	1,723
Non-low birth weight live births	35,199	35,535	34,374	34,959	35,807	37,351	37,703	38,859	41,550	45,134
Rate (per 100 non-low birth weight live births)	3.5	3.7	4.3	4.2	4.3	4.4	4.6	4.5	4.1	3.8
Standard Error (SE)	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.09

Table 4.4.1.3 Preterm Births and Rate by Plurality, Alberta, 1998 to 2007

Multiple	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Preterm multiple live births	534	543	611	620	694	809	812	728	835	884
Multiple live births	1,002	1,029	1,098	1,140	1,221	1,294	1,359	1,338	1,442	1,574
Rate (per 100 multiple live births)	53.3	52.8	55.6	54.4	56.8	62.5	59.7	54.4	57.9	56.2
Standard Error (SE)	1.58	1.56	1.50	1.48	1.42	1.35	1.33	1.36	1.30	1.25

Singleton	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Preterm singleton live births	2,281	2,393	2,487	2,488	2,606	2,712	2,854	3,053	3,122	3,170
Singleton live births	36,527	36,749	35,527	36,086	37,072	38,574	38,933	40,249	43,217	46,774
Rate (per 100 singleton live births)	6.2	6.5	7.0	6.9	7.0	7.0	7.3	7.6	7.2	6.8
Standard Error (SE)	0.13	0.13	0.14	0.13	0.13	0.13	0.13	0.13	0.12	0.12

Table 4.4.1.4 Preterm Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Preterm live births	668	2,110	3,450	3,452	1,709	402	11,792
Live births	6,930	25,713	42,562	38,866	17,216	3,302	134,591
Rate (per 100 live births)	9.6	8.2	8.1	8.9	9.9	12.2	8.8
Standard Error (SE)	0.35	0.17	0.13	0.14	0.23	0.57	0.08

Table 4.4.1.5 Preterm Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Preterm live births	519	275	4,617	1,066	248	3,621	633	504	309	11,793
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,601
Rate (per 100 live births)	7.7	6.4	9.3	8.5	8.4	9.1	8.2	7.5	6.9	8.8
Standard Error (SE)	0.32	0.37	0.13	0.25	0.51	0.14	0.31	0.32	0.38	0.08

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.4.1.6 Live Births by Gestational Age Categories, Alberta, 1998 to 2007

20 - 27 weeks	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births 20 to 27 weeks	162	173	207	180	221	216	224	269	236	243
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	0.43	0.46	0.57	0.48	0.58	0.54	0.56	0.65	0.53	0.50
Standard Error (SE)	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03

28 - 36 weeks	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births 28 to 36 weeks	2,649	2,757	2,886	2,921	3,067	3,298	3,431	3,502	3,710	3,799
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	7.1	7.3	7.9	7.8	8.0	8.3	8.5	8.4	8.3	7.9
Standard Error (SE)	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.12

37 - 42 weeks (term)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births 37 to 41 weeks	34,689	34,817	33,496	34,097	34,978	36,328	36,612	37,787	40,695	44,287
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	92.4	92.2	91.5	91.6	91.3	91.1	90.9	90.9	91.1	91.6
Standard Error (SE)	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.13	0.13

43 weeks or more (post-term)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live births 42 weeks or more	24	21	29	15	15	19	13	19	7	7
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Error (SE)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.4.1.7 Preterm Live Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

Preterm live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	241	193	215	193	204	193	188	222	228	218
20-24	545	614	576	616	713	702	713	656	753	701
25-29	801	832	870	892	937	1,018	1,063	1,151	1,108	1,191
30-34	755	821	865	838	934	1,000	1,009	1,072	1,188	1,192
35-39	410	398	474	475	432	494	554	547	558	604
>39	61	77	98	94	80	114	138	132	122	148
All	2,815	2,936	3,098	3,108	3,300	3,521	3,666	3,781	3,957	4,054

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	9.2	7.4	8.8	8.3	9.2	9.1	9.0	10.3	9.9	8.8
20-24	7.1	7.8	7.7	8.2	9.2	8.7	9.1	8.2	8.7	7.7
25-29	6.8	7.1	7.7	7.8	7.9	8.3	8.4	8.8	7.9	7.7
30-34	7.2	8.0	8.6	8.0	8.6	8.7	8.6	8.9	9.2	8.6
35-39	9.5	8.6	10.3	10.3	9.1	10.0	11.2	10.4	9.8	9.6
>39	9.1	10.0	12.5	11.6	9.7	11.4	14.0	12.6	11.4	12.5
All	7.5	7.8	8.5	8.3	8.6	8.8	9.1	9.1	8.9	8.4

Table 4.4.1.8 Preterm Live Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

Preterm live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	130	143	149	142	135	161	169	147	196	176
Palliser	98	77	79	88	93	105	68	85	88	102
Calgary	994	1,045	1,131	1,126	1,243	1,349	1,383	1,509	1,511	1,597
David Thompson	229	257	257	278	299	279	319	350	359	357
East Central	70	59	84	82	84	99	86	90	92	66
Capital	920	952	1,019	986	1,024	1,095	1,177	1,179	1,202	1,240
Aspen	176	199	187	192	207	192	232	193	221	219
Peace Country	116	121	112	141	124	144	149	137	184	183
Northern Lights	81	83	80	73	90	97	82	91	104	114
Alberta	2,815	2,936	3,098	3,108	3,300	3,521	3,666	3,781	3,957	4,054

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	6.4	6.9	7.7	7.2	6.9	7.7	8.3	7.0	8.7	7.3
Palliser	7.9	6.3	6.5	7.2	7.6	8.3	5.3	6.3	6.5	6.5
Calgary	7.7	8.0	8.7	8.6	9.1	9.3	9.5	9.8	9.2	9.0
David Thompson	6.4	7.0	7.4	8.0	8.3	7.5	8.4	9.2	8.4	8.0
East Central	7.0	6.1	9.3	9.3	8.7	11.0	9.0	9.7	9.3	6.3
Capital	8.2	8.4	9.4	8.9	9.1	9.4	9.9	9.7	9.2	8.6
Aspen	6.8	7.8	8.2	8.0	8.6	8.0	9.7	8.1	8.6	8.1
Peace Country	6.0	6.2	6.2	7.4	6.5	7.1	7.6	6.6	8.0	7.7
Northern Lights	7.4	7.8	7.2	6.1	6.9	7.5	6.1	6.6	7.2	7.0
Alberta	7.5	7.8	8.5	8.3	8.6	8.8	9.1	9.1	8.9	8.4

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

4. Births

4.5.1 Multiple Births

Multiple pregnancy: *Pregnancy in which two or more fetuses exist simultaneously* (Dorland, 2000).

Multiple birth: *The birth of two or more offspring produced in the same gestation period* (Dorland, 2000). This includes both live births and stillbirths.

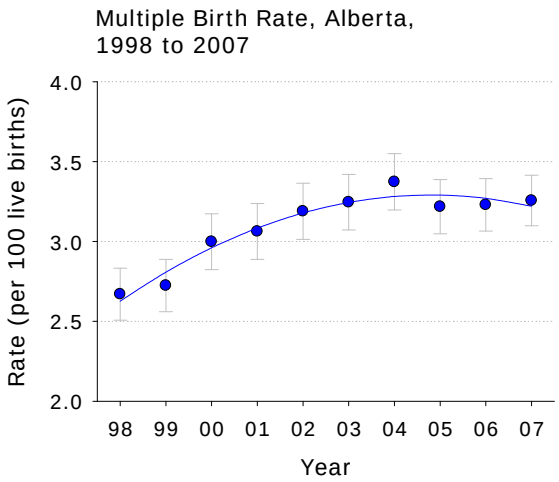
Multiple birth rate: *Number of multiple live births per 100 live births.*

Risk factors for multiple pregnancy include ovulation-stimulating medications, assisted reproductive technologies, higher maternal age, and obesity (Reddy, Branum, and Klebanoff, 2005).

Adverse perinatal outcomes more common in twins than singletons include preterm birth, low birth weight, in utero growth restriction, stillbirth, congenital anomalies, twin-twin transfusion syndrome, and infant death. Twins conceived after in vitro fertilization have worse perinatal outcomes than twins conceived spontaneously. Triplets and higher order multiples are at greatly increased risk of complications, compared to twins and singletons (Bissonnette, Cohen, Collins, et al., 2007).

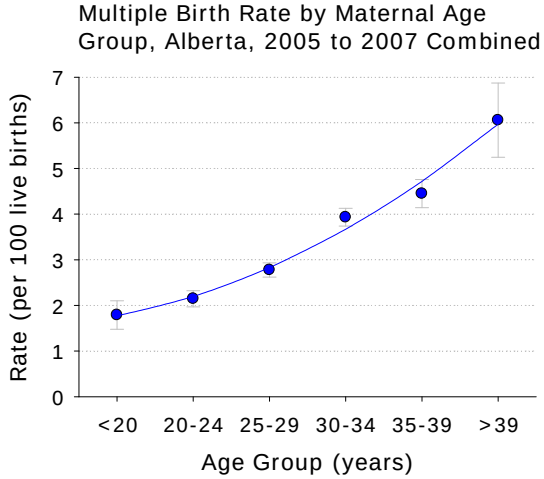
Multiple gestations are associated with maternal complications as well, including including maternal cardiovascular morbidity, haematologic morbidity, amniotic fluid embolus, pre-eclampsia, gestational diabetes, postpartum hemorrhage, prolonged hospital stay, operative delivery, hysterectomy, and blood transfusion. Rates of uterine rupture and vaginal tearing are lower in multiple pregnancies, owing to the high rates of cesarean section in multiple births (Walker, Murphy, Pan, Yang, and Wen, 2004).

Time Trends (see Tables 4.5.1.1, 4.5.1.4, 4.5.1.5, 4.5.1.6)



- The rate of multiple birth in Alberta rose from 1998 to 2004, and stabilized thereafter. In 2007, there were 1,574 multiple live births, for a rate of 3.3 (per 100 live births).
- In 2007, 96.8% of multiple births were twin births. There were 37 live births that were triplets, and no quadruplet births.
- For 2005 to 2007 combined, 52.7% of multiple births were low birth weight, compared with 5.2% of singleton births.
- Singleton births were at term 92.8% of the time between 2005 and 2007, compared with 43.8% of multiple births.

Maternal Age Effects (see Tables 4.5.1.2, 4.5.1.7)



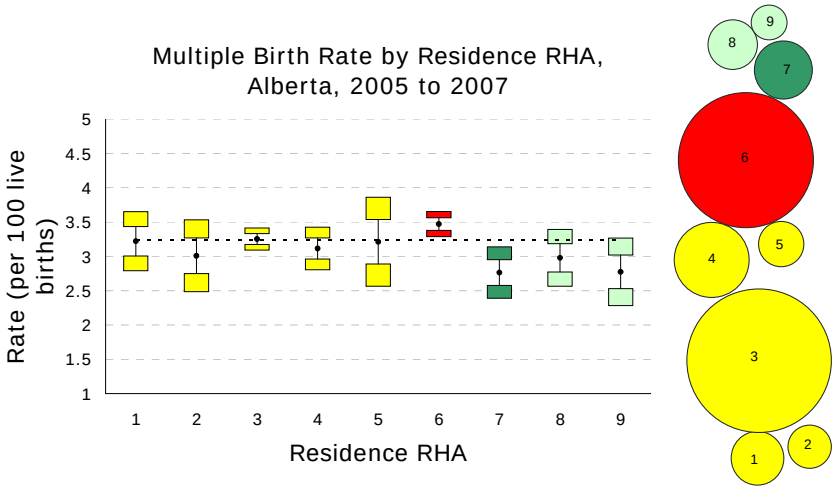
- Multiple births increase in frequency with increasing maternal age.
- The multiple birth rate was 1.8 (per 100 live births) for women under 20 years of age and 6.1 for mothers over 39 years of age (more than three times as high).

4.5.1 Multiple Births

Long-term disabilities known to occur in multiples are generally associated with preterm birth and include cerebral palsy, chronic lung disease, visual impairments, and learning disabilities (Bissonnette, Cohen, Collins, et al., 2007).

Multiple Birth Rate, 2005-07 Combined

Regional Data (see Tablse 4.5.1.3, 4.5.1.8)



- For 2005 to 2007 combined, the muliple birth rate was lower than the provincial average in RHA 7 (2.8 per 100 live births).
- The rate was higher than the provincial average in RHA 6 (3.5 per 100 live births) during this time period.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

4.5.1 Multiple Births

Prior to 2000, Canada and Alberta had very similar rates of multiple births. From 2000 to 2004, the Albertan rate increased at a faster pace than the Canadian rate. By 2005, however, the two rates were not statistically different. The multiple birth rate in 2006 was 3.1 in Canada and 3.3 in Alberta (Statistics Canada, 2008c).

Multiple Birth Rate,
Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)

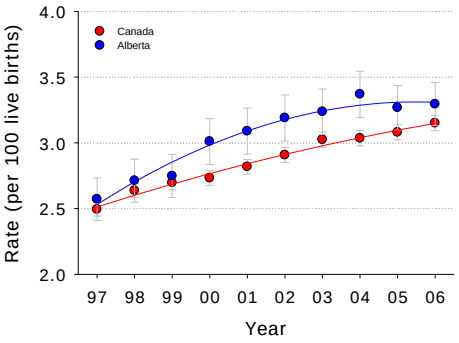


Table 4.5.1.1 Multiple Births and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Multiple live births	1,002	1,029	1,098	1,140	1,221	1,294	1,359	1,338	1,442	1,574
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	2.7	2.7	3.0	3.1	3.2	3.2	3.4	3.2	3.2	3.3
Standard Error (SE)	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08

Table 4.5.1.2 Multiple Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Multiple live births	124	552	1,182	1,528	766	200	4,352
Live births	6,930	25,713	42,562	38,866	17,216	3,302	134,591
Rate (per 100 live births)	1.8	2.1	2.8	3.9	4.4	6.1	3.2
Standard Error (SE)	0.16	0.09	0.08	0.10	0.16	0.42	0.05

Table 4.5.1.3 Multiple Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Multiple live births	218	129	1,609	391	95	1,375	212	201	124	4,354
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,601
Rate (per 100 live births)	3.2	3.0	3.3	3.1	3.2	3.5	2.8	3.0	2.8	3.2
Standard Error (SE)	0.21	0.26	0.08	0.16	0.32	0.09	0.19	0.21	0.25	0.05

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.5.1.4 Twin, Triplet and Quadruplet Live Births and Percent of Live Births, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live twins	965	997	1,053	1,092	1,188	1,237	1,304	1,298	1,416	1,537
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	2.6	2.6	2.9	2.9	3.1	3.1	3.2	3.1	3.2	3.2
Standard Error (SE)	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live triplets	34	32	45	43	29	57	52	40	26	37
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Standard Error (SE)	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.01

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Live quadruplets	3	0	0	5	4	0	3	0	0	0
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 100 live births)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Error (SE)	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.5.1.5 Live Births and Percent of Births by Plurality and Birth Weight Category (grams), Alberta, 2005 to 2007 Combined

	<500	500-749	750-999	1000-1249	1250-1499	1500-2499	2500-4499	>4499	Total	Average (grams)
Live births	214	270	307	326	479	7,455	123,248	2,295	134,594	3,348
Multiple live births	39	51	70	79	145	1,910	2,060	0	4,354	2,378
% of multiple live births	0.9	1.2	1.6	1.8	3.3	43.9	47.3	0.0	100.0	-
Singleton live births	175	219	237	247	334	5,545	121,188	2,295	130,240	3,380
% of singleton live births	0.1	0.2	0.2	0.2	0.3	4.3	93.0	1.8	100.0	-

Table 4.5.1.6 Live Births and Percent of Births by Plurality and Gestational Age Category (weeks), Alberta, 2005 to 2007 Combined

	20-27	28-36	37-42	>42	Total	Average (weeks)
Live births	748	11,011	122,769	33	134,594	38.8
Multiple live births	141	2,301	1,907	0	4,354	35.3
% of multiple live births	3.2	52.8	43.8	0.0	100.0	-
Singleton live births	607	8,710	120,862	33	130,240	38.9
% of singleton live births	0.5	6.7	92.8	0.0	100.0	-

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.5.1.7 Multiple Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

Multiple live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	28	27	35	38	33	41	30	38	43	43
20-24	128	139	159	175	192	202	185	167	185	200
25-29	295	277	311	292	310	322	362	388	365	429
30-34	358	384	344	378	430	440	472	446	543	539
35-39	165	174	211	218	224	255	252	235	253	278
>39	28	28	38	39	32	34	58	64	53	83
All	1,002	1,029	1,098	1,140	1,221	1,294	1,359	1,338	1,442	1,574

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	1.1	1.0	1.4	1.6	1.5	1.9	1.4	1.8	1.9	1.7
20-24	1.7	1.8	2.1	2.3	2.5	2.5	2.4	2.1	2.1	2.2
25-29	2.5	2.4	2.8	2.5	2.6	2.6	2.9	3.0	2.6	2.8
30-34	3.4	3.7	3.4	3.6	3.9	3.8	4.0	3.7	4.2	3.9
35-39	3.8	3.8	4.6	4.7	4.7	5.2	5.1	4.5	4.4	4.4
>39	4.2	3.6	4.9	4.8	3.9	3.4	5.9	6.1	4.9	7.0
All	2.7	2.7	3.0	3.1	3.2	3.2	3.4	3.2	3.2	3.3

Table 4.5.1.8 Multiple Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

Multiple live births	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	34	63	74	66	62	53	64	62	76	80
Palliser	26	36	46	42	41	39	44	47	32	50
Calgary	383	370	385	452	468	529	494	478	551	580
David Thompson	102	104	95	96	140	107	127	151	126	114
East Central	14	36	34	29	22	32	40	40	34	21
Capital	308	289	335	322	319	347	444	418	446	511
Aspen	55	59	60	67	60	87	68	58	85	69
Peace Country	53	53	34	46	61	61	54	58	60	83
Northern Lights	27	19	35	20	48	39	24	26	32	66
Alberta	1,002	1,029	1,098	1,140	1,221	1,294	1,359	1,338	1,442	1,574

Rate (per 100 live births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	1.7	3.1	3.8	3.4	3.1	2.5	3.1	2.9	3.4	3.3
Palliser	2.1	2.9	3.8	3.4	3.3	3.1	3.4	3.5	2.3	3.2
Calgary	3.0	2.8	2.9	3.4	3.4	3.7	3.4	3.1	3.4	3.3
David Thompson	2.9	2.9	2.7	2.8	3.9	2.9	3.4	3.9	3.0	2.5
East Central	1.4	3.7	3.7	3.3	2.3	3.6	4.2	4.3	3.4	2.0
Capital	2.8	2.6	3.1	2.9	2.8	3.0	3.7	3.5	3.4	3.5
Aspen	2.1	2.3	2.6	2.8	2.5	3.6	2.8	2.4	3.3	2.6
Peace Country	2.8	2.7	1.9	2.4	3.2	3.0	2.8	2.8	2.6	3.5
Northern Lights	2.5	1.8	3.1	1.7	3.7	3.0	1.8	1.9	2.2	4.0
Alberta	2.7	2.7	3.0	3.1	3.2	3.2	3.4	3.2	3.2	3.3

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

4. Births

4.6.1 Respiratory Distress Syndrome

Respiratory distress syndrome: *A lung disorder that causes difficulty in breathing; due to lack of surfactant in an infant's lungs.* Respiratory distress syndrome results in a life-threatening deficiency of blood oxygen (Morgan, 1990).

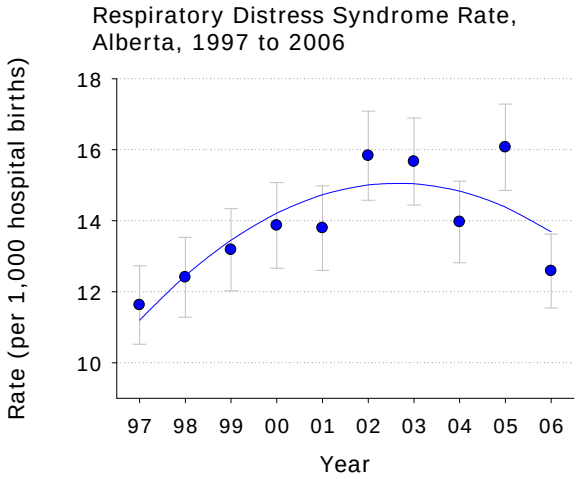
Respiratory distress syndrome rate: *Number of cases of respiratory distress syndrome per 1,000 hospital deliveries in a given year.*

Respiratory distress syndrome of the newborn results from a surfactant deficiency in the lungs, mainly in preterm babies born prior to approximately 36 weeks gestation but sometimes in term infants. Surfactant keeps the lungs from collapsing so adequate oxygen intake can occur (Public Health Agency of Canada, 2007).

Complications of respiratory distress syndrome include death, intraventricular bleeding and the development of chronic lung disease. Use of antenatal steroids and surfactant treatments has been successful in reducing mortality and morbidity (Public Health Agency of Canada, 2007).

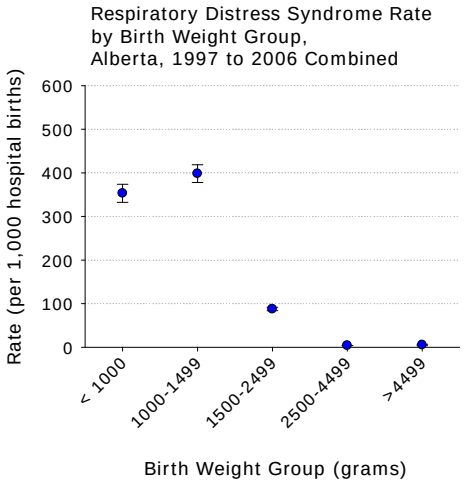
Subsequent to the development of antenatal steroid treatment, the rate of respiratory distress syndrome has declined markedly, but many infants still require assisted ventilation or surfactant treatment after birth. Assisted ventilation is one of the biggest costs in the care of preterm infants. Furthermore, respiratory distress syndrome is a leading cause of death among preterm infants (Public Health Agency of Canada, 2007).

Time Trends (see Tables 4.6.1.1, 4.6.1.2)



- The respiratory distress syndrome rate increased between 1997 and 2000, and was variable from 2002 to 2006. In 2006, 556 babies were diagnosed with respiratory distress syndrome, for a rate of 12.6 (per 1,000 hospital deliveries).
- Respiratory distress syndrome is diagnosed in males more often than females. In 2006, the rate for males was 13.9, and the female rate was 11.2.

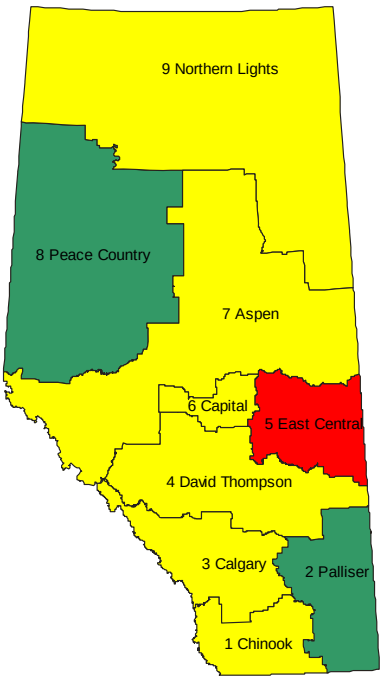
Birth Weight Effects (see Tables 4.6.1.3)



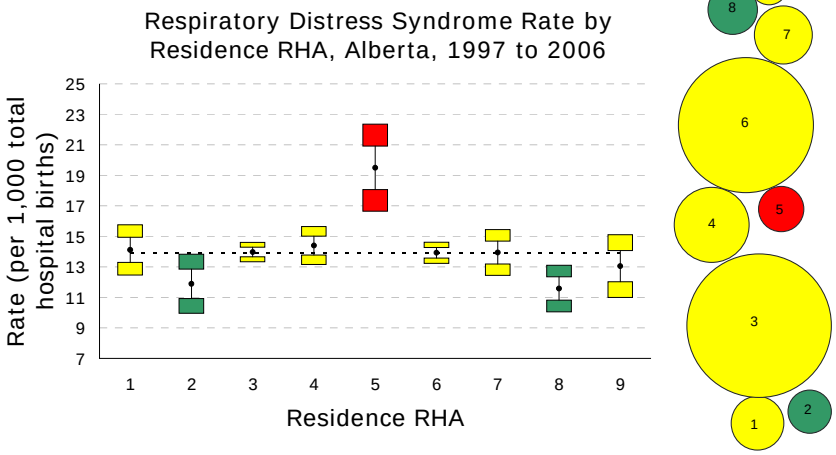
- For 1997 to 2006 combined, the rate of respiratory distress was much higher in babies with birth weights less than 1,500 grams than in heavier babies.
- The highest rate (398.1 per 1,000 hospital births) was in the 1,000 to 1,499 gram group, and the lowest rate (4.0) was in the 2,500 to 4,499 group between 1997 and 2006.

4.6.1 Respiratory Distress Syndrome

Respiratory Distress Syndrome Rate, 1997-2006 Combined



Regional Data (see Table 4.6.1.4)



- The respiratory distress syndrome rate was lower than the provincial average in RHAs 2 and 8 between 1997 and 2006. The lowest rate was in RHA 8 (11.6 per 1,000 hospital births).
- The rate was higher than the provincial average in RHA 5 (19.5 per 1,000 hospital births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 respiratory distress syndrome data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.6.1.1 Respiratory Distress Cases and Rate by Year, Alberta, 1997 to 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Respiratory distress cases	421	461	493	503	508	600	618	558	662	556
Live hospital births	36,217	37,158	37,402	36,272	36,833	37,898	39,453	39,960	41,192	44,190
Rate (per 1,000 hospital births)	11.6	12.4	13.2	13.9	13.8	15.8	15.7	14.0	16.1	12.6
Standard Error (SE)	0.56	0.57	0.59	0.61	0.61	0.64	0.63	0.59	0.62	0.53

Table 4.6.1.2 Respiratory Distress Cases and Rate by Sex, Alberta, 1997 to 2006

Female	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Respiratory distress cases	154	186	195	215	209	258	258	228	259	242
Live hospital births	17,630	18,051	18,364	17,823	17,931	18,503	19,245	19,443	20,146	21,556
Rate (per 1,000 hospital births)	8.7	10.3	10.6	12.1	11.7	13.9	13.4	11.7	12.9	11.2
Standard Error (SE)	0.70	0.75	0.76	0.82	0.80	0.86	0.83	0.77	0.79	0.72

Male	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Respiratory distress cases	267	275	298	288	299	342	360	330	403	314
Live hospital births	18,587	19,107	19,038	18,449	18,902	19,395	20,207	20,516	21,046	22,634
Rate (per 1,000 hospital births)	14.4	14.4	15.7	15.6	15.8	17.6	17.8	16.1	19.1	13.9
Standard Error (SE)	0.87	0.86	0.90	0.91	0.91	0.95	0.93	0.88	0.94	0.78

Table 4.6.1.3 Respiratory Distress Cases and Rate by Birth Weight Group, Alberta, 1997 to 2006 Combined

	< 1000	1000-1499	1500-2499	2500-4499	>4499	All
Respiratory distress cases	735	881	1,782	1,428	38	5,380
Live hospital births	2,082	2,213	20,313	354,878	7,089	386,575
Rate (per 1,000 hospital births)	353.0	398.1	87.7	4.0	5.4	13.9
Standard Error (SE)	10.47	10.41	1.98	0.11	0.87	0.19

Table 4.6.1.4 Respiratory Distress Cases and Rate by Residence RHA, Alberta, 1997 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Respiratory distress cases	289	149	1,917	526	183	1,590	339	227	160	5,380
Live hospital births	20,480	12,536	137,200	36,544	9,387	114,217	24,315	19,608	12,262	386,575
Rate (per 1,000 hospital deliveries)	14.1	11.9	14.0	14.4	19.5	13.9	13.9	11.6	13.0	13.9
Standard Error (SE)	0.82	0.97	0.32	0.62	1.43	0.35	0.75	0.76	1.02	0.19

Source: Fee-For-Service Claims Files, Alberta Health and Wellness, extracted May 2008.
Ambulatory Care Classification System (ACCS), Alberta Health and Wellness, extracted May 2008.
Hospital Inpatient Files, Alberta Health and Wellness, extracted May 2008.

Notes: Totals for weight groups and RHAs include unknown weights or RHAs.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

4.6.2 Congenital Anomalies

Congenital anomaly: *An abnormality of body structure, function, or metabolism that results in a physical or mental disability or is fatal.* (Pastuszak, 2000). Terminated pregnancies, stillbirths, and live births (diagnosed prior to one year of age), are collectively referred to as "total births" in this section.

Neural tube defects included in the following analyses *occur when the neural tube fails to close properly during early pregnancy (25 to 27 days after conception).* They are anencephaly (lack of cranial vault and cerebral hemispheres), spina bifida (open and closed defects in the spinal column), and encephalocele (lack of closure in the skull).

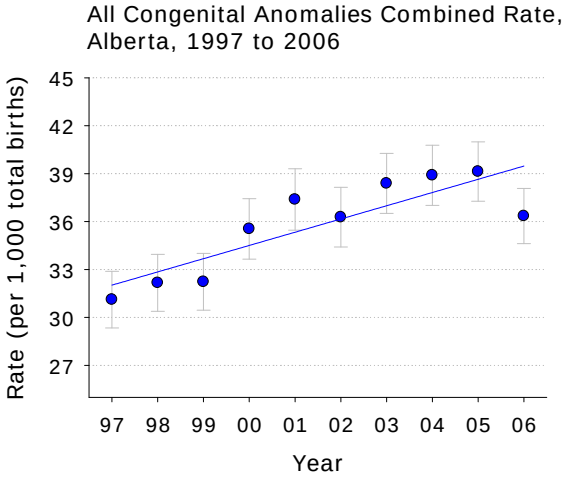
Heart septal defect: *A congenital defect in the septum, which separates the two sides of the heart, allowing blood to flow between the two atria or the two ventricles.*

Down syndrome: *A condition characterised by neonatal hypotonia, flat facial features, brachycephaly, Brushfield spots in the iris, moderate developmental disability and a high prevalence of heart defects(30-40%). Down Syndrome is the result of abnormalites of chromosome 21(Lowry, 2006).*

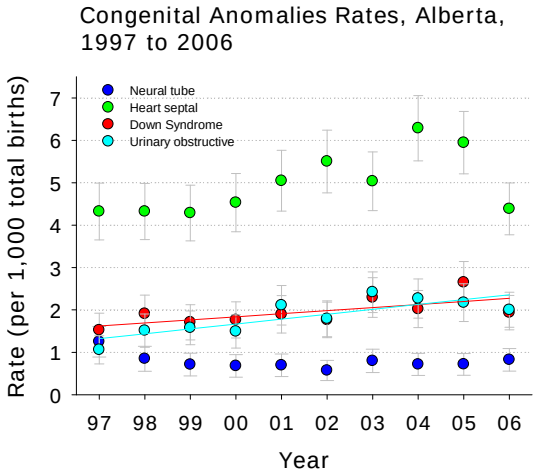
Rates for all congenital anomalies are per 1,000 total births (total births includes live births, stillbirths, and terminated pregnancies) in a given year.

Maternal risk factors for congenital anomalies include high maternal age, obesity, epilepsy controlled with anticonvulsant medications, and insulin-dependent diabetes (Health Canada, 2002).

Time Trends (see Table 4.6.2.1)



- Between 1997 and 2006, the rate of all congenital anomalies combined increased linearly in Alberta. The drop in the 2006 likely reflects a delay in reporting of all cases (as is common with congenital anomalies). In 2006, the rate of all congenital anomalies combined was 36.3 (per 1,000 total births), or 1,634 reported anomalies in that year.



- Rates for selected congenital anomalies between 1997 and 2006 are shown above. Down Syndrome and urinary obstructive defects showed significant linearly increasing trends over time. Lower 2006 rates likely reflect report delays.

4.6.2 Congenital Anomalies

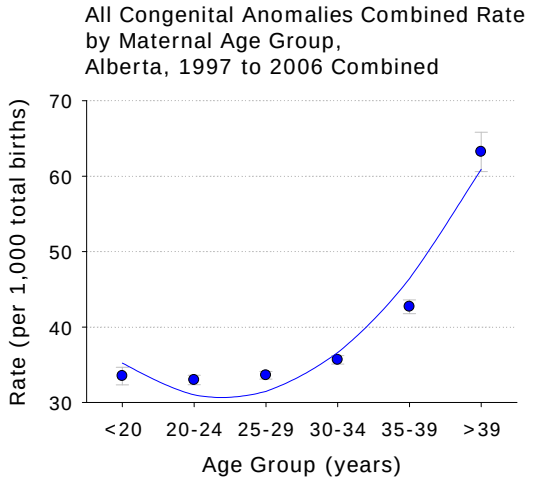
High maternal age is a risk factor for Down syndrome. Children with Down syndrome have distinctive facial features (see Definition), cognitive deficits (most often they have a mild to moderate developmental delay) and increased risk of major congenital malformations such as congenital heart defects, gastrointestinal anomalies, or endocrine, visual or auditory dysfunction (Kohut, 2003).

Maternal risk factors for neural tube defects include a previous pregnancy involving a neural tube defect, maternal diabetes, obesity, and epilepsy (Public Health Agency of Canada, 2008). Outcomes include miscarriage, stillbirth, infant or early childhood death, or lifelong disability (Health Canada, 2002). Maternal folic acid supplementation prior to conception reduces the occurrence of neural tube defects, and mandatory flour, pasta, and cornmeal fortification with folic acid has been shown to reduce neural tube defects in Canada (Public Health Agency of Canada, 2008).

Heart septal defects are a common anomaly and can often be repaired in infancy or early childhood. Untreated septal defects can lead to pulmonary hypertension.

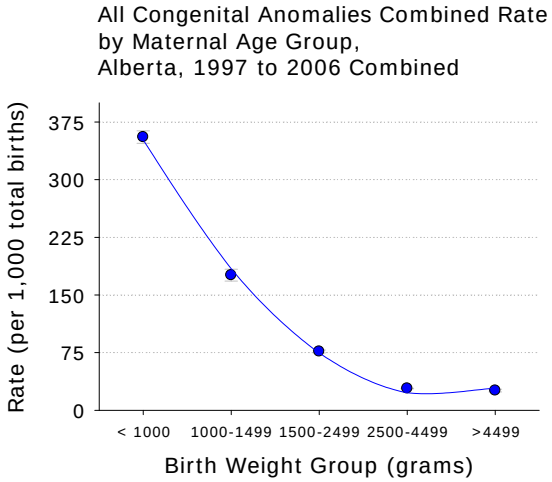
In urinary obstructive defects, the flow of urine from the kidneys is obstructed. Urine cannot drain into the bladder and can back up into the kidneys, which can lead to persistent urinary tract infections and kidney damage or failure (Better Health Channel, 2008). This defect is often treatable, thus early detection is important to prevent kidney damage.

Maternal Age Effects (see Table 4.6.2.2)



- For mothers under 35 years, the rate of all congenital anomalies combined varied between 33 and 36 (per 1,000 total births). The rate was higher for 35 to 39 year old mothers than for younger mothers, and was highest for mothers over 39. For 1997 to 2006 combined, the rate was 63.2 for women over 39 years of age.
- The rates for heart septal defects and Down Syndrome are higher for the oldest mothers than for younger mothers. There are no significant maternal age effects for neural tube or urinary obstructive anomalies, however.

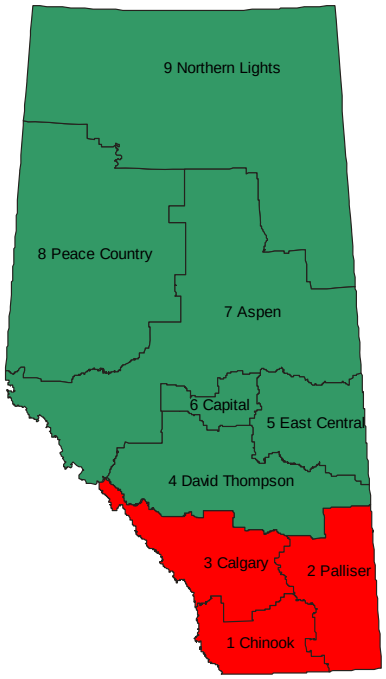
Birth Weight Effects (see Table 4.6.2.3)



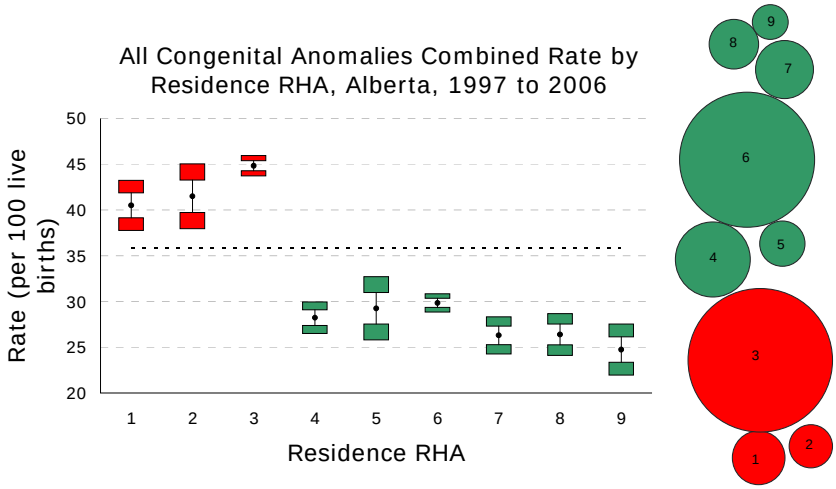
- The rate of all congenital anomalies combined was strongly affected by birth weight for 1997 to 2006 combined. The rate was 355.5 (per 1,000 total births, or more than one in three total births) for babies under 1,000 grams, compared with 25.6 for babies 4,500 grams or more.

4.6.2 Congenital Anomalies

All Congenital Anomalies Combined Rate, 1997-2006 Combined



Regional Data (see Table 4.6.2.4)



- For 1997 to 2006 combined, the Albertan rate of all congenital anomalies combined was higher than the provincial average in RHAs 1, 2, and 3. This is partially related to the higher proportion of older mothers in these regions. The highest rate was 44.8 (per 1,000 total births) in RHA 3, compared with the lowest rate of 24.7 in RHA 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Congenital anomalies data were provided by the Alberta Congenital Anomalies Surveillance System. All congenital anomalies diagnosed within one year of birth are reported to this system.

Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002congenital anomalies data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.6.2.1 Congenital Anomalies and Rates, Alberta, 1997 to 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total births	36,797	37,715	38,044	36,860	37,454	38,540	40,120	40,570	41,890	44,954
All anomalies combined	1,145	1,213	1,226	1,310	1,400	1,398	1,540	1,578	1,639	1,634
All anomalies combined rate (per 1,000 total births)	31.1	32.2	32.2	35.5	37.4	36.3	38.4	38.9	39.1	36.3
Neural tube defect cases	46	32	27	25	26	22	32	29	30	37
Neural tube defect rate (per 1,000 total births)	1.3	0.8	0.7	0.7	0.7	0.6	0.8	0.7	0.7	0.8
Heart septal defect cases	159	163	163	167	189	212	202	255	249	197
Heart septal defect rate (per 1,000 total births)	4.3	4.3	4.3	4.5	5.0	5.5	5.0	6.3	5.9	4.4
Down Syndrome cases	56	72	65	65	71	68	92	82	111	87
Down Syndrome rate (per 1,000 total births)	1.5	1.9	1.7	1.8	1.9	1.8	2.3	2.0	2.6	1.9
Urinary obstruction defect cases	39	57	60	55	79	69	97	92	91	90
Urinary obstruction defect rate (per 1,000 total births)	1.1	1.5	1.6	1.5	2.1	1.8	2.4	2.3	2.2	2.0

* Data may be incomplete, as of Oct 30/08.

Table 4.6.2.2 Congenital Anomalies and Rates by Maternal Age Group, Alberta, 1997 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Total births	23,610	78,712	122,425	111,041	48,373	8,764	392,944
All anomalies combined	791	2,596	4,114	3,959	2,065	554	14,083
All anomalies combined rate (per 1,000 total births)	33.5	33.0	33.6	35.7	42.7	63.2	35.8
Neural tube defect cases	23	72	97	66	42	6	306
Neural tube defect rate (per 1,000 total births)	1.0	0.9	0.8	0.6	0.9	0.7	0.8
Heart septal defect cases	125	350	555	541	299	86	1,956
Heart septal defect rate (per 1,000 total births)	5.3	4.4	4.5	4.9	6.2	9.8	5.0
Down Syndrome cases	21	48	127	178	250	145	769
Down Syndrome rate (per 1,000 total births)	0.9	0.6	1.0	1.6	5.2	16.5	2.0
Urinary obstruction defect cases	40	139	224	202	106	18	729
Urinary obstruction defect rate (per 1,000 total births)	1.7	1.8	1.8	1.8	2.2	2.1	1.9

Table 4.6.2.3 Congenital Anomalies and Rates by Birth Weight Group, Alberta, 1997 to 2006 Combined

	< 1000	1000-1499	1500-2499	2500-4499	>4499	All
Total births	3,485	2,418	20,782	358,945	7,274	392,944
All anomalies combined	1,239	425	1,589	10,148	186	14,083
All anomalies combined rate (per 1,000 total births)	355.5	175.8	76.5	28.3	25.6	35.8
Neural tube defect cases	138	9	28	89	0	306
Neural tube defect rate (per 1,000 total births)	39.6	3.7	1.3	0.2	0.0	0.8
Heart septal defect cases	129	48	316	1,400	34	1,956
Heart septal defect rate (per 1,000 total births)	37.0	19.9	15.2	3.9	4.7	5.0
Down Syndrome cases	136	16	104	366	5	769
Down Syndrome rate (per 1,000 total births)	39.0	6.6	5.0	1.0	0.7	2.0
Urinary obstruction defect cases	69	19	88	527	16	729
Urinary obstruction defect rate (per 1,000 total births)	19.8	7.9	4.2	1.5	2.2	1.9

Table 4.6.2.4 All Congenital Anomalies Combined by RHA, Alberta, 1997 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Total births	20,691	12,678	139,843	37,166	9,539	116,048	24,645	19,859	12,448	392,944
All anomalies combined	838	526	6,269	1,049	279	3,463	648	524	308	14,083
Rate (per 1000 total births)	40.5	41.5	44.8	28.2	29.2	29.8	26.3	26.4	24.7	35.8
Standard Error (SE)	1.37	1.77	0.55	0.86	1.73	0.50	1.02	1.14	1.39	0.30

Source: Alberta Congenital Anomalies Surveillance System, 1980-2005, Oct. 2008 release.

Notes: Includes all congenital anomalies in and outside ICD-9 Chapter XIV or outside ICD-10 XVII. The number of patients was counted; one patient could belong to more than one diagnostic category.

Totals for age and weight groups include unknown ages and weights.

Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction and improvement in data quality.

4. Births

4.7.1 Stillbirths

Stillbirths refer to *births with "the complete expulsion or the extraction from the mother after at least 20 weeks pregnancy, or after attaining a weight of 500 grams or more, of a fetus in which, after the expulsion or the extraction, there is no breathing, beating of the heart, pulsation of the umbilical cord or unmistakable movement of voluntary muscle"* (Alberta Vital Statistics Act, RHA 1980, cV-4 s1). Note that definitions of stillbirth differ between provinces and between countries, making inter-jurisdictional comparisons difficult.

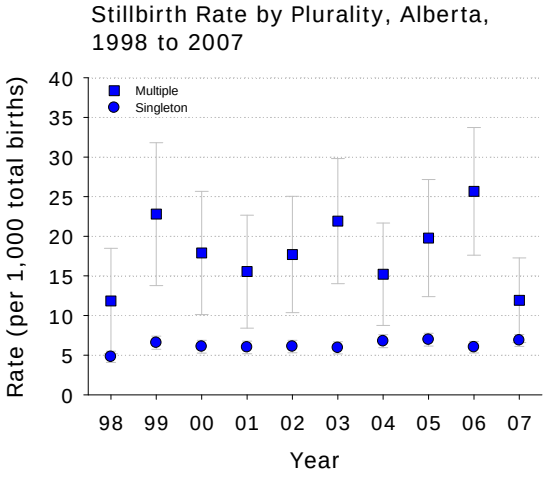
Stillbirth rate: *Number of stillbirths per 1,000 total births in a given year (total births is equal to the sum of live births and stillbirths)*

Causal factors in stillbirth are not well understood, but include fetal growth restriction, congenital anomalies, placental abruption, and intrauterine infection (Surkan, Stephansson, Dickman and Cnattingius, 2004).

Maternal risk factors for stillbirth include first birth, smoking, age 35 or older, obesity, less than high school education, previous stillbirth, multiple gestation, minority ethnicity, medical disorders (e.g,. hypertensive disorders, diabetes, systemic lupus erythematosus, renal disease, thyroid disorders). Increased prenatal screening has resulted in reduction of stillbirths caused by chromosomal anomalies, due to termination of some of these pregnancies (Smith and Fretts, 2007).

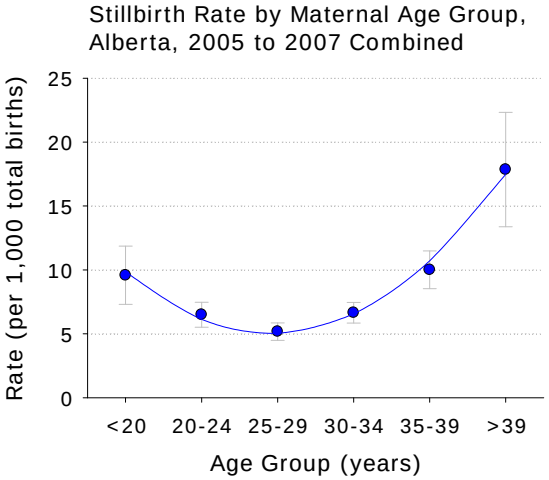
The effect of advanced maternal age on stillbirth rates may be an effect of aging (such as reduced uterine vasculature), or of the increased incidence of chronic disease and medical or obstetric complications in older mothers (Huang, Sauve, Birkett, Fergusson, and van Walraven, 2008).

Time Trends (see Tables 4.7.1.1, 4.7.1.2, 4.7.1.3, 4.7.1.4)



- The stillbirth rate in Alberta from 1998 to 2007 did not vary significantly with time. In 2007, there were 342 stillbirths, for a rate of 7.1 (per 1,000 total births).
- In 2007, the stillbirth rate for multiples was 11.9 (per 1,000 total births), compared with 6.9 for singletons. The rate for multiples is quite variable, due to low numbers of both stillbirths and multiples.

Maternal Age Effects (see Tables 4.7.1.5, 4.7.1.6)



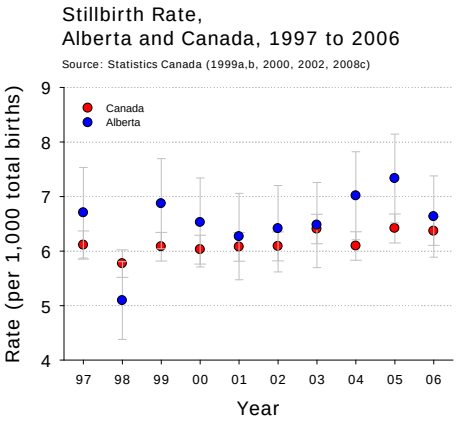
- Between 2005 and 2007, the stillbirth rate was lowest for women 25 to 34 years of age, and highest for women over 39. The rate for women over 39 (17.8 per 1,000 total births) was more than three time that for women 25 to 29 (5.2).

Gestational Age Effects (see Table 4.7.1.3)

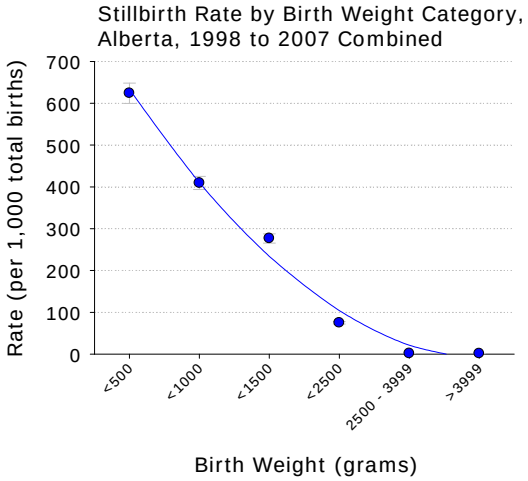
- Stillbirths are far more common prior to term than at term. In 2005, the stillbirth rate was 65.0 (per 1,000 total births) for preterm births, compared with 1.4 for term births.

4.7.1 Stillbirths

Between 1997 and 2006, there was no significant time trend in the stillbirth rate in Alberta or Canada, and Alberta and Canada rates did not differ from one another. In 2006, the stillbirth rate was 6.4 (per 1,000 total births) in Canada and 6.6 in Alberta (Statistics Canada, 2008c).



Birth Weight Effects (see Table 4.7.1.4)



- Stillbirth rates decline steadily with increasing birth weight. The stillbirth rate was only 1.3 (per 1,000 total births) for birth weights of 2,500 to 3,999 grams, whereas more than 60% of babies under 500 grams are stillborn.

Congenital Anomalies (see Tables 4.7.1.7, 4.7.1.8)

- Between 2002 and 2006, chromosomal anomalies were the most common type of anomaly in stillbirths, and accounted for 40.2% of stillbirths due to major anomalies. The majority of such stillbirths occurred with birth weights under 500 grams.

Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Stillbirth rates must be interpreted with caution due to the low number of cases in many categories.

Table 4.7.1.1 Stillbirths and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	188	267	237	235	249	259	286	309	299	342
Total births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 1,000 total births)	5.0	7.1	6.5	6.3	6.5	6.5	7.1	7.4	6.7	7.1
Standard Error (SE)	0.36	0.43	0.42	0.41	0.41	0.40	0.42	0.42	0.39	0.38

Table 4.7.1.2 Stillbirths and Rate by Plurality, Alberta, 1998 to 2007

Multiple	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	12	24	20	18	22	29	21	27	38	19
Total births	1,014	1,053	1,118	1,158	1,243	1,323	1,380	1,365	1,480	1,593
Rate (per 1,000 total births)	11.8	22.8	17.9	15.5	17.7	21.9	15.2	19.8	25.7	11.9
Standard Error (SE)	3.40	4.60	3.96	3.64	3.74	4.03	3.30	3.77	4.11	2.72

Singleton	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	176	243	217	217	227	230	265	282	261	323
Total births	36,703	36,992	35,744	36,303	37,299	38,804	39,198	40,531	43,478	47,097
Rate (per 1,000 total births)	4.8	6.6	6.1	6.0	6.1	5.9	6.8	7.0	6.0	6.9
Standard Error (SE)	0.36	0.42	0.41	0.40	0.40	0.39	0.41	0.41	0.37	0.38

Table 4.7.1.3 Stillbirths and Rates by Preterm/Term, Alberta, 1998 to 2007

<37 weeks (preterm)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	144	196	179	174	197	203	216	261	233	282
Total births	2,960	3,136	3,279	3,288	3,497	3,724	3,883	4,042	4,190	4,336
Rate (per 1,000 total births)	48.6	62.5	54.6	52.9	56.3	54.5	55.6	64.6	55.6	65.0
Standard Error (SE)	4.0	4.3	4.0	3.9	3.9	3.7	3.7	3.9	3.5	3.7

37-42 weeks (term)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	44	71	58	61	51	56	70	48	66	60
Total births	34,733	34,888	33,554	34,158	35,029	36,384	36,682	37,835	40,761	44,347
Rate (per 1,000 total births)	1.3	2.0	1.7	1.8	1.5	1.5	1.9	1.3	1.6	1.4
Standard Error (SE)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.

Notes: Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.1.4 Stillbirths and Rates by Birth Weight Categories, Alberta, 1998 to 2007

<500 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	71	90	74	60	77	86	93	133	115	150
Total births	101	121	122	105	141	151	168	204	181	227
Rate (per 1,000 total births)	703.0	743.8	606.6	571.4	546.1	569.5	553.6	652.0	635.4	660.8
Standard Error (SE)	45.47	39.68	44.23	48.29	41.93	40.29	38.35	33.35	35.78	31.42

<1000 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	104	138	132	116	136	155	159	198	182	219
Total births	270	322	346	312	362	369	389	464	437	489
Rate (per 1,000 total births)	385.2	428.6	381.5	371.8	375.7	420.1	408.7	426.7	416.5	447.9
Standard Error (SE)	29.62	27.58	26.11	27.36	25.45	25.69	24.93	22.96	23.58	22.49

<1500 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	115	159	145	135	157	178	179	221	200	239
Total births	484	534	569	547	605	620	632	743	728	785
Rate (per 1,000 total births)	237.6	297.8	254.8	246.8	259.5	287.1	283.2	297.4	274.7	304.5
Standard Error (SE)	19.35	19.79	18.27	18.43	17.82	18.17	17.92	16.77	16.54	16.42

<2500 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	143	197	169	172	193	208	224	259	239	282
Total births	2,473	2,440	2,420	2,439	2,679	2,725	2,813	2,987	3,348	3,496
Rate (per 1,000 total births)	57.8	80.7	69.8	70.5	72.0	76.3	79.6	86.7	71.4	80.7
Standard Error (SE)	4.69	5.52	5.18	5.18	5.00	5.09	5.10	5.15	4.45	4.61

2500 - 3999 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	38	63	57	57	50	50	56	46	54	50
Total births	30,604	30,834	29,718	30,220	31,084	32,567	33,075	34,248	36,621	39,863
Rate (per 1,000 total births)	1.2	2.0	1.9	1.9	1.6	1.5	1.7	1.3	1.5	1.3
Standard Error (SE)	0.20	0.26	0.25	0.25	0.23	0.22	0.23	0.20	0.20	0.18

>3999 grams	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stillbirths	7	7	11	6	6	1	6	4	6	10
Total births	4,647	4,775	4,729	4,807	4,781	4,844	4,695	4,673	4,995	5,339
Rate (per 1,000 total births)	1.5	1.5	2.3	1.2	1.3	0.2	1.3	0.9	1.2	1.9
Standard Error (SE)	0.57	0.55	0.70	0.51	0.51	0.21	0.52	0.43	0.49	0.59

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.

Notes: Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.1.5 Stillbirths and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Stillbirths	67	168	221	260	174	60	950
Total births	6,997	25,881	42,783	39,126	17,390	3,362	135,541
Rate (per 1,000 total births)	9.6	6.5	5.2	6.6	10.0	17.8	7.0
Standard Error (SE)	1.16	0.50	0.35	0.41	0.75	2.28	0.23

Table 4.7.1.6 Stillbirths and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

Stillbirths	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	21	20	20	19	21	19	22	27	20	20
20-24	31	52	44	46	45	59	59	60	44	64
25-29	53	79	66	51	60	73	74	71	71	79
30-34	51	66	67	63	68	66	80	83	97	80
35-39	26	39	29	41	42	31	39	55	44	75
>39	6	11	11	15	13	11	12	13	23	24
All	188	267	237	235	249	259	286	309	299	342

Rate (per 1,000 total births)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<20	8.0	7.6	8.1	8.1	9.4	8.9	10.4	12.4	8.6	8.0
20-24	4.0	6.6	5.9	6.1	5.7	7.3	7.4	7.5	5.1	7.0
25-29	4.5	6.7	5.8	4.4	5.0	5.9	5.8	5.4	5.0	5.1
30-34	4.9	6.4	6.6	6.0	6.2	5.7	6.8	6.8	7.4	5.7
35-39	6.0	8.4	6.2	8.8	8.8	6.2	7.8	10.4	7.7	11.8
>39	8.9	14.1	13.9	18.2	15.5	10.8	12.0	12.3	21.0	19.9
All	5.0	7.0	6.4	6.3	6.5	6.5	7.0	7.4	6.7	7.0

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.

Notes: Data include Alberta residents only.
Totals for age groups include unknown ages.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.1.7 Major Anomalies as Cause of Death by Type of Death, Stillbirths and Neonatal Deaths, Alberta, 2002 to 2006

	2002			2003			2004			2005			2006		
	Stillbirths	Neonatal Deaths	% of All Deaths	Stillbirths	Neonatal Deaths	% of All Deaths	Stillbirths	Neonatal Deaths	% of All Deaths	Stillbirths	Neonatal Deaths	% of All Deaths	Stillbirths	Neonatal Deaths	% of All Deaths
Neural Tube Defects/ Other Central Nervous System	6	8	3.1	11	12	5.1	9	13	4.7	7	11	3.4	22	6	5.8
Cardio-Respiratory	11	12	5.1	8	12	4.4	11	12	4.9	12	8	3.8	6	10	3.3
Gastrointestinal / Musculoskeletal / Integument	2	13	3.3	5	10	3.3	8	7	3.2	8	8	3.1	3	9	2.5
Genitourinary	6	13	4.2	7	12	4.2	6	9	3.2	8	9	3.3	8	6	2.9
Chromosomal	30	21	11.2	11	15	5.7	29	15	9.4	42	33	14.3	29	18	9.8
Unspecified Congenital/Multiple Systems	7	9	3.5	14	9	5.1	10	10	4.3	2	7	1.7	13	12	5.2
Total	62	76	30.3	56	70	27.8	73	66	29.7	79	76	29.6	81	61	29.5

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.

Notes: Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.1.8 Major Anomalies as Cause of Death by Type of Death and Birth Weight Category (grams), Alberta, 2005, 2006

	Stillbirths			Early Neonatal Deaths			Late Neonatal Deaths			Total Deaths		
2005	<500	500-999	>999	<500	500-999	>999	<500	500-999	>999	Stillbirths	Early Neonatal	Late Neonatal
Neural Tube Defects	2	1	1	6	1	1	0	0	0	4	8	0
Other Central Nervous System	2	1	0	1	1	1	0	0	0	3	3	0
Heart	6	1	4	2	1	0	0	0	1	11	3	1
Circulatory System	0	0	1	0	0	1	0	0	0	1	1	0
Respiratory System	0	0	0	0	0	3	0	0	1	0	3	0
Gastrointestinal System	2	0	0	2	0	1	0	0	0	2	3	1
Genital Organs	0	0	0	0	0	0	0	0	0	0	0	0
Urinary System	2	5	1	2	1	6	0	0	0	8	9	0
Musculoskeletal Deformity	5	0	0	3	0	1	0	0	0	5	4	0
Integument	1	0	0	0	0	0	0	0	0	1	0	0
Chromosomal	14	14	11	11	14	7	0	0	1	42	32	1
Other/Unspecified Congenital	1	1	0	0	2	2	0	0	3	2	4	3
Total	35	23	18	27	20	23	0	0	6	79	70	6

	Stillbirths			Early Neonatal Deaths			Late Neonatal Deaths			Total Deaths		
2006	<500	500-999	>999	<500	500-999	>999	<500	500-999	>999	Stillbirths	Early Neonatal	Late Neonatal
Neural Tube Defects	7	1	1	1	1	1	0	0	0	10	3	0
Other Central Nervous System	8	4	0	0	0	2	0	0	1	13	2	1
Heart	4	0	0	2	1	3	0	1	0	4	6	1
Circulatory System	0	1	0	0	0	1	0	0	0	1	1	0
Respiratory System	0	0	0	1	0	1	0	0	0	0	2	0
Gastrointestinal System	0	1	0	0	0	1	0	0	0	1	1	0
Genital Organs	0	0	0	0	0	0	0	0	0	0	0	0
Urinary System	3	3	2	1	1	4	0	0	0	8	6	0
Musculoskeletal Deformity	0	1	1	3	1	3	0	0	1	2	7	1
Integument	0	0	0	0	0	0	0	0	0	0	0	0
Chromosomal	17	3	7	7	4	5	0	0	2	29	16	2
Other/Unspecified Congenital	11	2	0	5	1	4	0	0	2	13	10	2
Total	50	16	11	20	9	25	0	1	6	81	54	7

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.

Notes: Three 2005 stillbirths with congenital anomalies had no weight documented; there were four stillbirths with no weight documented in 2006.

Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

4.7.2 Perinatal Mortality

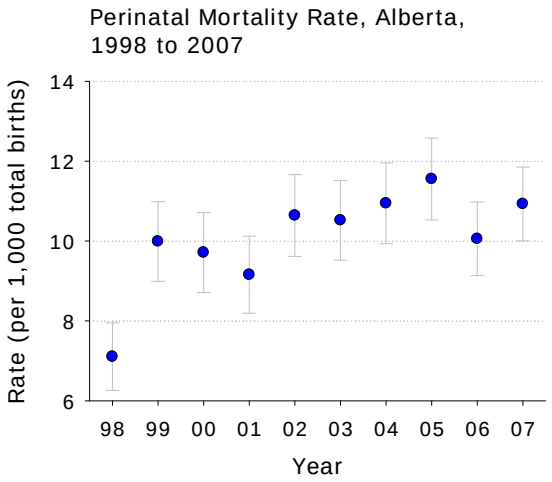
Perinatal deaths *include stillbirths and early neonatal deaths (deaths before seven days of age). A fetal death is registered as a stillbirth in Alberta if delivery occurs at or after 20 weeks of pregnancy or if the fetal weight is 500 grams or greater and gestational age is not known.*

Perinatal mortality rate: Number of perinatal deaths per 1,000 total births in a given year (total births is equal to the sum of live births and stillbirths).

Male gender, maternal smoking, black race, low gestational age, fetal growth restriction, and multiple birth are risk factors for perinatal death (Joseph et al., 2004, 2005).

Comparisons of birth weight-specific perinatal mortality rates must be made with caution. A recent study of Canadian births showed that birth weight information was most likely to be missing for fetal deaths, and least likely to be missing in infants surviving to at least one year of age. Thus, bias occurs in calculating weight-specific mortality rates (Wen, Chen, Li, Kramer, & Allen, 2002).

Time Trends (see Table 4.7.2.1)

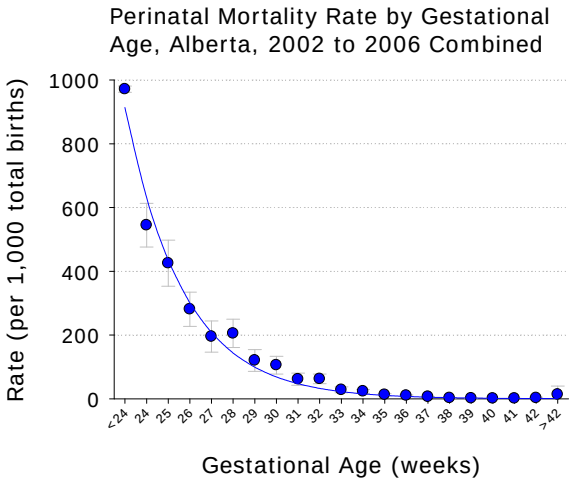


- In 2007, there were 532 perinatal deaths (10.5 per 1,000 total births). There was no time trend in this rate from 1998 to 2007.

Maternal Age Effects (see Tables 4.7.2.2, 4.7.2.3)

- Perinatal mortality rates are somewhat elevated for mothers over 39 years of age, but the number of deaths is too small for reliable comparisons between age groups.

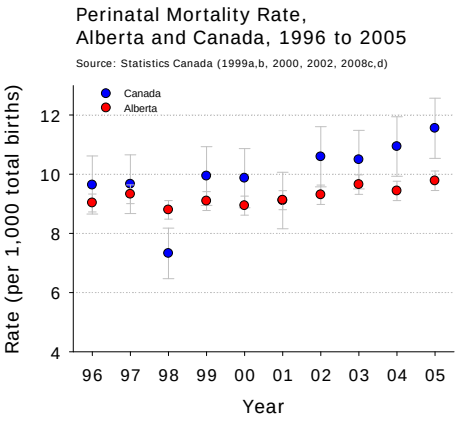
Gestational Age Effects (see Tables 4.7.2.4 and 4.7.2.5)



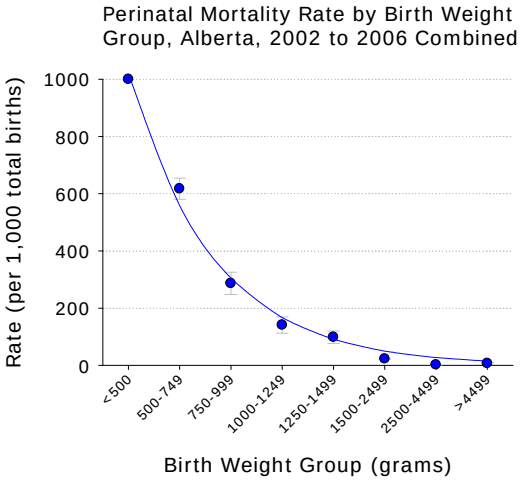
- Perinatal mortality rates show an exponential decline with increasing gestational age. The 2002 to 2006 combined rates ranged from 971.2 (per 1,000 total births) at less than 24 weeks gestation, to 1.3 for gestational ages of 40 and 41 weeks.

4.7.2 Perinatal Mortality

The 2005 perinatal mortality rate was 9.8 in Canada and 11.6 in Alberta (Statistics Canada, 2008c, d). The Albertan rate is consistently slightly higher than the Canadian rate, and was significantly higher in 2004 and 2005. Registration of live births under 500 grams has been routine in Alberta since 1990, elevating the perinatal, neonatal, and infant mortality rates in Alberta relative to the rest of Canada, where such births are not universally registered.



Birth Weight Effects (see Table 4.7.2.6)



- Perinatal mortality rates for 2000 to 2004 combined decrease exponentially with increasing birth weight.
- All infants under 500 grams who were born between 2002 and 2006 died before birth or before 7 days of life. The lowest perinatal mortality rate (2.0 per 1,000 total births) occurred in infants with birth weights between 2,500 and 4,499 grams. When corrected for major congenital anomalies, this rate was 1.6.

Congenital Anomalies (see Table 4.7.1.7, 4.7.1.8)

- Chromosomal anomalies were the leading cause of perinatal deaths due to major anomalies between 2002 and 2006.

Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Perinatal mortality rates must be interpreted with caution due to the low number of cases in many categories.

Table 4.7.2.1 Perinatal Deaths and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Perinatal Deaths	268	380	358	343	410	422	444	484	452	532
Total births	37,717	38,045	36,862	37,461	38,542	40,127	40,578	41,896	44,958	48,690
Rate (per 1,000 total births)	7.1	10.0	9.7	9.2	10.6	10.5	10.9	11.6	10.1	10.9
Standard Error (SE)	0.43	0.51	0.51	0.49	0.52	0.51	0.52	0.52	0.47	0.47

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.
Vital Statistics, Death File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.2.2 Perinatal and Neonatal Deaths and Rates by Maternal Age Group, Alberta, 2005, 2006

2005	<18	18-29	30-39	>34	>39	Total
Stillbirths	9	148	146	74	15	318
Early neonatal deaths	1	96	63	30	11	171
Late neonatal deaths	2	23	7	4	2	34
% of deaths[1]	2.3	51.1	41.3	20.7	5.4	100.0
Live births	600	22,638	17,303	6,284	1,045	41,587
Perinatal mortality rate (per 1,000 total births)[2]	16.4	10.7	12.0	16.4	24.5	11.7
Perinatal mortality rate standard error (SE)	5.1	0.7	0.8	1.6	4.8	0.5
Corrected perinatal mortality rate[4]	11.6	8.1	8.4	10.1	13.4	8.4
Corrected perinatal mortality rate SE	4.3	0.6	0.7	1.3	3.5	0.4
Neonatal mortality rate (per 1,000 live births)[3]	5.0	5.3	4.0	5.4	12.4	4.9
Neonatal mortality rate SE	2.9	0.5	0.5	0.9	3.4	0.3
Corrected neonatal mortality rate[4]	5.0	3.8	2.7	2.4	5.7	3.4
Corrected neonatal mortality rate SE	2.9	0.4	0.4	0.6	2.3	0.3

2006	<18	18-29	30-39	>34	>39	Total
Stillbirths	4	135	148	68	23	310
Early neonatal deaths	9	72	68	19	2	151
Late neonatal deaths	1	13	6	4	1	21
% of deaths[1]	2.9	45.6	46.1	18.9	5.4	100.0
Live births	715	24,233	18,638	6,780	1,073	44,659
Perinatal mortality rate (per 1,000 total births)[2]	18.1	8.5	11.5	12.7	22.8	10.3
Perinatal mortality rate standard error (SE)	5.0	0.6	0.8	1.4	4.5	0.5
Corrected perinatal mortality rate[4]	15.3	6.3	8.0	8.4	15.6	7.3
Corrected perinatal mortality rate SE	4.6	0.5	0.6	1.1	3.8	0.4
Neonatal mortality rate (per 1,000 live births)[3]	14.0	3.5	4.0	3.4	2.8	3.9
Neonatal mortality rate SE	4.4	0.4	0.5	0.7	1.6	0.3
Corrected neonatal mortality rate[4]	11.2	2.4	2.5	1.9	1.9	2.6
Corrected neonatal mortality rate SE	3.9	0.3	0.4	0.5	1.3	0.2

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: 1. % of deaths = (total deaths for a given age group) / (total deaths for all ages) x 100.
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000.
3. ((early neonatal deaths + late neonatal deaths) / live births) x 1000.
4. Corrected rates exclude deaths due to major congenital anomalies.
Total columns include unknown maternal ages.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.2.3 Perinatal and Neonatal Deaths and Rates by Maternal Age Group, excluding <500 grams, Alberta, 2005, 2006

2005	<18	18-29	30-39	>34	>39	Total
Stillbirths	6	88	74	42	8	176
Early neonatal deaths	0	65	31	13	5	101
Late neonatal deaths	2	23	7	4	2	34
% of deaths[1]	2.6	56.6	36.0	19.0	4.8	100.0
Live births	599	22,608	17,269	6,266	1,039	41,516
Perinatal mortality rate (per 1,000 total births)[2]	9.9	6.7	6.1	8.7	12.4	6.6
Perinatal mortality rate standard error (SE)	4.0	0.5	0.6	1.2	3.4	0.4
Corrected perinatal mortality rate[4]	5.0	5.3	4.5	5.6	6.7	5.1
Corrected perinatal mortality rate SE	2.9	0.5	0.5	0.9	2.5	0.4
Neonatal mortality rate (per 1,000 live births)[3]	3.3	3.9	2.2	2.7	6.7	3.3
Neonatal mortality rate SE	2.4	0.4	0.4	0.7	2.5	0.3
Corrected neonatal mortality rate[4]	3.3	2.8	1.6	1.0	2.9	2.1
Corrected neonatal mortality rate SE	2.4	0.4	0.3	0.4	1.7	0.2

2006	<18	18-29	30-39	>34	>39	Total
Stillbirths	3	81	82	37	14	180
Early neonatal deaths	6	42	42	13	0	90
Late neonatal deaths	1	12	6	4	1	20
% of deaths[1]	3.4	46.6	44.8	18.6	5.2	100.0
Live births	712	24,201	18,609	6,773	1,071	44,593
Perinatal mortality rate (per 1,000 total births)[2]	12.6	5.1	6.6	7.3	12.9	6.0
Perinatal mortality rate standard error (SE)	4.2	0.5	0.6	1.0	3.4	0.4
Corrected perinatal mortality rate[4]	9.8	4.1	5.1	5.3	8.3	4.5
Corrected perinatal mortality rate SE	3.7	0.4	0.5	0.9	2.8	0.3
Neonatal mortality rate (per 1,000 live births)[3]	9.8	2.2	2.6	2.5	0.9	2.5
Neonatal mortality rate SE	3.7	0.3	0.4	0.6	0.9	0.2
Corrected neonatal mortality rate[4]	7.0	1.4	1.7	1.6	0.0	1.5
Corrected neonatal mortality rate SE	3.1	0.2	0.3	0.5	0.0	0.2

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: 1. % of deaths = (total deaths for a given age group) / (total deaths for all ages) x 100.
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000.
3. ((early neonatal deaths + late neonatal deaths) / live births) x 1000.
4. Corrected rates exclude deaths due to major congenital anomalies.
Total columns include unknown maternal ages.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.2.4 Perinatal and Neonatal Deaths and Rate by Length of Gestation (weeks), Alberta, 2005, 2006, and 2002 to 2006 Combined

2005	<24*	24	25	26	27	28	29	30	31	32	33
Stillbirths	150	11	7	13	7	12	3	7	12	11	9
Early neonatal deaths	101	16	11	7	4	4	2	3	1	0	0
Late neonatal deaths	2	4	4	4	1	0	0	2	1	0	1
% of deaths[1]	48.4	5.9	4.2	4.6	2.3	3.1	1.0	2.3	2.7	2.1	1.9
Live births	106	35	30	49	59	52	59	88	110	224	239
Perinatal mortality rate (per 1,000 total births)[2]	980.5	587.0	486.5	322.6	166.7	250.0	80.6	105.3	106.6	46.8	36.3
Perinatal mortality rate standard error (SE)	8.6	72.6	82.2	59.4	45.9	54.1	34.6	31.5	27.9	13.8	11.9
Neonatal mortality rate (per 1,000 live births)[3]	971.7	571.4	500.0	224.5	84.7	76.9	33.9	56.8	18.2	0.0	4.2
Neonatal mortality rate standard error (SE)	16.1	83.6	91.3	59.6	36.3	37.0	23.6	24.7	12.7	0.0	4.2

2005 continued	34	35	36	37	38	39	40	41	42	>42	Total
Stillbirths	4	7	15	9	10	16	13	2	0	0	318
Early neonatal deaths	2	3	3	5	1	5	1	1	1	0	171
Late neonatal deaths	0	0	3	1	6	4	1	0	0	0	34
% of deaths[1]	1.1	1.9	4.0	2.9	3.3	4.8	2.9	0.6	0.2	0.0	100.0
Live births	534	657	1,539	2,999	6,959	10,075	11,544	5,928	282	19	41,587
Perinatal mortality rate (per 1,000 total births)[2]	11.2	15.1	11.6	4.7	1.6	2.1	1.2	0.5	3.5	0.0	11.7
Perinatal mortality rate standard error (SE)	4.5	4.7	2.7	1.2	0.5	0.5	0.3	0.3	3.5	0.0	0.5
Neonatal mortality rate (per 1,000 live births)[3]	3.7	4.6	3.9	2.0	1.0	0.9	0.2	0.2	3.5	0.0	4.9
Neonatal mortality rate standard error (SE)	2.6	2.6	1.6	0.8	0.4	0.3	0.1	0.2	3.5	0.0	0.3

2006	<24*	24	25	26	27	28	29	30	31	32	33
Stillbirths	131	12	12	9	6	13	8	4	5	7	7
Early neonatal deaths	85	14	7	3	2	6	1	2	0	6	2
Late neonatal deaths	1	3	2	1	0	0	0	1	0	0	1
% of deaths[1]	45.0	6.0	4.4	2.7	1.7	3.9	1.9	1.5	1.0	2.7	2.1
Live births	93	31	37	49	37	55	80	91	147	198	283
Perinatal mortality rate (per 1,000 total births)[2]	1,000.0	604.7	387.8	206.9	186.0	279.4	102.3	63.2	32.9	63.4	31.0
Perinatal mortality rate standard error (SE)	0.0	74.6	69.6	53.2	59.3	54.4	32.3	25.0	14.5	17.0	10.2
Neonatal mortality rate (per 1,000 live births)[3]	1,000.0	548.4	243.2	81.6	54.1	109.1	12.5	33.0	0.0	30.3	10.6
Neonatal mortality rate standard error (SE)	0.0	89.4	70.5	39.1	37.2	42.0	12.4	18.7	0.0	12.2	6.1

2006 continued	34	35	36	37	38	39	40	41	42	>42	Total
Stillbirths	10	7	9	20	20	14	9	7	0	0	310
Early neonatal deaths	4	2	3	2	3	6	3	0	0	0	151
Late neonatal deaths	1	1	1	3	1	1	2	2	0	0	21
% of deaths[1]	3.1	2.1	2.7	5.2	5.0	4.4	2.9	1.9	0.0	0.0	100.0
Live births	507	821	1,528	3,377	7,788	11,401	11,845	6,068	216	7	44,659
Perinatal mortality rate (per 1,000 total births)[2]	27.1	10.9	7.8	6.5	2.9	1.8	1.0	1.2	0.0	0.0	10.3
Perinatal mortality rate standard error (SE)	7.1	3.6	2.2	1.4	0.6	0.4	0.3	0.4	0.0	0.0	0.5
Neonatal mortality rate (per 1,000 live births)[3]	9.9	3.7	2.6	1.5	0.5	0.6	0.4	0.3	0.0	0.0	3.9
Neonatal mortality rate standard error (SE)	4.4	2.1	1.3	0.7	0.3	0.2	0.2	0.2	0.0	0.0	0.3

2002 to 2006 combined	<24*	24	25	26	27	28	29	30	31	32	33
Stillbirths	617	52	40	49	37	46	31	38	31	52	31
Early neonatal deaths	463	58	37	26	12	19	11	12	7	10	5
Late neonatal deaths	14	14	11	12	6	1	2	5	1	2	6
% of deaths[1]	45.6	5.2	3.7	3.6	2.3	2.7	1.8	2.3	1.6	2.7	1.7
Live births	495	150	141	218	214	271	318	435	587	941	1,250
Perinatal mortality rate (per 1,000 total births)[2]	971.2	544.6	425.4	280.9	195.2	205.0	120.3	105.7	61.5	62.4	28.1
Perinatal mortality rate standard error (SE)	5.0	35.0	36.7	27.5	25.0	22.7	17.4	14.1	9.7	7.7	4.6
Neonatal mortality rate (per 1,000 live births)[3]	963.6	480.0	340.4	174.3	84.1	73.8	40.9	39.1	13.6	12.8	8.8
Neonatal mortality rate standard error (SE)	8.4	40.8	39.9	25.7	19.0	15.9	11.1	9.3	4.8	3.7	2.6

2002 to 2006 combined continued	34	35	36	37	38	39	40	41	42	>42	Total
Stillbirths	42	35	52	76	74	67	61	25	3	1	1460
Early neonatal deaths	14	11	23	16	17	28	16	14	1	0	800
Late neonatal deaths	7	3	9	7	12	13	10	6	0	0	141
% of deaths[1]	2.6	2.0	3.5	4.1	4.3	4.5	3.6	1.9	0.2	0.0	100.0
Live births	2,331	3,552	7,323	14,547	33,840	49,354	57,632	29,389	1,638	73	204,699
Perinatal mortality rate (per 1,000 total births)[2]	23.6	12.8	10.2	6.3	2.7	1.9	1.3	1.3	2.4	13.5	11.0
Perinatal mortality rate standard error (SE)	3.1	1.9	1.2	0.7	0.3	0.2	0.2	0.2	1.2	13.4	0.2
Neonatal mortality rate (per 1,000 live births)[3]	9.0	3.9	4.4	1.6	0.9	0.8	0.5	0.7	0.6	0.0	4.6
Neonatal mortality rate standard error (SE)	2.0	1.1	0.8	0.3	0.2	0.1	0.1	0.2	0.6	0.0	0.1

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: 1. % of deaths = (total deaths for a given gestational age) / (total deaths at all gestational ages) x 100.
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000.
3. ((early neonatal deaths + late neonatal deaths) / live births) x 1000.
Total columns include unknown gestational ages.
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The perinatal deaths come from the Medical Records departments, which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.2.5 Perinatal and Neonatal Deaths and Rate by Length of Gestation (weeks), excluding births <500 grams, Alberta, 2005, 2006, and 2002 to 2006 Combined

2005	<24*	24	25	26	27	28	29	30	31	32	33
Stillbirths	29	5	4	7	4	12	2	7	12	11	9
Early neonatal deaths	32	15	11	7	4	4	2	3	1	0	0
Late neonatal deaths	2	4	4	4	1	0	0	2	1	0	1
% of deaths[1]	20.3	7.7	6.1	5.8	2.9	5.1	1.3	3.9	4.5	3.5	3.2
Live births	37	33	30	49	59	52	59	88	110	224	239
Perinatal mortality rate (per 1,000 total births)[2]	924.2	526.3	441.2	250.0	127.0	250.0	65.6	105.3	106.6	46.8	36.3
Perinatal mortality rate standard error (SE)	32.6	81.0	85.2	57.9	41.9	54.1	31.7	31.5	27.9	13.8	11.9
Neonatal mortality rate (per 1,000 live births)[3]	918.9	575.8	500.0	224.5	84.7	76.9	33.9	56.8	18.2	0.0	4.2
Neonatal mortality rate standard error (SE)	44.9	86.0	91.3	59.6	36.3	37.0	23.6	24.7	12.7	0.0	4.2

2005 continued	34	35	36	37	38	39	40	41	42	>42	Total
Stillbirths	2	7	15	9	10	16	13	2	0	0	176
Early neonatal deaths	2	3	3	5	1	5	1	1	1	0	101
Late neonatal deaths	0	0	3	1	6	4	1	0	0	0	34
% of deaths[1]	1.3	3.2	6.8	4.8	5.5	8.0	4.8	1.0	0.3	0.0	100.0
Live births	534	657	1,539	2,999	6,959	10,075	11,544	5,928	282	19	41,516
Perinatal mortality rate (per 1,000 total births)[2]	7.5	15.1	11.6	4.7	1.6	2.1	1.2	0.5	3.5	0.0	6.6
Perinatal mortality rate standard error (SE)	3.7	4.7	2.7	1.2	0.5	0.5	0.3	0.3	3.5	0.0	0.4
Neonatal mortality rate (per 1,000 live births)[3]	3.7	4.6	3.9	2.0	1.0	0.9	0.2	0.2	3.5	0.0	3.3
Neonatal mortality rate standard error (SE)	2.6	2.6	1.6	0.8	0.4	0.3	0.1	0.2	3.5	0.0	0.3

2006	<24*	24	25	26	27	28	29	30	31	32	33
Stillbirths	28	9	6	7	4	12	7	4	4	6	7
Early neonatal deaths	24	14	7	3	2	6	1	2	0	6	2
Late neonatal deaths	1	2	2	1	0	0	0	1	0	0	1
% of deaths[1]	18.3	8.6	5.2	3.8	2.1	6.2	2.8	2.4	1.4	4.1	3.4
Live births	28	30	37	49	37	55	80	91	147	198	283
Perinatal mortality rate (per 1,000 total births)[2]	928.6	589.7	302.3	178.6	146.3	268.7	92.0	63.2	26.5	58.8	31.0
Perinatal mortality rate standard error (SE)	34.4	78.8	70.0	51.2	55.2	54.2	31.0	25.0	13.1	16.5	10.2
Neonatal mortality rate (per 1,000 live births)[3]	892.9	533.3	243.2	81.6	54.1	109.1	12.5	33.0	0.0	30.3	10.6
Neonatal mortality rate standard error (SE)	58.5	91.1	70.5	39.1	37.2	42.0	12.4	18.7	0.0	12.2	6.1

2006 continued	34	35	36	37	38	39	40	41	42	>42	Total
Stillbirths	9	7	9	16	16	13	9	7	0	0	180
Early neonatal deaths	4	2	3	2	3	6	3	0	0	0	90
Late neonatal deaths	1	1	1	3	1	1	2	2	0	0	20
% of deaths[1]	4.8	3.4	4.5	7.2	6.9	6.9	4.8	3.1	0.0	0.0	100.0
Live births	507	821	1,528	3,377	7,788	11,401	11,845	6,068	216	7	44,593
Perinatal mortality rate (per 1,000 total births)[2]	25.2	10.9	7.8	5.3	2.4	1.7	1.0	1.2	0.0	0.0	6.0
Perinatal mortality rate standard error (SE)	6.9	3.6	2.2	1.2	0.6	0.4	0.3	0.4	0.0	0.0	0.4
Neonatal mortality rate (per 1,000 live births)[3]	9.9	3.7	2.6	1.5	0.5	0.6	0.4	0.3	0.0	0.0	2.5
Neonatal mortality rate standard error (SE)	4.4	2.1	1.3	0.7	0.3	0.2	0.2	0.2	0.0	0.0	0.2

2002 to 2006 combined	<24*	24	25	26	27	28	29	30	31	32	33
Stillbirths	136	32	22	34	27	42	27	37	30	50	30
Early neonatal deaths	156	53	35	26	12	19	11	12	7	10	5
Late neonatal deaths	12	13	11	12	5	1	2	5	1	2	6
% of deaths[1]	20.2	6.5	4.5	4.8	2.9	4.1	2.7	3.6	2.5	4.1	2.7
Live births	169	143	140	216	213	271	317	435	587	941	1,250
Perinatal mortality rate (per 1,000 total births)[2]	957.4	485.7	351.9	240.0	162.5	194.9	110.5	103.8	60.0	60.5	27.3
Perinatal mortality rate standard error (SE)	11.6	37.8	37.5	27.0	23.8	22.4	16.9	14.0	9.6	7.6	4.6
Neonatal mortality rate (per 1,000 live births)[3]	994.1	461.5	328.6	175.9	79.8	73.8	41.0	39.1	13.6	12.8	8.8
Neonatal mortality rate standard error (SE)	5.9	41.7	39.7	25.9	18.6	15.9	11.1	9.3	4.8	3.7	2.6

2002 to 2006 combined continued	34	35	36	37	38	39	40	41	42	>42	Total
Stillbirths	38	35	52	71	67	65	60	25	3	1	884
Early neonatal deaths	14	11	23	16	17	28	16	14	1	0	486
Late neonatal deaths	7	3	9	7	12	13	10	6	0	0	137
% of deaths[1]	3.9	3.3	5.6	6.2	6.4	7.0	5.7	3.0	0.3	0.1	100.0
Live births	2,331	3,552	7,323	14,546	33,840	49,354	57,630	29,389	1,638	73	204,358
Perinatal mortality rate (per 1,000 total births)[2]	22.0	12.8	10.2	6.0	2.5	1.9	1.3	1.3	2.4	13.5	6.7
Perinatal mortality rate standard error (SE)	3.0	1.9	1.2	0.6	0.3	0.2	0.2	0.2	1.2	13.4	0.2
Neonatal mortality rate (per 1,000 live births)[3]	9.0	3.9	4.4	1.6	0.9	0.8	0.5	0.7	0.6	0.0	3.0
Neonatal mortality rate standard error (SE)	2.0	1.1	0.8	0.3	0.2	0.1	0.1	0.2	0.6	0.0	0.1

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: 1. % of deaths = (total deaths for a given gestational age) / (total deaths at all gestational ages) x 100.
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000.
3. ((early neonatal deaths + late neonatal deaths) / live births) x 1000.
Total columns include unknown gestational ages.
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The perinatal deaths come from the Medical Records departments, which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.2.6 Weight-Specific Perinatal Deaths and Rates by Birth Weight Category (grams), Alberta, 2005, 2006, and 2002 to 2006 Combined

2005	<500*	500-749	750-999	1000-1249	1250-1499	1500-2499	2500-4499	>4499	Total
Perinatal deaths	206	91	37	14	18	53	62	2	489
Total births[1]	204	135	125	119	160	2,244	38,226	683	41,896
Perinatal mortality rate[2] (per 1,000 total births)	1000.0	674.1	296.0	117.6	112.5	23.6	1.6	2.9	11.7
Standard Error (SE)	0.00	40.34	40.83	29.54	24.98	3.21	0.21	2.07	0.52
Corrected perinatal mortality rate[3] (per 1,000 total births)	1000.0	614.0	221.2	70.8	83.9	16.6	1.4	2.9	8.4
Standard Error (SE)	0.00	45.60	39.05	24.13	22.26	2.71	0.19	2.07	0.45

2006	<500*	500-749	750-999	1000-1249	1250-1499	1500-2499	2500-4499	>4499	Total
Perinatal deaths	185	88	27	17	11	50	73	4	461
Total births[1]	180	134	122	111	180	2,620	40,874	736	44,958
Perinatal mortality rate[2] (per 1,000 total births)	1000.0	656.7	221.3	153.2	61.1	19.1	1.8	5.4	10.3
Standard Error (SE)	0.00	41.02	37.58	34.18	17.85	2.67	0.21	2.71	0.48
Corrected perinatal mortality rate[3] (per 1,000 total births)	1000.0	600.0	181.0	121.5	39.8	13.4	1.5	5.4	7.3
Standard Error (SE)	0.00	45.68	35.75	31.58	14.73	2.26	0.19	2.71	0.40

2002 to 2006 Combined	<500*	500-749	750-999	1000-1249	1250-1499	1500-2499	2500-4499	>4499	Total
Perinatal deaths	883	405	149	81	72	256	369	26	2,260
Total births[1]	844	656	520	575	732	11,224	187,907	3,642	206,101
Perinatal mortality rate[2] (per 1,000 total births)	1000.0	617.4	286.5	140.9	98.4	22.8	2.0	7.1	11.0
Standard Error (SE)	0.00	18.98	19.83	14.51	11.01	1.41	0.10	1.40	0.23
Corrected perinatal mortality rate[3] (per 1,000 total births)	1000.0	548.6	223.8	96.9	70.4	15.7	1.6	4.1	7.8
Standard Error (SE)	0.00	21.10	19.07	12.65	9.60	1.18	0.09	1.06	0.19

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.

Notes: 1. Total births = live births + stillbirths.
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000.
Total columns include unknown weights.
3. Corrected rates exclude deaths due to major congenital anomalies.
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The perinatal deaths come from the Medical Records departments, which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

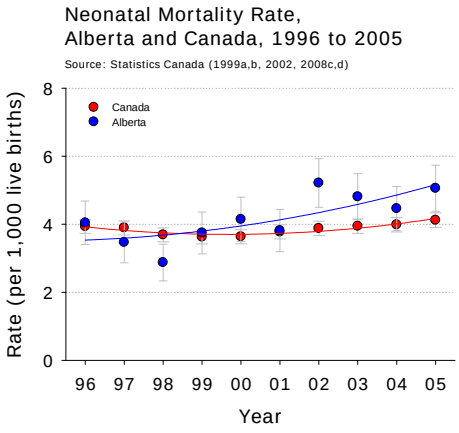
4.7.3 Neonatal Mortality

A neonatal death occurs when an infant is born alive but dies before 28 days of age.

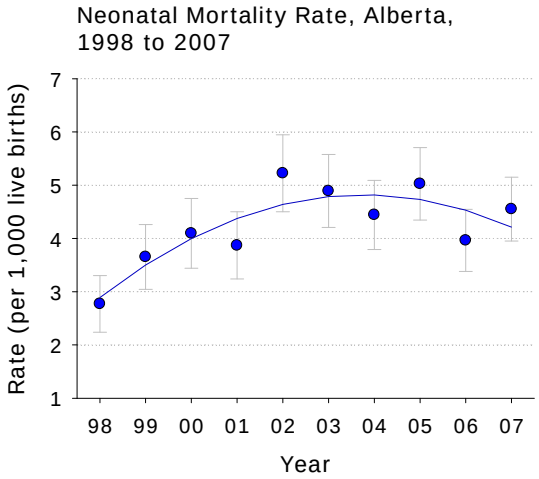
Neonatal mortality rate: Number of neonatal deaths per 1,000 live births in a given year.

The leading causes of neonatal death in Canada in 1999 were immaturity (32.6% of neonatal deaths), congenital anomalies (28.5%), and asphyxia (14.7%; Health Canada, 2003). Risk factors for neonatal mortality are similar to those for perinatal mortality.

With the exception of 2002, Albertan and Canadian neonatal mortality rates did not differ significantly between 1996 and 2005. In 2005, the neonatal mortality rate was 5.1 (per 1,000 live births) in Alberta and 4.1 in Canada (Statistics Canada, 2008c, d). Registration of live births under 500 grams has been routine in Alberta since 1990, elevating the perinatal, neonatal, and infant mortality rates in Alberta relative to the rest of Canada, where such births are not universally registered.



Time Trends (see Table 4.7.3.1)

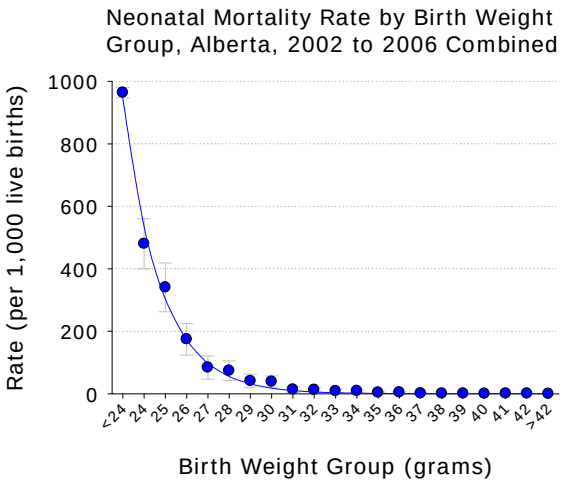


- In 2007, there were 220 neonatal deaths (4.6 per 1,000 live births). The neonatal mortality rate (per 1,000 live births) was generally stable between 2002 and 2007.

Maternal Age Effects (see Tables 4.7.2.2, 4.7.2.3)

- The number of neonatal deaths in 2005 and 2006 was too small for reliable comparisons between age groups.

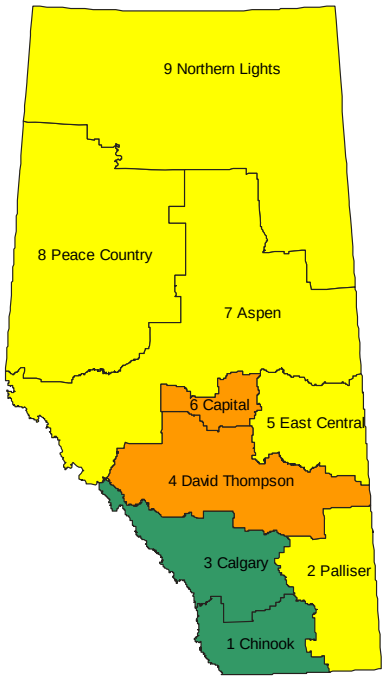
Gestational Age Effects (see Tables 4.7.2.4, 4.7.2.5)



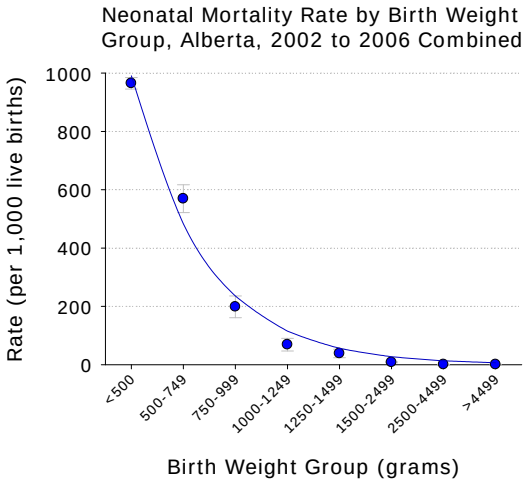
- Neonatal deaths also decrease exponentially with increasing gestational age.
- For 2002 to 2006 combined, more than 96% of all babies born alive prior to 24 weeks gestation died before 28 days of life. For infants born at or after 27 weeks gestation, the neonatal mortality rate was less than one tenth of this rate. At 40 weeks gestation, the rate was at its lowest level (0.5 per 1,000 live births).

4.7.3 Neonatal Mortality

Neonatal Mortality Rate, 1997-2006 Combined



Birth Weight Effects (see Table 4.7.3.3)

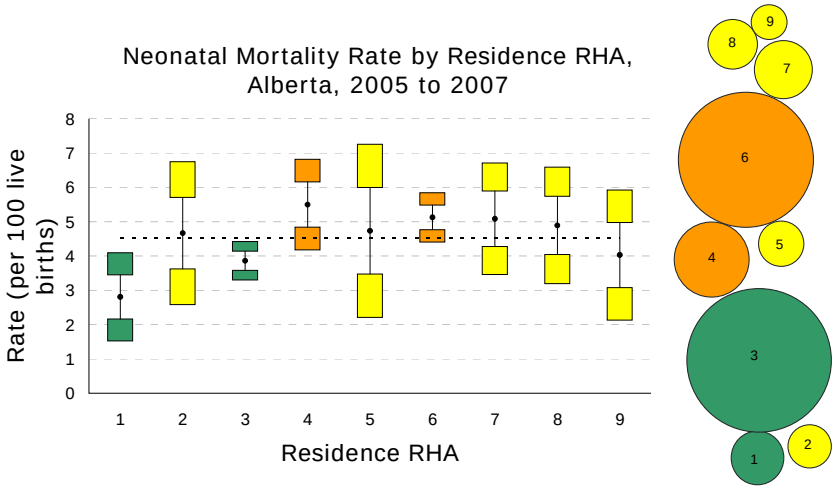


- Neonatal mortality rates decrease exponentially with increasing birth weight. For 2002 to 2006 combined, the neonatal mortality rate ranged from 964.8 (per 1,000 live births) for births under 500 grams to less than 1.0 for births between of 2,500 grams or more.

Congenital Anomalies (see Tables 4.7.1.7, 4.7.1.8)

- For 2002to 2006 combined, 29.2% of neonatal deaths due to major anomalies were due to chromosomal anomalies, more than any other type of anomaly.

Regional Data (see Table 4.7.3.2)



- The neonatal mortality rate was significantly lower than the provincial average in RHAs 1 and 3 between 2005 and 2007. RHA 1 had the lowest rate (2.8 per 1,000 live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

4.7.3 Neonatal Mortality

Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Neonatal mortality rates must be interpreted with caution due to the low number of cases in many categories.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.7.3.1 Neonatal Deaths and Rate, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Neonatal deaths	104	138	150	144	200	195	179	209	177	220
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 1,000 live births)	2.8	3.7	4.1	3.9	5.2	4.9	4.4	5.0	4.0	4.6
Standard Error (SE)	0.27	0.31	0.33	0.32	0.37	0.35	0.33	0.35	0.30	0.31

Table 4.7.3.2 Neonatal Deaths and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Neonatal deaths	19	20	191	69	14	203	39	33	18	607
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,601
Rate (per 1,000 live births)	2.8	4.7	3.9	5.5	4.7	5.1	5.1	4.9	4.0	4.5
Standard Error (SE)	0.64	1.04	0.28	0.66	1.26	0.36	0.81	0.85	0.95	0.18

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Death File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.
Totals for RHAs include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.3.3 Weight-Specific Neonatal Deaths and Rates by Birth Weight Category (grams), Alberta, 2005, 2006, and 2004 to 2006 Combined

2005	<500*	500-749	750-999	1000-1249	1250-1499	1500-2499	2500-4499	>4499	Total
Neonatal deaths	70	56	23	9	5	18	24	0	205
Live births	71	92	103	112	144	2,206	38,178	681	41,587
Neonatal mortality rate[1] (per 1,000 total births)	985.9	608.7	223.3	80.4	34.7	8.2	0.6	0.0	4.9
Standard Error (SE)	13.98	50.88	41.03	25.69	15.26	1.92	0.13	0.00	0.34
Corrected Neonatal mortality rate[2] (per 1,000 total births)	979.2	571.4	207.9	46.3	28.0	2.7	0.3	0.0	3.5
Standard Error (SE)	20.62	53.99	40.38	20.22	13.79	1.11	0.09	0.00	0.29

2006	<500*	500-749	750-999	1000-1249	1250-1499	1500-2499	2500-4499	>4499	Total
Neonatal deaths	61	44	17	6	5	12	26	0	172
Live births	66	79	110	100	173	2,581	40,817	733	44,659
Neonatal mortality rate[1] (per 1,000 total births)	924.2	557.0	154.5	60.0	28.9	4.6	0.6	0.0	3.9
Standard Error (SE)	0.00	55.89	34.46	23.75	12.74	1.34	0.12	0.00	0.29
Corrected Neonatal mortality rate[2] (per 1,000 total births)	891.3	520.5	122.6	30.9	17.5	0.8	0.3	0.0	2.5
Standard Error (SE)	0.00	58.47	31.86	17.58	10.04	0.55	0.08	0.00	0.24

2002 to 2006 Combined	<500*	500-749	750-999	1000-1249	1250-1499	1500-2499	2500-4499	>4499	Total
Neonatal deaths	329	234	87	36	26	88	138	2	941
Live births	341	411	439	525	677	11,036	187,638	3,632	204,699
Neonatal mortality rate[1] (per 1,000 total births)	964.8	569.3	198.2	68.6	38.4	8.0	0.7	0.6	4.6
Standard Error (SE)	9.98	24.42	19.03	11.03	7.39	0.85	0.06	0.39	0.15
Corrected Neonatal mortality rate[2] (per 1,000 total births)	947.8	529.3	169.8	39.3	19.6	1.7	0.3	0.6	3.0
Standard Error (SE)	0.00	25.74	18.23	8.61	5.38	0.40	0.04	0.39	0.12

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.

Notes: 1. (neonatal deaths / live births) x 1000.
2. Corrected rates exclude deaths due to major congenital anomalies.
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The Neonatal deaths come from the Medical Records departments, which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

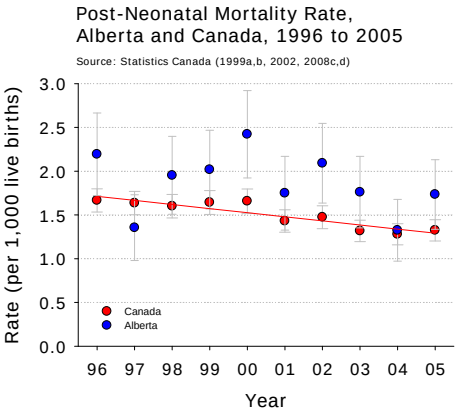
4.7.4 Post-neonatal Mortality

A post-neonatal death *occurs when an infant is born alive but dies between 28 days and one year of age.*

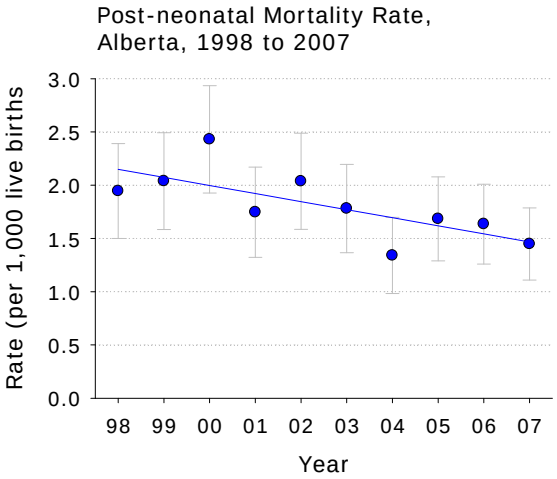
Post-neonatal mortality rate: Number of post-neonatal deaths per 1,000 live births in a given year.

Socioeconomic factors play a role in post-neonatal death rates in Canada. The rate of post-neonatal death was more than five times higher among low income women than among high income women in one large study. Behavioural and lifestyle factors (e.g., smoking, pre-pregnancy weight, maternal age) accounted for these differences (Joseph, Liston, Dodds, Dahlgren, and Allen, 2007). Sudden infant death syndrome and congenital anomalies are the leading causes of post-neonatal death in Canada (Health Canada, 2003).

Between 1996 and 2005, post-neonatal mortality rates declined in Canada as a whole; the rate in Alberta showed no time trend. In 2005, the post-neonatal mortality rate was 1.7 (per 1,000 live births) in Alberta and 1.3 in Canada (Statistics Canada, 2008c, d).



Time Trends (see Table 4.7.4.1)



- The post-neonatal mortality rate declined over time, from 1.9 (per 1,000 live births) in 1998 to 1.4 in 2007. There were 70 post-neonatal deaths in Alberta in 2007.

Regional Data (see Table 4.7.4.2)

- Post-neonatal mortality rates by residence RHA for 2003 to 2005 combined are in Table 4.7.4.2. The number of cases is too small to make reliable inter-regional comparisons.

Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Post-neonatal mortality rates must be interpreted with caution due to the low number of cases in many categories.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.7.4.1 Post-neonatal Deaths and Rate, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Post-neonatal deaths	73	77	89	65	78	71	54	70	73	70
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 1,000 live births)	1.9	2.0	2.4	1.7	2.0	1.8	1.3	1.7	1.6	1.4
Standard Error (SE)	0.23	0.23	0.26	0.22	0.23	0.21	0.18	0.20	0.19	0.17

Table 4.7.4.2 Post-neonatal Deaths and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Post-neonatal deaths	8	8	72	29	3	57	18	12	6	213
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,601
Rate (per 1,000 live births)	1.2	1.9	1.5	2.3	1.0	1.4	2.3	1.8	1.3	1.6
Standard Error (SE)	0.42	0.66	0.17	0.43	0.59	0.19	0.55	0.51	0.55	0.11

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Death File, Service Alberta, May 2008 release.

Notes: Data include Alberta residents only.
Totals for RHAs include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

4.7.5 Infant Mortality

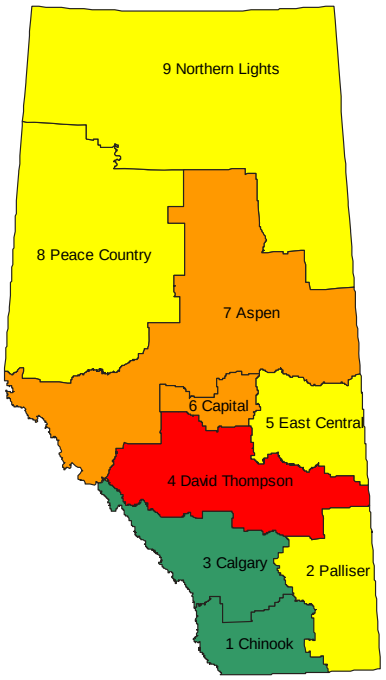
An infant mortality *occurs when an infant dies before reaching 12 months of age.* This includes neonatal and post-neonatal deaths.

Infant mortality rate: *Number of infant deaths per 1,000 live births.*

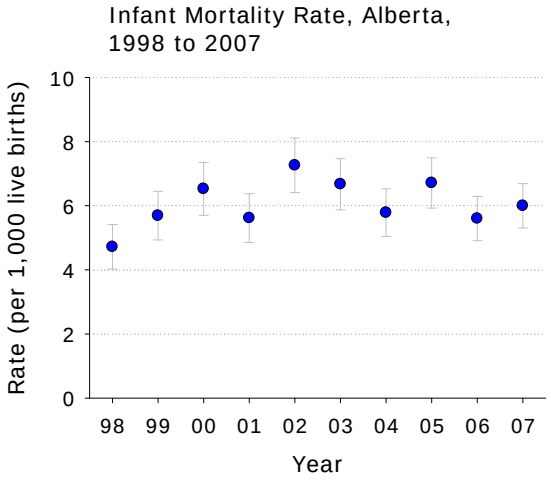
Most infant deaths are preterm or low birth weight or both. Other risk factors include maternal smoking, low maternal education, low or high maternal age, and male gender (Chen et al., 1998; Nault, 1997; Pollack, Lantz, and Frohna, 2000).

The leading causes of infant mortality in Alberta for 1998 to 2003 combined were perinatal conditions (e.g., pregnancy and birth complications, birth injury, respiratory problems, infection, etc.; 41.5% of deaths), congenital anomalies (28.0% of deaths) and Sudden Infant Death Syndrome (11.8% of deaths; Child Health Surveillance Project Data Group, 2005).

Infant Mortality Rate, 2005-07 Combined

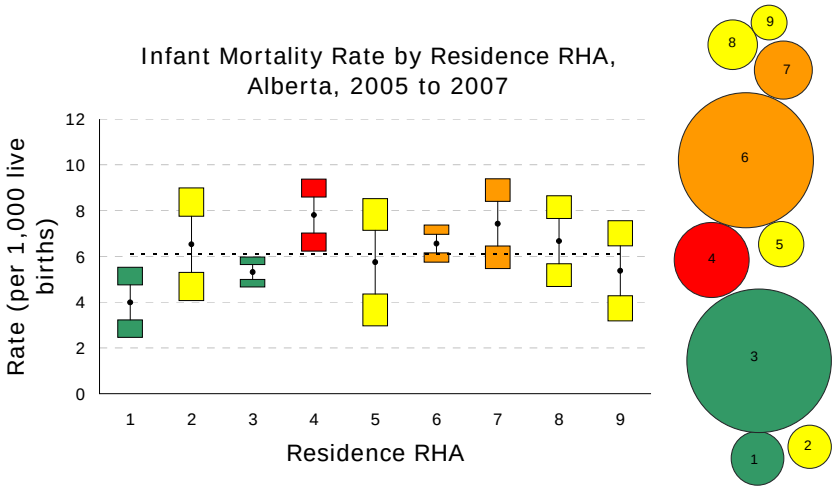


Time Trends (see Tables 4.7.5.1, 4.7.5.2)



- The infant mortality rate did not vary significantly with time between 1998 and 2007. In 2007, there were 290 infant deaths in Alberta, resulting in a rate of 6.0 (per 1,000 live births).
- Generally, the infant mortality rate was slightly higher for males than for females.

Regional Data (see Tables 4.7.5.3, 4.7.5.4)



- The infant mortality rate was significantly lower than the provincial average in RHAs 1 and 3 between 2005 and 2007, with the lowest rate in RHA 1 (4.0 per 1,000 live births).
- The rate was higher than the provincial average in RHA 4 (7.8 per 1,000 live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

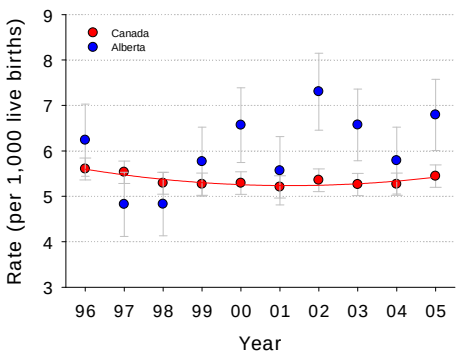
4.7.5 Infant Mortality

Throughout the world, infant mortality declined dramatically in the 1900s. In Canada, the rate has stabilized in recent years, but regional variation persists due to variability in demographics, quality of obstetric and infant care, and differences in registration practices (Wen, Kramer, Liu, Dzakpasu, & Sauvé, 2000). While mortality rates have declined, morbidity rates have increased. Much perinatal and infant research is directed toward preventing or reducing long-term morbidity in preterm and low birth weight infants (Saigal and Doyle, 2008).

Canadian infant mortality rates declined slightly in the late 1990s, while Albertan infant mortality rates did not vary significantly with time between 1996 and 2005. In 2005, the infant mortality rate was 6.8 (per 1,000 live births) in Alberta and 5.4 in Canada (Statistics Canada, 2008d). Registration of live births under 500 grams has been routine in Alberta since 1990, elevating the perinatal, neonatal, and infant mortality rates in Alberta relative to the rest of Canada, where such births are not universally registered.

Infant Mortality Rate,
Alberta and Canada, 1996 to 2005

Source: Statistics Canada (1999a,b, 2002, 2008c,d)



Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Infant mortality rates must be interpreted with caution due to the low number of cases in many categories.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.7.5.1 Infant Deaths and Rate by Year, Alberta, 1998 to 2007

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Infant Deaths	177	215	239	209	278	266	233	279	250	290
Live births	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659	48,348
Rate (per 1,000 live births)	4.7	5.7	6.5	5.6	7.3	6.7	5.8	6.7	5.6	6.0
Standard Error (SE)	0.35	0.39	0.42	0.39	0.43	0.41	0.38	0.40	0.35	0.35

Table 4.7.5.2 Infant Deaths and Rate by Sex, Alberta, 1998 to 2007

Female	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Infant Deaths	73	100	100	81	133	108	104	118	110	142
Live births	18,234	18,547	18,009	18,116	18,709	19,455	19,624	20,344	21,802	23,751
Rate (per 1,000 live births)	4.0	5.4	5.6	4.5	7.1	5.6	5.3	5.8	5.0	6.0
Standard Error (SE)	0.47	0.54	0.55	0.50	0.61	0.53	0.52	0.53	0.48	0.50

Male	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Infant Deaths	104	115	139	128	145	157	128	161	140	148
Live births	19,295	19,231	18,616	19,110	19,584	20,412	20,667	21,243	22,857	24,597
Rate (per 1,000 live births)	5.4	6.0	7.5	6.7	7.4	7.7	6.2	7.6	6.1	6.0
Standard Error (SE)	0.53	0.56	0.63	0.59	0.61	0.61	0.55	0.60	0.52	0.49

Table 4.7.5.3 Infant Deaths and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Infant Deaths	27	28	263	98	17	260	57	45	24	820
Live births	6,771	4,289	49,489	12,556	2,959	39,635	7,674	6,750	4,471	134,601
Rate (per 1,000 live births)	4.0	6.5	5.3	7.8	5.7	6.6	7.4	6.7	5.4	6.1
Standard Error (SE)	0.77	1.23	0.33	0.79	1.39	0.41	0.98	0.99	1.09	0.21

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Death File, Service Alberta, May 2008 release.
Notes: Data include Alberta residents only.
Totals for RHAs include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.5.4 Infant Deaths by Year and Residence RHA, Alberta, 1998 to 2007

Infant deaths	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	8	11	13	18	13	16	7	6	12	9
Palliser	11	3	3	8	11	12	6	8	9	11
Calgary	49	70	70	62	96	79	60	94	72	97
David Thompson	17	23	23	22	28	32	24	31	28	39
East Central	4	4	3	5	14	16	7	9	4	4
Capital	52	68	79	72	56	77	87	90	77	93
Aspen	10	20	23	11	28	15	25	22	16	19
Peace Country	10	9	15	6	15	9	10	10	24	11
Northern Lights	14	4	10	5	15	10	6	9	8	7
Alberta	177	215	239	209	278	266	233	279	250	290

Source: Vital Statistics, Death File, Service Alberta, May 2008 release.
Notes: Number of infant deaths is too low to provide rates in many cells.
Notes: Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

4.7.6 Maternal Mortality

The Alberta Perinatal Health Program reviews reported maternal deaths that occur during pregnancy and up to 90 days post-delivery. These deaths are classified according to the Council on Medical Service, American Medical Association, Committee on Maternal and Child Care (1964). This classification includes three categories:

Direct obstetric deaths: *Maternal deaths resulting from complications of pregnancy, childbirth or puerperium, including intervention, omission, incorrect treatment, or from chain of events resulting from above.*

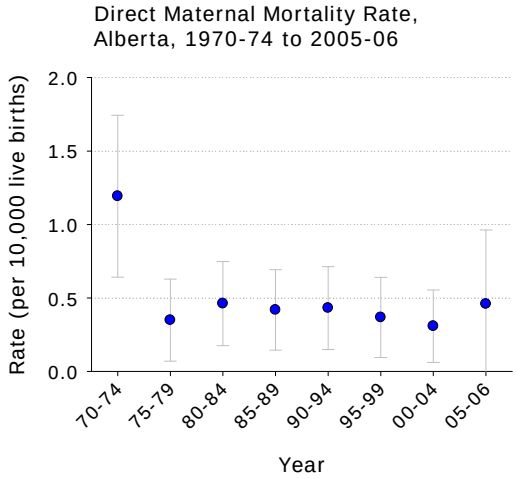
Indirect obstetric deaths: *Maternal deaths resulting from previous existing diseases or diseases that developed during pregnancy, childbirth or the puerperium which are not due to a direct obstetric cause.*

Unrelated deaths: *Maternal deaths not related to pregnancy, childbirth or puerperium, but occurring within the defined time frame.* These deaths are not reported here.

Maternal mortality rate: *Number of maternal deaths per 10,000 live births in a given year (includes direct, indirect, and unrelated deaths).*

Maternal mortality rates are used worldwide as an indictor of the status of women, their ability to access care, and the ability of health care systems to provide care. More than one half million maternal deaths occur across the world each year; two-thirds of these deaths occur in just 13 countries. Canada's maternal mortality rate is one of the lowest in the world, but risk varies across sub-populations of women. (Health Canada, 2004).

Time Trends (see Table 4.7.6.1)



- The direct maternal mortality rate for five-year periods, and for 2005-06, is shown in the figure above. The rate for 1970-74 was higher than for later years. The rate has been stable since 1975-79.
- Between 2000 and 2006, there were 10 direct and 7 indirect maternal deaths in Alberta out of a total of 281,848 live births. Maternal deaths are extremely rare in Alberta.
- In 2006, there were three direct maternal deaths. There were no indirect maternal deaths in Alberta in 2006.

Limitations and Methodology Notes

Maternal mortality rates must be interpreted with caution due to the low number of cases in many categories.

4.7.6 Maternal Mortality

The risk of maternal death is higher for older mothers, in particular mothers over 40 years of age, regardless of parity, prenatal care, or education. Causes of death associated with increased maternal age include placental abnormalities and hypertensive disorders (Callaghan & Berg, 2003).

The most common causes of direct maternal mortality from 1997 to 2000 in Canada were pulmonary embolism and pre-eclampsia/pregnancy-induced hypertension. Cardiovascular disease accounted for 60% of indirect maternal deaths between 1997 and 2000. The most common cause of maternal death unrelated to pregnancy was motor vehicle collisions, accounting for 50% of unrelated maternal deaths (Health Canada, 2004).

Between 1997 and 2000, there were 64 maternal deaths in Canada, 44 direct and 20 indirect. The overall maternal mortality rate was 6.1 (per 100,000 live births), with direct and indirect rate of 4.2 and 1.9, respectively. About three quarters of maternal deaths occurred at 24 weeks' gestation or later, with almost half of these deaths occurring in the post-partum period (Health Canada, 2004).

Table 4.7.6.1 Maternal Deaths and Rates by Cause, Alberta, 1970 to 2006

	Deaths				Rates (per 10,000 live births)		
	Direct	Indirect	Total (Direct + Indirect)	Unrelated	Direct	Indirect	Total (Direct + Indirect)
1970	4	1	5	6	1.3	0.3	1.6
1971	3	2	5	8	1.0	0.7	1.6
1972	5	0	5	5	1.7	0.0	1.7
1973	5	2	7	10	1.7	0.7	2.4
1974	1	1	2	3	0.3	0.3	0.7
1975	1	2	3	3	0.3	0.6	0.9
1976	1	1	2	2	0.3	0.3	0.6
1977	1	4	5	4	0.3	1.2	1.5
1978	1	2	3	2	0.3	0.6	0.8
1979	2	1	3	6	0.5	0.3	0.8
1980	2	1	3	0	0.5	0.3	0.8
1981	2	4	6	2	0.5	0.9	1.4
1982	1	4	5	4	0.2	0.9	1.1
1983	5	1	6	2	1.1	0.2	1.3
1984	0	1	1	4	0.0	0.2	0.2
1985	2	0	2	6	0.5	0.0	0.5
1986	0	0	0	7	0.0	0.0	0.0
1987	0	0	0	7	0.0	0.0	0.0
1988	4	3	7	6	1.0	0.7	1.7
1989	3	2	5	2	0.7	0.5	1.2
1990	3	0	3	3	0.7	0.0	0.7
1991	1	3	4	1	0.2	0.7	0.9
1992	2	3	5	1	0.5	0.7	1.2
1993	1	1	2	2	0.2	0.2	0.5
1994	2	0	2	1	0.5	0.0	0.5
1995	2	2	4	0	0.5	0.5	1.0
1996	2	2	4	2	0.5	0.5	1.1
1997	1	0	1	0	0.3	0.0	0.3
1998	2	5	7	1	0.5	1.3	1.8
1999	0	0	0	1	0.0	0.0	0.0
2000	0	0	0	0	0.0	0.0	0.0
2001	2	1	3	1	0.5	0.3	0.8
2002	1	0	1	5	0.3	0.0	0.3
2003	2	1	3	6	0.5	0.2	0.7
2004	1	1	2	0	0.2	0.2	0.5
2005	1	4	5	6	0.2	1.0	1.2
2006	3	0	3	2	0.7	0.0	0.7

Source: Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals.
Vital Statistics, Birth Files, Service Alberta.

Notes: Data include non-Alberta residents who died in Alberta.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

4. Births

4.8.1 Maternal Postnatal Morbidity

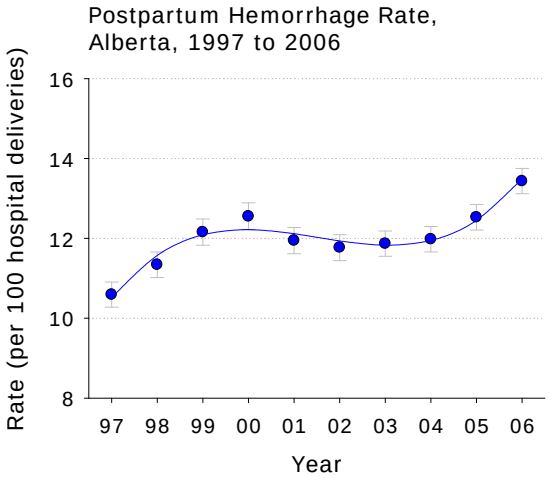
Postpartum hemorrhage: *Excessive blood loss after childbirth. May occur immediately after delivery or may be delayed by days or weeks* (Morgan, 1990). Early postpartum hemorrhage *occurs within 24 hours of giving birth*, while late postpartum hemorrhage *occurs more than 24 hours after giving birth.* Overall postpartum hemorrhage *includes cases for which onset is not specified, so overall cases are more than the sum of early and late.* For the data presented here, postpartum hemorrhage was defined as loss of more than 500 ml of blood after vaginal delivery or loss of more than 1000 ml of blood after cesarean section.

Depression: *A mental state of depressed mood characterized by feelings of sadness, despair, and discouragement. Depression ranges from normal feelings of "the blues" through dysthymic disorder to major depressive disorder* (Dorland, 2000).

Postpartum depression: *In the analyses below, we looked at diagnoses of depressive disorders occurring within 1 month, 6 months, 1 year and 2 years after birth, compared with levels in the 40 weeks prior to delivery (prenatal depression).*

Rates for the postpartum hemorrhage and postpartum depression are per 100 hospital deliveries.

Time Trends (see Tables 4.8.1.1, 4.8.1.4)



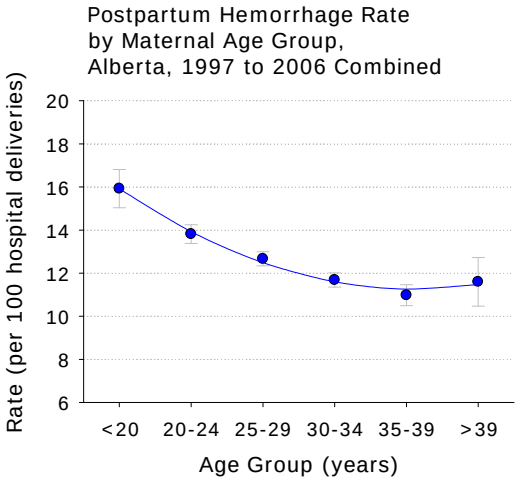
- The overall postpartum hemorrhage rate in Alberta increased in the late 1990s, decreased slightly in 2001, stabilized, and then increased in 2005 and 2006. In 2006, the postpartum hemorrhage rate was 13.4.
- In 2005 and 2006, the rate of early postpartum hemorrhage but not late postpartum hemorrhage increased. In 2006, the early rate was 8.6 (per 100 live births), and the late rate was 2.3.
- Between 2002 and 2006, the rates of prenatal and postpartum depression did not vary significantly with time.
- In 2006, the rate of prenatal depression was 2.7 (per 100 hospital deliveries); depression one month following delivery occurred in 2.0% of deliveries.
- The rate of postpartum depression up to 6 months after delivery was 6.8 in 2006; this rate increased to 10.0 and 12.2 at 12 and 24 months after delivery, respectively.
- In summary, in the 12 months following delivery, almost four times as many women (10.0%) were diagnosed with depression as were diagnosed in the prenatal period (2.7%).

4.8.1 Maternal Postnatal Morbidity

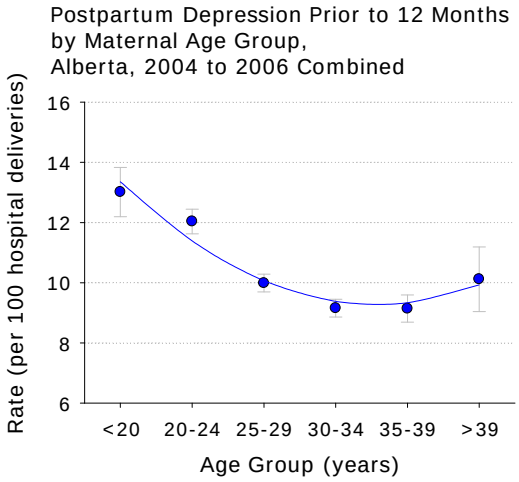
Postpartum hemorrhage is the leading cause of maternal death worldwide, and is a leading cause of serious maternal morbidity. Ability to recover from blood loss depends on many factors, including overall health, presence of anemia, and presence of complicating factors such as dehydration or preeclampsia (Ramanathan and Arulkumaran, 2006). There are recent increasing trends in rates of postpartum hemorrhage and postpartum hemorrhage with hysterectomy in Canada. Reasons for the rate increase are unclear (Joseph, Rouleau, Kramer, et al., 2007). Risk factors for postpartum hemorrhage include prolonged third stage of labour, preeclampsia, episiotomy, previous postpartum hemorrhage, and multiple pregnancy (Maughan, Heim, and Galazka, 2006).

Postpartum depression can affect the health of the mother, her infant, and other family members. Postpartum depressive disorders range from mild "blues" to non-psychotic major depression to psychosis, and affect 10 to 15% of mothers (Munk-Olsen, Laursen, Pedersen, Mors, and Mortensen, 2006). Predictors of postpartum depression include prenatal depression, low self-esteem, childcare stress, and prenatal anxiety (Beck, 2001). Limited social support and teenage pregnancy have also been implicated (O'Hara & Swain, 1996). Hormonal and other biologic factors are thought to play an important role (Miller, 2002).

Maternal Age Effects (see Tables 4.8.1.2, 4.8.1.5)



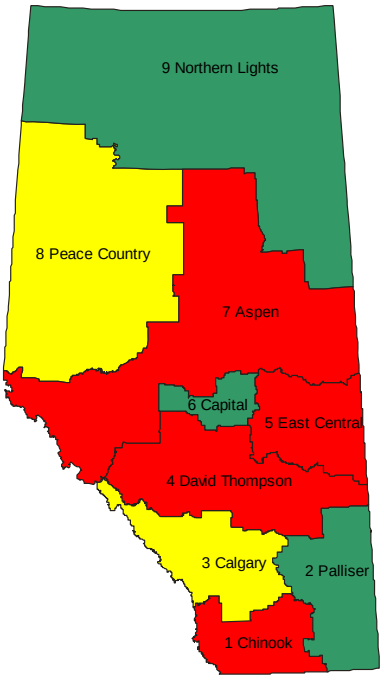
- Postpartum hemorrhage was most likely in mothers under 20, and declined with increasing maternal age for women under 40. Between 1997 and 2006, 15.9% of live births to women under 20 involved postpartum hemorrhage, compared with 11.0% for women 35 to 39.



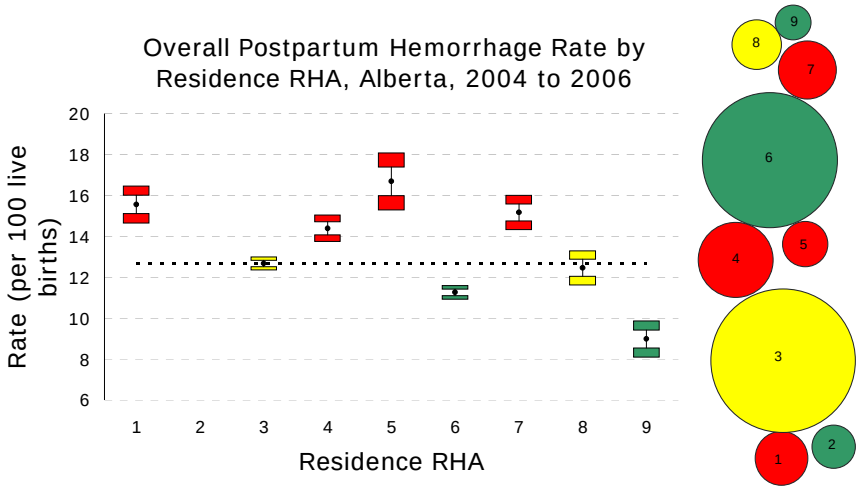
- Prior to delivery, depression diagnoses do not vary with maternal age. After delivery, teen mothers consistently have the highest rates of postpartum depression, and mothers over 40 tend to have slightly elevated rates compared to younger mothers.
- For 2004 to 2006 combined, the rate of postpartum depression up to 12 months after delivery was 13.1 (per 100 hospital deliveries) for women under 20 years of age, compared with 9.1 for women 35 to 39 years of age.

4.8.1 Maternal Postnatal Morbidity

Overall Postpartum Hemorrhage Rate, 2004-06 Combined



Regional Data (see Tables 4.8.1.3)



- For 2004 to 2006 combined, the overall rate of postpartum hemorrhage was lower than the provincial average in RHAs 2, 6, and 9. The lowest rate was in RHA 9 (9.0 per 100 live births).
- The overall rate was higher than the provincial average in RHAs 1, 4, 6, and 7, with the highest rate in RHA 5 (16.7).
- The rate of postpartum depression diagnosed prior to 12 months after delivery was lower than the provincial average in RHAs 3 and 9 between 2004 and 2006. The lowest rate was 7.3 (per 100 hospital deliveries) in RHA 9.
- The 12-month postpartum depression rate was higher than the provincial average in RHAs 1, 2, 7, and 8. The highest rate was in RHA 1 (11.6 per 100 hospital deliveries).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 maternal postnatal morbidity data to data from prior years due to changes in data coding systems.

The number of women with a given disease/condition was defined by the first three diagnoses (for Fee-for-Service claims) or the first six diagnoses (Ambulatory Care Classification System and Hospital Inpatient files) recorded in the database. Only the first visit within each year for the diagnosis was counted.

Postpartum hemorrhage and postpartum depression data did not include out-of-hospital births.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.8.1.1 Postpartum Hemorrhage Cases and Rate by Case Type and Year, Alberta, 1997 to 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Live births	36,550	37,529	37,778	36,625	37,226	38,293	39,868	40,292	41,587	44,659
Early cases	2,559	2,700	2,999	2,913	2,879	2,840	3,063	3,041	3,381	3,862
Rate (per 100 live births)	7.0	7.2	7.9	8.0	7.7	7.4	7.7	7.5	8.1	8.6
Standard Error (SE)	0.13	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13
Late cases	745	941	968	938	854	936	923	971	926	1,036
Rate (per 100 live births)	2.0	2.5	2.6	2.6	2.3	2.4	2.3	2.4	2.2	2.3
Standard Error (SE)	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07
All cases	3,871	4,255	4,592	4,596	4,446	4,506	4,731	4,826	5,210	5,999
Rate (per 100 live births)	10.6	11.3	12.2	12.5	11.9	11.8	11.9	12.0	12.5	13.4
Standard Error (SE)	0.16	0.16	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.16

Table 4.8.1.2 Postpartum Hemorrhage Cases and Rate by Case and Type Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Live births	6,545	24,482	39,808	36,692	15,904	3,105	126,539
Early cases	650	2,059	3,264	2,801	1,136	214	10,284
Rate (per 100 live births)	9.9	8.4	8.2	7.6	7.1	6.9	8.1
Standard Error (SE)	0.37	0.18	0.14	0.14	0.20	0.45	0.08
Late cases	204	686	905	778	290	54	2,933
Rate (per 100 live births)	3.1	2.8	2.3	2.1	1.8	1.7	2.3
Standard Error (SE)	0.21	0.11	0.07	0.08	0.11	0.23	0.04
All cases	1,042	3,382	5,041	4,286	1,746	360	16,035
Rate (per 100 live births)	15.9	13.8	12.7	11.7	11.0	11.6	12.7
Standard Error (SE)	0.45	0.22	0.17	0.17	0.25	0.57	0.09

Table 4.8.1.3 Postpartum Hemorrhage Cases and Rate by Case Type and Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Live births	6,396	3,991	46,379	11,863	2,871	37,152	7,365	6,333	4,186	126,539
Early cases	687	314	3,959	1,099	278	2,614	624	487	222	10,284
Rate (per 100 live births)	10.7	7.9	8.5	9.3	9.7	7.0	8.5	7.7	5.3	8.1
Standard Error (SE)	0.39	0.43	0.13	0.27	0.55	0.13	0.32	0.33	0.35	0.08
Late cases	124	88	912	380	120	820	202	190	97	2,933
Rate (per 100 live births)	1.9	2.2	2.0	3.2	4.2	2.2	2.7	3.0	2.3	2.3
Standard Error (SE)	0.17	0.23	0.06	0.16	0.37	0.08	0.19	0.21	0.23	0.04
All cases	995	511	5,878	1,707	479	4,183	1,117	789	376	16,035
Rate (per 100 live births)	15.6	12.8	12.7	14.4	16.7	11.3	15.2	12.5	9.0	12.7
Standard Error (SE)	0.45	0.53	0.15	0.32	0.70	0.16	0.42	0.41	0.44	0.09

Sources: Alberta Health and Wellness**.** Fee for Service Claims File, August 2008 extraction.
Alberta Health and Wellness. Ambulatory Care Classification System (ACCS), August 2008 extraction.
Alberta Health and Wellness. Inpatient Hospital Morbidity Data, August 2008 extraction.
Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File, August 2008 extraction.

Notes: Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of extraction.

Table 4.8.1.4 Prenatal and Postpartum Depression Cases and Rates, Alberta, 2002 to 2006

	2002	2003	2004	2005	2006
Hospital deliveries	38,146	39,652	40,236	41,478	44408
Prenatal depression					
Cases	960	1,028	1,006	1,135	1,208
Rate (per 100 hospital deliveries)	2.5	2.6	2.5	2.7	2.7
Postpartum depression					
Up to 1 month					
Cases	725	780	774	873	903
Rate (per 100 hospital deliveries)	1.9	2.0	1.9	2.1	2.0
Up to 6 months					
Cases	2,403	2,713	2,683	2,997	3,028
Rate (per 100 hospital deliveries)	6.3	6.8	6.7	7.2	6.8
Up to 12 months					
Cases	3,650	4,010	3,937	4,333	4,455
Rate (per 100 hospital deliveries)	9.6	10.1	9.8	10.4	10.0
Up to 24 months					
Cases	4,632	4,976	4,872	5,314	5,404
Rate (per 100 hospital deliveries)	12.1	12.5	12.1	12.8	12.2

Table 4.8.1.5 Prenatal and Postpartum Depression Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

	<20	20-24	25-29	30-34	35-39	>39	All
Hospital deliveries	6,471	24,288	39,408	35,977	15,576	3,025	124,748
Prenatal depression							
Cases	171	643	982	1,008	462	83	3,349
Rate (per 100 hospital deliveries)	2.6	2.6	2.5	2.8	3.0	2.7	2.7
Postpartum depression							
Up to 1 month							
Cases	162	528	758	724	304	74	2,550
Rate (per 100 hospital deliveries)	2.5	2.2	1.9	2.0	2.0	2.4	2.0
Up to 6 months							
Cases	563	1,965	2,728	2,332	929	191	8,708
Rate (per 100 hospital deliveries)	8.7	8.1	6.9	6.5	6.0	6.3	7.0
Up to 12 months							
Cases	842	2,923	3,936	3,294	1,424	306	12,725
Rate (per 100 hospital deliveries)	13.0	12.0	10.0	9.2	9.1	10.1	10.2
Up to 24 months							
Cases	1,042	3,608	4,829	4,003	1,740	368	15,590
Rate (per 100 hospital deliveries)	16.1	14.9	12.3	11.1	11.2	12.2	12.5

Sources: Alberta Health and Wellness**.** Fee for Service Claims File, August 2008 extraction.
Alberta Health and Wellness. Ambulatory Care Classification System (ACCS), August 2008 extraction.
Alberta Health and Wellness. Inpatient Hospital Morbidity Data, August 2008 extraction.
Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File, August 2008 extraction.

Notes: Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of extraction.

Table 4.8.1.6 Prenatal and Postpartum Depression Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Hospital deliveries	6,245	3,912	45,335	11,599	2,798	36,280	7,215	6,219	4,117	124,748
Prenatal depression										
Cases	145	110	1,202	310	59	1,111	205	137	61	3,349
Rate (per 100 hospital deliveries)	2.3	2.8	2.7	2.7	2.1	3.1	2.8	2.2	1.5	2.7
Postpartum depression										
Up to 1 month										
Cases	207	79	912	202	78	712	161	138	54	2,550
Rate (per 100 hospital deliveries)	3.3	2.0	2.0	1.7	2.8	2.0	2.2	2.2	1.3	2.0
Up to 6 months										
Cases	534	295	3,143	790	194	2,513	544	480	195	8,708
Rate (per 100 hospital deliveries)	8.6	7.5	6.9	6.8	6.9	6.9	7.5	7.7	4.7	7.0
Up to 12 months										
Cases	724	444	4,399	1,227	285	3,779	822	714	302	12,725
Rate (per 100 hospital deliveries)	11.6	11.3	9.7	10.6	10.2	10.4	11.4	11.5	7.3	10.2
Up to 24 months										
Cases	876	553	5,356	1,563	358	4,623	986	869	369	15,590
Rate (per 100 hospital deliveries)	14.0	14.1	11.8	13.5	12.8	12.7	13.7	14.0	9.0	12.5

Sources: Alberta Health and Wellness, Fee for Service Claims File, August 2008 extraction.
Alberta Health and Wellness. Ambulatory Care Classification System (ACCS), August 2008 extraction.
Alberta Health and Wellness. Inpatient Hospital Morbidity Data, August 2008 extraction.
Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File, August 2008 extraction.

Notes: The number of women with a given disease/condition defined by the first three diagnoses (for FFS claims) or the first 6 diagnoses (ACCS and inpatient) recorded in the database. Only first visit within each year for the diagnosis is counted.
Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of extraction.

4.8.2 Breastfeeding

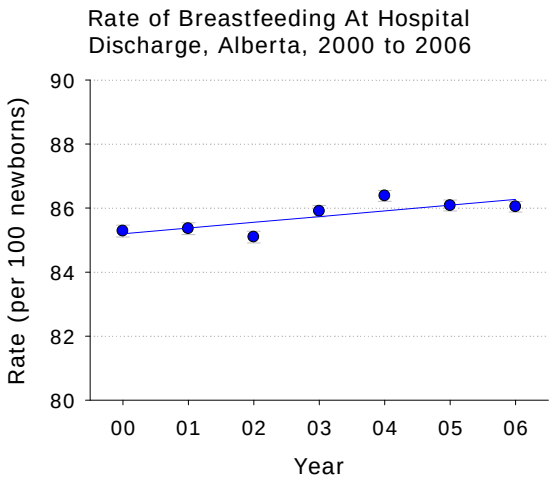
Breastfeeding newborns included those *documented as breastfeeding on discharge from hospital after birth.* This includes newborns exclusively breastfeeding as well as those receiving other sources of nutrition.

Rate of breastfeeding at hospital discharge: *Number of newborns per 100 newborns delivered in hospital who were breastfeeding when discharged.*

The World Health Organization and the Public Health Agency of Canada recommend exclusive breastfeeding up to six months of age, and continuation of supplemented breastfeeding up to two years of age and beyond (Sguassero, 2008; World Health Organization/UNICEF, 1990). Only 17% of Canadian mothers were doing so in 2003. Exclusive breastfeeding for at least six months is more likely with mothers who are older, married, have higher levels of education, have higher household income, are immigrants, and are urban (Millar & Maclean, 2005).

Breastfeeding is associated with protection from gastrointestinal and respiratory infections, otitis media, allergies, respiratory infections, Type 2 diabetes, and post-neonatal death, as well as enhanced cognitive development and reductions in childhood obesity rates (Health Canada, 2003; Millar & Maclean, 2005; Woo, Dolan, Morrow, Geraghty, and Goodman, 2008). For mothers, benefits include reduced postpartum bleeding, earlier postpartum weight loss, delayed resumption of ovulation, increased postpartum bone remineralization, and reduced risk of ovarian and breast cancer (Health Canada, 2003).

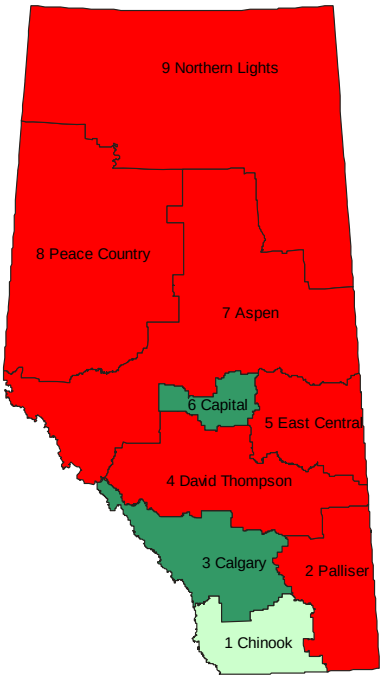
Time Trends (see Table 4.8.2.1)



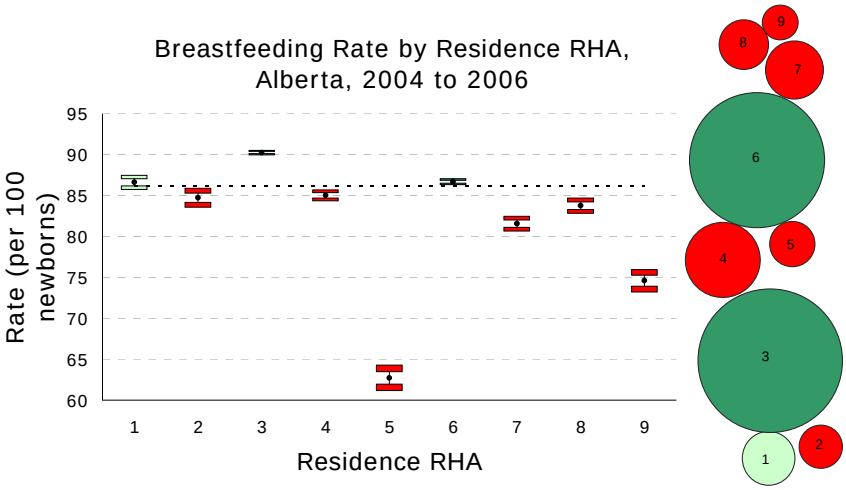
- The large majority of Alberta women initiate breastfeeding before being discharged from the hospital (only hospital births are included here). In 2006, 86.0% of newborns (37,930 newborns) were breastfeeding when discharged from the hospital.
- There was a small increase in the provincial breastfeeding rate from 85.3% in 2000 to 86.0% in 2006, with a peak at 86.4% in 2004.

4.8.2 Breastfeeding

Breastfeeding Initiation Rate, 2004-06 Combined



Regional Data (see Tables 4.8.2.2, 4.8.2.3)



- For 2004 to 2006 combined, the rate of breastfeeding at discharge was significantly higher than the provincial rate in RHAs 3 and 6. The highest rate was in RHA 3 (90.2% of newborns).
- The breastfeeding rate was lower than the provincial average in RHAs 2, 4, 5, 7, 8, and 9. The lowest rate was in RHA 5 (62.7%).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.8.2.1 Newborns Breastfeeding and Rate by Year, Alberta, 2000 to 2006

	2000	2001	2002	2003	2004	2005	2006
Newborns breastfeeding	30,954	31,450	32,238	33,921	34,617	35,493	37,930
Live newborns	36,296	36,846	37,884	39,488	40,074	41,233	44,084
Breastfeeding Rate (per 100 live births)	85.3	85.4	85.1	85.9	86.4	86.1	86.0
Standard Error (SE)	0.19	0.18	0.18	0.18	0.17	0.17	0.17

Table 4.8.2.2 Newborns Breastfeeding and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

	Chinook	Palliser	Calgary	David Thompson	East Central	Capital	Aspen	Peace Country	Northern Lights	Alberta
Newborns breastfeeding	5,449	3,317	40,910	9,959	2,463	31,742	5,965	5,208	3,027	108,040
Live newborns	6,291	3,915	45,331	11,712	3,927	36,620	7,313	6,218	4,058	125,385
Breastfeeding Rate (per 100 live births)	86.6	84.7	90.2	85.0	62.7	86.7	81.6	83.8	74.6	86.2
Standard Error (SE)	0.43	0.57	0.14	0.33	0.77	0.18	0.45	0.47	0.68	0.10

Source: Hospital Inpatient Files, Alberta Health and Wellness, May 2008 extraction.

Notes: Data include Alberta residents only.

Totals for RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.8.2.3 Newborns Breastfeeding and Rate by Year and Residence RHA, Alberta, 2000 to 2006

Newborns breastfeeding	2000	2001	2002	2003	2004	2005	2006
Chinook	1,680	1,679	1,698	1,790	1,760	1,791	1,898
Palliser	989	1,020	1,031	1,023	1,090	1,101	1,126
Calgary	11,492	11,529	11,910	12,874	12,967	13,609	14,334
David Thompson	2,955	2,943	3,079	3,121	3,239	3,234	3,486
East Central	760	743	773	749	824	783	856
Capital	8,867	9,072	9,213	9,793	10,131	10,283	11,328
Aspen	1,783	1,930	1,913	1,899	1,940	1,949	2,076
Peace Country	1,535	1,585	1,603	1,668	1,628	1,732	1,848
Northern Lights	893	949	1,018	1,003	1,038	1,011	978
Alberta	30,954	31,450	32,238	33,921	34,617	35,493	37,930

Rate (per 100 live newborns)	2000	2001	2002	2003	2004	2005	2006
Chinook	87.1	86.6	87.8	87.7	86.9	87.4	85.6
Palliser	83.1	84.0	84.1	82.3	86.3	84.0	84.0
Calgary	89.5	89.9	89.6	90.8	90.3	90.3	90.2
David Thompson	86.3	85.9	86.2	84.1	86.8	84.9	83.6
East Central	68.3	67.5	66.1	62.6	64.3	62.0	61.9
Capital	83.2	83.2	82.9	85.2	86.1	86.2	87.7
Aspen	80.0	82.0	80.8	81.4	81.7	81.5	81.5
Peace Country	84.6	83.4	83.5	83.1	84.1	84.2	83.0
Northern Lights	80.5	79.7	79.0	78.4	78.2	75.2	70.6
Alberta	85.3	85.4	85.1	85.9	86.4	86.1	86.0

Source: Hospital Inpatient Files, Alberta Health and Wellness, May 2008 release.

Notes: Data include out-of-province residents.

Totals for RHAs include unknown RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

5. References

5.1 References

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6. Appendices

6.1.1 Codes Used for Data Extraction

ICD-9-CM: International Classification of Disease – 9th Revision – Clinical Modification
ICD-10-CA: International Statistical Classification of Diseases and Related Health Problems Tenth Revision, Canada
CCI: Canadian Classification of Health Interventions
Where the symbol ^^ occurs, all codes with the given prefix were included

Spontaneous abortion, January 1997 to December 2007
Fee-For-Service Claims diagnostic code
ICD-9-CM 634

Induced abortion, January 1997 to December 2007, by year, maternal age group, and residence RHA
Fee-For-Service Claims diagnostic code
ICD-9-CM 635-636
Fee-For-Service Claims billing code
86.41, 87.0, 87.0A, 87.1, 87.21, 87.29A
Induced abortion, January 1997 to March 2002, by facility type, facility region, and week of gestation
Inpatient Hospital Separations and Ambulatory Care Classification System health service codes
86.41, 87.0, 87.0A, 87.1, 87.21
Induced abortion, April 2002 to December 2007, by facility type, facility region, and week of gestation
Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
Medical abortion ICD-10-CA O04^^
Inpatient Hospital Separations and Ambulatory Care Classification System intervention codes:
Medical termination CCI 5CA88.^^
Surgical aspiration and curettage CCI 5CA89GA
Surgical dilatation and curettage CCI 5CA89GC

Hospital delivery, January 1997 to December 2006
Hospital Inpatient Files
Program Area as Main Patient Service code 51

Induction of labour
If a delivery was counted in "Combined Induction", it was not counted in "Medical Induction" or "Surgical Induction" (i.e., these three categories are mutually exclusive).

From April 2002 to March 2003, inductions performed on outpatient bases were not captured, resulting in under-estimation of induction rates for this time period. From April 2003 onward, outpatient inductions were included in total inductions but were not categorized as medical, surgical, or combined. Consequently, "total inductions" is greater than the sum of medical, surgical, and combined from 2003 onward.

Induction of labour, January 1997 to December 2001
Hospital Inpatient Files procedure codes
Medical induction ICD-9-CM 73.4
Surgical induction ICD-9-CM 73.01, 73.1
Combined induction ICD-9-CM 73.4, and 73.01 or 73.1
Induction of labour, January 2002 to March 2006
Hospital Inpatient Files intervention codes
Medical induction CCI 5AC30AL, 5AC30AZ, 5AC30CA, 5AC30GU, 5AC30HA, 5AC30YA, 5AC30YB, 5AC30ZZ
Surgical induction CCI 5AC30AN, 5AC30AP, 5AC30CK
Combined induction One of CCI 5AC30AL, 5AC30AZ, 5AC30CA, 5AC30GU, 5AC30HA, 5AC30YA, 5AC30YB, 5AC30ZZ, and one of 5AC30AN, 5AC30AP, 5AC30CK

Induction of labour, April to December 2006
- Hospital Inpatient Files intervention codes
  - Medical Induction CCI 5AC30AL-I2, 5AC30AZ, 5AC30CA-I2, 5AC30CA-Z9, 5AC30CK-A2, 5AC30CK-I2, 5AC30HA-I2, 5AC30YA-I2
  - Surgical Induction CCI 5AC30AN, 5AC30AP, 5AC30CK-BD, 5AC30CK-W6
  - Combined Induction One of CI 5AC30AL-I2, 5AC30AZ, 5AC30CA-I2, 5AC30CA-Z9, 5AC30CK-A2, 5AC30CK-I2, 5AC30HA-I2, 5AC30YA-I2, and one of CCI 5AC30AN, 5AC30AP, 5AC30CK-BD, 5AC30CK-W6

Normal delivery, January 1999 to December 2007
- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 650

Operative/assisted delivery, January 1997 to March 2002
- Hospital Inpatient Files procedure codes
  - Cesarean section and removal of fetus ICD-9-CM 74 (74.91 (hysterotomy to terminate pregnancy) was excluded).
  - Low forceps operation ICD-9-CM 72.0
  - Low forceps operation with episiotomy ICD-9-CM 72.1
  - Mid forceps operation ICD-9-CM 72.2
  - Mid forceps with episiotomy ICD-9-CM 72.21
  - Other mid forceps operation ICD-9-CM 72.29
  - High forceps operation ICD-9-CM 72.3
  - High forceps operation with episiotomy ICD-9-CM 72.31
  - Other high forceps operation ICD-9-CM 72.39
  - Vacuum extraction ICD-9-CM 72.7
  - Vacuum extraction with episiotomy ICD-9-CM 72.71

Operative/assisted delivery, April 2002 to December 2006
- Hospital Inpatient Files intervention codes
  - Forceps traction and rotation delivery CCI 5MD53.^^, 5MD55.^^, 5.MD.60.RG, 5.MD.60.JZ, 5.MD.60.KC, 5.MD.60.RA, 5.MD.60.RE, 5.MD.60.JW, 5.MD.60.RG , 5.MD.60.CB, 5.MD.60.CC, 5.MD.60.CD, 5.MD.60.CE, 5.MD.60.CF, 5.MD.60.CG
  - Vacuum traction delivery CCI 5MD54.^^, 5MD55.^^, 5.MD.60.RD, 5.MD.60.KA, 5.MD.60.KD, 5.MD.60.RB, 5.MD.60.RF, 5.MD.60.JX, 5.MD.60.RH, 5.MD.60.CB, 5.MD.60.CC, 5.MD.60.CD, 5.MD.60.CE, 5.MD.60.CF, 5.MD.60.CG
  - Combination of vacuum and forceps delivery CCI 5MD55.^^
  - Cesarean section delivery CCI 5MD60.^^

Shoulder dystocia, January 1997 to March 2002
- Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
  - ICD-9-CM 660.4

Shoulder dystocia, April 2002 to December 2006
- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 660.4
- Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
  - ICD-10-CA O66.0

Respiratory distress syndrome, January 1997 to March 2002
- Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
  - ICD-9-CM 769

Respiratory distress syndrome, April 2002 to December 2006
- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 769
- Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
  - ICD-10-CA P22.0

Congenital anomalies, January 1997 to March 2002
- Alberta Congenital Anomalies Surveillance System diagnostic codes
  - Neural Tube Defects ICD-9-CM 740.0-742.0

Heart Septal Defect ICD-9-CM 745.0-745.9
Down Syndrome ICD-9-CM 758.0
Urinary obstructive anomalies ICD-9-CM 753.2
All congenital anomalies combined
Nervous System Anomalies ICD-9-CM 740.0-742.9
Eye Anomalies ICD-9-CM 743.0-743.9
Ear, Face and Neck ICD-9-CM 744.0-744.9
Cardiovascular System Defect ICD-9-CM 745.0-747.9
Respiratory System Anomalies ICD-9-CM 748.0-748.9
Digestive System Anomalies ICD-9-CM 749.0-751.9
Genital Organ Anomalies ICD-9-CM 752.0-752.9
Urinary System Anomalies ICD-9-CM 753.0-753.9
Musculoskeletal Anomalies ICD-9-CM 754.0-756.9
Integument Anomalies ICD-9-CM 757.0-757.9
Chromosomal Anomalies ICD-9-CM 758.0-758.9
Other and Unspecified Anomalies ICD-9-CM 759.0-759.9
Other malformations, deformations, disruptions, and dysplasias present at birth, occurring outside ICD-9-CM 740.0 to 759.9

Congenital anomalies, April 2002 to December 2006

Alberta Congenital Anomalies Surveillance System diagnostic codes
Neural tube defects ICD-10 Q00, Q01, Q05
Heart septal defects ICD-10 Q20-Q21
Down syndrome ICD-10 Q90
Urinary obstructive anomalies ICD-10 Q62
All congenital anomalies combined
Congenital malformations of the nervous system ICD-10-CA Q00-Q07
Congenital malformations of eye, ear, face and neck ICD-10-CA Q10-Q18
Congenital malformations of the circulatory system ICD-10-CA Q20-Q28
Congenital malformations of the respiratory system ICD-10-CA Q30-Q34
Cleft lip and cleft palate ICD-10-CA Q35-Q37
Other congenital malformations of the digestive system ICD-10-CA Q38-Q45
Congenital malformations of genital organs ICD-10-CA Q50-Q56
Congenital malformations of the urinary system ICD-10-CA Q60-Q64
Congenital malformations and deformations of the musculoskeletal system ICD-10-CA Q65-Q79
Other congenital malformations ICD-10-CA Q80-Q89
Chromosomal abnormalities, not elsewhere classified ICD-10-CA Q90-Q99
Other malformations, deformations, disruptions, and dysplasias present at birth, occurring outside ICD-10 Q00 to Q99

Postpartum hemorrhage, January 1997 to March 2002

Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
ICD-9-CM 666

Postpartum hemorrhage, April 2002 to December 2006

Fee-For-Service Claims diagnostic Code
ICD-9-CM 666
Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
ICD-10-CA O72

Postpartum depression, January 1997 to March 2002

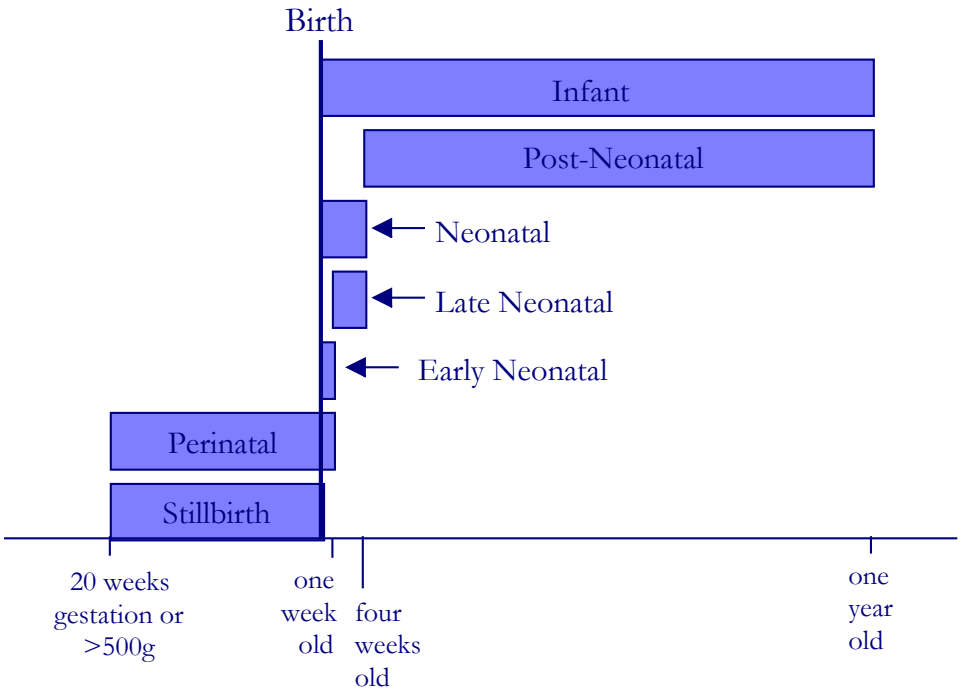
Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
ICD-9-CM 296.2-296.3, 311

Postpartum depression, April 2002 to December 2006

Fee-For-Service Claims diagnostic Code
ICD-9-CM 296.2-296.3, 311
Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
ICD-10-CA F32-F33, F53

6. Appendices

6.2.1 Mortality Definitions



Type of Death	Definition
Infant	Death prior to one year of age
Post-Neonatal	Death at four weeks of age or later, prior to one year of age
Neonatal	Death prior to four full weeks of age
Late Neonatal	Death at one week of age or later, prior to four weeks of age
Early Neonatal	Death prior to one full week of age
Perinatal	Stillbirth or early neonatal death
Stillbirth	Death prior to birth, at 20 weeks gestation or later, or weighing 500 grams or more

6. Appendices

6.3.1 Epidemiologic Measures for Maps

Written by Dr. Donald Schopflocher and Erik Ellehoj

All health events reported in this document are mapped according to the method described below. This method was developed to address the issue of how population sizes of health regions can affect rate stability. Specifically, rates will be less stable for RHAs with smaller populations than those for RHAs with larger populations. The mapping method used in this report is designed to address this issue and allow statistically consistent interpretations. (As an example the numbers shown in the calculations in Steps 1, 2 and 3 below are for low birth weight babies born in the Chinook, Palliser and Northern Lights health regions and compared against provincial rates from 2000 to 2002.)

The mapping method consists of the following seven steps:

1. Calculate the rates for each region. For crude rates, an example of this calculation is shown below. *Note: where sex- age standardized rates are used a more detailed calculation would be required.*

Health Region #	Low Birth Weight (LBW)	Total Live Births	Proportion LBW
1	331	5,874	0.056
2	213	3,677	0.058
.	.	.	.
.	.	.	.
.	.	.	.
9	175	3,602	0.049

2. Calculate the rate for the province. For crude rates, an example of this calculation is shown below. *Note: where sex- age standardized rates are used a more detailed calculation would be required.*

Number of low birth weight newborns: 6,999
Total number of live births: 112,133
Proportion low birth weight: 6,999 / 112,133 = 0.062

3. Calculate standard error of a probability of a health event for each regional rate. For crude rates the formula which follows can be used. *Note: where sex- age standardized rates are used a more detailed calculation would be required.*

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

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

Health Region #	Low Birth Weight	Total Births	Proportion LBW	Calculation	Standard Error
1	331	5,874	0.056	$\sqrt{\frac{0.056(1-0.056)}{5,874}}$	0.0030
2	213	3,677	0.058	$\sqrt{\frac{0.058(1-0.058)}{3,677}}$	0.0038
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
9	175	3,602	0.049	$\sqrt{\frac{0.049(1-0.049)}{3,602}}$	0.0036

4. Calculate the regional-specific standard scores.

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

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

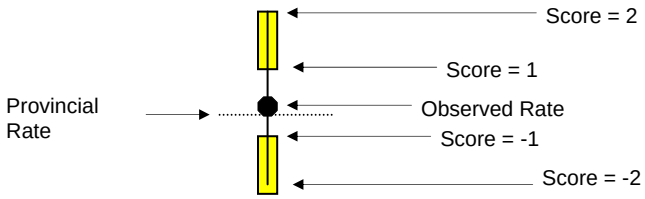
5. Graph the regional-specific standard scores calculated in Step 4.

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

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

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

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



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

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

7. Generate a cartogram.

A cartogram is similar to a map. However, each region is represented by a circle that is sized proportionately to the regional population. This graphic is useful for interpreting reported rates by providing an indication of the population size of each region. Each RHA in the cartogram is coloured the same as it is on the provincial map.

Map/graph/cartogram colour legend:

6. Appendices

6.4.1 Populations

Women 15 - 49 by Residence RHA, Alberta, 1998 to 2007

Residence RHA	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chinook	36,667	37,116	37,409	37,453	37,469	37,538	37,637	37,621	37,820	38,573
Palliser	23,095	23,669	23,990	24,512	24,876	24,820	24,991	25,160	25,302	25,821
Calgary	280,183	289,318	294,761	301,784	309,686	314,359	318,119	322,633	330,679	340,332
David Thompson	68,182	69,712	70,725	71,785	72,982	73,541	74,145	74,570	75,569	77,632
East Central	25,663	25,721	25,838	26,088	26,345	26,308	26,207	26,172	26,136	26,778
Capital	246,101	250,900	253,364	256,989	261,592	264,438	265,829	267,430	271,912	280,518
Aspen	44,003	44,416	44,399	44,765	45,130	44,774	44,538	44,291	44,506	45,256
Peace Country	32,977	33,660	33,874	34,118	34,583	34,705	35,038	35,364	36,245	37,336
Northern Lights	17,081	17,419	17,784	18,304	19,263	20,028	20,611	21,073	21,548	22,802
Unknown	107	50	38	115	38	49	59	35	59	79
Total Women 15-49	**774,059**	**791,981**	**802,182**	**815,913**	**831,964**	**840,560**	**847,174**	**854,349**	**869,776**	**895,127**
Alberta Population	**2,854,621**	**2,923,449**	**2,967,755**	**3,022,891**	**3,086,646**	**3,134,337**	**3,179,036**	**3,222,191**	**3,298,028**	**3,407,742**

Source: Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness as of March 2008

Notes: Data may differ from previously published data due to differences in definitions and dates of data extraction.

Women 10 - 49 by Age Group, Alberta, 1998 to 2007

Age group	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
10-14	107,146	108,776	110,073	110,821	111,927	112,452	111,565	110,360	110,161	109,951
15-17	62,489	64,531	65,499	66,621	67,490	67,455	68,065	69,187	70,552	71,193
18-19	39,617	40,965	42,723	44,386	45,513	45,940	46,249	46,372	46,284	47,741
15-19	102,106	105,496	108,222	111,007	113,003	113,395	114,314	115,559	116,836	118,934
20-24	98,376	102,104	103,552	106,634	110,520	113,900	116,575	118,397	122,100	127,053
25-29	104,141	105,731	105,981	106,813	109,731	111,509	113,764	116,210	121,374	128,880
30-34	114,614	112,685	110,996	112,047	113,471	114,564	114,582	115,321	117,553	122,803
35-39	132,964	133,934	132,554	129,575	126,332	122,284	119,152	117,930	120,304	123,898
40-44	123,113	127,749	131,234	133,936	137,029	138,222	138,573	137,349	135,051	133,101
45-49	98,745	104,282	109,643	115,901	121,878	126,686	130,214	133,583	136,558	140,458
Women aged 15 - 49	**774,059**	**791,981**	**802,182**	**815,913**	**831,964**	**840,560**	**847,174**	**854,349**	**869,776**	**895,127**
Women aged 10 - 49	**881,205**	**900,757**	**912,255**	**926,734**	**943,891**	**953,012**	**958,739**	**964,709**	**979,937**	**1,005,078**
Alberta Population	**2,854,621**	**2,923,449**	**2,967,755**	**3,022,891**	**3,086,646**	**3,134,337**	**3,179,036**	**3,222,191**	**3,298,028**	**3,407,742**

Source: Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness as of March 2008

Notes: Data may differ from previously published data due to differences in definitions and dates of data extraction.