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Canadian Perinatal Health Report

2008 EDITION

Canada

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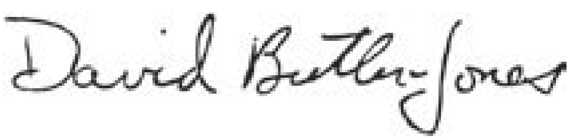
Message from the Chief Public Health Officer

The Public Health Agency of Canada was established to promote and protect the health of Canadians through leadership, partnership and action in public health, both nationally and worldwide. It is my role as Canada's Chief Public Health Officer to uphold that mission, in part, by supporting federal efforts in surveillance and health reporting in order to communicate vital information on the health status of Canadians and on our public health system. To that end, I am pleased to present the 2008 edition of the *Canadian Perinatal Health Report (PHR)*.

The PHR, through its 29 indicators, provides valuable data and information on a number of perinatal health determinants and outcomes which not only impact health programs at all levels, but also contribute to evidence-based policy-making; inform health professionals in clinical practice and research environments; and allow Canadians to examine our health in relation to other countries.

This report is one of several pan-Canadian initiatives resulting from a dynamic collaboration between the Public Health Agency of Canada and the Canadian Perinatal Surveillance System (CPSS) in areas of surveillance and scientific research on maternal and infant health. I would like to take this opportunity to recognize the CPSS for their efforts in promoting the health, well-being and reduction of inequalities among pregnant women, mothers and infants in Canada. In addition to these contributions, the *Canadian Perinatal Health Report, 2008 Edition*, serves as an important resource tool that supports the Agency's vision of healthier Canadians and communities in a healthier world.



Dr. David Butler-Jones
Chief Public Health Officer
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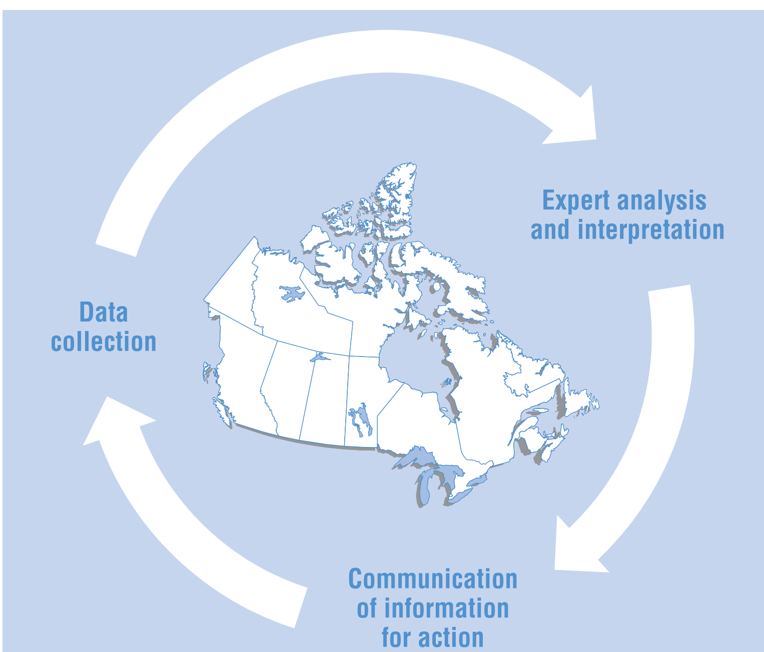
Introduction

The *Canadian Perinatal Health Report, 2008 Edition* is the fifth national surveillance report from the Canadian Perinatal Surveillance System (CPSS), continuing an important information dissemination activity of the Maternal and Infant Health Section, Public Health Agency of Canada. In 1995, the Section and the CPSS Steering Committee developed the conceptual framework for the CPSS, identified appropriate perinatal health indicators and their data sources, and began analysis and interpretation of the data. Since then, the CPSS has produced numerous publications, including four national surveillance reports and over 50 peer-reviewed papers.* These publications, and other activities of the CPSS, have been favourably reviewed by external evaluators.[1] This fifth CPSS report is the third *Canadian Perinatal Health Report.* It presents temporal trends and differences observed at the national and provincial/territorial levels for 29 perinatal health indicators.

CPSS Conceptual Framework

The CPSS considers a health surveillance system to be a network of people and activities that maintain the surveillance process.[2] The surveillance itself is a continuous and systematic process of data collection, analysis and interpretation of information for monitoring health problems[2] with the aim of contributing to improved health outcomes. Figure A depicts the cycle of surveillance.[3]

FIGURE A National Health Surveillance



Source: Adapted from Centers for Disease Control and Prevention (CDC).

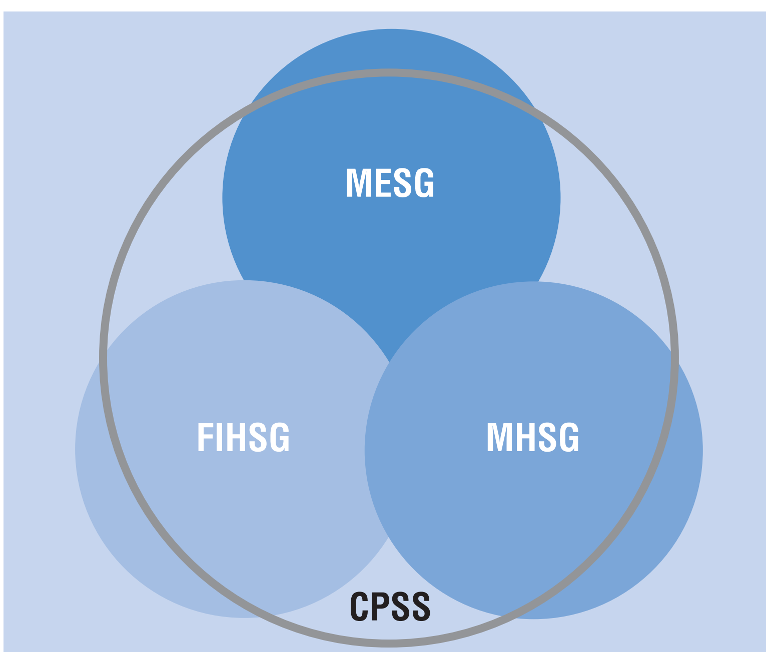
* A complete list of CPSS publications can be found in *Appendix I.*

Overlying this concept of health surveillance is the concept of the determinants of health—that health status is influenced by a range of factors including, but not limited to, health care.[4] Therefore, it is important to monitor not only health outcomes but also factors—such as behaviours, physical and social environments, and health services—that may affect those outcomes. Information on trends in and patterns of various risk and protective factors helps to explain patterns of morbidity and mortality, and may point the way to effective interventions and appropriate allocation of health resources. Health surveillance is thus a core competency and strategic objective of the Public Health Agency of Canada, as "effective and timely surveillance is critical to the ability of the government and provinces/territories to accurately track, plan for and respond to diseases."[5]

CPSS Structure

The mandate of the CPSS is to contribute to improved health for pregnant women, mothers and infants in Canada through ongoing monitoring and reporting on perinatal health determinants and outcomes. The CPSS collaborates with Statistics Canada, the Canadian Institute for Health Information (CIHI), provincial and territorial governments, health professional organizations, advocacy groups and university-based researchers. Representatives of these groups and several international experts serve on the CPSS Steering Committee and its study groups: the Fetal and Infant Health Study Group (FIHSG), Maternal Health Study Group (MHSG) and the Maternity Experiences Study Group (MESG). This intersectorial and intergovernmental structure effectively engages stakeholders as full partners in shaping and conducting national perinatal health surveillance, and has been recognized as an innovative and important strength of the CPSS.[1] The principles and objectives of the CPSS are described in more detail elsewhere.[6,7]

FIGURE B **Structure of the Canadian Perinatal Surveillance System**



Study Groups of the Canadian Perinatal Surveillance System

Fetal and Infant Health Study Group

The mandate of the FIHSG is to conduct surveillance on fetal and infant mortality and morbidity. Current study group activities include the Canadian Congenital Anomalies Surveillance Network with the mandate to support the development and maintenance of a population-based congenital anomalies surveillance system; and a Working Group on First Nations, Inuit and Métis Infant Mortality Data with the mandate to identify and support strategies to improve the quality of the data on infant mortality in these populations. In collaboration with Statistics Canada, members of the FIHSG are also exploring linking the already combined infant birth-death records with the person-oriented hospital birth and delivery records in order to create a more comprehensive national database on perinatal events. The FIHSG primarily uses existing data sources for its surveillance efforts.

Maternal Health Study Group

The mandate of the MHSG is to conduct surveillance on key behaviours, health services and outcomes related to maternal health. Current study group projects include the surveillance of cesarean delivery and planning toward a second report on maternal mortality and severe morbidity in Canada, scheduled for publication in 2010. Members of the MHSG are also involved in the Canadian component of a World Health Organization (WHO) survey on mode of delivery and maternal and perinatal outcomes. The MHSG primarily uses existing data sources for its surveillance efforts.

Maternity Experiences Study Group

The mandate of the MESG is to guide the development, implementation, expert analysis and reporting of a national Maternity Experiences Survey. The first survey of its kind in Canada, its primary objective is to provide information for an in-depth examination of Canadian women's knowledge, experiences and practices during pregnancy, birth and the early postpartum months, and of their perceptions of perinatal care as an integral component of perinatal health surveillance. Data collection for the national survey was completed in January 2007 achieving a response rate of 78%. Data editing and analysis activities are ongoing and results will be reported in the CPSS's sixth national report, scheduled for publication in 2008.

CPSS Indicators

A health indicator is a measurement that, when compared with either a standard or desired level of achievement, provides information regarding a health outcome or important health determinant.[7] In order to identify perinatal health indicators that should be monitored by a national perinatal surveillance system, the CPSS considered the importance of the health outcome or determinant, the scientific properties of the indicator, such as its validity in measuring that outcome or determinant, and the feasibility of collecting the data required to construct it. *Appendix C* lists the 54 indicators that resulted from this process.

Outline of the Report

This report contains information on 29 perinatal health indicators for which we currently have national data. Two of these indicators, rate of periconceptional folic acid supplementation and rate of maternal exposure to second-hand smoke, are new to the report. Also, the indicator on breastfeeding rates has been enhanced to include rates of exclusive breastfeeding. Indicators are grouped as health determinants (behaviours and practices, and health services) and health outcomes (maternal, fetal and infant). As in the CPSS's previous *Perinatal Health Reports*, for each indicator, surveillance results are presented, data limitations discussed and key references listed. Statistics for each indicator consist mainly of temporal trends at the national level and interprovincial/territorial comparisons for the most recent year for which data are available.

The principal data sources used for this *Perinatal Health Report* were vital statistics, hospitalization data and the Canadian Community Health Survey. Population estimates and induced abortion statistics from Statistics Canada were also used. In comparison to the data sources and methods used for previous reports, three differences are noteworthy. First, with the exception of two indicators on hospital readmission, all indicators using hospitalization data were calculated using CIHI's Hospital Morbidity Database rather than its Discharge Abstract Database. Second, indicators using hospitalization data are reported by province/territory of residence rather than province/territory of hospitalization. And, third, indicators previously based on the National Longitudinal Survey of Children and Youth are now based on data from the Canadian Community Health Survey. Because these data sources are limited in their ability to identify populations at risk, accurately measuring and reporting on disparities in perinatal health in Canada remains a challenge and the lack of this information is a limitation in CPSS reports. Additionally, as in previous CPSS publications, Ontario vital statistics data were excluded from most vital statistics-based indicators due to concerns about data quality. Ontario has begun to take steps to respond to this important problem and we hope to be able to include Ontario data in national statistics in future reports. Ontario vital statistics are reported separately in *Appendix H.*

A detailed description of each data source, including data quality and the methods for calculating each indicator based on the data source, is presented in the *Data Sources and Methods* section of the report. The ICD-9 and ICD-10 codes used for each indicator are also detailed in that section.

Summary

Perinatal health surveillance has an important and fundamental role in providing the necessary information to be used to improve the health status of pregnant women, mothers and infants in Canada. It comprises a dynamic, integrated system of ongoing data collection, linkage, validation, analysis and interpretation on vital perinatal health issues. The result is information that permits identification of "red flags," tracking of temporal trends and geographic disparities, as well as consideration of the impact of changes in clinical practice and public health policy. Perinatal health surveillance provides both a measurement tool (where we have been in the past, where we are at present) and a stimulus to action (where we need to be in the future).

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An Overview of Perinatal Health in Canada

In 1995, Statistics Canada reported that Canada's infant mortality rate in 1993 increased after a long series of successive annual declines over more than three decades.[1] The increase in the infant mortality rate, from 6.1 per 1,000 live births in 1992 to 6.3 per 1,000 live births in 1993, was greeted with sensational headlines. *The Globe and Mail*[2] covered the story extensively:

> *"Rising deaths among infants stun scientists"*
> *"Unexpectedly high mortality rate may be signal, demographers warn"*
> *"Could this be the first indication that the environment is becoming increasingly toxic?"*

This crisis was one of the first major challenges addressed by the then newly formed Canadian Perinatal Surveillance System (CPSS). The CPSS explained the unexpected rise in infant mortality as a consequence of changing birth registration practices, especially at the borderline of viability.[3] An isolated, secular increase in the registration of live births with a birth weight <500 g was deemed to be responsible for the upturn in Canadian infant mortality. Not surprisingly, this prosaic explanation for a story with enormous potential for political rhetoric attracted little media attention.

Almost a decade later, Canadian infant mortality rates registered another upturn. The infant mortality rate increased from 5.2 per 1,000 live births in 2001 to 5.4 per 1,000 live births in 2002.[4,5] The media reaction to this development was fortunately muted at the national level, although in Alberta, where the provincial infant mortality rate increased from 5.6 in 2001 to 7.3 per 1,000 live births in 2002, it was an altogether different story. Political and media groups in that province used the Statistics Canada press release[6] to cast the mortality increase as a health care issue. This was not surprising given that Alberta was in the middle of an election campaign. The medical establishment was not beyond reproach either, with the *Canadian Medical Association Journal* carrying a news item blaming Alberta's high infant mortality on babies from neighbouring provinces, multiple births and "a large First Nations population that experiences higher rates of alcohol and tobacco use."[7] The CPSS, in what has become a predictable lament, urged caution in interpreting an increasingly complex indicator, given regional and temporal variations in birth registration.[8] On a related note, Canadian perinatologists involved in these controversies drew some measure of comfort from the fact that the United States simultaneously experienced a similar infant mortality hiccup. The infant mortality rate in the U.S. increased from 6.8 per 1,000 live births in 2001 to 7.0 per 1,000 live births in 2002, apparently the first increase in over four decades.[9–11] The perinatal phenomena underlying such increases in infant mortality deserve close and dispassionate scrutiny as they are likely to become a regular feature of infant mortality statistics in industrialized countries.

Birth Registration Artefacts Influencing Infant Mortality Trends in Canada

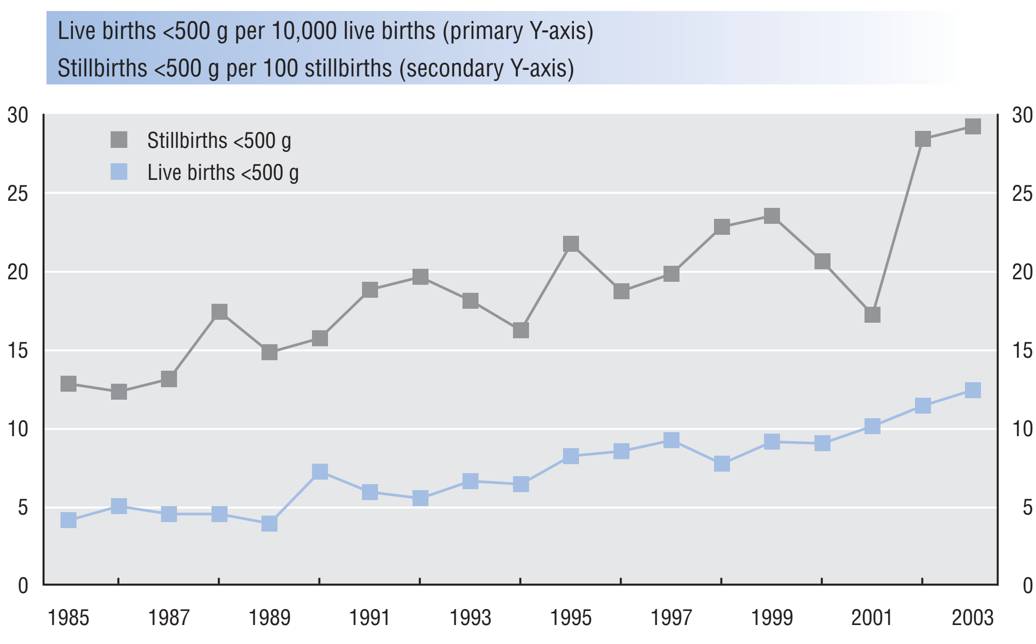
Frequency of live births and stillbirths at the borderline of viability

Live births <500 g have increased in frequency in recent years.[3] Figure 1.A shows the frequency of live births <500 g as a proportion of all live births in Canada (excluding Ontario, and Newfoundland and Labrador). This proportion increased from 4.1 per 10,000 live births in 1985 to 12.4 per 10,000 live births in 2003. The rising rate of live births <500 g has an important bearing on temporal trends in infant mortality rates as such infants have very high rates of mortality (944 per 1,000 live births in Canada in 2000–2003). The rise in the registration of infants at the borderline of viability was not due to a decline in fetal, infant or maternal health because the frequency of other low birth weight categories did not alter substantially over this same period. Thus, low birth weight (<2,500 g) rates in Canada (excluding Ontario, and Newfoundland and Labrador) were 5.6% in 1985 and 5.7% in 2003.

Substantial changes have also occurred in stillbirths <500 g in Canada since the mid-1980s.[12] In 1985, 12.8% of all stillbirths had a birth weight <500 g and this proportion increased to 29.2% in 2003 (Figure 1.A). Again, this relative increase in the registration of stillbirths <500 g was unrelated to any downturn in fetal or maternal health because similar increases did not occur in other low birth weight categories. The proportion of stillbirths with a birth weight between 500 and 2,499 g was 56.5% in 1985 and 48.6% in 2003.

FIGURE 1.A Rates of live births <500 g and stillbirths <500 g

Canada (excluding Ontario, and Newfoundland and Labrador), 1985–2003*



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1985–2003.

* Data for Ontario were excluded because of data quality concerns. Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.

Reasons for the increase in live births and stillbirths at the borderline of viability

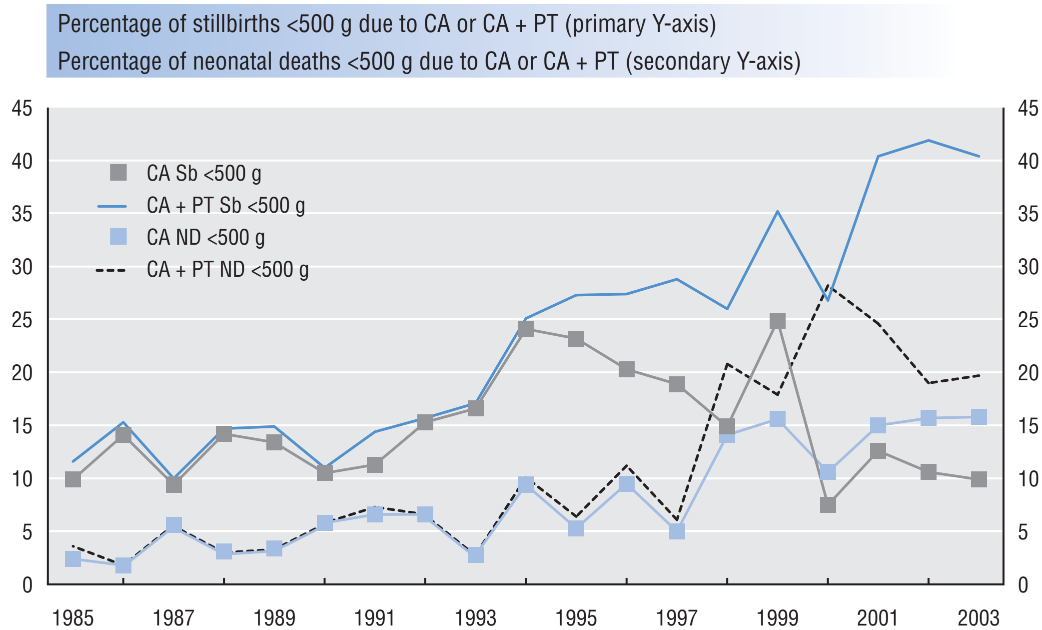
Rules for live birth and stillbirth registration in Canada have not changed significantly in recent years. The definition of live birth used for the purposes of live birth registration was the standard World Health Organization (WHO) definition which includes all products of conception that show signs of life after birth;[13] birth weight and gestational age criteria do not enter into this definition of live birth. The definition of stillbirth in Canada over this period included all fetal deaths with a birth weight ≥500 g or with a gestational age ≥20 weeks (or some variation of these criteria). Despite little change in these definitions over recent decades, the registration of live births and stillbirths at the borderline of viability has increased partly as a consequence of greater recognition of registration requirements. Such increases in birth registration have also been motivated by other factors including improvements in the survival of extremely low birth weight infants and social changes in attitudes towards the grieving process that accompanies the demise of such babies.

Contribution of prenatal diagnosis and pregnancy termination to trends in infant mortality

One major technologic change that has had a profound effect on the frequency of stillbirths and live births <500 g, and on trends in fetal and infant mortality as a whole, was the introduction and widespread uptake of prenatal diagnosis and pregnancy termination for serious congenital anomalies.[14–17] Stillbirths <500 g that were due to congenital anomalies or pregnancy termination constituted 11.6% of all stillbirths <500 g in 1985 (Figure 1.B). This proportion increased to 40.4% in 2003. The proportion of neonatal deaths <500 g that were due to congenital anomalies or pregnancy termination increased from 3.6% in 1985 to 19.7% in 2003 (Figure 1.B). Note the change in the cause of death coding of stillbirths <500 g that (presumably) resulted from pregnancy termination following prenatal diagnosis—from the mid-1990s onwards, such deaths have been increasingly assigned pregnancy termination as the cause of death, rather than congenital anomaly.

FIGURE 1.B **Cause- and birth weight-specific rates of stillbirth (Sb) <500 g and neonatal death (ND) <500 g**

Canada (excluding Ontario, and Newfoundland and Labrador), 1985–2003*



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1985–2003.

* Data for Ontario were excluded because of data quality concerns. Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.

CA Sb <500 g—Stillbirths <500 g due to congenital anomalies as a percent of stillbirths <500 g.

CA ND <500 g—Neonatal deaths <500 g due to congenital anomalies as a percent of neonatal deaths <500 g.

CA + PT ND <500 g—Neonatal deaths <500 g due to congenital anomalies or pregnancy termination as a percent of neonatal deaths <500 g.

CA + PT Sb <500 g—Stillbirths <500 g due to congenital anomalies or pregnancy termination as a percent of stillbirths <500 g.

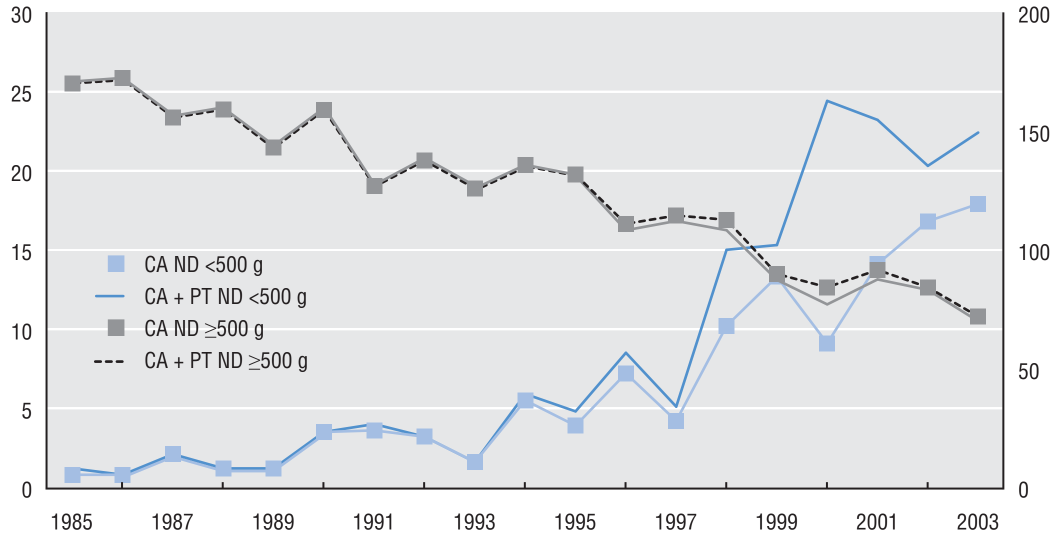
Figure 1.C shows the rate of neonatal death due to congenital anomalies or pregnancy termination expressed as a proportion of all live births. Neonatal deaths <500 g due to congenital anomalies or pregnancy termination increased from 1.3 per 100,000 live births in 1985 to 22.5 per 100,000 live births in 2003. Over the same period, neonatal deaths ≥500 g due to congenital anomalies or pregnancy termination decreased from 170.7 per 100,000 live births to 72.6 per 100,000 live births in 2003.

These patterns reflect the evolution of prenatal diagnosis and pregnancy termination over the last 15 years. Live births occasionally occur following prenatal diagnosis and pregnancy termination,[18] and the increase in neonatal deaths <500 g due to congenital anomalies merely reflects this uncommon event occurring against a background of secular increases in prenatal diagnosis (Figure 1.C). The beneficial effects of the technology are evident in the declining rate of late fetal deaths due to congenital anomalies and in infant deaths due to congenital anomalies among live births ≥500 g birth weight.[15–17] Folic acid fortification of food in Canada[19] since 1998 and improvements in surgical treatments for congenital malformations are other factors that have contributed to the decline in such late fetal and infant deaths.

FIGURE 1.C Cause- and birth weight-specific rates* of neonatal death (ND)

*Canada (excluding Ontario, and Newfoundland and Labrador),** 1985–2003*

CA and CA + PT neonatal deaths <500 g per 100,000 live births (primary Y-axis)
CA and CA + PT neonatal deaths ≥500 g per 100,000 live births (secondary Y-axis)



Source: Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1985–2003.
* All birth weight-specific rates exclude those with missing birth weight.
** Data for Ontario were excluded because of data quality concerns. Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.
CA ND <500 g—Neonatal deaths <500 g due to congenital anomalies per 100,000 live births.
CA ND ≥500 g—Neonatal deaths ≥500 g due to congenital anomalies per 100,000 live births.
CA + PT ND <500 g—Neonatal deaths <500 g due to congenital anomalies or pregnancy termination per 100,000 live births.
CA + PT ND ≥500 g—Neonatal deaths ≥500 g due to congenital anomalies or pregnancy termination per 100,000 live births.

International Comparisons of Infant Mortality

A lack of standardization with regard to live birth and stillbirth registration undermines international comparisons of fetal and infant mortality rates.[20–23] Some countries have systems of birth registration that are pragmatic rather than definition based, with live births being registered if they have a reasonable chance of survival. This results in lower rates of mortality, as compared with countries which closely adhere to WHO type definitions of live birth and fetal death. The fallacy inherent in international comparisons of infant mortality rates is highlighted by various examples:

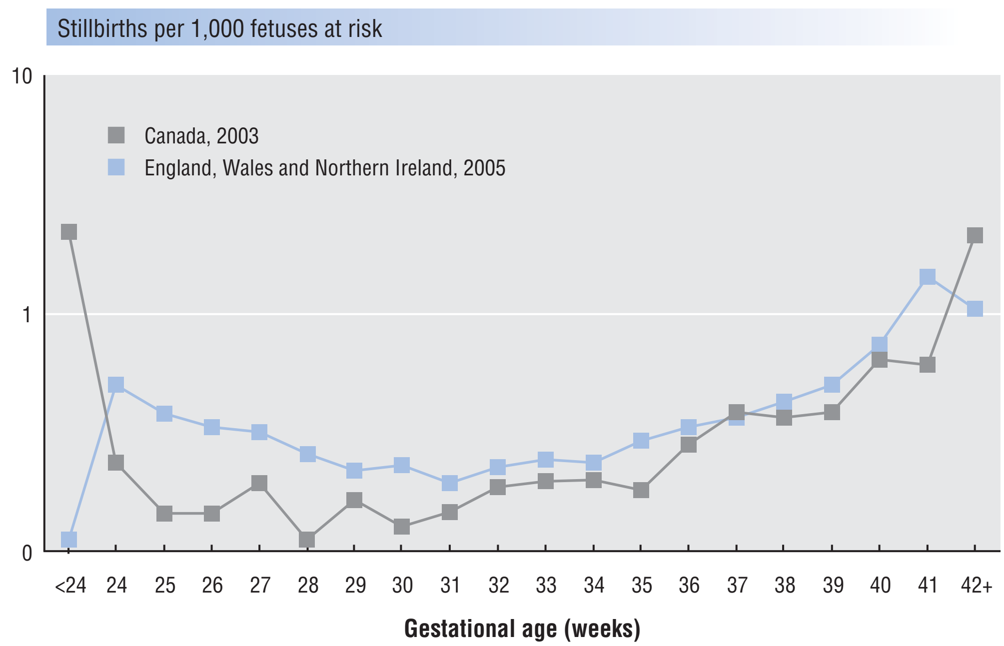
- In 1994, the perinatal mortality rate in Germany increased by 20% from 5.5 per 1,000 total births to 6.6 per 1,000 total births[24] due to a change in criteria for registering fetal deaths, from a birth weight requirement of 1,000 g and over to a birth weight requirement of 500 g and over.
- Sweden and Denmark do not register fetal deaths prior to 28 weeks of gestation, Italy does not register them before 180 days, the United Kingdom does not register them before 24 weeks, and France changed its definition from 28 weeks to 22 weeks in 2000.[25]
- Some European countries exclude all live births <500 g from their birth registers. The gestational age criterion for live birth registration in Sweden requires birth to occur after 27 weeks of gestation, while in Finland registration is limited to live births at 22 weeks of gestation and 500 g birth weight.[25]

Stillbirths and neonatal deaths in Canada versus England, Wales and Northern Ireland

A comparison of perinatal mortality indices in England, Wales and Northern Ireland (obtained from a recent Confidential Enquiry into Maternal and Child Health (CEMACH) publication[26]) with those from Canada illustrates some of the above-mentioned differences in birth registration and how these impact international comparisons. The stillbirth rate was 5.5 (95% CI: 5.5–5.6) per 1,000 total births in England, Wales and Northern Ireland in 2005, and 5.8 (95% CI: 5.5–6.2) per 1,000 total births in Canada (excluding Ontario) in 2003. The neonatal death rate in England, Wales and Northern Ireland in 2005 was 3.5 (95% CI: 3.4–3.7) per 1,000 live births, while in Canada in 2003 this rate was 3.6 (95% CI: 3.4–3.9) per 1,000 live births. Although both stillbirth and neonatal mortality rates were marginally higher in Canada, they are consistent with perinatal, neonatal and infant mortality rankings published by UNICEF and the Organisation for Economic Cooperation and Development (OECD), which place Canada and the United Kingdom in close proximity. UNICEF's 2007 report,[27] for instance, lists the neonatal and infant mortality rates in both countries in 2005 at 4 per 1,000 live births and 5 per 1,000 live births, respectively.

FIGURE 2.A Gestational age-specific stillbirth rates*

*Canada (excluding Ontario),** 2003, and England, Wales and Northern Ireland, 2005*[26]



Sources: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 2003.
Confidential Enquiry into Maternal and Child Health (CEMACH). *Perinatal mortality 2005: England, Wales and Northern Ireland.* London: CEMACH, 2007.

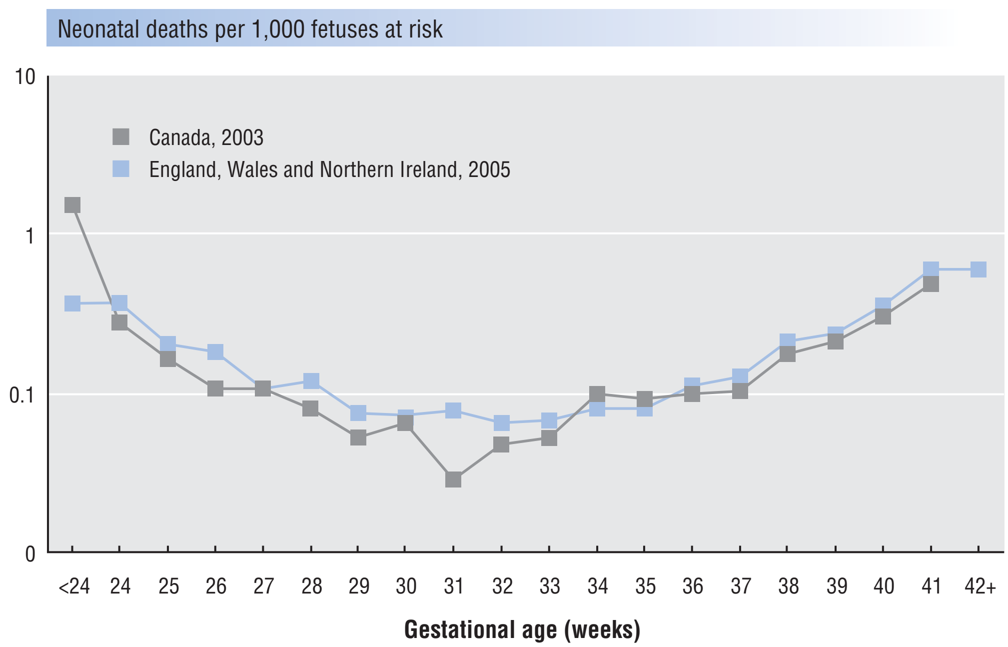
* The numerator for the gestational age-specific stillbirth rate was the number of stillbirths at any gestation, while the denominator was the number of fetuses at risk for stillbirth at the same gestation (commonly referred to as the fetuses at risk approach[28]).

** Data for Ontario were excluded because of data quality concerns.

Gestational age-specific stillbirth rates, calculated according to the fetuses-at-risk approach,[28–30] show lower rates of fetal death in Canada except at the extremes of gestation (Figure 2.A). At less than 24 weeks of gestation there were no stillbirths in England,Wales and Northern Ireland (per stillbirth registration practice). The low stillbirth rate at postterm in England, Wales and Northern Ireland may reflect reliance on menstrual dates for gestational age estimation,[31] or practice differences related to clinical management of pregnancy at and after 41 weeks of gestation (the frequency of postterm birth, i.e., ≥42 weeks, was 4.4% in England, Wales and Northern Ireland versus 0.9% in Canada). The incidence of neonatal death, revealed a pattern similar to the stillbirth contrast, with lower neonatal mortality rates in Canada at virtually all gestational ages (Figure 2.B).

FIGURE 2.B Gestational age-specific rates of neonatal death*

*Canada (excluding Ontario),** 2003, and England, Wales and Northern Ireland, 2005*[26]



Sources: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 2003.
Confidential Enquiry into Maternal and Child Health (CEMACH). *Perinatal mortality 2005: England, Wales and Northern Ireland.* London: CEMACH, 2007.

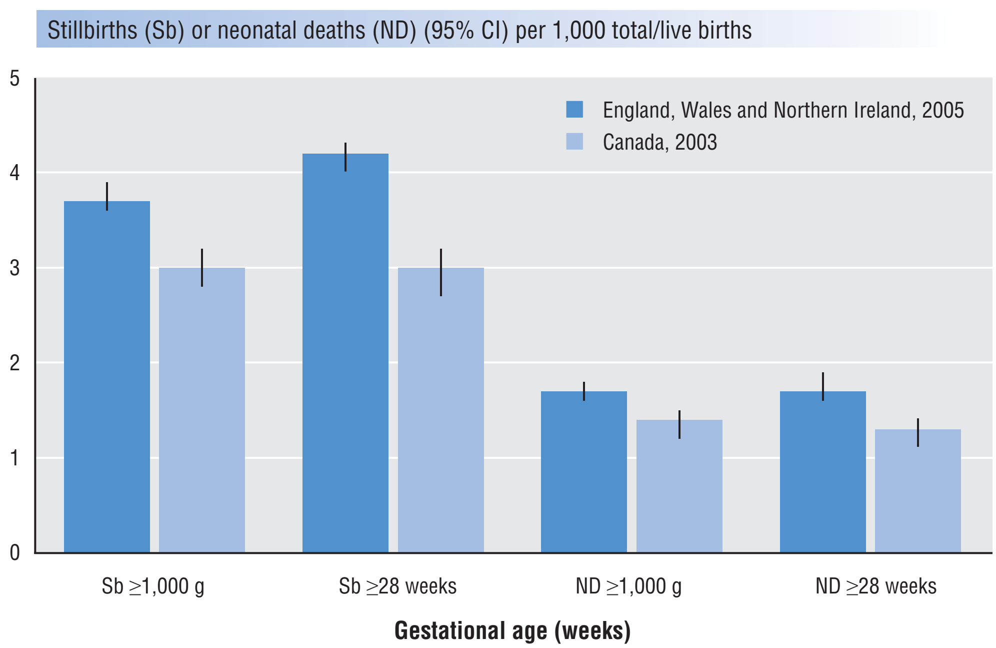
* The numerator for the gestational age-specific neonatal death rate was the number of neonatal deaths at any gestation, while the denominator was the number of fetuses at risk for neonatal death at the same gestation (commonly referred to as the fetuses at risk approach[28]).

** Data for Ontario were excluded because of data quality concerns.

Correcting for the differences in birth registration, by examining mortality rates among births with a birth weight ≥1,000 g or with a gestational age ≥28 weeks, leads to substantial changes in mortality statistics, with rates in Canada being significantly lower than rates in England, Wales and Northern Ireland (Figure 2.C).* However, the purpose of this comparison is not to conclude that Canadian perinatal health status is superior to that in England, Wales and Northern Ireland, nor to speculate about potential differences in the provision of care services. Rather, these analyses highlight the lack of validity in contemporary rankings of countries by crude infant mortality rates and related indices due to differences in birth registration. Differences in the measurement of gestational age are another important issue which could underlie some of the differences in mortality rates noted above.[31] Publications like the CEMACH report[26] and this *Canadian Perinatal Health Report* will hopefully lead the movement towards a more rational and meaningful comparison of international health indices.

FIGURE 2.C Gestational age- and birth weight-specific stillbirth and neonatal death rates*

*Canada (excluding Ontario),** 2003, and England, Wales and Northern Ireland, 2005*[26]



Sources: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 2003.
Confidential Enquiry into Maternal and Child Health (CEMACH). *Perinatal mortality 2005: England, Wales and Northern Ireland.* London: CEMACH, 2007.
* Birth weight-specific rates exclude those <1,000 g and gestational age-specific rates exclude those <28 weeks. These birth weight-specific and gestational age-specific comparisons (recommended by the WHO[13]), which eliminate bias due to variable birth registration, show substantially lower fetal death rates and significantly lower neonatal death rates in Canada.
** Data for Ontario were excluded because of data quality concerns.
CI—confidence interval

Birth Weight-Specific Infant Mortality in Canada

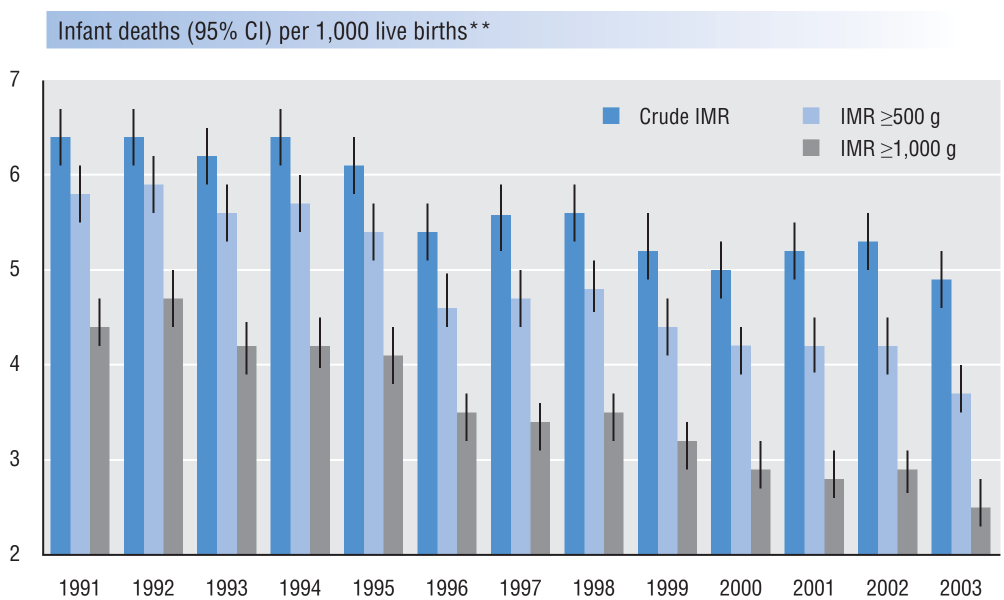
Temporal trends

Figure 3.A shows Canadian infant mortality rates among all live births, live births with a birth weight ≥500 g and live births with a birth weight ≥1,000 g. Whereas the crude infant mortality rate in Canada (excluding Ontario) declined from 6.4 per 1,000 live births in 1991 to 4.9 per 1,000 live births in 2003 (a 23% decrease), the infant mortality rate among live births ≥500 g decreased from 5.8 per 1,000 live births to 3.7 per 1,000 live births (a 36% decrease), and the infant mortality rate among live births ≥1,000 g decreased from 4.4 to 2.5 per 1,000 live births from 1991 to 2003 (a 44% decrease). These estimates of birth weight-specific infant mortality permit a more valid assessment of temporal trends in infant death rates in Canada since they are free from confounding by simultaneous changes in the registration of live births at the borderline of viability.

Variations between provinces and territories

Figure 3.B shows crude and birth weight-specific rates of infant death in the provinces and territories of Canada for the three years 2001–2003 combined. Again, the alternative indices illustrate how rankings based on crude infant mortality rates can yield results that are at variance with those obtained from birth weight-specific estimates. For example, Saskatchewan had a lower crude infant mortality rate than Alberta (6.0 versus 6.3 per 1,000 live births). On the other hand, the infant mortality rate ≥500 g was higher in Saskatchewan compared with Alberta (5.5 versus 4.9 per 1,000 live births) as was infant mortality among live births ≥1,000 g (3.7 versus 3.3 per 1,000 live births).

FIGURE 3.A **Temporal trends in infant mortality rates (IMR)**
Canada (excluding Ontario), 1991–2003*

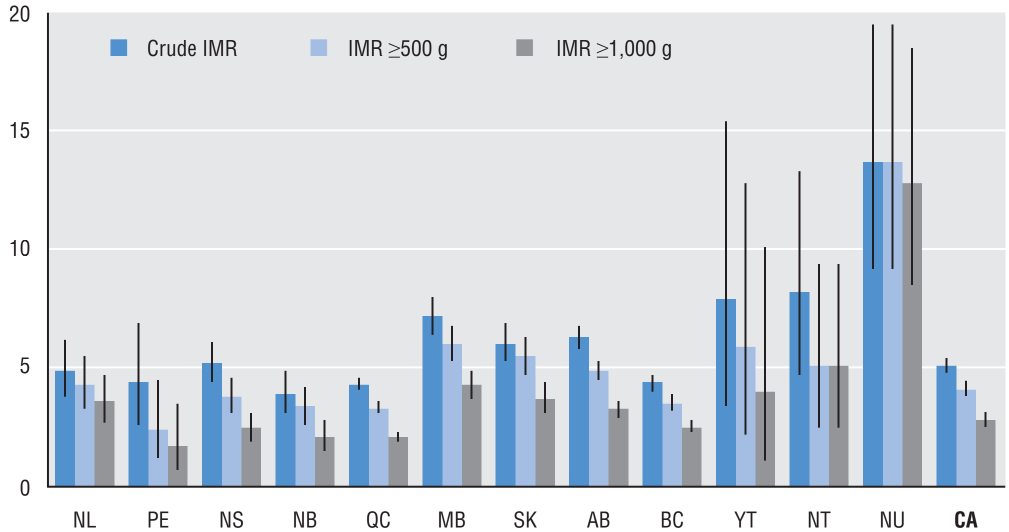


Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files. 1991–2003.
* Data for Ontario were excluded because of data quality concerns.
** Birth weight-specific infant mortality rates include infant deaths with missing birth weight and unlinked infant deaths.
CI—confidence interval

FIGURE 3.B **Rates of infant mortality (IMR), by province/territory**

Canada (excluding Ontario), 2001–2003*

Infant deaths (95% CI) per 1,000 live births**



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files. 1991–2003.

* Data for Ontario were excluded because of data quality concerns.

** Birth weight-specific infant mortality rates include infant deaths with missing birth weight and unlinked infant deaths.

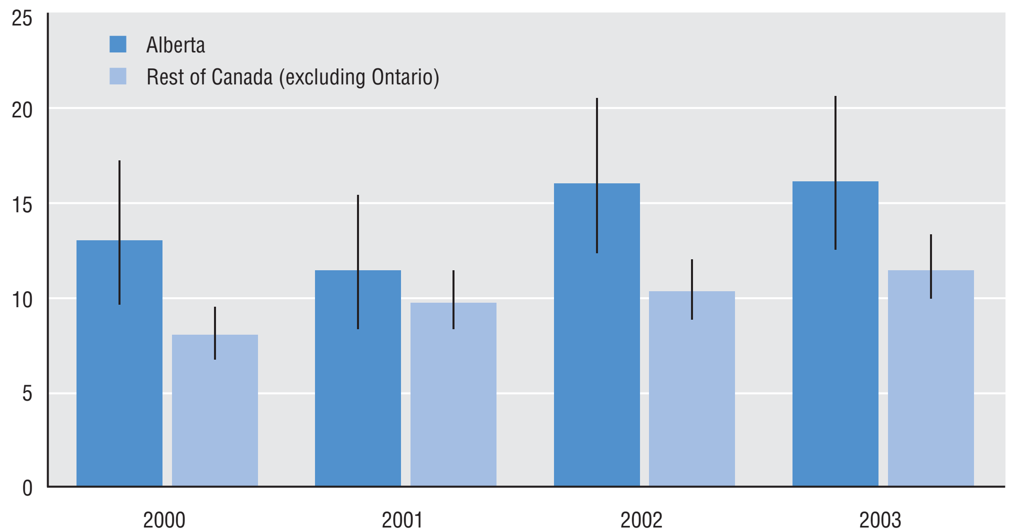
CI—confidence interval

The situation in Alberta deserves mention, especially because of the unwarranted press it received over its infant mortality rate in 2002. In 2004, the rate of infant mortality in Alberta was 5.8 per 1,000 live births and this was lower than rates in Manitoba, Saskatchewan, the Yukon and Nunavut (page 146). Two features of perinatal outcomes in Alberta are worthy of note. First, the rate of preterm birth in Alberta in 2004 was higher than in any other province (rates in the three territories were higher, page 125), while the rate of small-for-gestational-age live births in Alberta was the highest in Canada (page 131). A second feature of Alberta that has an important bearing on its rate of infant death was the diligence with which live births at the borderline of viability were registered. Figure 4.A shows the higher frequency with which live births <500 g are registered in Alberta as compared with the rest of Canada. Figure 4.B shows the rate of neonatal deaths due to congenital anomalies or pregnancy terminations among live births with a birth weight <500 g. The higher rate of such births in Alberta likely reflects a more accurate and complete documentation of births at the borderline of viability, especially those that follow prenatal diagnosis and pregnancy termination for major congenital malformations. Clearly, differences in birth registration practices not only invalidate international comparisons of infant mortality but also undermine interprovincial/territorial comparisons within Canada. The birth weight-specific infant mortality rates provided in Figure 3.B allow more meaningful interpretation, while similar contrasts of stillbirth rates ≥500 g provided elsewhere in this *Report* allow standardized interprovincial and territorial comparisons of fetal mortality.

FIGURE 4.A **Rates of live births <500 g***

*Alberta and the rest of Canada (excluding Ontario),** 2000–2003*

Live births <500 g (95% CI) per 10,000 live births

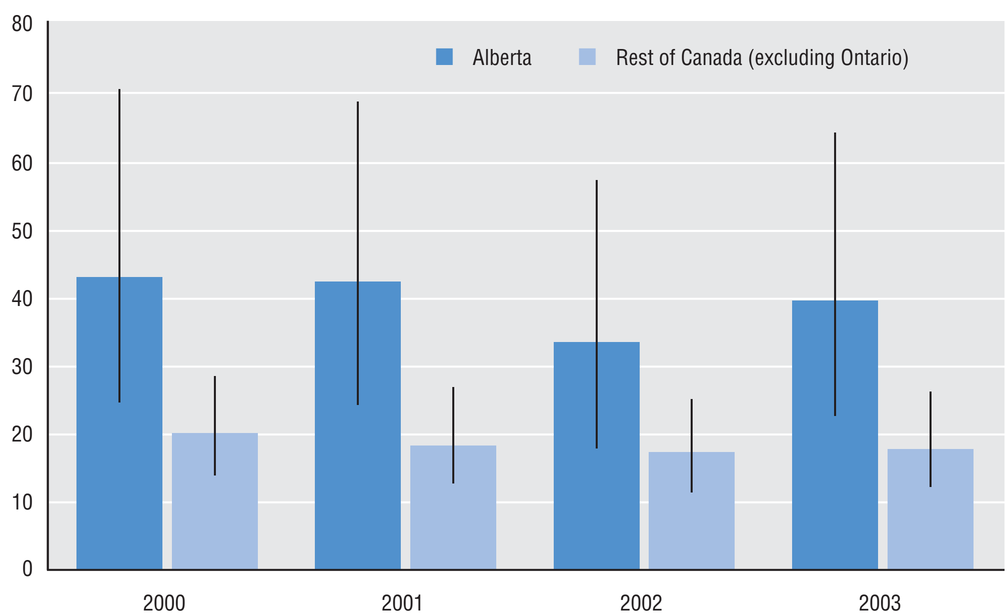


Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 2000–2003.
* Excluding those with missing birth weight.
** Data for Ontario were excluded because of data quality concerns.
CI—confidence interval

FIGURE 4.B **Rates of neonatal deaths <500 g due to congenital anomalies (CA) or pregnancy termination (PT)**

Alberta and the rest of Canada (excluding Ontario), 2000–2003*

CA + PT neonatal deaths <500 g (95% CI) per 100,000 live births



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 2000–2003.
* Data for Ontario were excluded because of data quality concerns.
CI—confidence interval

Infant Mortality among First Nations, Inuit and Métis Populations

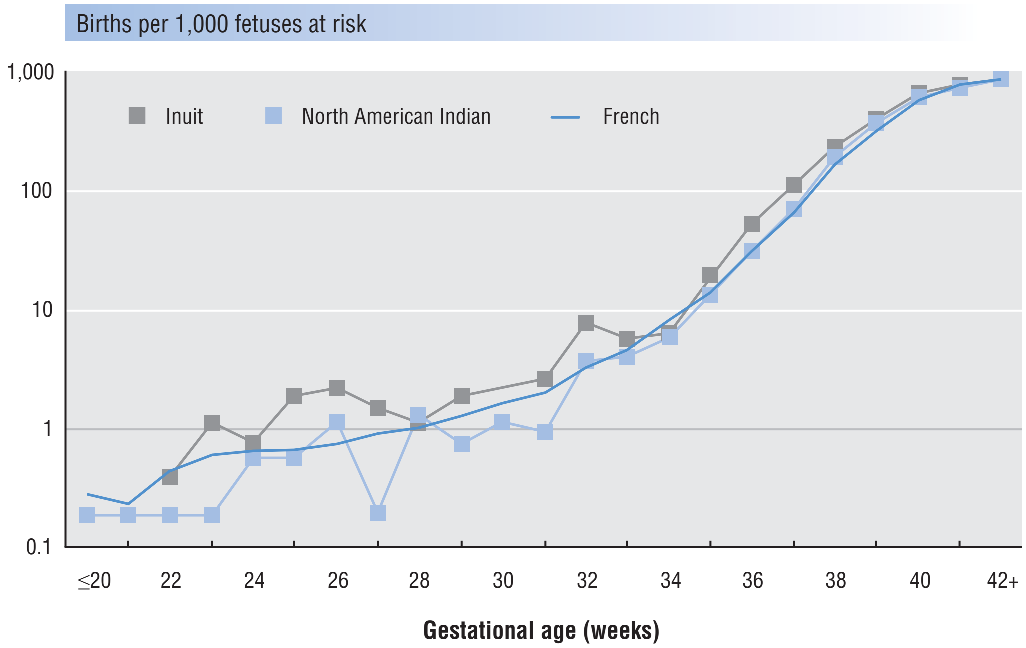
The lack of standardization that plagues international and interprovincial comparisons of fetal and infant mortality also clouds our understanding of perinatal health status among First Nations, Inuit and Métis populations. In fact, this issue is probably of greater consequence to Canada than international ranking of countries by infant mortality, as it has a direct bearing on policy and on the provision of health services.

Over a decade ago, the Royal Commission on Aboriginal Peoples[32] documented the fact that the infant mortality rate among Aboriginal populations of Canada has been two-fold higher than that among the non-Aboriginal population for more than a century. Recently, however, the First Nations and Inuit Health Branch released a fact sheet[33] stating that the infant mortality rate in the First Nations population had dropped to 6.4 per 1,000 live births in 2000 (almost on par with the infant mortality rate of 5.3 per 1,000 live births for Canada in 2000). Other federal publications echoed this finding stating that the infant mortality rate for First Nations peoples in 2000 was 6.2 per 1,000 live births.[34] There is now fair consensus that these rates are underestimates.

The argument that First Nations, Inuit and Métis populations have a sub-optimal perinatal health status requiring serious public health attention is difficult to make partly because of inadequate and poor quality surveillance information. This was borne out by a recently published research study on singleton births from Quebec[35] which showed that stillbirth rates among French, English, Inuit and North American Indian populations (defined on the basis of the language spoken by the mother) in 1995–1997 were 3.9, 3.4, 2.7 and 9.3 per 1,000 total births, respectively, while infant mortality rates were 4.4, 4.2, 23.1 and 7.5 per 1,000 live births, respectively. Note the high rates of stillbirth in the North American Indian population (approximately two- to three-fold higher than among the French and English) and the high rates of infant mortality among the Inuit (five- to six-fold higher than among the French and the English). Such excess mortality among Aboriginal populations is congruent with the century-old pattern of a two-fold higher infant mortality rate documented by the Royal Commission.[32] Nevertheless, there is evidence to suggest that even these mortality statistics for First Nations, Inuit and Métis populations are underestimates of true rates because of an under-registration of births at the borderline of viability.

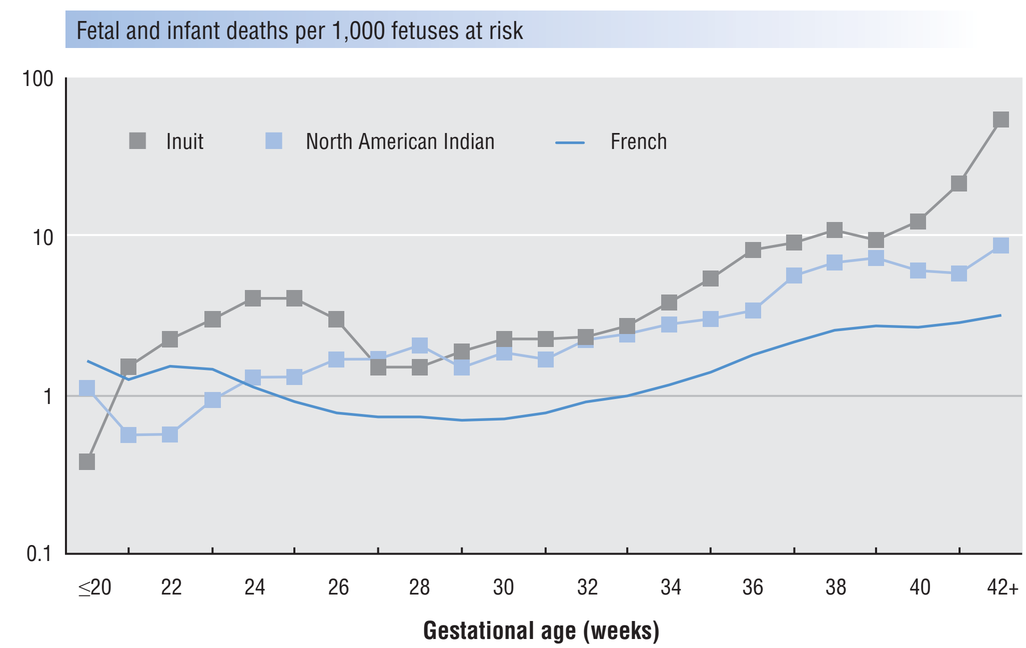
Figure 5.A shows the incidence of birth[28] among French, North American Indian and Inuit women from Quebec in 1995–1997. At gestational ages <32 weeks, North American Indian women experienced lower rates of birth compared with French women, while Inuit women experienced higher rates. When fetal and infant mortality rates were examined using a similar calculation, mortality beyond 24 weeks of gestation was substantially higher among North American Indian and Inuit women (Figure 5.B). A similar picture emerged when fetal and infant mortality rates were examined separately. Most of the patterns in these graphs are consistent with *a priori* expectation, but the low frequency of births between 20 and 23 weeks in the North American Indian population deserves comment. Although a low birth rate could represent healthier North American Indian fetuses and mothers (relative to French fetuses and mothers), the patterns of birth and fetal/infant mortality at subsequent gestational ages suggest otherwise. The low birth rate between 20 and 23 weeks in the North American Indian population probably represents an under-registration of births at the borderline of viability.

FIGURE 5.A **Gestational age-specific birth rates,* by population group**
Quebec, 1995–1997



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 1995–1997.
* The numerator for the gestational age-specific birth rate was the number of births at any gestation, while the denominator was the number of fetuses at risk for birth at the same gestation (commonly referred to as the fetuses at risk approach[28]).

FIGURE 5.B **Gestational age-specific rates of fetal and infant death,* by population group**
Quebec, 1995–1997



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 1995–1997.
* The numerator for the gestational age-specific fetal-infant death rate was the number of fetal-infant deaths at any gestation, while the denominator was the number of fetus at risk for fetal-infant death at the same gestation (commonly referred to as the fetuses at risk approach[28]). The rate of fetal-infant death was cumulated over three weeks of gestation to provide stability to rates.

Figure 5.C shows stillbirth and infant mortality rates among the French, North American Indian and Inuit populations within birth weight and gestational age-specific categories where birth registration is likely to be complete. Most birth weight- and gestational age-specific rates of fetal and infant death were more than two-fold higher among the North American Indian and Inuit populations than among the French population. True fetal and infant mortality rate differentials between First Nations, Inuit and Métis populations and the rest of the Canadian population are likely to be higher than the two-fold excess highlighted by the Royal Commission.[32]

FIGURE 5.C Rates of fetal and infant mortality, by population group*
Quebec, 1995–1997

Index	French			North American Indian			Inuit		
	Rate	Rate ratio	(95% CI)	Rate	Rate ratio	(95% CI)	Rate	Rate ratio	(95% CI)
Fetal deaths per 1,000 total births									
Crude	4.0	1.0	(–)	8.2	2.0	(1.5–2.7)	6.9	1.7	(1.1–2.7)
≥1,000 g	2.7	1.0	(–)	6.3	2.3	(1.7–3.3)	5.8	2.2	(1.3–3.6)
≥28 weeks	2.9	1.0	(–)	6.7	2.3	(1.7–3.2)	5.4	1.9	(1.1–3.2)
Infant deaths per 1,000 live births									
Crude	5.1	1.0	(–)	9.0	1.8	(1.3–2.4)	20.1	3.9	(3.0–5.2)
≥1,000 g	3.4	1.0	(–)	8.0	2.4	(1.8–3.2)	17.8	5.3	(3.9–7.0)
≥28 weeks	3.3	1.0	(–)	8.2	2.5	(1.9–3.4)	15.1	4.6	(3.4–6.3)

Source: Statistics Canada. Canadian Vital Statistics System, 1995–1997. Data courtesy of Russell Wilkins, Health Analysis and Measurement Group.
* Based on language spoken by the mother (662,226 French, 5,242 North American Indian and 2,577 Inuit live births and stillbirths).

Birth Registration in Ontario

It is widely acknowledged that for the last 15 years, vital statistics data from our most populous province have been beset by a number of serious problems. Poor data quality on birth weight led to a public health crisis in the mid-1990s when it appeared that Ontario, and consequently Canada, faced an epidemic of low birth weight births.[36] Similarly, errors in gestational age resulted in an increase in the preterm birth rate in 1994 and 1995, and data for these years remain uncorrected to date (page 297). Fees for obtaining birth certificates in Ontario (introduced in Ontario municipalities in mid-1996 and 1997 and not required in any other region of Canada) led to a documented under-registration of live births especially among vulnerable sub-populations, such as single mothers and infants born with a low birth weight.[37,38] This issue, widely publicized in the media in early 2007, led to an undertaking from the provincial government to revoke such fees. Fees remain, however, and have in fact increased in some jurisdictions. The unresolved birth registration issues in the province represents an unfortunate weakness in national perinatal health surveillance.

The case of the missing birth registrations

Perhaps the most enigmatic of the problems that plague Ontario data is the issue of missing birth registrations for a substantial fraction of infant deaths. Statistics Canada (under a contract with the CPSS and the Public Health Agency of Canada) has annually undertaken a linkage of live birth and infant death registrations. This project provides valuable public health and clinical information (including gestational age-specific infant mortality rates and information on the antecedents of infant death). In all provinces of Canada, except Ontario, this linkage was almost entirely successful and birth registrations of all infants who died were identified in all but a handful of cases (10 of 969 infant deaths (1.1%) remained unlinked for the 2003 birth cohort). In Ontario, however, linkage was typically unsuccessful in a large fraction of infant deaths (295 of 697 infant deaths (42.3%) were unlinked in 2003). A brief description of the above-mentioned unlinked infant deaths in Ontario (i.e., those with missing birth registrations) is provided here in the hope that it will shed some light on this seemingly intractable problem.

Temporal trends in unlinked infant deaths

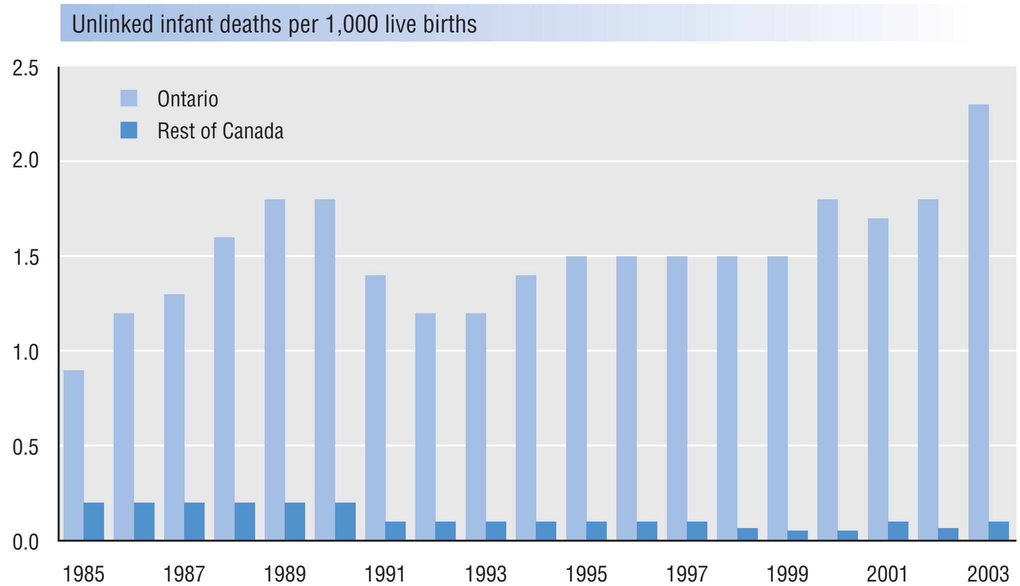
Of the 15,799 infant deaths in Ontario that occurred between 1985 and 2003, 3,987 did not appear to have been registered at the time of birth. The anomaly of unlinked live births in Ontario is not a new phenomenon and was evident in live birth and infant death registrations from the mid-1980s (Figure 6). Whereas the frequency of unlinked infant deaths has decreased in Canada (excluding Ontario) in recent years (Figure 6), the rate of such infant deaths increased in Ontario. Thus, in 1985, 43 infant deaths could not be linked to their birth registrations (0.18 per 1,000 live births) in Canada (excluding Ontario) and this number fell to 10 in 2003 (0.05 per 1,000 live births). In Ontario, the frequency of unlinked infant deaths increased from 122 (0.92 per 1,000 live births) in 1985 to 295 (2.25 per 1,000 live births) unlinked deaths in 2003. During this same period, the infant mortality rate among linked infant deaths in Ontario decreased from 6.3 per 1,000 live births in 1985 to 3.1 per 1,000 live births in 2003.

Time of death

The timing of death among unlinked infant deaths in Ontario was very different from the timing of death among linked infant deaths. Between 1985 and 2003, the neonatal mortality rate among linked infant deaths was 2.9 per 1,000 live births and the postneonatal mortality rate was 1.6 per 1,000 live births. The ratio of neonatal to postneonatal mortality rates was 1.9 among these linked infant deaths in Ontario (i.e., approximately 65% of such infant deaths occurred in the neonatal period). This ratio was identical to the same ratio for linked infant deaths in Canada (excluding Ontario). However, among unlinked infant deaths in Ontario, the neonatal death rate was 1.3 per 1,000 live births and the postneonatal death rate was 0.18 per 1,000 live births, yielding a ratio of 7.6 (i.e., approximately 88% of unlinked infant deaths occurred in the neonatal period). The same ratio among the smaller number of unlinked infant deaths in the rest of Canada was 3.2.

FIGURE 6 **Frequency of unlinked infant deaths***

*Ontario and the rest of Canada (excluding Newfoundland and Labrador),** 1985–2003*



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1985–2003.
* Unlinked infant deaths refer to infant death registrations for which no corresponding birth registration documents could be located.
** Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.

Region of residence

Examination of linked and unlinked infant deaths by region of residence did not yield any unexpected patterns. An arbitrary geographic categorization of Ontario into eight regions (based on census subdivisions) showed that the linked infant death rate was approximately three- to six-fold higher than the unlinked death rate in each of the regions examined.

Cause of death

Analysis of the causes of death among linked and unlinked infant deaths showed that some causes of death were over-represented among the unlinked infant deaths whereas others were under-represented. The overall pattern appeared to be consistent with neonatal deaths being more likely to remain unlinked and postneonatal deaths being less likely to remain unlinked. Thus, the ratio of linked versus unlinked deaths (by cause of infant death) was 3.2 for congenital anomalies and 8.2 for sudden infant death syndrome (SIDS). Causes of neonatal death such as short gestation and low birth weight, maternal complications of pregnancy, respiratory distress syndrome, complications of the placenta cord and membranes, perinatal infection, hypoxia and birth asphyxia, as well as neonatal hemorrhage had ratios (of linked to unlinked infant death rates) under 3. On the other hand, causes of postneonatal death such as accidents, pneumonia and influenza had death ratios (of linked to unlinked infant deaths) which exceeded 3.

Other features of unlinked deaths

Unlinked infant deaths showed a preponderance of males, although to a lesser extent than linked infant deaths. Other analyses by month of death were uninformative, while place of death analyses showed that 93% of unlinked infant deaths had occurred in hospital (relative to 89% of hospital deaths among linked infant deaths).

"Whodunit"

A few tentative insights may be gleaned from this analysis regarding the cause of missing birth registrations in Ontario:

- The problem is longstanding and preceded the introduction of fees for birth registration.
- The problem is widespread across all regions of the province.
- The rate of unlinked infant deaths appears to be increasing in magnitude in recent years. The number of unlinked infant deaths has increased even as the number of live births and infant mortality rates have declined, and currently almost one in two (42%) infant deaths do not appear to have a birth registration.
- The excess of neonatal deaths, hospital deaths and deaths due to causes that operate in the perinatal period (among the unlinked infant deaths) raises the possibility that the missing birth registrations involve relatively complicated births.
- The significance of the small deficit of males among unlinked infant deaths is uncertain.
- The absence of a similar problem with infant deaths from other provinces and territories absolves the method used to link birth and infant death registrations.

Overall, this picture suggests a centralized problem in Ontario, possibly at the data collation level. Details such as the plurality, the birth weight and gestational age, etc., of the unlinked infant deaths cannot be obtained from the death registration as such details are only available in the birth registration (to which the death registration cannot be linked). Only a careful investigation can shed further light on this impediment to Canadian perinatal surveillance.

Trends in Preterm Birth and Low Birth Weight

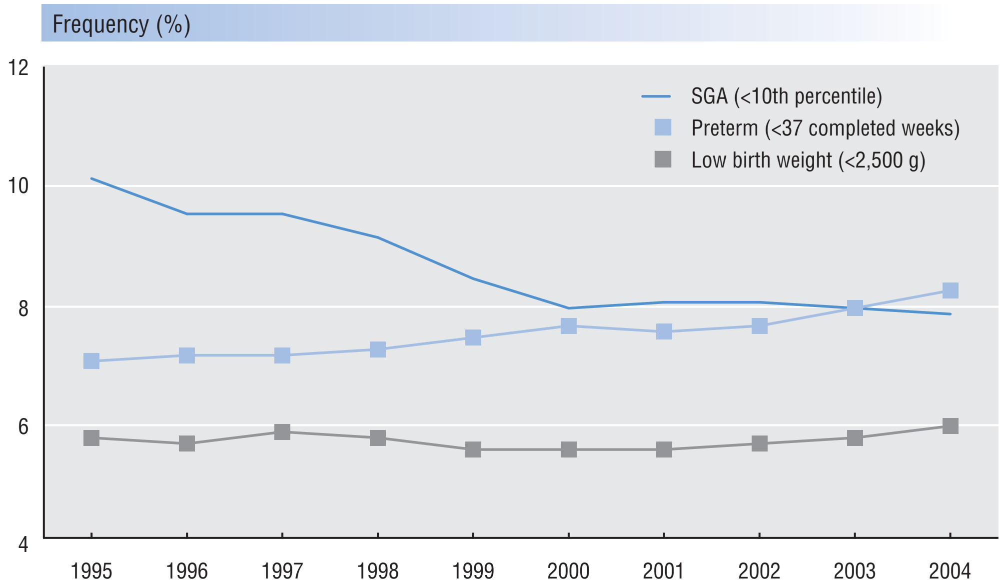
Despite the recognition that preterm birth is the most important perinatal challenge facing industrialized countries, two decades of clinical and community efforts at preterm birth prevention have failed to reduce rates of preterm birth. In fact, preterm birth rates in Canada have increased from 6.4% in 1981[39] to 8.2% in 2004 (and to 7.9% in Canada (excluding Ontario) in 2005[40]). The primary factors cited in connection with this increase include increased rates of obstetric intervention (i.e., medically indicated labour induction and cesarean delivery), increases in older maternal age and increases in multiple births. Although there is a tendency to view the contribution of obstetric intervention, older maternal age and multiple births separately, there is substantial overlap between the effects of these risk factors. Older women are more likely to have multiple births both spontaneously and because they are more likely to require assisted reproduction. Older women and those pregnant with multiples are also more likely to deliver following a medically indicated preterm labour induction or preterm cesarean delivery.

Increases in preterm induction and preterm cesarean delivery have been concentrated at 34 to 36 weeks of gestational age and have occurred primarily among high-risk pregnancies.[41] This latter point is well illustrated by increases in preterm birth among multiple births, a high-risk group which experiences substantially higher rates of perinatal mortality and serious neonatal morbidity. The frequency of preterm birth among multiple births has increased from about 30% in the 1970s,[42] to 40% in the early 1980s, to 50% in the 1990s[43] and to 58.4% in 2004 (page 270). The therapeutic efficacy of medically indicated iatrogenic preterm birth in preventing death is evident in the inverse relationship between population increases in preterm birth and simultaneous declines in stillbirth rates and perinatal mortality rates.[41,43–47] With recent increases in preterm birth viewed as the product of obstetric efforts to reduce perinatal mortality, the preterm birth rate indicator, once a reliable barometer of population perinatal health, has become transformed into a more complex and heterogenous marker of both population perinatal health status and perinatal health care services. As for the increasing tendency towards iatrogenic preterm delivery (given fetal compromise), more research, especially through the long-term follow-up of babies born at 34–36 weeks, is needed to fully frame the cost-benefit equation.[48] Although medically indicated obstetric intervention which prevents perinatal death is laudable, long-term effects such as neuro-developmental impairment, handicap and disability need to be a part of the equation that determines therapeutic indices such as the number needed to treat.

A second issue related to preterm birth that this *Report* highlights, concerns the temporal patterns in preterm birth versus small-for-gestational-age (SGA) live birth in Canada. Rates of preterm birth in Canada increased from 7.0% in 1995 to 8.2% in 2004, while rates of SGA declined substantially from 10.1% in 1995 to 7.8% in 2004 (pages 124 and 131). However, these dramatic changes in the perinatal landscape are mostly masked when perinatal health status is examined using the low birth weight index. As Figure 7 shows, the low birth weight rate in Canada has remained generally stable despite the above-mentioned changes in preterm birth and fetal growth restriction. In fact, it is the simultaneous increases in the preterm birth rate and the decline in SGA rate that is responsible for the stability of the low birth weight rate in Canada. This masking of important perinatal phenomena is one reason for focusing on preterm birth and SGA rates instead of low birth weight. Also, low birth weight is a heterogenous entity and its components, namely, preterm birth and SGA, are different from both an etiologic and prognostic standpoint.[49,50] For these reasons, *Canadian Perinatal Health Reports*, past and current, have provided information on preterm birth and SGA rates in Canada, but not on low birth weight rates. The small increase in low birth weight rates evident in recent years (i.e., from 5.5% in 2001 to 5.9% in 2004) noted in a recent publication from the Canadian Institute for Health Information (CIHI)[51] is best understood within the context of rising rates of preterm birth.

FIGURE 7 **Rates of small-for-gestational-age (SGA) live birth, preterm birth and low birth weight***

*Canada (excluding Ontario),** 1995–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.

* Live births with unknown gestational age or birth weight, gestational age <22 weeks or >43 weeks, and multiple births were excluded for SGA rate calculations.

** Data for Ontario were excluded because of data quality concerns.

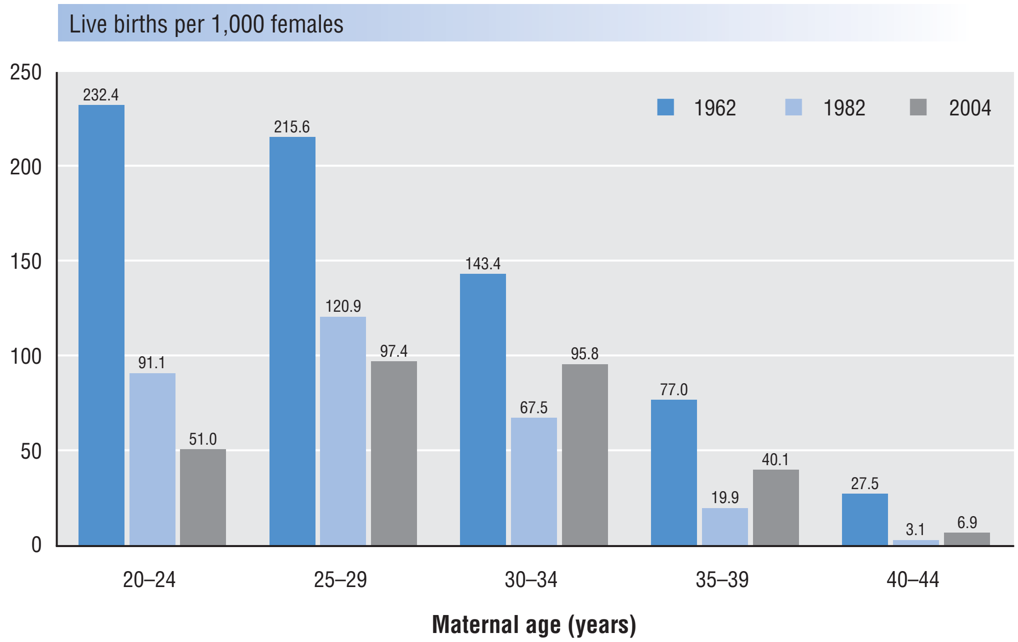
Behaviours and Practices in Pregnancy

One key determinant of maternal behaviours and practices in pregnancy is maternal education. This factor is closely associated with rates of breastfeeding, maternal smoking, exposure to second-hand smoke and periconceptional folic acid supplementation; higher maternal education is typically linked with healthy choices. For this reason, it is encouraging to observe increases in the proportion of Canadian mothers who completed college/university. As documented in this *Report* (page 58), this proportion increased from 56.9% (95% CI: 55.2–58.6) in 2000 to 69.6% (95% CI: 68.1–71.2) in 2005. Over the same period, rates of breastfeeding initiation increased from 81.6% (95% CI: 80.3–82.8) in 2000 to 87.0% (95% CI: 85.7–87.9) in 2005, while maternal smoking rates declined from 17.7% (95% CI: 16.6–18.8) to 13.4% (95% CI 12.4 to 14.4).

The proportion of live births to teenage mothers continued to decrease, with the proportion of live births to mothers aged 15 to 19 decreasing from 6.8% in 1995 to 4.8% in 2004 (page 63). Over the same period, the age-specific live birth rate among females aged 15 to 19 decreased from 25.4 to 15.4 per 1,000 females. The proportion of live births to women 35 years of age and over increased from 11.2% in 1995 to 15.4% in 2004, while the age-specific live birth rate among women aged 35 to 49 years increased from 11.8 in 1995 to 13.5 per 1,000 females in 2004 (pages 235 and 236). The increasing trend towards delayed childbearing is of enormous clinical and public health concern. Older maternal age is responsible for higher rates of preterm birth, fetal growth restriction, perinatal mortality and serious neonatal morbidity.[52–54] Maternal mortality rates are also higher among older mothers.[55] The excess (relative) risks that attend childbearing at older ages are a concern even though the absolute risks of adverse perinatal outcomes are typically low.

FIGURE 8 **Age-specific live birth rates among females 20–44 years**

Canada, 1962, 1982 and 2004



Source: Statistics Canada. Canadian Vital Statistics System, Births Database, 1962, 1982 and 2004.

Nevertheless, it is important to recognize that this phenomenon has different impacts at the individual level, the population level and the social level. Although the individual-level risks associated with delayed childbearing are well recognized, the population health impact is less discussed. There have been steep fertility declines in the Canadian population over the last five decades and women over 30 years of age are the only subgroups showing any recovery in fertility patterns (Figure 8). Also, the population impact of older maternal age on outcomes such as preterm birth and SGA live births is substantially smaller than the increase in risk of these outcomes at the individual level. Whereas older maternal age increases the risk of preterm birth/SGA live birth by 50%–100%, the population rate of preterm birth/SGA would only decrease by about 10% if women 35 years of age and older stopped having babies. Finally, it should be recognized that more babies are born following assisted reproductive technology treatments to women under 35 years of age compared to those over 35.[56] None of this mitigates the individual-level hazards associated with older maternal age, and women contemplating postponing childbirth should be aware of the risks associated with such a decision.[57,58] Still, it bears emphasizing that delayed childbearing is now commonplace in industrialized countries and represents a social phenomenon with complex antecedents.

Pre-pregnancy weight

Excess pre-pregnancy weight is an increasingly common risk factor for various adverse outcomes that affect the mother, fetus and infant.[59-61] Unfortunately, national-level databases in Canada do not contain information on this indicator and monitoring trends over time is therefore not possible. The recent Maternity Experiences Survey carried out by the CPSS should remedy this surveillance deficiency, especially if it is repeated on a periodic basis. Various provincial databases which contain good quality data on pre-pregnancy weight are another source of information on this issue and such information provides a reasonable picture of secular trends in Canada. Data from the Reproductive Care Program of Nova Scotia show that maternal pre-pregnancy weight ≥90 kg increased from 3.4% in 1988 to 13.1% in 2006 in that province. Similarly, data from the British Columbia Reproductive Care Program show that pre-pregnancy body mass index (BMI) ≥30 kg/m^2 increased from 10.6% in 2001 to 11.4% in 2005.[62] This disquieting trend in maternal size reflects similar well-recognized trends in body size in Canada and elsewhere that transcend gender and age.

Pre-pregnancy weight highlights one particular challenge in perinatal surveillance since national-level data on this indicator are not readily available. Adapting data in regional databases for the purpose of national surveillance in this situation represents a wise use of resources and strengthening provincial-level databases is clearly in the best interests of perinatal health surveillance and perinatal health in Canada. In this context, it is important to note that for reasons not readily apparent, there has been an unfortunate increase in missing information on pre-pregnancy weight in both the Nova Scotia and the British Columbia databases.[62,63] Whereas the Reproductive Care Programs in both these provinces do a commendable job of maintaining their highly detailed databases, more support and focus on strengthening data quality is essential to ensure greater utility.

Health Services

Rates of labour induction in Canada, which had increased from 20.7% in 1995 to a peak high of 23.7% in 2001, dropped to 21.8% in 2004 (page 74). Cesarean delivery rates, on the other hand, continued their monotonic increase, with total cesarean rates increasing from 17.6% in 1995, to 21.1% in 2000 and 25.6% in 2004 (page 78). These figures provide an interesting contrast with those from the United States, both in terms of the similarities and the differences. In the United States, labour induction rates increased steadily from 16.0% in 1995 to 21.2% in 2004, while total cesarean rates increased from 20.8% in 1995 to 29.1% in 2004.[64] Large differences were evident in the rate of vaginal birth after cesarean (VBAC); VBAC rates were 19.9% in Canada and 9.2% in the United States in 2004.

Episiotomy rates continued to decline in Canada—20.4% of women delivering vaginally had an episiotomy in 2004 compared with 31.1% in 1995. The rates of the more severe, third- and fourth-degree perineal lacerations showed contrasting trends, with third-degree lacerations increasing slightly from 3.0% in 1995 to 3.3% in 2004 and fourth-degree lacerations declining from 0.7% in 1995 to 0.6% in 2004. Overall, however, third- and fourth-degree lacerations (combined) did not show an increase or decrease and the possibility of changes in labelling (third- versus fourth-degree laceration) cannot be excluded.[65]

Trends in length of hospital stay following birth and in readmission rates after hospital discharge showed encouraging patterns, especially for newborns. In 1995, 20.1% of normal birth weight newborns were discharged within two days after birth and this rate increased to 27.3% in 2004. A similar trend was observed among low birth weight infants. Rates of neonatal admission did not increase over the same period; 3.7 per 100 infants discharged after the birth admission were readmitted within the neonatal period in 1995 compared with 3.4 per 100 infants in 2004. Maternal length of stay also decreased between 1995 and 2004, while rates of readmission increased marginally over the same period (1.5 to 1.7 per 100 vaginal deliveries, and 2.8 to 3.0 per 100 cesarean deliveries). These trends imply substantial gains in the efficient use of hospital resources over the last decade without any apparent compromise of patient safety. The confidence one can place in these estimates and the resulting inferences is unfortunately somewhat reduced because of methodologic issues, however. The exact time of birth is not currently available in either CIHI's Discharge Abstract Database or the Hospital Morbidity Database, and hence estimates of the length of stay for newborns and postpartum length of stay for mothers represent approximations.

Maternal Health

The maternal mortality ratio (MMR) for Canada was 5.5 (95% CI: 4.2–7.2) per 100,000 live births in 2002–2004. This rate was not statistically different from the same rate in 1999–2001 (4.2, 95% CI: 3.2–5.7). Even though the point estimate of the MMR in 2002–2004 was higher than in previous years, this is unlikely to be of significance especially since there were no striking increases in any of the specific causes of maternal death (page 103). A similar non-significant increase in the MMR was observed in the United Kingdom as well (11.4 per 100,000 maternities in 1997–1999 and 13.1 per 100,000 maternities in 2000–2002[55]).

Among the direct causes of maternal death, death due to postpartum hemorrhage (PPH) has been of particular interest in Canada in recent years. This is because the *Canadian Perinatal Health Report, 2003* reported a two-fold increase in the rate of hysterectomy for PPH between 1991 and 1999.[66] The increase remained unexplained at that time and hypotheses proposed included changes in obstetric practice, increases in older maternal age and increases in adherent placenta due to a higher prevalence of women with a previous cesarean delivery. The Maternal Health Study Group of the CPSS has since carried out a detailed investigation of this issue.[67] The principal underlying phenomenon appears to be a temporal increase in atonic PPH (page 105). Whereas the cause of the increase in atonic PPH remains unclear, it is worth noting that a similar unexplained increase in PPH has been documented in Australia,[68,69] and maternal deaths due to PPH have increased in the United Kingdom in recent years.[55] The editorial comment that accompanied the Canadian publication stated: "The rise in atonic postpartum haemorrhage, which many of us have observed . . . remains unexplained . . . If any of our readers have any suggestions for [this] puzzling [increase], please share them with us."[70]

The frequency of induced abortions in Canada, which the CPSS has tracked in each of its *Perinatal Health Reports*, appears to have reached a plateau in recent years. However, it is unclear if the data provide an accurate picture of the situation in Canada. Some of the causes for the problems with data quality arise because of newer technologies that are more difficult to track (such as very early abortions carried out in physicians' offices and those carried out using pharmacologic agents). Other causes and issues, detailed in the section on *Induced Abortions* (page 109), should however be addressed in the interests of national surveillance.

Fetal and Infant Health

Large-for-gestational-age (LGA) live births have increased in frequency since 1995, although this trend has stabilized in the last three years. Regional variations were large, with Quebec having the lowest frequency (10.2%) and the Northwest Territories having the highest (20.4%). Small-for-gestational-age live births in Canada show the opposite temporal trend (page 130), and the Northwest Territories had the lowest rate of such babies (5.1% in 2004). These regional variations in fetal growth may reflect differences in population ethnicity. The broader question of whether fetal growth standards (i.e., the standard cut-offs used for determining whether an infant is SGA or LGA) should be customized for ethnicity and other factors is part of an emerging debate in the international perinatal literature.[71,72] The final consensus on this issue will have an important bearing on clinical practice and perinatal health in Canada.

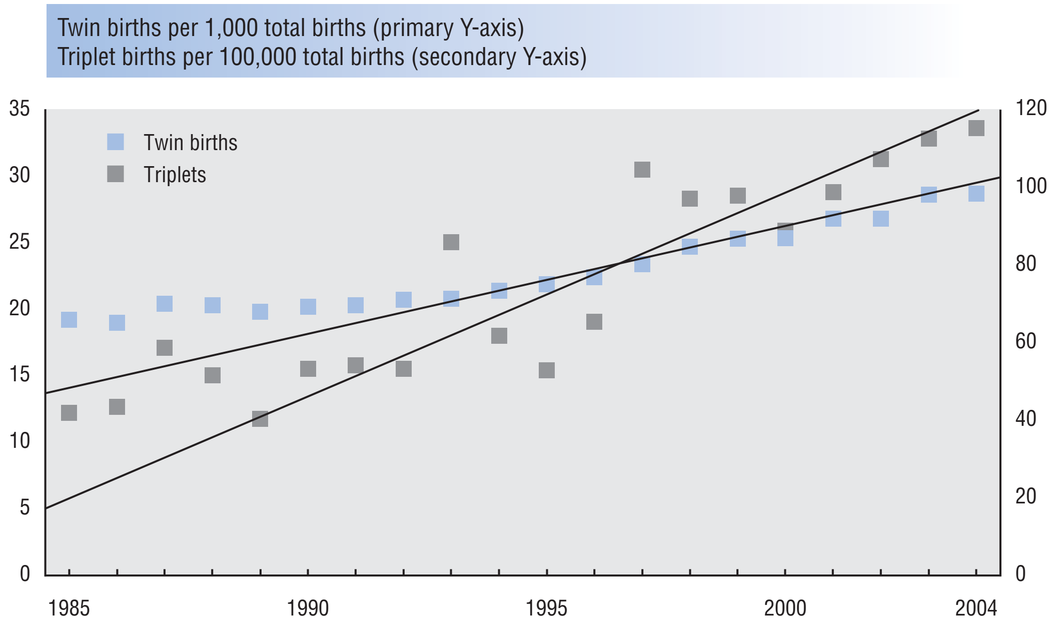
Of the three specific anomalies highlighted in the *Congenital Anomalies* section (page 158), the birth prevalence of Down syndrome and cleft palate appear unchanged, while the frequency of neural tube defects has been reduced by more than half between 1995 and 2004. The decline in the birth prevalence of neural tube defects has occurred secondary to prenatal diagnosis and also, from 1998 onwards, due to food fortification with folic acid. Several studies have documented the effects of folic acid food fortification in Canada.[73–76] The most recent seven-province study showed a 46% decline in neural tube defects, with the magnitude of the decrease proportional to the baseline pre-fortification rate.[76]

The rate of multiple births increased from 2.2% in 1995 to 3.0% in 2004. The relative increase in triplet and higher order multiple births was larger than the increase among twins (Figure 9), and neither trend appeared to show any signs of a plateau. Much of this increase was due to increases in the use of assisted reproductive technologies (ART). The increase in multiple births is not surprising—both because the number of ART cycles performed in Canada has increased from 7,884 in 2001 to 11,068 in 2004, and because the percentage of (in vitro fertilization/intra-cytoplasmic sperm injection) cycles with two or more embryos has increased from 49% in 2001 to 66% in 2004.[56]

Two indicators of severe neonatal morbidity, namely, the rate of neonatal sepsis and the rate of endotracheal intubation have shown encouraging trends between 1995 and 2004. The rates of each morbidity and the changes observed over the last decade varied by birth weight category (page 150). The increases in intubation particularly among infants with a birth weight <1,000 g are promising, especially in the light of recent research findings showing that among such newborns intensive neonatal care technologies have moved beyond the stage of reducing death at the expense of increases in both disability-free survival and disability-associated survival.[77] We appear to be at a stage where rates of death and disability-associated survival are both being reduced among infants with a birth weight between 500 and 999 g.[78]

FIGURE 9 **Temporal trends in the rates of twin and triplet births***

*Canada (excluding Ontario, and Newfoundland and Labrador),** 1985–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1985–2004.

* Triplet births include triplet and higher order multiple births.

** Data for Ontario were excluded because of data quality concerns. Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.

Conclusion

The *Canadian Perinatal Health Report, 2008 Edition* documents a variety of surveillance phenomena that range from simple trends describing improvements in determinants of health (e.g., declining rates of maternal smoking, rising rates of breastfeeding) to more complex patterns in health outcomes (e.g., rising rates of preterm birth and declining rates of SGA). In addition, several enigmatic phenomena require further study and elucidation, including the mystery surrounding missing birth registrations in Ontario and the increases in atonic PPH in Canada (which mirror similar unexplained increases in Australia and the United Kingdom). Finally, there are several areas identified where surveillance information could benefit from improvements in data quality, including indicators such as the induced abortion rate. It is also clear that better quality information on First Nations, Inuit and Métis and other vulnerable subpopulations is necessary in order to identify and target disparities in perinatal health. Nevertheless, the general tone of the *Report* is upbeat, with clear documentation of many small and large improvements in perinatal health. The information, especially the regional comparisons, can be used to create benchmarks for improvement in the future. It is hoped that this *Report* will be widely used to inform clinical, public health and health policy decision making and to spur efforts aimed at improving perinatal health surveillance.

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A

Determinants of Maternal, Fetal and Infant Health

Behaviours and Practices

1. Rate of Maternal Smoking during Pregnancy

Joan Lindsay, Cathie Royle and Maureen Heaman

The rate of maternal smoking during pregnancy is defined as the number of pregnant women who smoked cigarettes during pregnancy, expressed as a proportion of all pregnant women (in a given place and time).

Maternal cigarette smoking can have adverse health effects on the fetus and child. It increases the risk of intrauterine growth restriction (IUGR), preterm birth, spontaneous abortion, placental complications, stillbirth and sudden infant death syndrome (SIDS).[1] It is associated with an overall increased risk of infant mortality and morbidity, due in part to increases in IUGR and preterm birth.

The literature suggests longer term adverse effects of smoking during pregnancy. One such study reported long-term behavioural problems including inattention and attention-deficit/hyperactivity disorder in children of mothers who smoked during pregnancy.[2] Smoking during pregnancy has been linked with some childhood cancers, including central nervous system tumours, leukemias and lymphomas.[3] This has been attributed to adverse effects of prenatal exposure to tobacco smoke on the immune system.[3] Maternal smoking during pregnancy (even with cessation immediately after) is a risk factor for asthma in young children.[4,5] Restricted fetal growth caused by smoking during pregnancy has been linked to impaired airway development and pulmonary function in all stages of life of these children.[5]

The relation between maternal smoking and adverse pregnancy outcomes is linked to the amount and duration of smoking. Women who stop smoking before becoming pregnant or during their pregnancy are at significantly reduced risk of IUGR and preterm birth compared with women who smoke throughout pregnancy.[1,6] Although pregnant women are more likely to quit smoking and smoke fewer cigarettes than women who are not pregnant, maternal smoking during pregnancy remains a notable public health problem. The literature suggests that smoking rates during pregnancy are also higher among women with low socioeconomic status and within vulnerable populations.[7,8] It is important to promote non-smoking among women in general, to target groups at particular risk, and to help pregnant women who smoke to stop or reduce smoking as early as possible.[6,9]

Rates of maternal smoking during pregnancy were estimated using data from the Canadian Community Health Survey (CCHS).

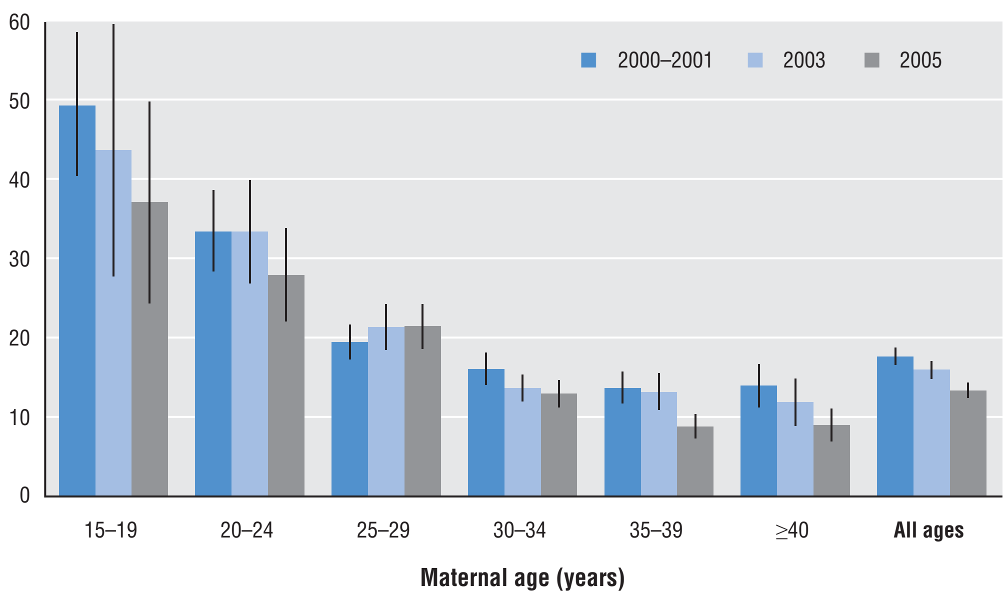
Results

- Between 2000–2001 and 2005, the decrease in maternal smoking rates observed in previous years continued. In 2000–2001, 17.7% of women who had given birth in the previous five years reported smoking during their pregnancy compared with 13.4% in 2005. The percentage of recent mothers who reported smoking more than 10 cigarettes per day during pregnancy declined from 4.9% 2000–2001 to 1.7% in 2005.
- Younger mothers were more likely to report smoking. In 2005, 37.2% (95% CI: 24.4–49.9) of mothers who were under 20 years of age smoked during their pregnancy, compared with 9.0% (95% CI: 6.9–11.1) of mothers who were 40 years of age or older (Figure 1.1). Even though mothers under 20 years of age reported the highest rate of smoking, they only accounted for 3.0% of mothers who reported smoking prenatally (data not shown).
- Reported rates of maternal smoking during pregnancy varied by region. In 2005, rates ranged from lows of 9.7% (95% CI: 7.4–12.0) and 10.3% (95% CI: 9.0–11.7) in British Columbia and Ontario, respectively, to highs of 59.5% (95% CI: 43.4–75.5) in Nunavut and 32.8% (95% CI: 22.0–43.6) in the Northwest Territories (Figure 1.2).

FIGURE 1.1 Rate of maternal smoking during pregnancy, by maternal age

Canada, 2000–2001, 2003 and 2005

Percentage of mothers* (95% CI) who reported smoking during pregnancy

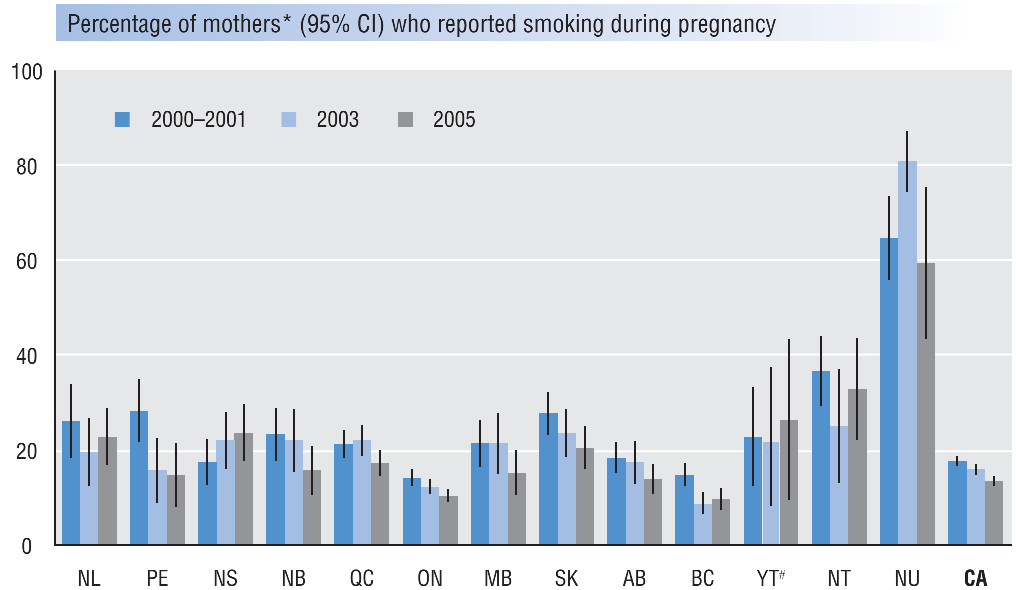


Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.

* Women who gave birth in the five years preceding the survey; denominators exclude responses of “do not know” and “not stated,” and refusal to answer.

CI—confidence interval

FIGURE 1.2 Rate of maternal smoking during pregnancy, by province/territory
Canada, 2000–2001, 2003 and 2005



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
# High level of sampling variability for 2003 data from the Yukon.
CI—confidence interval

Data Limitations

The knowledge that smoking during pregnancy can adversely affect the outcome of the pregnancy may have led mothers to under-report their smoking behaviour during pregnancy.[10] Also, mothers reported on smoking during pregnancies up to five years preceding the interview, which may have affected the accuracy of their recall. Therefore, rates of maternal smoking in Canada are probably higher than those reported in the CCHS.

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■ 2. Rate of Maternal Exposure to Second-Hand Smoke during Pregnancy

Joan Lindsay, Cathie Royle and Maureen Heaman

The rate of maternal exposure to second-hand smoke, or environmental tobacco smoke, during pregnancy is defined as the number of pregnant women who were exposed to second-hand smoke during pregnancy, expressed as a proportion of all pregnant women (in a given place and time).

The chemical exposure from second-hand smoke is similar to the exposure of the smoker, but the pattern and amounts of exposure vary and are different from that of the smoker. Undiluted sidestream smoke contains many harmful chemicals in greater amounts than cigarette smoke that is inhaled through a filter.[1–3]

Evidence of adverse effects of second-hand smoke during pregnancy is strongest for reduction in birth weight. While some studies have not shown an increased risk of low birth weight due to exposure to second-hand smoke,[1,3] this association has been supported by a majority of studies. The U.S. Surgeon General recently concluded that the evidence is sufficient to infer a causal relationship between maternal exposure to second-hand smoke during pregnancy and a small reduction in birth weight.[1,2,4]

Evidence of an association between second-hand smoke exposure during pregnancy and preterm birth has been seen inconsistently and is more likely at higher levels of exposure; the U.S. Surgeon General considered the evidence "suggestive," but not strong enough to support a causal relationship.[1,2,4–6] The reduction in birth weight as well as the risk of preterm birth resulting from second-hand smoke exposure appear to be more pronounced in mothers aged 30 or over in comparison to younger mothers.[7]

There is some evidence that maternal exposure to second-hand smoke during pregnancy is an independent risk factor for symptoms of wheeze and bronchitis in infants and young children, but further study is needed.[8–9]

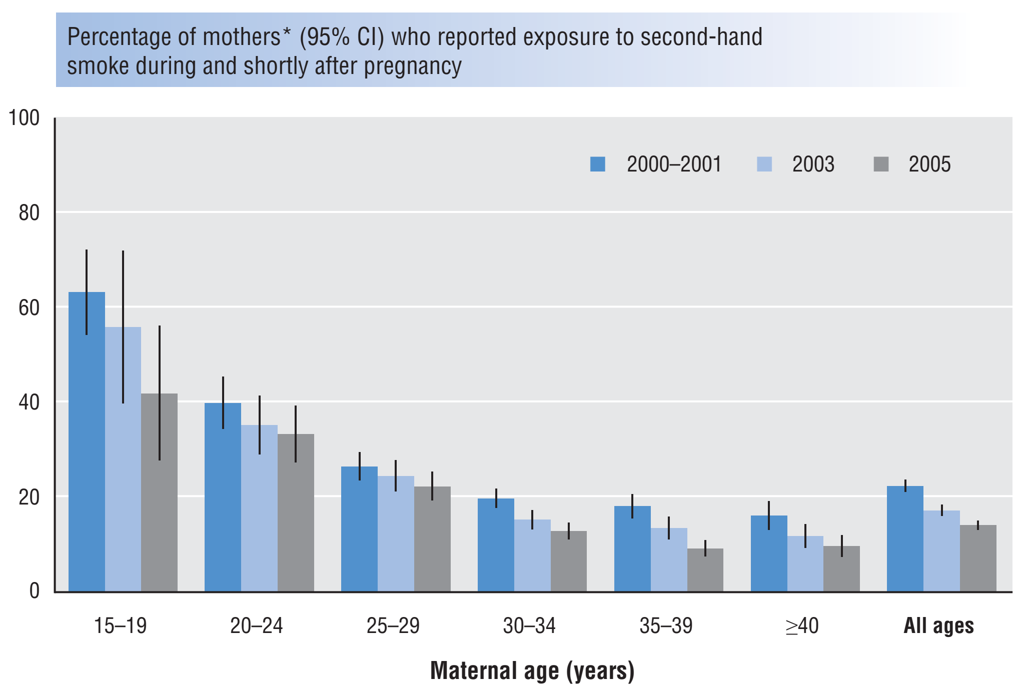
It is important to continue to promote avoidance of second-hand smoke among women in general, and among pregnant women in particular. Increasingly comprehensive legislation prohibiting smoking in public places and the workplace has undoubtedly helped to reduce exposure to second-hand smoke in many localities. Smoking in households may represent a more serious health issue for pregnant women and their fetuses, and education of their partners and other family members on the dangers of second-hand smoke is needed.

Rates of maternal exposure to second-hand smoke were estimated using data from the Canadian Community Health Survey (CCHS). This survey asked women who reported giving birth in the previous five years if anyone regularly smoked in their presence during or about six months after their pregnancy. This is assumed to reflect exposure to second-hand smoke during their pregnancy.

Results

- Between 2000–2001 and 2005, rates of maternal exposure to second-hand smoke decreased. In 2000–2001, 22.4% of women who gave birth in the previous five years reported exposure to second-hand smoke during their pregnancy, compared with 14.1% in 2005 (Figure 2.1). More than half of those exposed to second-hand smoke also smoked during pregnancy (Figure 2.2), although the rate decreased more dramatically for women who both smoked during pregnancy and were exposed to second-hand smoke (from 12.6% in 2000–2001 to 7.8% in 2005) than for women who reported being exposed only to second-hand smoke (from 9.8% in 2000–2001 to 6.4% in 2005).
- Younger mothers were more likely to report exposure to second-hand smoke. In 2005, 41.9% (95% CI: 27.7–56.2) of mothers under 20 years of age were exposed to second-hand smoke during their pregnancy, compared with 9.7% (95% CI: 7.4–12.0) of mothers who were 40 years or older (Figure 2.1). Even though mothers under 20 years of age reported the highest rate of exposure to second-hand smoke, they only accounted for 3.2 % of mothers exposed to second-hand smoke during pregnancy.
- Reported rates of maternal exposure to second-hand smoke varied by province/territory. In 2005, rates ranged from lows of 8.9% (95% CI: 6.7–11.1) and 11.2% (95% CI: 9.8–12.7) in British Columbia and Ontario, respectively, to highs of 35.2% (95% CI: 24.4–46.1) in Nunavut and 34.7% (95% CI: 21.6–47.9) in the Northwest Territories (Figure 2.3).

FIGURE 2.1 Rate of maternal exposure to second-hand smoke, by maternal age
Canada, 2000–2001, 2003 and 2005

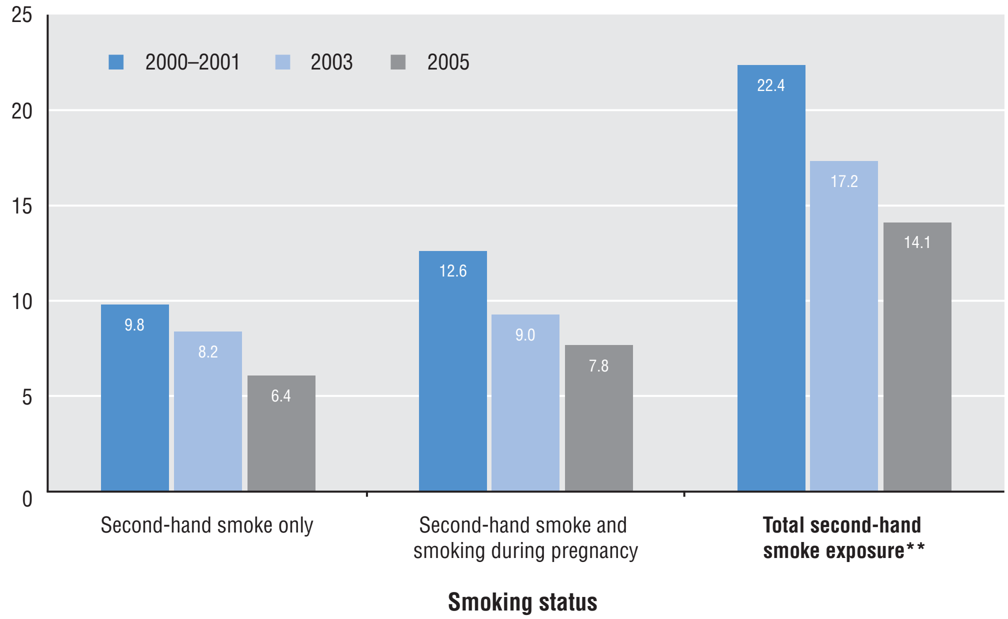


Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

FIGURE 2.2 Rate (%) of maternal exposure to second-hand smoke alone and in combination with smoking during pregnancy

Canada, 2000–2001, 2003 and 2005

Percentage of mothers* who reported exposure to second-hand smoke during and after pregnancy, by self-reported smoking status

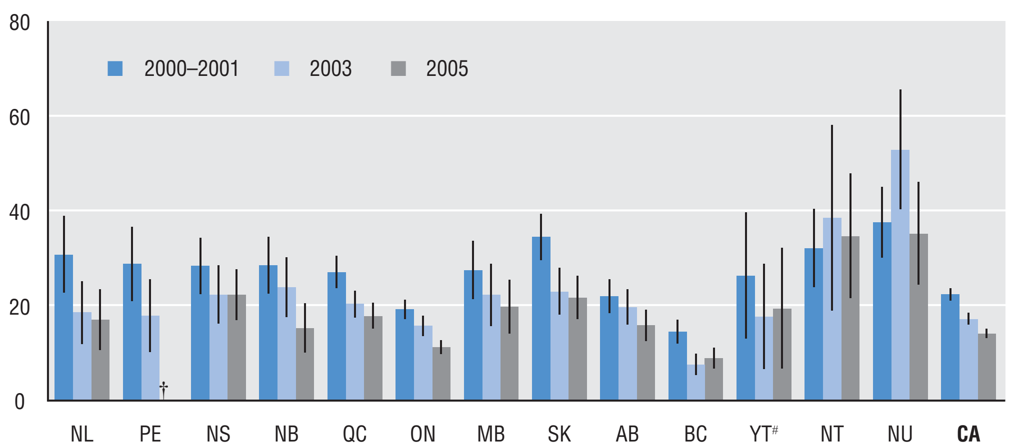


Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
** Rates may not add due to rounding.

FIGURE 2.3 Rate of maternal exposure to second-hand smoke, by province/territory

Canada, 2000–2001, 2003 and 2005

Percentage of mothers* (95% CI) who reported exposure to second-hand smoke during and shortly after pregnancy



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
† Estimate not shown because sample size was less than 10.
\# High level of sampling variability for 2005 data from the Yukon.
CI—confidence interval

Data Limitations

Mothers were asked to report on their exposure to second-hand smoke up to five years before the interview, which may have affected the accuracy of their recall. Therefore, rates of maternal exposure to second-hand smoke in Canada may be higher than those reported in the CCHS. The CCHS did not collect data on the source of exposure to second-hand smoke (e.g., partner, friends, co-workers), which would help in targeting efforts to reduce exposure. There was no information on biomarkers of exposure to second-hand smoke to validate the self-reported exposure.

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3. Rate of Maternal Alcohol Consumption during Pregnancy

Joan Lindsay, Cathie Royle and Mary Johnston

The rate of maternal alcohol consumption during pregnancy is defined as the number of pregnant women who reported consuming alcoholic beverages during pregnancy, expressed as a proportion of all pregnant women (in a given place and time).

Maternal alcohol consumption can have health consequences for both the mother and fetus, including fetal alcohol spectrum disorder (FASD). FASD describes a range of conditions linked to prenatal exposure to alcohol; however, effects on the baby vary widely and are difficult to predict and to diagnose.[1] The cognitive, behavioural, neurodevelopmental, physiological or physical impairments that may occur with FASD have implications for the individual over his or her lifespan. The diagnosis of fetal alcohol syndrome (FAS), which is the most severe of the FASD conditions, is based on a history of prenatal alcohol exposure combined with pre- and postnatal growth restriction, characteristic facial dysmorphology and central nervous system damage.[1,2] The effects of alcohol on the fetus depend on numerous factors, including the amount of alcohol consumed, the pattern and timing of drinking, maternal age, the mother's ability to metabolize alcohol and the genetic susceptibility of the fetus.[1,2] Recent research suggests that maternal alcohol consumption during pregnancy may also partially explain early adult alcohol abuse and alcohol dependence in offspring.[3]

Since no safe level of alcohol consumption during pregnancy has been established, Health Canada and the Public Health Agency of Canada recommend that women who are or may become pregnant abstain from alcohol consumption.[4,5]

Rates of maternal alcohol consumption during pregnancy were estimated using data from the Canadian Community Health Survey (CCHS).

Results

- The rate of mothers who reported drinking alcohol during pregnancy fluctuated between 2000–2001 and 2005. While the rate was 10.5% in 2005, it was 12.4% in 2003 and 12.2% in 2000–2001. This percentage includes all mothers who reported drinking, regardless of amount and frequency. According to the 2005 CCHS survey, 1.1% of women who were pregnant in the previous five years reported drinking more than once a week during their pregnancy. The amount consumed on each occasion and the proportion of mothers who engaged in binge drinking during their pregnancy could not be determined reliably using CCHS data.

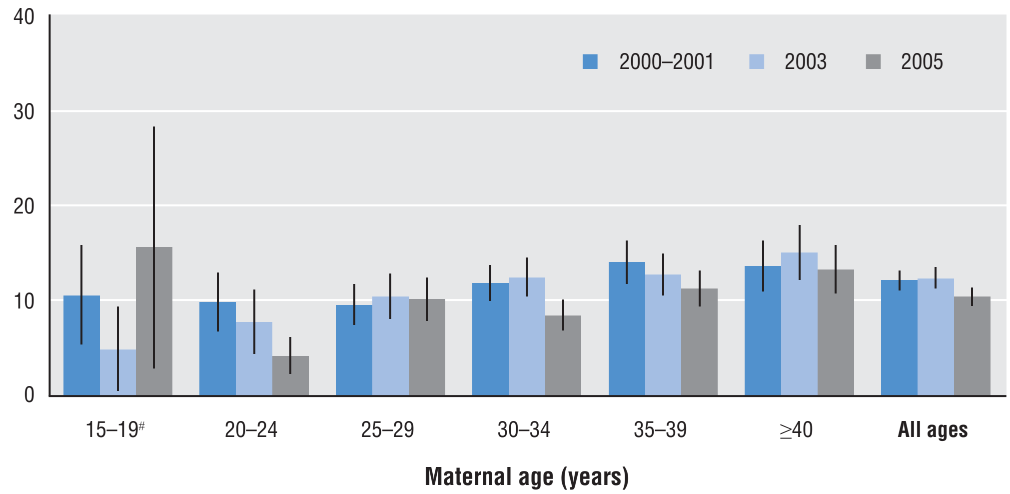
- Reported alcohol use in pregnancy varied by age of the mother. Older mothers were generally more likely than younger mothers to report alcohol consumption. Estimates of alcohol consumption among women 15 to 19 years of age fluctuated considerably from 2000–2001 to 2003 to 2005. However, the differences were not statistically significant (note wide confidence intervals). No clear temporal trend was discernible from these imprecise estimates (Figure 3.1).

- Reported rates of maternal alcohol consumption varied by province/territory. In 2005, rates ranged from a low of 4.1% (95% CI: 0.9–7.3) in Newfoundland and Labrador to a high of 17.7% (95% CI: 15.1–20.2) in Quebec (Figure 3.2).

FIGURE 3.1 Rate of maternal alcohol consumption during pregnancy, by maternal age

Canada, 2000–2001, 2003 and 2005

Percentage of mothers* (95% CI) who reported drinking any alcohol during pregnancy



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.

* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.

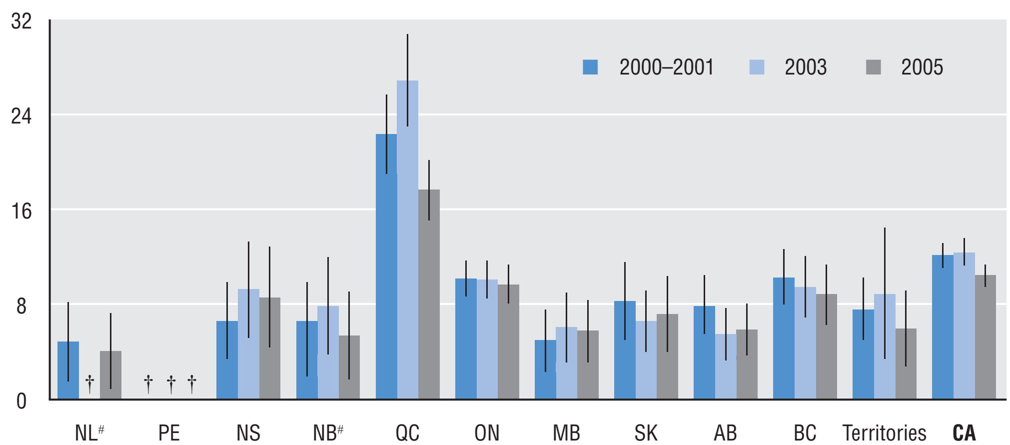
\# High level of sampling variability for 2003 and 2005 data for ages 15–19.

CI—confidence interval

FIGURE 3.2 Rate of maternal alcohol consumption during pregnancy, by province/region

Canada, 2000–2001, 2003 and 2005

Percentage of mothers* (95% CI) who reported drinking any alcohol during pregnancy



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.

* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.

† Estimates not shown because sample size was less than 10.

\# High level of sampling variability for 2000–2001 and 2005 data from Newfoundland and Labrador, and 2005 data from New Brunswick.

CI—confidence interval

Data Limitations

As the conditions within FASD are difficult to diagnose, maternal alcohol consumption is often used as an indicator of alcohol-exposed pregnancies. However, there may be systematic under-reporting of maternal alcohol consumption in surveys, because alcohol consumption during pregnancy is considered socially undesirable and known to incur risk to the fetus.[6] Mothers reported on alcohol consumption during pregnancies that occurred up to five years preceding the interview, which may have affected the accuracy of their recall. Therefore, rates of maternal alcohol consumption in Canada are probably higher than those reported in the CCHS. The proportion of pregnant women with chronic, heavy alcohol consumption could not be determined reliably using CCHS data.

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4. Rate of Breastfeeding

Tatiana Sotindjo, Beverley Chalmers and Cathie Royle

The rate of breastfeeding is defined as the number of women who have given birth to a live born child and ever breastfed that child, expressed as a proportion of all the women who delivered a live born child (in a given place and time).

Breastfeeding is internationally recognized as the optimal method of infant feeding, given its beneficial effects on infants' growth, immunity and cognitive development.[1–4] In addition, beneficial effects such as reduced postpartum bleeding, delayed resumption of ovulation and improved bone remineralization can be noted in breastfeeding mothers.[5]

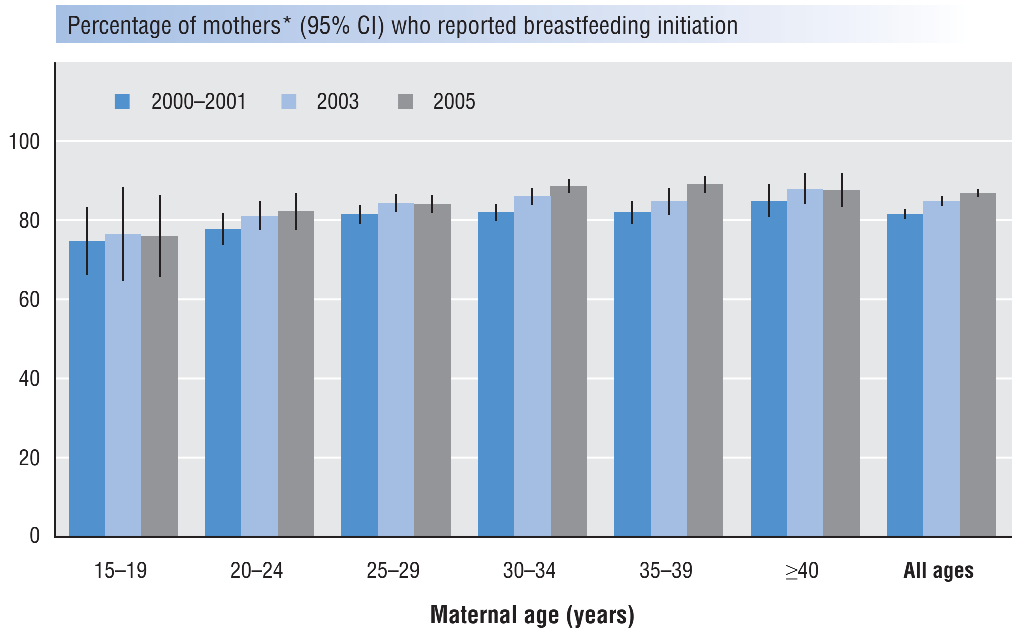
The Public Health Agency of Canada, Health Canada, the Canadian Paediatric Society and Dieticians of Canada recommend exclusive breastfeeding for the first six months after birth for healthy term infants, with the introduction of complementary foods and continued breastfeeding for up to two years of age and beyond.[6] This is consistent with practices endorsed by the WHO and UNICEF, as incorporated in the Baby Friendly Hospital Initiative launched in 1989 to strengthen maternity practices that support breastfeeding.[7,8] Exclusive breastfeeding is defined as breastfeeding with no other liquid or solid given to the infant.

Breastfeeding rates were calculated using data from the Canadian Community Health Survey (CCHS).

Results

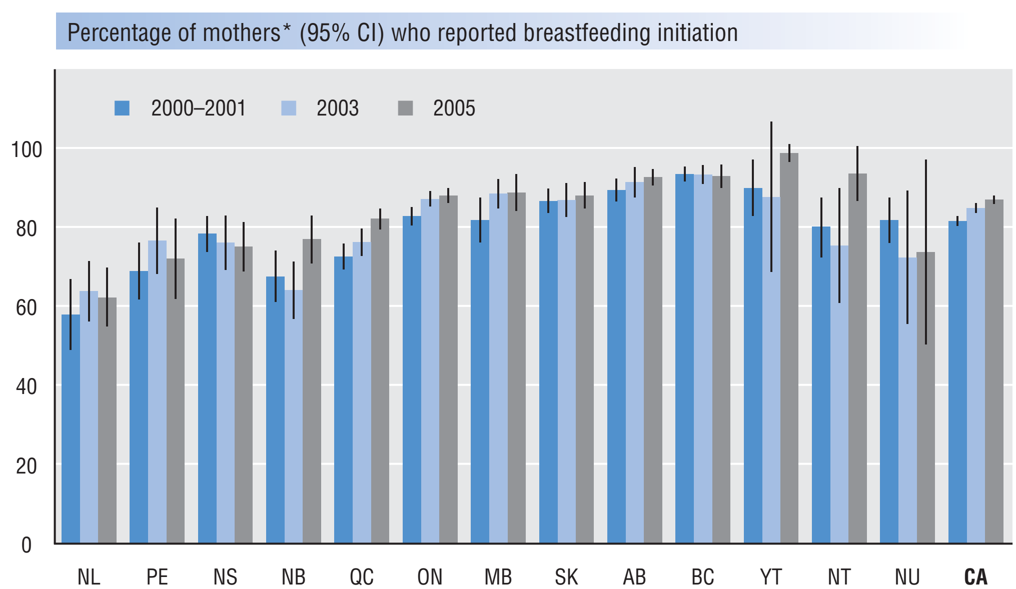
- The rates of breastfeeding initiation have increased steadily in the past five years. In 2005, 87.0% of mothers who gave birth in the previous five years initiated breastfeeding, compared to 81.6% in 2000–2001 (Figure 4.1).
- Similarly, rates of exclusive breastfeeding for at least six months have increased. In 2005, 16.4% of infants were breastfed exclusively for six months compared to 14.2% in 2003 (Figure 4.3).
- Maternal age was associated with breastfeeding initiation rates. In all three cycles of the CCHS, rates among older mothers were higher than those among younger mothers. The same pattern emerged for the rate of exclusive breastfeeding for six months or more. In both 2003 and 2005, rates were higher among older mothers (Figures 4.1 and 4.3).
- Breastfeeding initiation rates varied by province with an increasing trend from east to west. In 2005, rates ranged from a low of 62.3% (95% CI: 54.9–69.8) in Newfoundland and Labrador to 98.8% (95% CI: 96.5–101.1) in the Yukon (Figure 4.2).

FIGURE 4.1 **Rate of breastfeeding initiation, by maternal age**
Canada, 2000–2001, 2003 and 2005



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

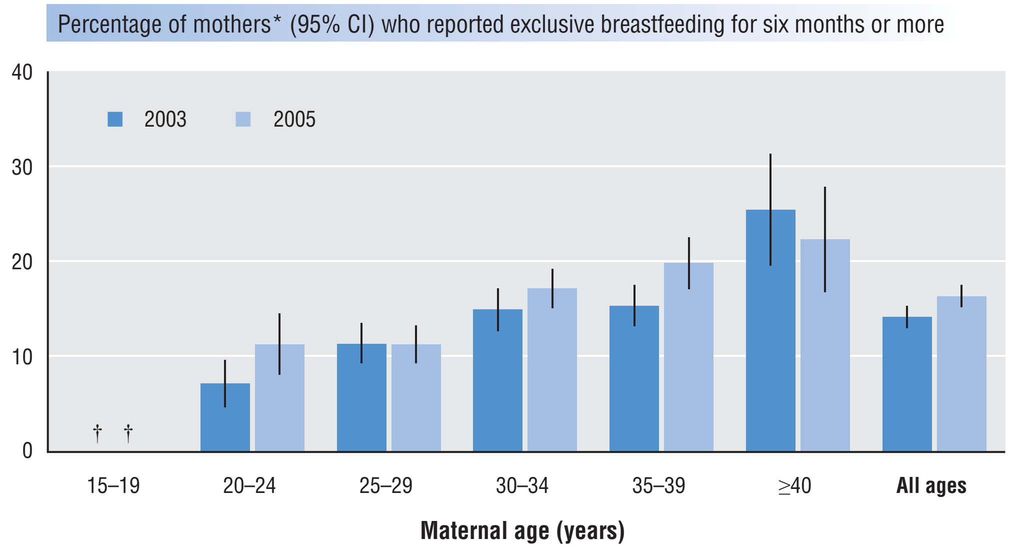
FIGURE 4.2 **Rate of breastfeeding initiation, by province/territory**
Canada, 2000–2001, 2003 and 2005



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

FIGURE 4.3 **Rate of exclusive breastfeeding for six months or more, by maternal age**

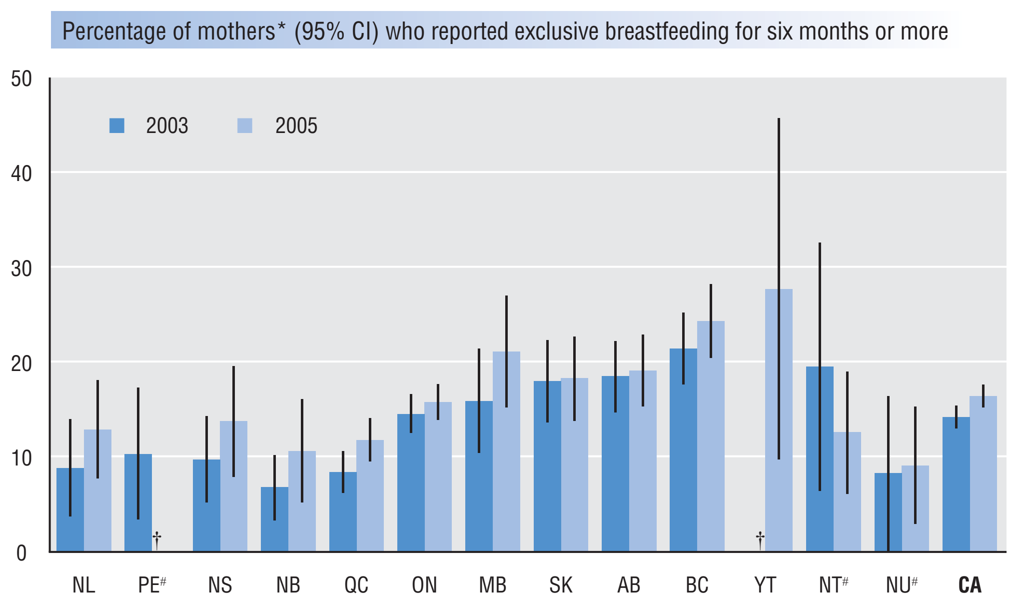
Canada, 2003 and 2005



Source: Statistics Canada. Canadian Community Health Survey, 2003, 2005.
Please note that rates of exclusive breastfeeding cannot be obtained for the period 2000–2001.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," refusal to answer, and women still exclusively breastfeeding.
† Estimates not shown because sample size was less than 10.
CI—confidence interval

FIGURE 4.4 **Rate of exclusive breastfeeding for six months or more, by province/territory**

Canada, 2003 and 2005



Source: Statistics Canada. Canadian Community Health Survey, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," refusal to answer, and women still exclusively breastfeeding.
† Estimates not shown because sample size was less than 10.
# High level of sampling variability for 2003 data from Prince Edward Island, 2003 data for Northwest Territories, and 2003 and 2005 data for Nunavut.
CI—confidence interval

Data Limitations

Information reported from the CCHS was collected from mothers recalling pregnancies up to five years preceding the survey, which may affect the accuracy of the information obtained.

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5. Rate of Periconceptional Folic Acid Supplementation

Joan Lindsay and Jane Evans

The rate of periconceptional folic acid supplementation is defined as the number of women who took folic acid vitamin supplements in the periconceptional period, expressed as a proportion of all pregnant women (in a given place and time).

Folic acid supplementation during the periconceptional period substantially reduces the risk of neural tube defects (NTDs), the most common of which are spina bifida and anencephaly.[1–4] For this reason, it is currently recommended that all women who could become pregnant take a daily multivitamin containing 0.4 mg of folic acid, and eat a healthy, well-balanced diet according to *Canada's Food Guide.*[5] There is evidence that periconceptional supplementation with multivitamins containing folic acid may also reduce the risk of other congenital anomalies, such as cardiovascular defects and limb defects,[6] but further research is needed.

To overcome difficulties in achieving optimal periconceptional folic acid supplementation through public education campaigns alone, food fortification with folic acid was implemented in several countries. In Canada, food fortification became mandatory in November 1998.[7] The fortification of all white flour and enriched pasta and cornmeal sold in Canada has been associated with a decrease in the rates of NTDs of up to 42%.[8,9]

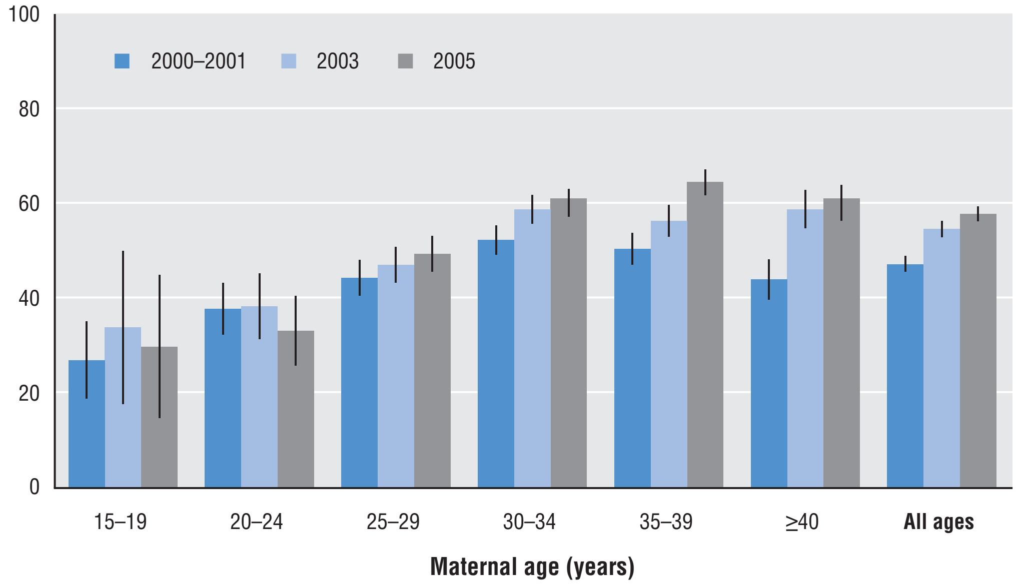
Rates of periconceptional folic acid supplementation were estimated using data from the Canadian Community Health Survey (CCHS). The CCHS question asked only if a woman had taken a vitamin supplement containing folic acid before she found out she was pregnant. However, this is likely to be indicative of folic acid supplementation during the periconceptional period, especially as pregnancy is often recognized at two to four weeks postconception.

Results

- Between 2000–2001 and 2005, rates of periconceptional folic acid supplementation increased. In 2005, 57.8% of women who gave birth in the previous five years reported taking folic acid supplements before they found out that they were pregnant, compared with 47.2% in 2000–2001.
- Younger mothers were less likely to take folic acid supplements: in 2005, 29.8% of mothers under 20 years of age reported taking folic acid supplements compared with 64.5% of mothers aged 35 to 39, and 60.1% of mothers aged 30 to 34, as well as mothers aged 40 and over (Figure 5.1).
- Reported rates of periconceptional folic acid supplementation varied by province/territory. In 2005, rates ranged from lows of 37.5% (95% CI: 22.6–52.3) in Nunavut and 44.0% (95% CI: 30.4–57.50) in the Northwest Territories, to highs of 67.7% (95% CI: 49.1–86.2) and 64.0% (95% CI: 59.6–68.3) in the Yukon and British Columbia, respectively (Figure 5.2).

FIGURE 5.1 **Rate of periconceptional folic acid supplementation, by maternal age**
Canada, 2000–2001, 2003 and 2005

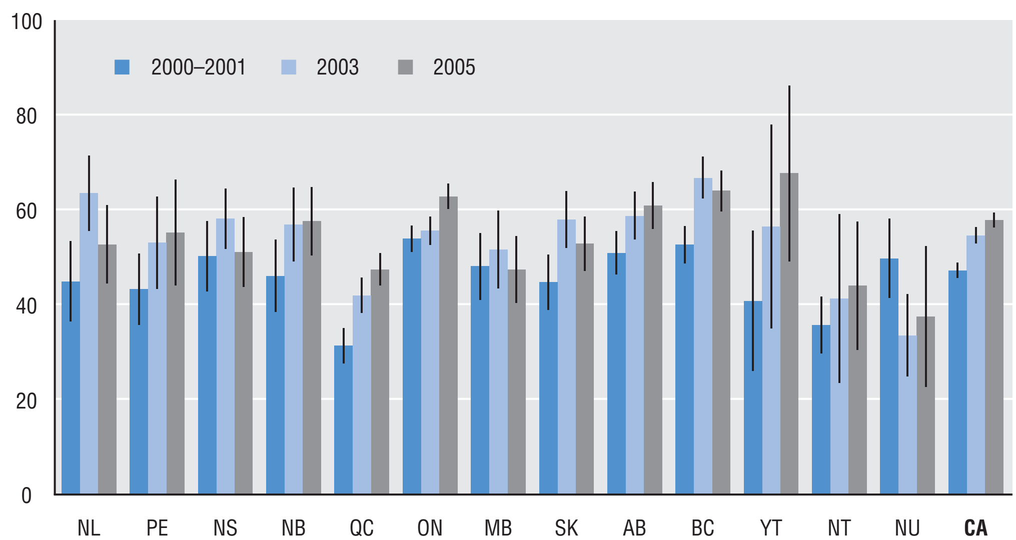
Percentage of mothers* (95% CI) who reported taking folic acid before becoming pregnant



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

FIGURE 5.2 **Rate of periconceptional folic acid supplementation, by province/territory**
Canada, 2000–2001, 2003 and 2005

Percentage of mothers* (95% CI) who reported taking folic acid before becoming pregnant



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

Data Limitations

The question on the CCHS asked only if a woman had taken a vitamin supplement containing folic acid before she found out that she was pregnant. Mothers reported on folic acid supplementation up to five years preceding the survey which may have affected the accuracy of their recall. It is not known if folic acid supplementation was at the recommended daily level.

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6. Rate of Low Maternal Education

Joan Lindsay and Patricia O'Campo

The rate of low maternal education is defined as the number of women with less than a high school education who delivered a live born child, as a proportion of all women who delivered a live born child (in a given place and time).

A low maternal educational level has been consistently related to poor perinatal health outcomes. For example, preterm birth, small-for-gestational-age, stillbirth and infant mortality rates are higher among women with a low level of education.[1–3] The mechanisms by which maternal education ultimately influences perinatal health outcomes are complex, often involving intermediate variables such as maternal age, health care utilization, economic factors such as poverty or low income, social factors, and the prevalence of risk behaviours such as maternal smoking.[4–6]

The rate of low maternal education (and its association with specific health determinants) was estimated using data from the Canadian Community Health Survey (CCHS).

Results

- Between 2000–2001 and 2005, there was a decrease in the proportion of mothers with less than a high school education who gave birth (Figure 6.1). In 2000–2001, 13.4% of mothers who had delivered in the previous five years had not completed high school, compared with 8.4% of mothers in 2005. In 2000–2001, 56.9% of mothers were college or university graduates, compared with 69.6% in 2005.

- Reported rates of mothers with less than a high school education varied by province/territory. In 2005, rates ranged from a low of 5.5% (95% CI: 3.3–7.7) in British Columbia to a high of 45.4% (95% CI: 32.3–58.4) in Nunavut (Figure 6.2).

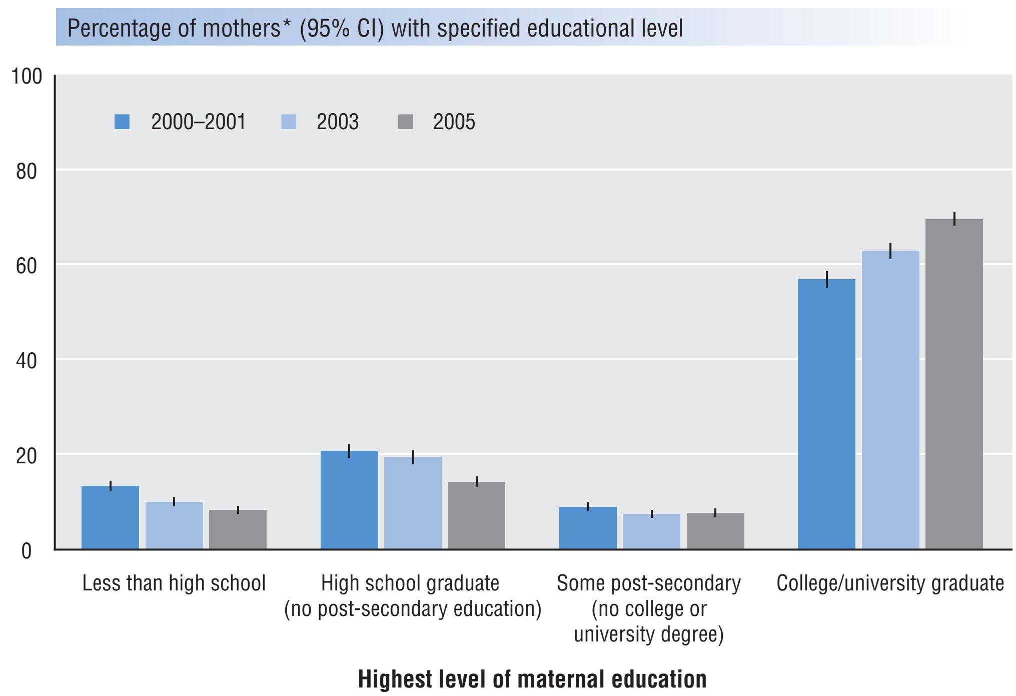
- There were strong associations between maternal education and maternal smoking, exposure to second-hand smoke and alcohol consumption during pregnancy in all three of the CCHS surveys (only 2005 data shown). In 2005, 39.0% (95% CI: 34.0–43.9) of mothers with less than a high school education smoked prenatally compared with 8.9% (95% CI: 8.0–9.9) of those who were college or university graduates (Figure 6.3). The patterns of maternal exposure to second-hand smoke were similar, affecting 38.1% (95% CI: 32.7–43.4) of mothers with less than a high school education and only 9.4% (95% CI: 8.3–10.4) of those who were college or university graduates. The association between maternal education and prenatal exposure to alcohol was in the opposite direction. In 2005, 7.5% (95% CI: 4.8–10.1) of mothers who had less than a high school education reported drinking prenatally, compared with 11.4% (95% CI: 10.2–12.6) of mothers who were college or university graduates.

- Breastfeeding initiation and exclusive breastfeeding rates were also associated with maternal educational levels. In 2005, 71.6% (95% CI: 66.4–76.8) of mothers with less than a high school education initiated breastfeeding, compared with 90.3% (95% CI: 89.1–91.4) of college or university graduates (Figure 6.4). The proportion of women who breastfed exclusively at six months was also lower among mothers with a lower education level.

- Folic acid supplementation generally increased with the level of maternal education. In 2005, 34.3% (95% CI: 28.8–39.7) of mothers with less than a high school education took folic acid supplements before they found out that they were pregnant, compared with 64.4% (95% CI: 62.4–66.4) of college or university graduates (Figure 6.4). These findings are consistent with research that has shown that maternal education is a strong predictor of both awareness and use of folic acid,[7] and with a study relating neural tube defects (against which periconceptional folic acid supplementation is protective) to low maternal education.[8]

FIGURE 6.1 Rate of maternal educational levels

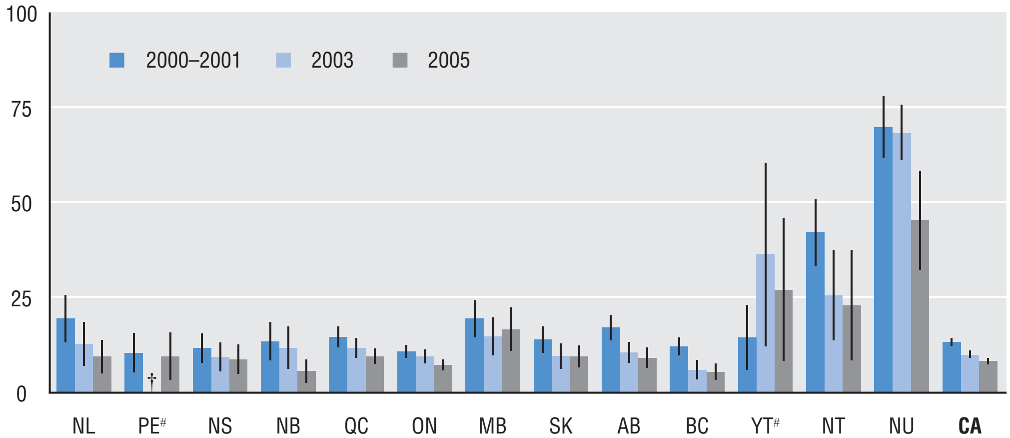
Canada, 2000–2001, 2003 and 2005



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

FIGURE 6.2 **Rate of maternal educational level less than high school, by province/territory**
Canada, 2000–2001, 2003 and 2005

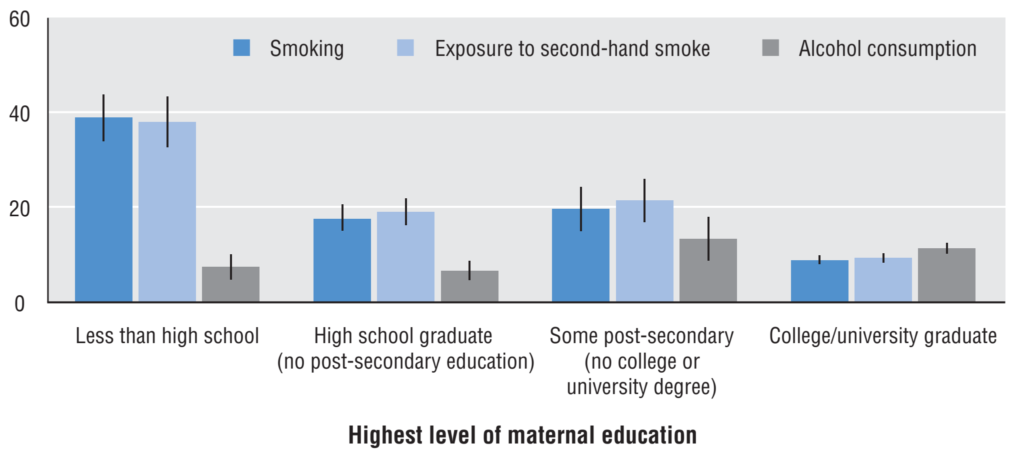
Percentage of mothers* (95% CI) who reported less than high school education



Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of “do not know” and “not stated,” and refusal to answer.
† Estimate not shown because sample size was less than 10.
\# High level of sampling variability for 2005 data from Prince Edward Island, and 2003 and 2005 data from the Yukon.
CI—confidence interval

FIGURE 6.3 **Rate of maternal smoking, exposure to second-hand smoke and alcohol consumption during pregnancy, by maternal educational level**
Canada, 2005

Percentage of mothers* (95% CI) who reported smoking during pregnancy, exposure to second-hand smoke and alcohol consumption

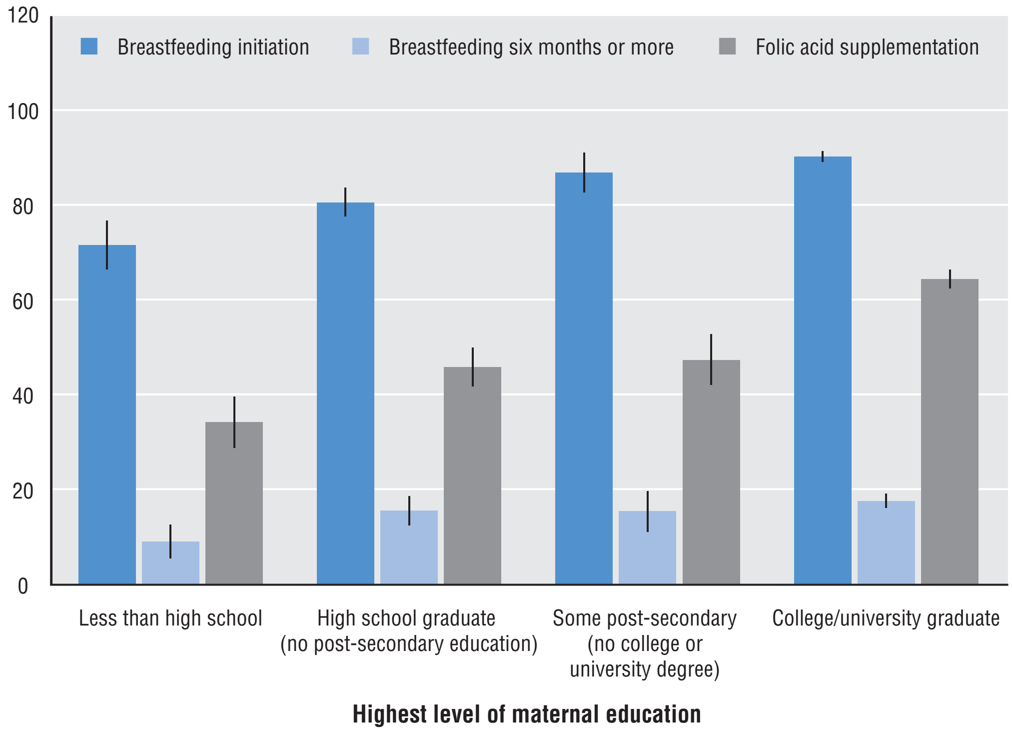


Source: Statistics Canada. Canadian Community Health Survey, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of “do not know” and “not stated,” and refusal to answer.
CI—confidence interval

FIGURE 6.4 **Rate of breastfeeding and periconceptional folic acid supplementation, by maternal educational level**

Canada, 2005

Percentage of mothers* (95% CI) who reported breastfeeding initiation, breastfeeding six months or more, and folic acid supplementation



Source: Statistics Canada. Canadian Community Health Survey, 2005.

* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.

CI—confidence interval

Data Limitations

The knowledge that smoking and alcohol consumption during pregnancy can adversely affect the outcome of the pregnancy and the health of the child may have led mothers to under-report their smoking and alcohol consumption behaviour during pregnancy.[9,10] Mothers reported on their educational level and various behaviours for pregnancies up to five years preceding the survey, which may have affected the accuracy of their recall. The CCHS asked only if a woman had taken a vitamin supplement containing folic acid before she found out that she was pregnant. It is not known if folic acid supplementation was at the recommended daily level. With regard to second-hand smoke, the CCHS asked only if anyone regularly smoked in the mother's presence during or about six months after her pregnancy.

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7. Rate of Live Births to Teenage Mothers

Ling Huang and Cathy Kimak

The age-specific rate of live births to teenage mothers is defined as the number of live births to mothers aged 10–14, 15–17 or 18–19 years per 1,000 females in the same age category (in a given place and time). A related indicator is the proportion of live births to teenage mothers, which refers to the number of live births to mothers aged 10–14, 15–17 or 18–19 years, expressed as a percentage of all live births (in a given place and time).

Although rates of live births to teenage mothers have been decreasing since the 1990s,[1,2] teenage motherhood is still an important public health issue due to its association with various adverse maternal and infant health outcomes. Health problems noted in teenage pregnancies include poor maternal weight gain and anemia.[3,4] Teenage mothers have a two-fold higher risk of having a low birth weight baby or a preterm birth compared with adult mothers.[3,4] The neonatal and maternal mortality rates for teenage mothers are almost three-fold and two-fold higher, respectively, although these risks may be greatest for the youngest teenagers.[3] Teenage mothers are more likely to experience curtailment or premature termination of their education.[2,3] Many factors contribute to the poor outcomes associated with teenage childbearing. These include a disadvantaged social environment,[5] biological immaturity,[6] increased likelihood of social deprivation, inadequate antenatal care, physical and sexual abuse, drug use and smoking.[4,7]

Rates of live births to teenage mothers should be differentiated from teenage pregnancy rates which would also include spontaneous and induced abortions, ectopic pregnancies and stillbirths.

Rates of live births to teenage mothers were calculated using vital statistics data.

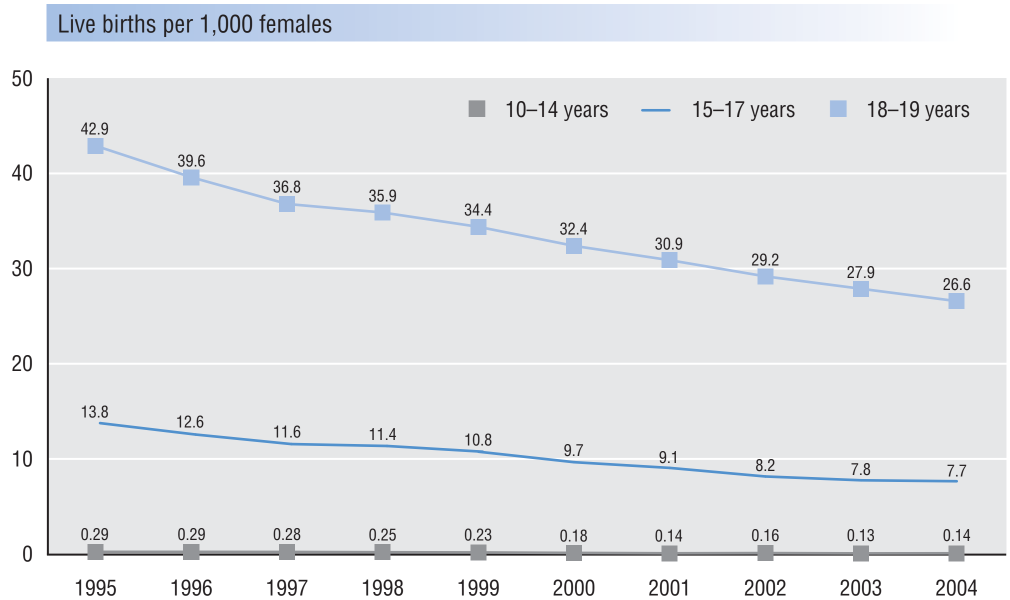
Results

- The live birth rate decreased steadily in all of the teenage groups in the time period 1995–2004. Among teenage mothers aged 10–14, 15–17 and 18–19 years, age-specific birth rates decreased from 0.29, 13.8 and 42.9 per 1,000 females, respectively, in 1995 to 0.14, 7.7 and 26.6 per 1,000 females, respectively, in 2004. The younger age groups experienced larger declines. Among those 10 to 14 years of age, the birth rate decreased by over 50% (Figure 7.1). The proportion of live births to teenage mothers also decreased in all three age groups between 1995 and 2004. The overall proportion of live births to teenagers aged 10 to 19 years declined from 6.8% in 1995 to 4.8% in 2004 (Figure 7.2).

- In 2004, there were significant geographic variations in live birth rates to teenagers. Among teens aged 10 to 17 years, provincial/territorial live birth rates varied from 1.5 (95% CI: 1.4–1.6) per 1,000 females in Quebec to 34.6 (95% CI: 27.8–42.5) per 1,000 females in Nunavut. Among those aged 18 to 19 years, live birth rates ranged from 17.6 (95% CI: 16.5–18.7) per 1,000 females in British Columbia to 169.9 (95% CI: 139.7–203.7) per 1,000 females in Nunavut (Figure 7.3). Geographic variations were also observed in the proportion of live births to teenage mothers. In 2004, Nunavut had the overall highest proportion of live births to teenage mothers at 24.4% (95% CI: 21.3–27.6), while Quebec had the lowest at 3.1% (95% CI: 3.1–3.3) (Figure 7.4).

FIGURE 7.1 Age-specific live birth rates, females 10–14, 15–17 and 18–19 years

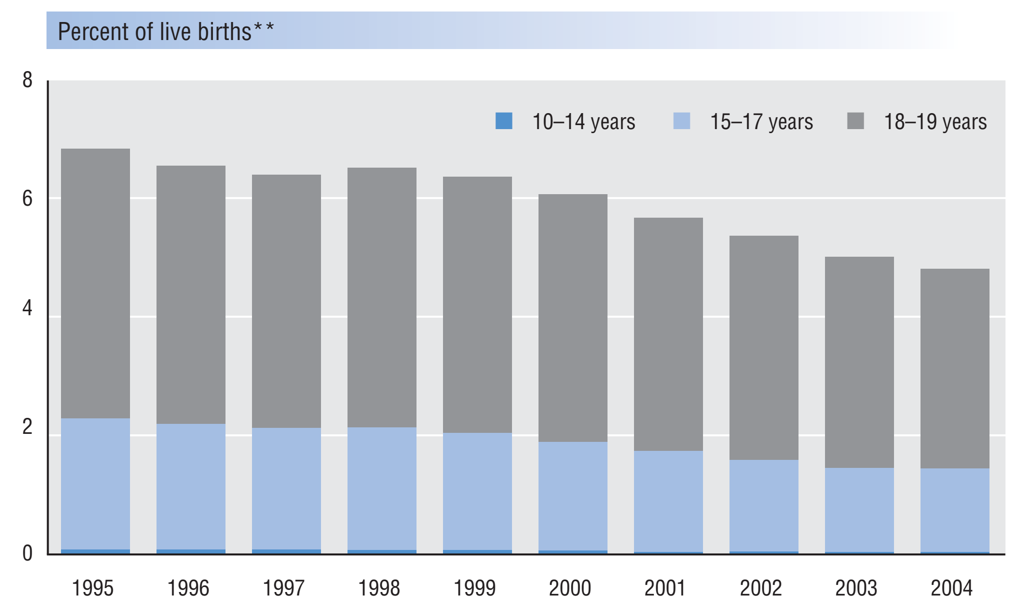
Canada (excluding Ontario), 1995–2004*



Sources: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Statistics Canada. *Annual Demographics Statistics,* 2005. Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

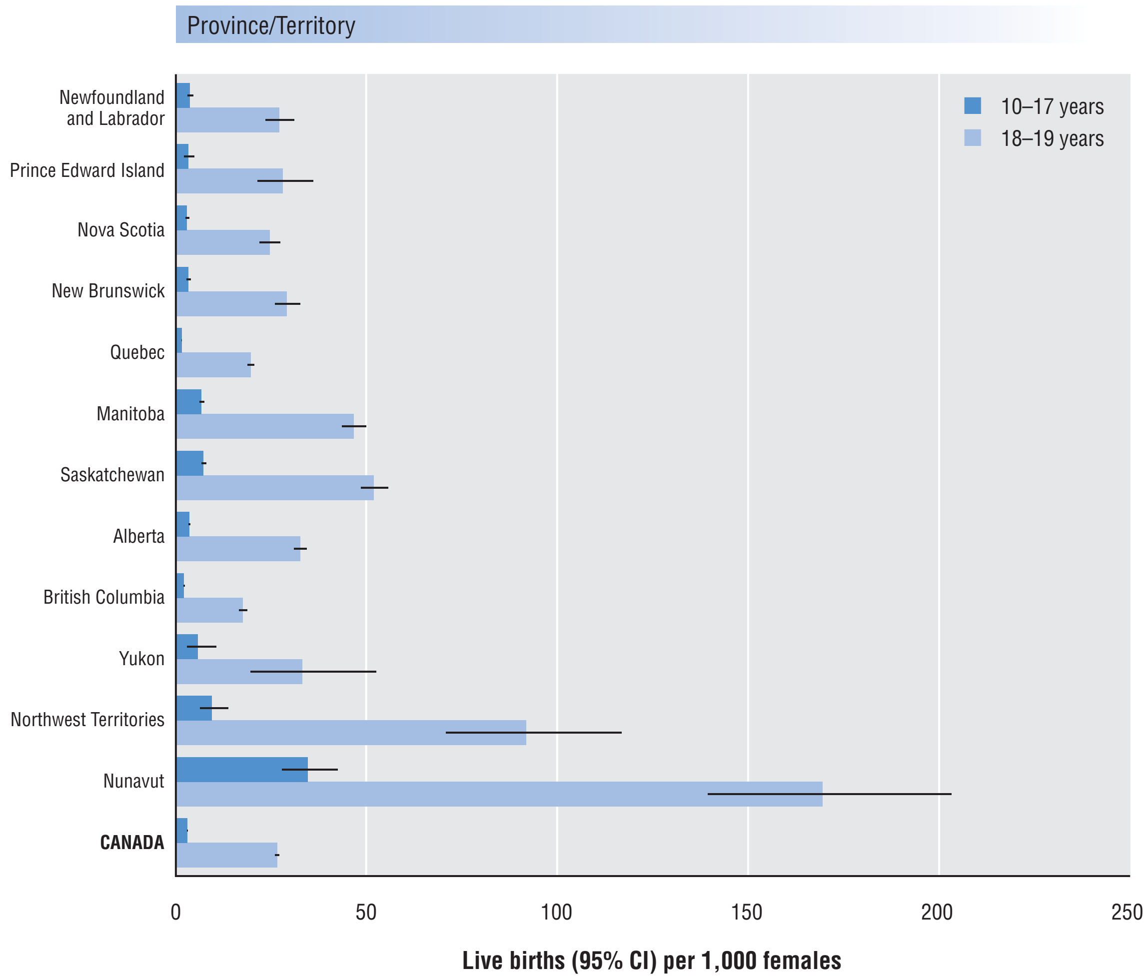
FIGURE 7.2 Proportion (%) of live births to teenage mothers (10–19 years)

Canada (excluding Ontario), 1995–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Excludes live births to mothers ≥50 years and those with unknown maternal age.

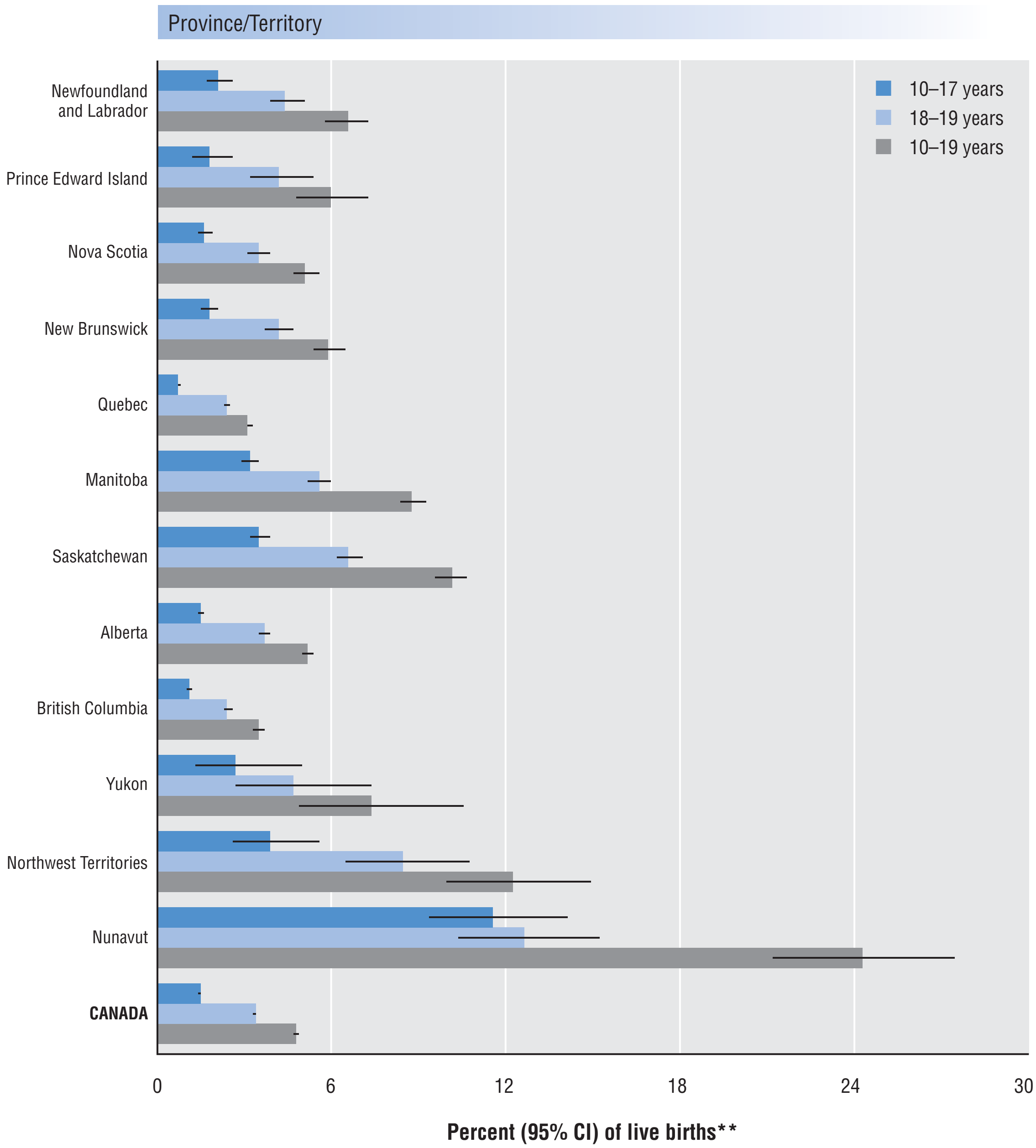
FIGURE 7.3 **Age-specific live birth rates, females 10–19 years, by province/territory**
Canada (excluding Ontario), 2004*



Sources: Statistics Canada. Canadian Vital Statistics System, 2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
CI—confidence interval

FIGURE 7.4 **Proportion (%) of live births to teenage mothers (10–19 years), by province/territory**

Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H*.
** Excludes live births to mothers ≥50 years and those with unknown maternal age.
CI—confidence interval

Data Limitations

Data on maternal age were obtained from birth registrations. In a small fraction of records, maternal age was not stated. Late registered births, stillbirths, ectopic pregnancies and aborted pregnancies were not included in the above statistics. Therefore, these rates do not reflect the total number of pregnancies to teenagers. Small discrepancies in the number of females in the population between the current and previous *Perinatal Health Reports* occurred because of differing population estimates used. Ontario data have been excluded because of data quality concerns; they are presented in *Appendix H.*

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8. Rate of Live Births to Older Mothers

Ling Huang, Cathie Royle and Madeline Boscoe

The rate of live births to older mothers is defined as the number of live births to women in each of three age groups: 35–39, 40–44 or 45–49 years per 1,000 females in the same age category (in a given place and time). A related indicator is the proportion of live births to older mothers, which refers to the number of live births to mothers in these three age groups expressed as a percentage of all live births (in a given place and time).

Over the past several decades, an increasing number of women in industrialized countries have delayed childbearing to their late 30s or even later for economic, social and other reasons. For example, in Canada, the proportion of live births to women aged 35 to 39 and 40 to 44 years increased from 7.6% and 0.9%, respectively, in 1991 to 12.4% and 2.1% in 2000.[1] A similar change has been observed in other industrialized countries such as the United States,[2] the United Kingdom[3] and Australia.[4] This huge change in the pattern of childbearing has become an important public health issue because of its potential to lead to increases in maternal morbidity, obstetrical interventions and adverse pregnancy outcomes.

Women who conceive at older ages face greater risks during pregnancy and in labour. Women with advanced maternal age are more likely to experience chronic illnesses, such as hypertension and diabetes, to develop placental problems in pregnancy, and to have an increase in fetal aneuploidy compared to younger mothers.[2,5,6] Older women are more likely to experience multiple pregnancy both naturally and because of higher use of assisted reproductive technologies (due to increased infertility).[7] Other complications that may be associated with delayed childbearing include prolonged labour, cesarean delivery, low birth weight, small for gestational age, preterm birth, stillbirth and perinatal mortality/serious neonatal morbidity.[5,8]

At the same time, older women having their first child often have a higher level of education and socioeconomic status.[9] They seek prenatal care earlier and receive good quality obstetric care.[9] Since higher socioeconomic status is associated with a lower prevalence of risk factors such as pre-pregnancy obesity and smoking during pregnancy,[10] older women today, especially those who have no chronic conditions, generally have healthy pregnancies and healthy babies.[11]

Rates of live births to older mothers were calculated using vital statistics data. Data on live births to mothers aged 50 and older were not available due to small numbers.

Results

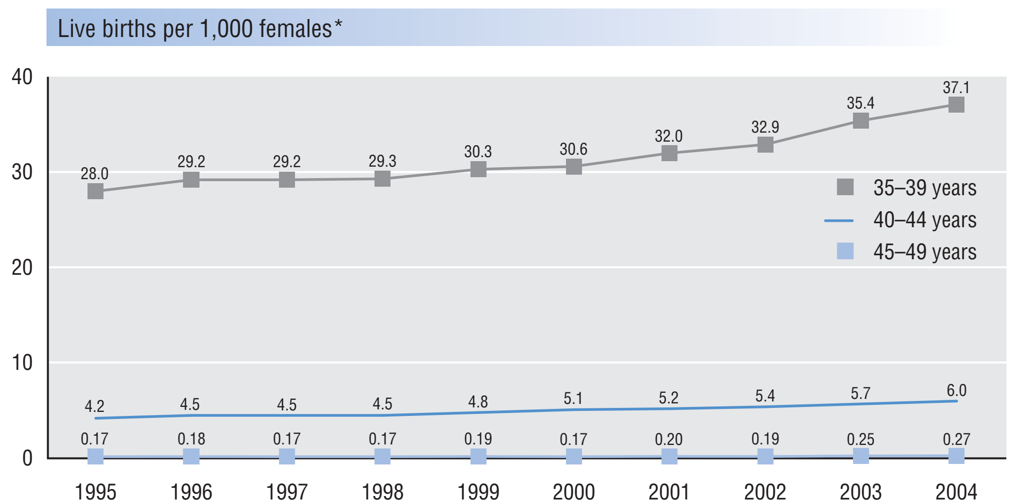
- Between 1995 and 2004, the live birth rate among older mothers increased substantially. The live birth rate for women aged 35 to 39 years old increased by 32.5%, from 28.0 per 1,000 females in 1995 to 37.1 per 1,000 females in 2004. Even larger increases were observed in other older age groups. The rates increased by 42.9% from 4.2 to 6.0 per 1,000 females for women 40 to 44 years of age, and by 58.8% from 0.17 to 0.27 per 1,000 females among those aged 45 to 49 years (Figure 8.1). The proportion of live births to older mothers 35 to 39 years of age has also been steadily increasing, from 9.8% in 1995 to 12.9% in 2004. Live births to women 40 to 49 years of age increased from 1.4% to 2.6% (Figure 8.2).

- In 2004, the rate of live births to older mothers aged 35 to 39 years varied by province or territory, ranging from a low of 23.4 (95% CI: 21.3–25.5) per 1,000 females in Newfoundland and Labrador, to a high of 50.4 (95% CI: 37.7–65.7) per 1,000 females in Nunavut. In the 40 to 49 age group, the lowest rate was observed in New Brunswick at 1.7 (95% CI: 1.4–2.0) per 1,000 females. British Columbia and the Northwest Territories had the highest rate, at 4.5 per 1,000 females (95% CI: 4.3–4.7

and 2.5–7.4, respectively) (Figure 8.3). In 2004, British Columbia had the highest proportion of live births to mothers 35 to 49 years of age at 21.5% (95% CI: 21.1–21.9), and Nunavut had the lowest at 7.5% (95% CI: 5.7–9.6) (Figure 8.4). The relative status of Nunavut in Canada with respect to these indices (highest live birth rate among older women and the lowest proportion of live births to older women) reflects the high fecundity rates in all age groups in this territory.

FIGURE 8.1 Age-specific live birth rates, females 35–49 years*

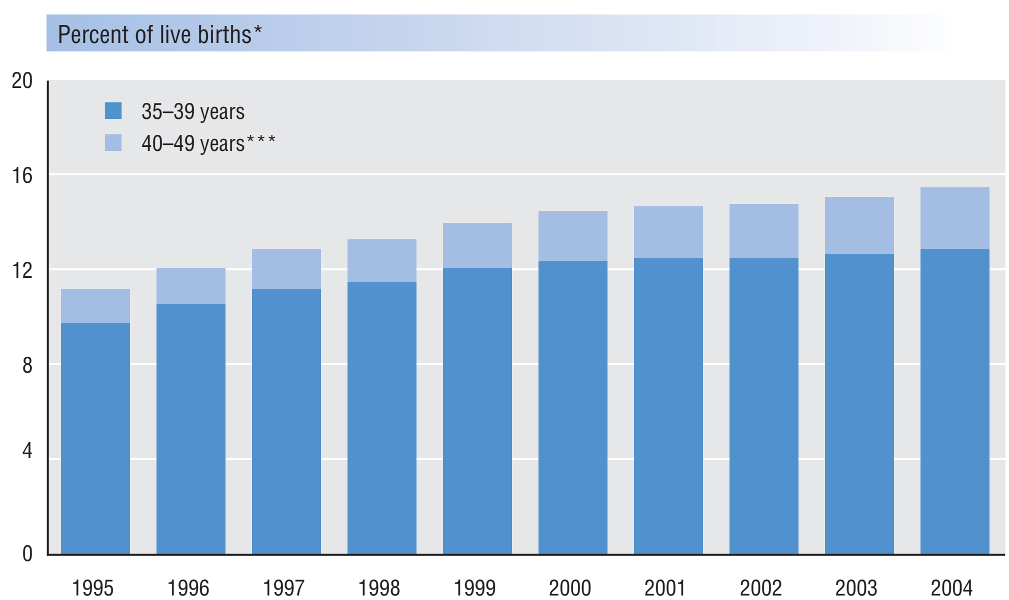
*Canada (excluding Ontario),*** *1995–2004*



Sources: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.
* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

FIGURE 8.2 Proportion (%) of live births to older mothers 35–49 years*

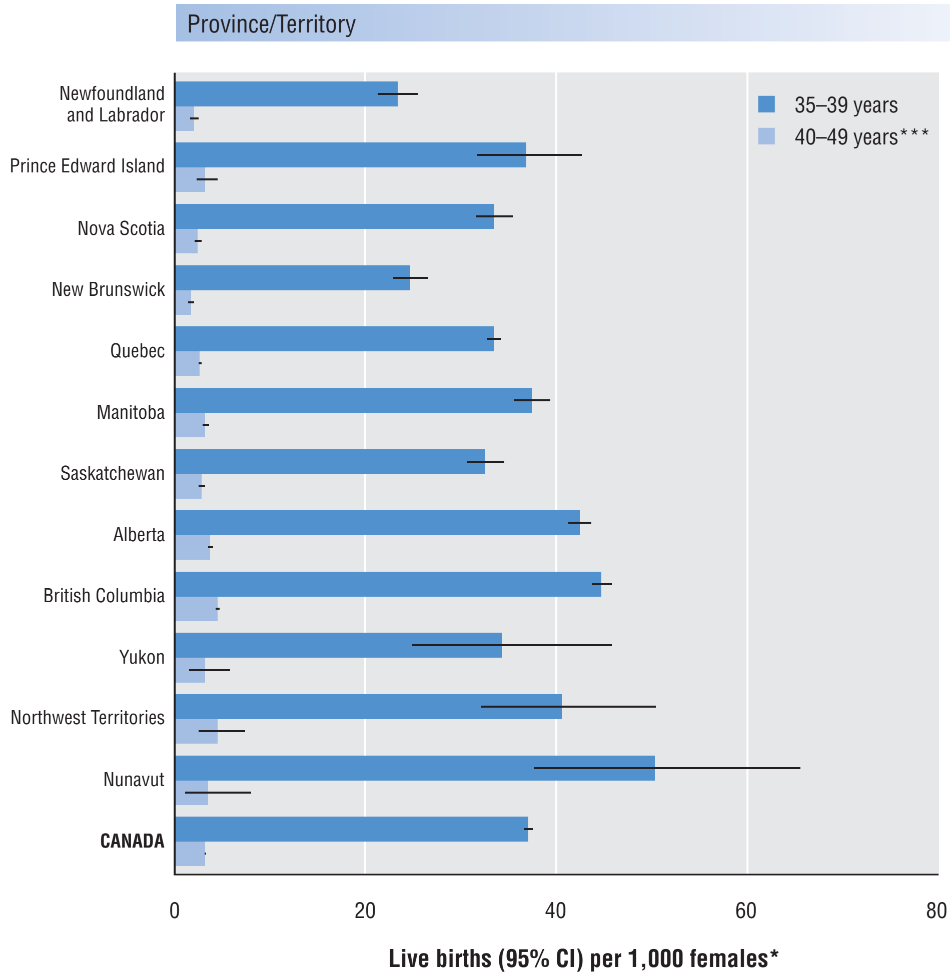
*Canada (excluding Ontario),*** *1995–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
*** Age groups 40–44 and 45–49 were combined because of small numbers.

FIGURE 8.3 Age-specific live birth rate, females 35–49 years,* by province/territory

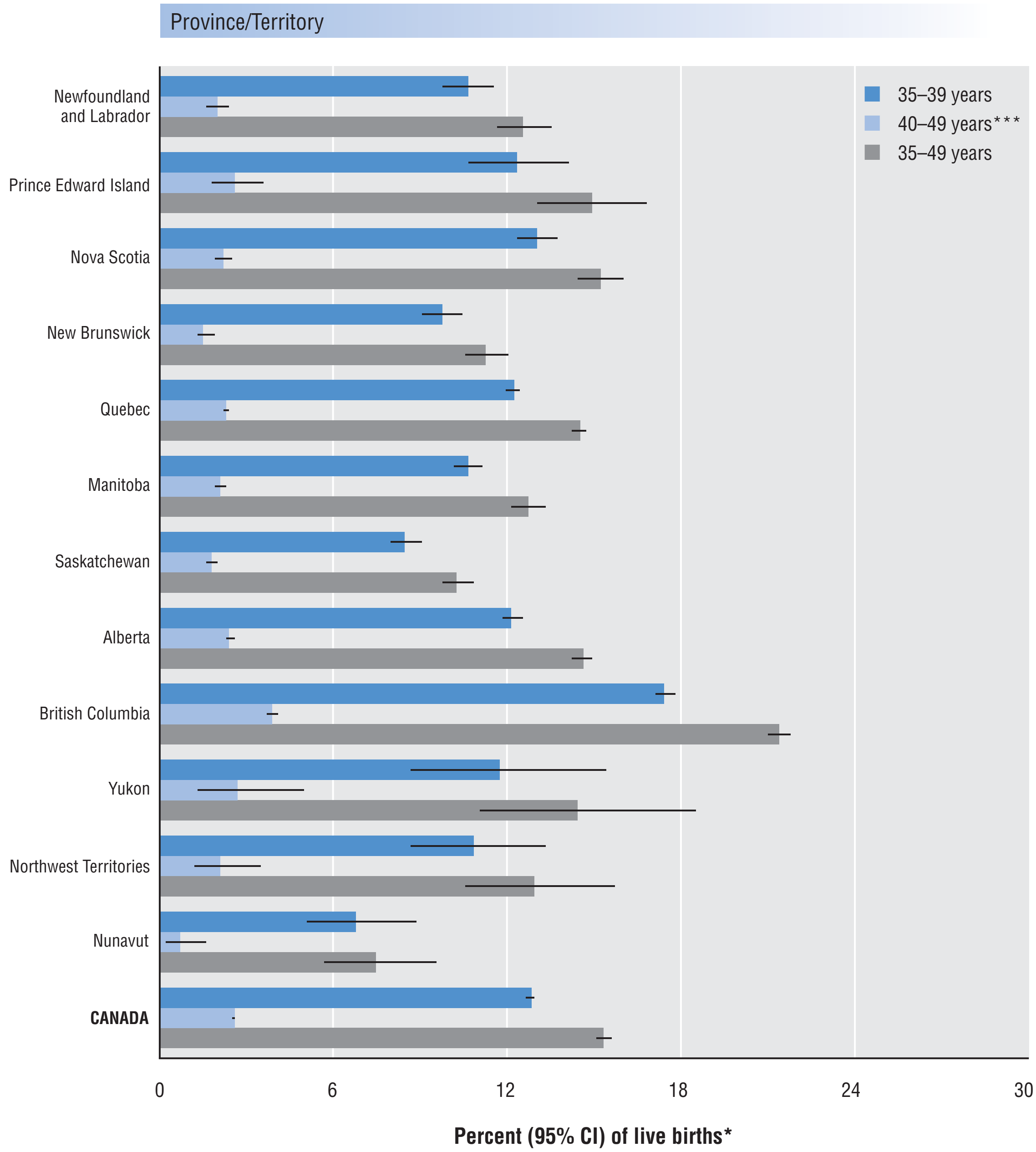
*Canada (excluding Ontario),** 2004*



Sources: Statistics Canada. Canadian Vital Statistics System, 2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.

* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
*** Age groups 40–44 and 45–49 were combined because of small numbers.
CI—confidence interval

FIGURE 8.4 **Proportion (%) of live births to older mothers 35–49 years,* by province/territory**
*Canada (excluding Ontario),** 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
*** Age groups 40–44 and 45–49 were combined because of small numbers.
CI—confidence interval

Data Limitations

Data on maternal age were obtained from birth registrations. Maternal age was not stated in a small fraction of records. Late registered births, stillbirths, ectopic pregnancies and pregnancies that ended in abortion were not included in the above statistics. Therefore, these rates are not necessarily representative of the rate of pregnancies to older mothers. Ontario data have been excluded from the figures because of data quality concerns; they are presented in *Appendix H*.

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Health Services

9. Rate of Labour Induction

Shiliang Liu, Robert Liston and William Fraser

The labour induction rate is defined as the number of delivering women whose labour is induced by medical or surgical means (before the onset of labour) expressed as a proportion of all women giving birth (in a given place and time).

Induction of labour is widely practised in order to prevent some adverse obstetric conditions and to avoid sequelae of these conditions in women and their infants. Labour can be induced medically using a variety of pharmacological techniques, including oxytocin and prostaglandins.[1] Labour can also be induced surgically in hospitalized women by the artificial rupture of membranes, referred to as amniotomy.[1] Women with pre-existing diabetes, chronic hypertension, lung and renal diseases, or obstetric complications such as eclampsia, pregnancy-induced hypertension and premature rupture of membranes are more likely to have induction of labour than women who do not have these conditions.[2] Although induction of labour is generally considered to be safe, problems that have been associated with induction include prolonged labour, chorioamnionitis, nuchal cord (i.e., the umbilical cord is wrapped around the fetus' neck), cesarean delivery, fetal death, neonatal intensive care unit admission, early postpartum hemorrhage, uterine rupture (particularly for women who have had a previous cesarean delivery) and maternal cardiovascular complications.[1,3–5]

Currently, around 20% of all deliveries are preceded by labour induction in many industrialized countries including Canada.[5,6] The recent increase in induction rate, particularly among preterm births, marks a shift in the obstetric management of pregnancy.[2] However, definitions and the relative importance of the various indications for labour induction vary among obstetricians, obstetric units and countries. For example, postterm, postdates or prolonged pregnancy is probably the most common indication in many obstetric units but definitions may include any gestation beyond 40, 41 or 42 completed weeks of gestation.[4,5] Some obstetricians believe that cervical state should determine the timing of delivery, particularly when "postdates pregnancy" is the indication for induction.

Labour induction rates were calculated using national hospitalization data.

Results

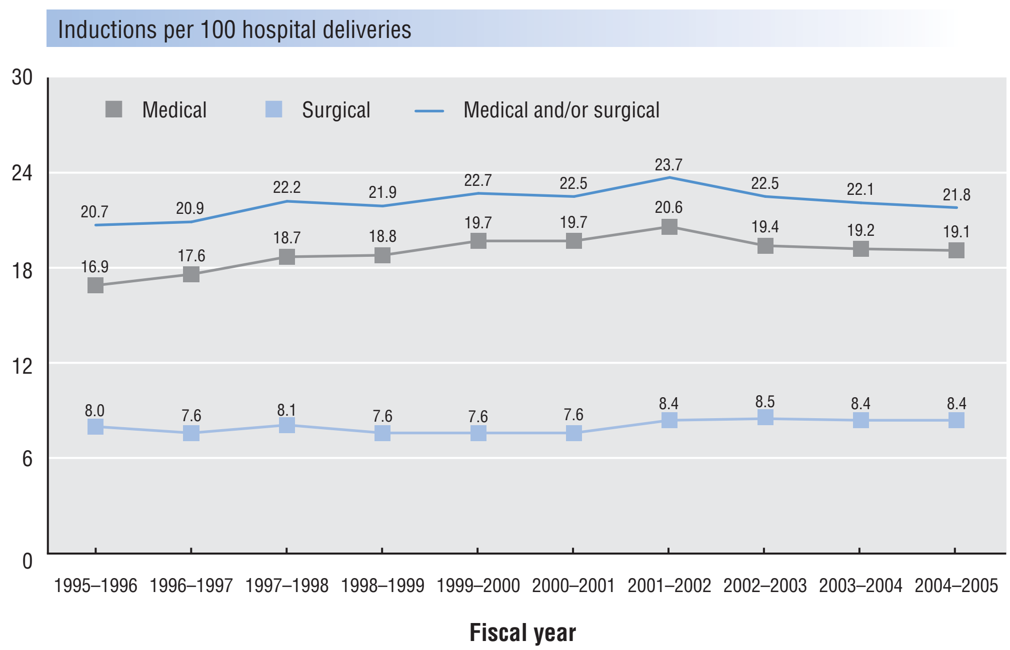
- The rate of medical induction of labour in Canada increased steadily from 16.9 per 100 hospital deliveries in 1995–1996 to 20.6 per 100 hospital deliveries in 2001–2002, and then decreased to 19.1 per 100 hospital deliveries in 2004–2005 (Figure 9.1). These results are similar with those reported in the United States and several other industrialized countries.[5]

- The rate of surgical induction of labour was stable, ranging between 7.6 per 100 hospital deliveries and 8.5 per 100 hospital deliveries in the time period 1995–1996 to 2004–2005. The rate for 2004–2005 was 8.4 per 100 hospital deliveries (Figure 9.1).

- The total induction rate (medical and/or surgical induction) for Canada varied slightly over the time period 1995–1996 to 2004–2005, ranging from a low of 20.7 to a high of 23.7 per 100 hospital deliveries. In approximately 3%–6% of women, both methods were used (Figure 9.1).
- Rates of medical induction of labour varied substantially among Canadian provinces and territories, from a low of 11.9 (95% CI: 9.6–14.4) per 100 hospital deliveries in Nunavut, to a high of 23.5 (95% CI: 22.6–24.5) per 100 hospital deliveries in Nova Scotia. There was an even wider variation in rates of surgical induction, from a low of 3.6 (95% CI: 3.4–3.8) per 100 hospital deliveries in British Columbia to a high of 15.5 (95% CI: 13.6–17.5) per 100 hospital deliveries in Prince Edward Island (Figure 9.2). Variations in rates may be due to differences in practice preference for specific induction methods and/or variations in data coding but the numbers in the smaller provinces and territories are too small for more detailed interpretation.

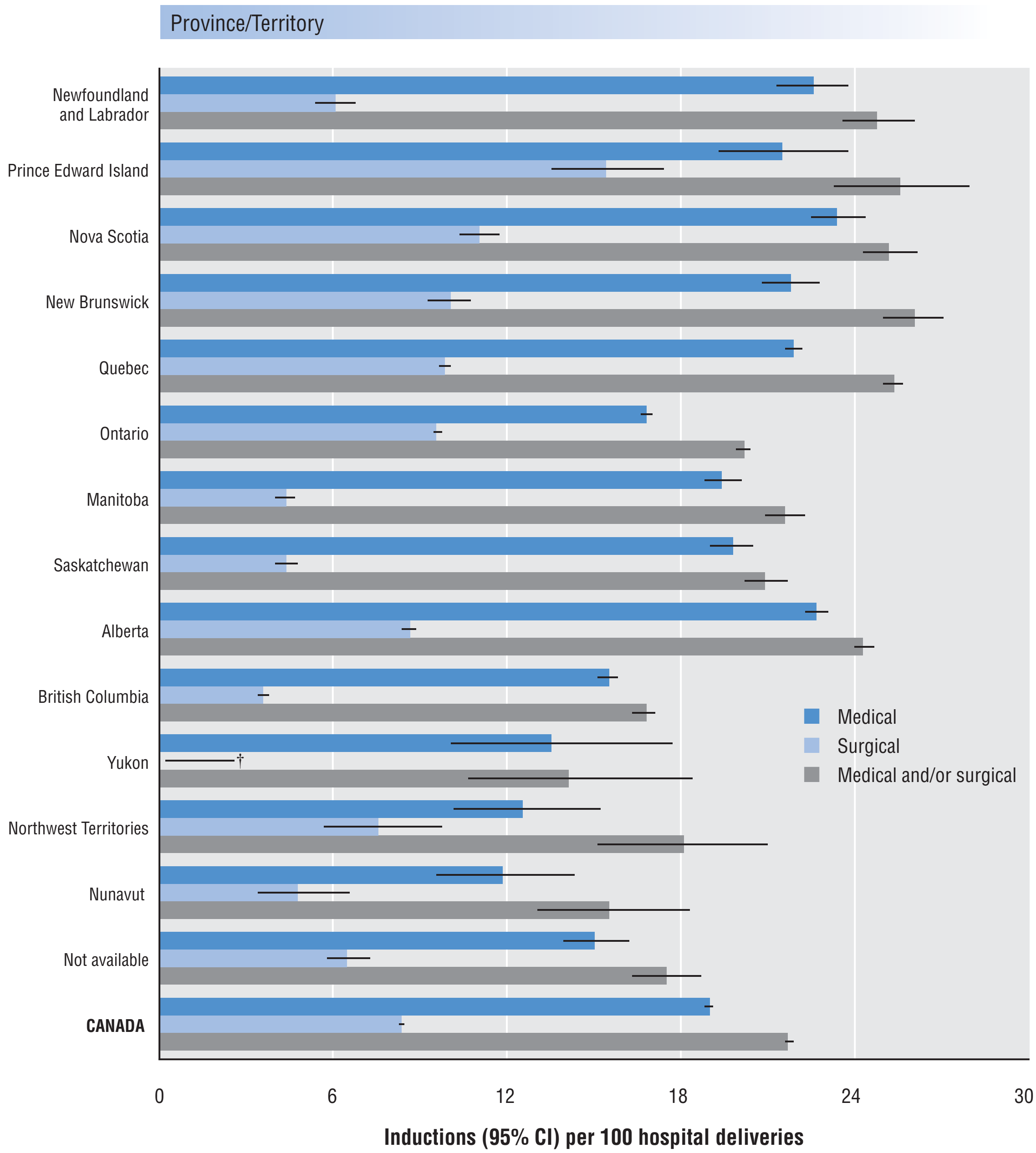
FIGURE 9.1 Rate of labour induction

Canada, 1995–1996 to 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

FIGURE 9.2 **Rate of labour induction, by province/territory**
Canada, 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
† Rate suppressed due to small numbers.
CI—confidence interval

Data Limitations

Coding for surgical induction of labour may be inconsistent across provinces and territories. Labour induction rates may erroneously include cases where the labour was not induced but where existing labour was augmented (augmentation is defined as the use of medical or surgical means to enhance labour that has already begun spontaneously). Such errors may explain some of the differences in induction rates among provinces/territories.

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10. Rate of Cesarean Delivery

Shiliang Liu, Robert Liston and Lily Lee

The cesarean delivery rate is defined as the number of cesarean deliveries expressed as a percentage of the total number of deliveries (in a given place and time). The primary cesarean delivery rate is the number of cesarean deliveries to women who have not had a previous cesarean delivery, expressed as a percentage of all deliveries to women who have not had a cesarean delivery previously. This rate includes primiparas (i.e., women giving birth for the first time) and multiparas (i.e., women who have given birth one or more times previously). The repeat cesarean delivery rate is the number of cesarean deliveries in women who have had a cesarean delivery previously, expressed as a percentage of all deliveries to women who have had a previous cesarean delivery.

Older maternal age is a risk factor for cesarean delivery. As well, primiparous women are more likely to undergo cesarean delivery than women having their second or third child who have not had a previous cesarean delivery.[1,2] Previous cesarean delivery, dystocia, breech presentation and fetal distress are the most frequent indications for cesarean delivery.[1–3] Primary cesarean delivery without medical indication (e.g., cesarean delivery on maternal request) appears to be on the rise, although inconsistent use of terminology makes it difficult to obtain accurate data on frequency.[4,5] A recent Canadian report showed that risk of severe maternal morbidity, such as hysterectomy, major infection and venous thromboembolism, is significantly higher in women having a planned low-risk cesarean delivery at term compared with women having a planned vaginal delivery (though the absolute risk was small in both groups).[4]

The proportion of women who delivered by cesarean section increased from approximately 5% to nearly 20% in Canada and the United States between the late 1960s and the early 1980s.[1,6] A recent persistent increase began in the early 1990s, and has continued in Canada and many other industrialized countries.[2,7] Explanations for the recent increased cesarean delivery rates include changes in maternal characteristics (increases in older maternal age and pre-pregnancy body mass index [BMI] and reductions in parity), obstetric practice (increasing use of electronic fetal monitoring, cesarean delivery for breech presentation, epidural anesthesia and reduced use of midpelvic forceps) and social factors (malpractice litigation and socioeconomic factors).[8,9]

Cesarean delivery rates were calculated using national hospitalization data.

Results

- The cesarean delivery rate increased from 17.6 per 100 hospital deliveries in 1995–1996 to 25.6 per 100 hospital deliveries in 2004–2005. Much of the increase in the overall cesarean delivery rates (i.e., absolute increase 8.0%) during this period was due to an increase in primary cesarean delivery (absolute increase 6.0%, Figure 10.1).
- The repeat cesarean delivery rate increased from 64.7% in 1995–1996 to 80.0% in 2004–2005 (Figure 10.1). The vaginal birth after previous cesarean (VBAC) rate (complement of repeat cesarean delivery rate) thus decreased over the same period.

- In 2004–2005, the three main reasons for cesarean deliveries (including primary and repeat cesareans) were dystocia (9.9 per 100 hospital deliveries), "elective repeat/other" (6.7 per 100 hospital deliveries) and breech presentation (3.6 per 100 hospital deliveries). In this report, "other" represents cesarean deliveries where no obstetrical/medical indication was coded in the Hospital Morbidity Database. Primary cesarean deliveries due to dystocia increased significantly from 6.7 per 100 women with no previous cesarean in 1995–1996 to 10.3 per 100 in 2004–2005 (Figure 10.2).
- From 1995–1996 to 2004–2005, repeat cesarean deliveries for dystocia declined by 8.7 per 100 women with previous cesarean delivery, while repeat cesarean deliveries for "elective repeat/other" increased by 18.2% (Figure 10.2).
- Overall, cesarean delivery rates varied substantially among Canadian provinces and territories, from a low of 9.9 (95% CI: 7.8–12.2) per 100 hospital deliveries in Nunavut to a high of 33.4 (95% CI: 30.9–36.0) per 100 hospital deliveries in Prince Edward Island in 2004–2005 (Figure 10.3). These regional variations may reflect geographic differences in obstetric practice as well as maternal characteristics.

FIGURE 10.1 Rate of cesarean delivery and rates of primary cesarean delivery and repeat cesarean delivery

Canada, 1995–1996 to 2004–2005

Fiscal year	Cesarean deliveries per 100 hospital deliveries	Primary cesarean deliveries per 100 hospital deliveries without a previous cesarean delivery	Repeat cesarean delivery rate (%)
1995–1996	17.6	12.6	64.7
1996–1997	18.2	13.1	64.8
1997–1998	18.5	13.5	64.8
1998–1999	19.0	13.8	65.3
1999–2000	19.7	14.5	66.9
2000–2001	21.1	15.6	70.0
2001–2002	22.5	16.5	73.3
2002–2003	23.7	17.5	76.1
2003–2004	24.8	18.2	78.0
2004–2005	25.6	18.6	80.0

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

FIGURE 10.2 Rate of cesarean delivery, by indication
Canada, 1995–1996 and 2004–2005

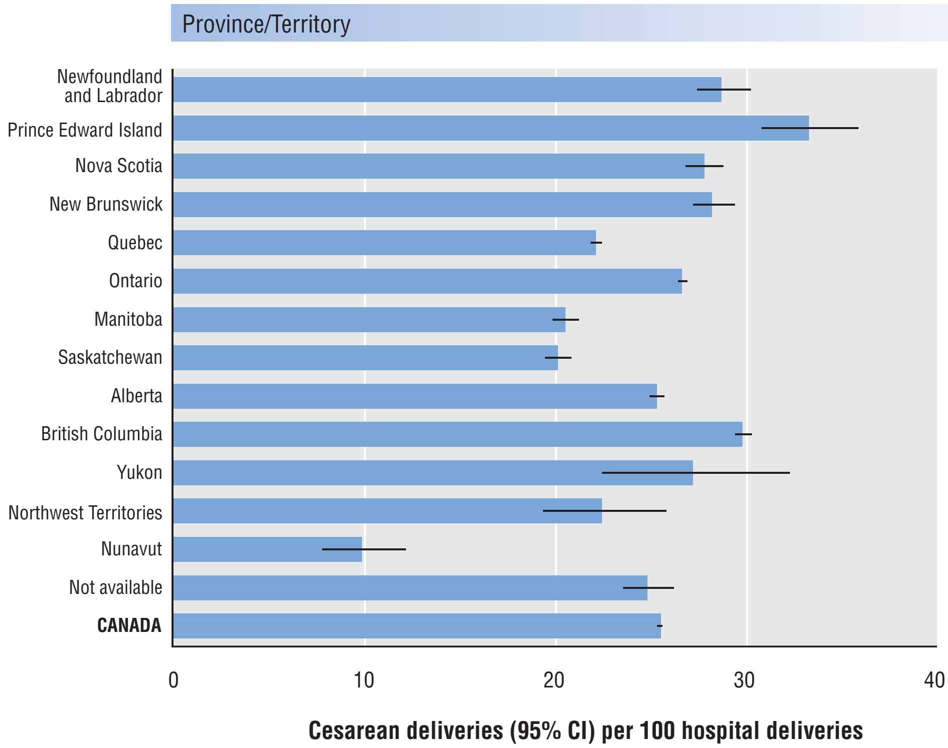
Indication*	1995–1996	2004–2005	2004–2005 vs. 1995–1996
	Rate of cesarean delivery (%)	Rate of cesarean delivery (%)	Absolute change (%)
All cesareans			
Breech presentation	3.0	3.6	+0.6
Dystocia	7.5	9.9	+2.4
Fetal distress	1.7	2.5	+0.8
Miscellaneous	1.7	2.9	+1.2
Elective repeat/Other	3.7	6.7	+3.0
TOTAL	**17.6**	**25.6**	**+8.0**
Primary cesareans			
Breech presentation	3.0	3.5	+0.5
Dystocia	6.7	10.3	+3.6
Fetal distress	1.6	2.6	+1.0
Miscellaneous	1.0	1.5	+0.5
Other	0.3	0.7	+0.4
TOTAL	**12.6**	**18.6**	**+6.0**
Repeat cesareans			
Breech presentation	4.1	4.1	0.0
Dystocia	14.7	6.0	-8.7
Fetal distress	2.2	2.1	-0.1
Miscellaneous	8.5	14.4	+5.9
Elective repeat/Other	35.2	53.4	+18.2
TOTAL	**64.7**	**80.0**	**+15.3**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 and 2004–2005.

* Note:

1) Indications were defined based on an earlier publication by Henry et al.[10]
2) "Miscellaneous" includes multiple gestations, antepartum hemorrhage, placental abruption, placenta previa, intrauterine growth retardation, macrosomia, genital herpes simplex virus, diabetes mellitus, abnormal glucose tolerance, hypertensive disorders, oligohydramnios, chorioamnionitis, fetal central nervous system malformation affecting management, other congenital or acquired anomaly, rupture of uterus, congenital or acquired abnormality of vagina, scarred uterus, Rhesus (anti-D) isoimmunization and cerebral hemorrhage or occlusion.
3) "Other" indicates that none of the above obstetrical/medical indications were coded in the database. It should be noted that primary cesarean delivery with no medical indication identified does not necessarily represent cesarean delivery on maternal request.

FIGURE 10.3 **Rate of cesarean delivery, by province/territory**
Canada, 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

Data Limitations

Cesarean delivery rates have been presented without controlling for differences in population characteristics (such as maternal age and parity). Information on parity was not available as this variable was not recorded in the Hospital Morbidity Database. Out-of-hospital deliveries are not included in the calculation of cesarean delivery rates.

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11. Rate of Operative Vaginal Delivery

Shiliang Liu, David Young and Robert Liston

The rate of operative vaginal delivery is defined as the number of hospital vaginal deliveries assisted by means of forceps or vacuum extraction, expressed as a proportion of all hospital vaginal deliveries (in a given place and time).

Operative vaginal delivery is used to facilitate vaginal birth when there are fetal or maternal concerns. In general, choice of forceps or vacuum extraction is based largely on tradition and training of the physician.[1,2] In North America, forceps were used more frequently than vacuum extraction until the late 1980s when the use of vacuum extraction became more common, and the use of forceps decreased.[2,3] This shift in practice may have been influenced by the evidence of reduced maternal trauma with vacuum extraction compared with forceps delivery and by improved design of vacuum cups.[4] An increased risk of neonatal scalp trauma and intracranial injury is associated with vacuum-assisted delivery; however, the absolute risk of infant morbidity is low and may be due, in part, to an underlying abnormality of labour rather than a direct result of the operative procedure.[1,2,4] In general, forceps are associated with greater rates of perineal injury and short-term post-delivery pain, while the use of vacuum extraction decreases the risk of maternal perineal trauma without long-term adverse consequences for mother or baby.[3,5] Numerous studies have shown lower rates of cesarean delivery among planned vaginal deliveries using vacuum extraction compared to planned vaginal deliveries using forceps.[2,4,5] However, this may reflect the fact that forceps, not a vacuum, is the usual instrument of choice when the fetal head is above the pelvic outlet and vaginal delivery is urgent.

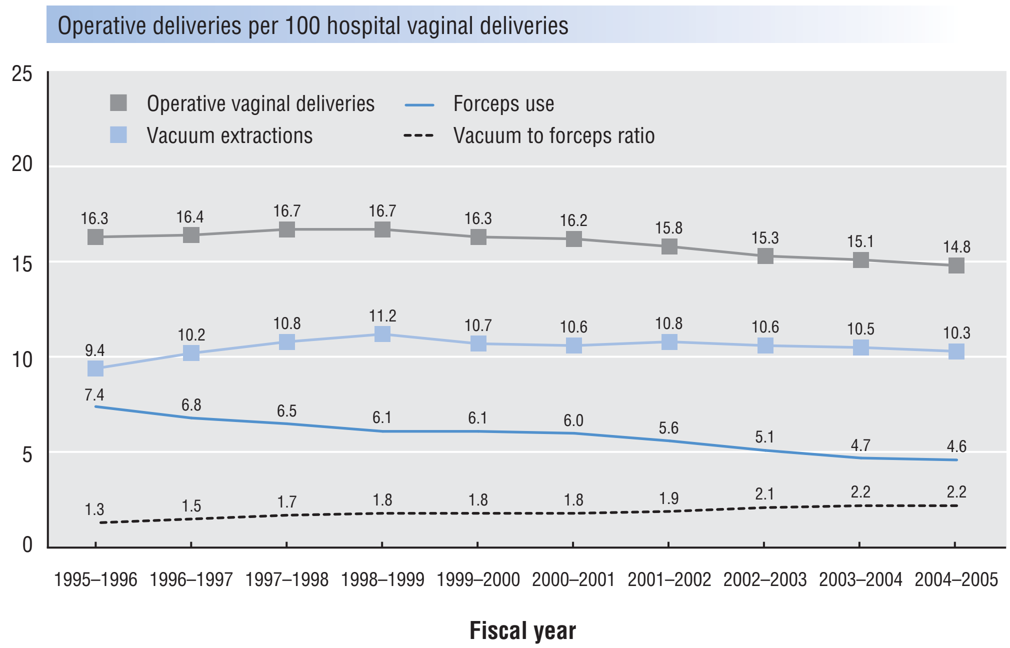
Rates of operative vaginal deliveries were calculated using national hospitalization data.

Results

- The overall rate of operative vaginal delivery increased slightly from 16.3% in 1995–1996 to 16.7% in 1998–1999, and then decreased steadily to 14.8% in 2004–2005 (Figure 11.1). Deliveries in which both forceps and vacuum extraction were used account for the discrepancy between the overall rate and the sum of the individual forceps use and vacuum extraction rates (either for the same baby, and/or for more than one baby).
- The rate of forceps delivery declined significantly from 7.4% in 1995–1996 to 4.6% in 2004–2005, while the rate of vacuum extraction varied between 9.4% and 11.2% over the same period. In 2004–2005, the rate of vacuum extraction was 10.3% (Figure 11.1).
- The vacuum extraction to forceps delivery ratio increased from 1.3 in 1995–1996 to 2.2 in 2004–2005 (Figure 11.1).
- In 2003–2004 and 2004–2005 combined, overall rates of operative vaginal delivery varied significantly among Canadian provinces and territories, from a low of 2.5 (95% CI: 1.7–3.6) per 100 hospital vaginal deliveries in Nunavut, to a high of 17.9 (95% CI: 17.0–18.9) per 100 hospital vaginal deliveries in Newfoundland and Labrador (Figure 11.2). There was a large provincial/territorial variation in rates of vaginal delivery by forceps and vacuum extraction (Figures 11.3 and 11.4). These regional differences may reflect variations in preference of care providers.

FIGURE 11.1 **Rate of operative vaginal delivery**

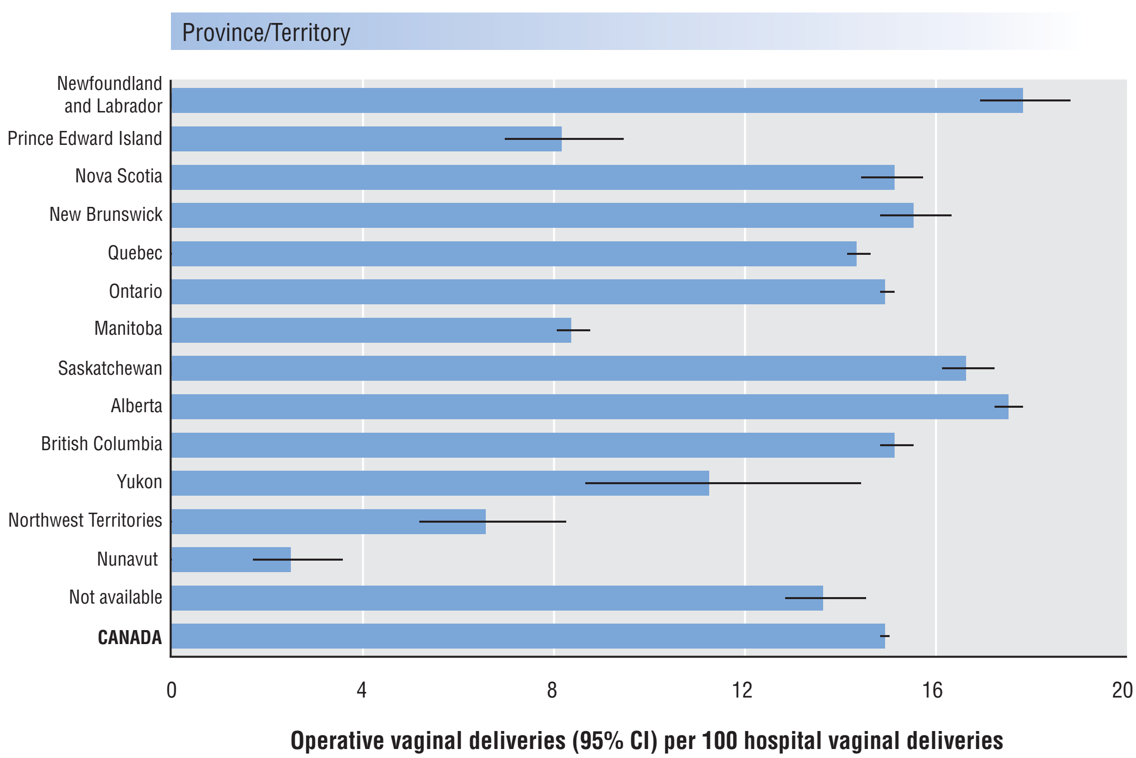
Canada, 1995–1996 to 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

FIGURE 11.2 **Rate of operative vaginal delivery, by province/territory**

*Canada, 2003–2004 and 2004–2005**

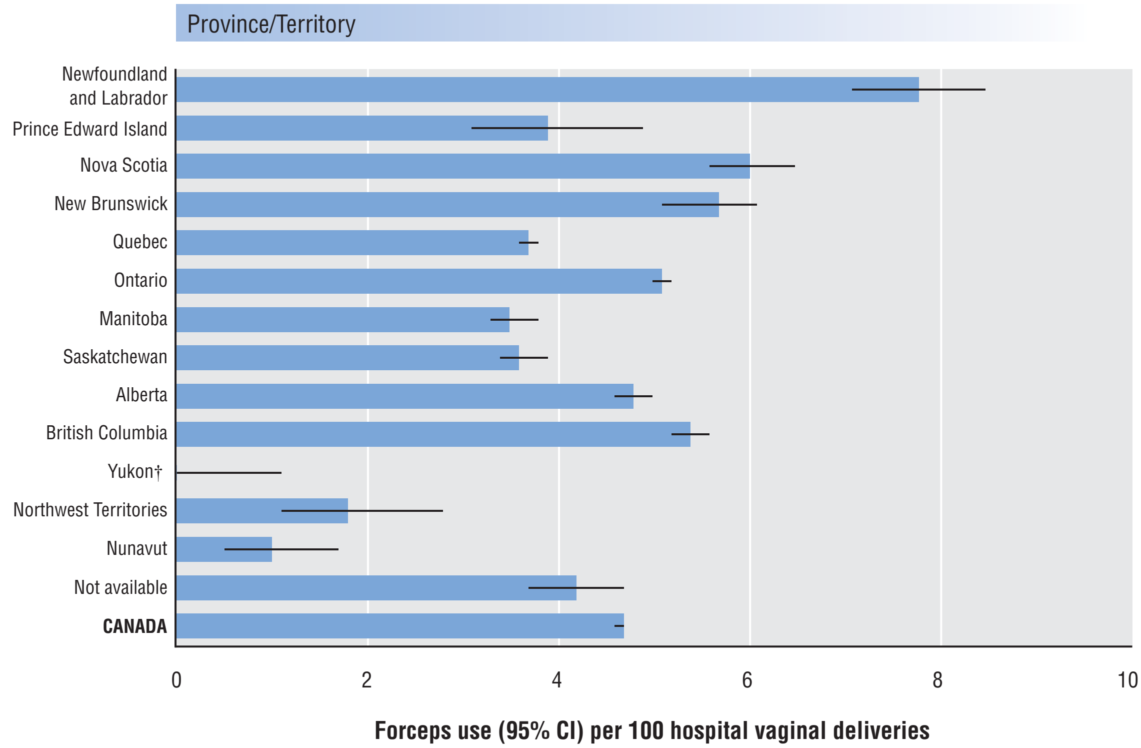


Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2003–2004 and 2004–2005.

* Data for two years were combined because of small numbers.

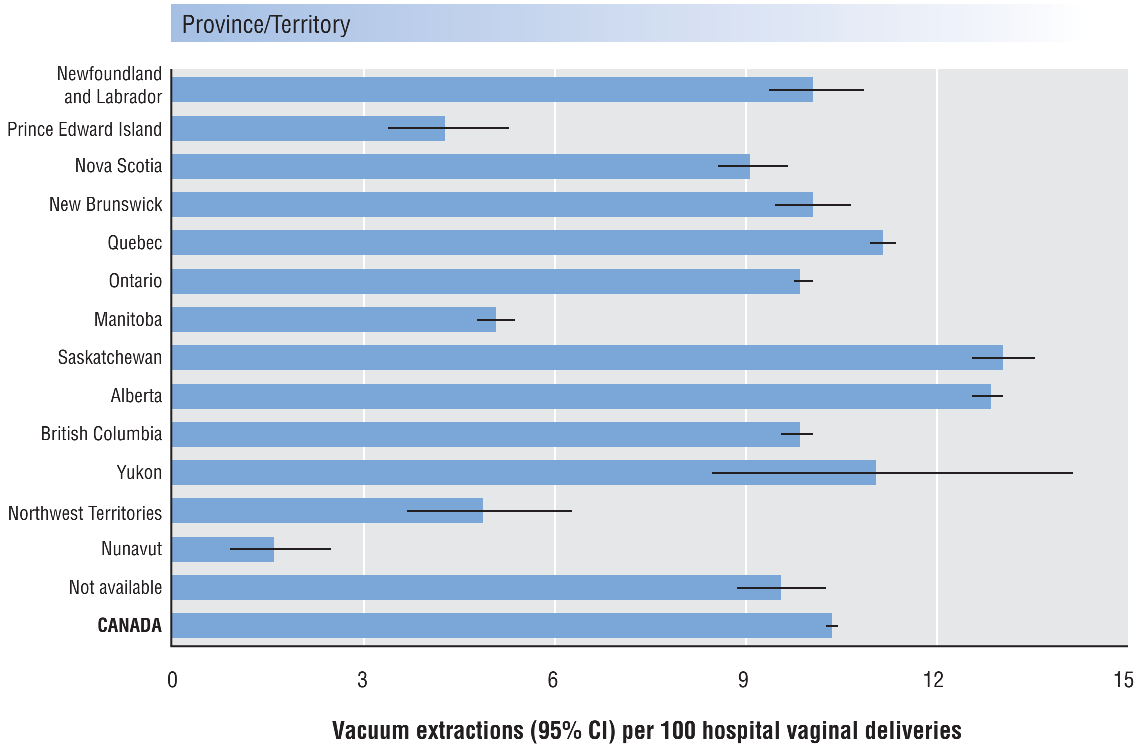
FIGURE 11.3 Rate of vaginal delivery by forceps, by province/territory

*Canada, 2003–2004 and 2004–2005**



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2003–2004 and 2004–2005.
* Data for two years were combined because of small numbers.
† Rate suppressed due to small numbers.
CI—confidence interval

FIGURE 11.4 Rate of vaginal delivery by vacuum extraction, by province/territory
*Canada, 2003–2004 and 2004–2005**



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2003–2004 and 2004–2005.
* Data for two years were combined because of small numbers.
CI—confidence interval

Data Limitations

Use of operative instruments to assist vaginal delivery is considered a minor procedure. Coding of these procedures may therefore be incomplete, resulting in an underestimation of rates.

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12. Rate of Trauma to the Perineum

Catherine McCourt, Beverley O'Brien and David Young

The rate of trauma to the perineum is defined as the number of women who have an episiotomy or a delivery resulting in a first-, second-, third- or fourth-degree laceration (tear) of the perineum expressed as a proportion of all women who have a vaginal delivery (in a given place and time).

There are a number of factors affecting integrity of the perineum during childbirth, such as the speed at which the head is delivered, maternal control with pushing, parity, fetal size, use of forceps or vacuum extraction, and episiotomy.[1] Historically, the reason for episiotomy has been the perception of benefit to the newborn through shortened second stage of labour, or benefit to the mother by reducing injury to the perineum. However, there is strong evidence that liberal or routine use of episiotomy provides no benefit compared to selective or restrictive use (e.g., in cases of fetal distress, imminent severe perineal laceration).[2,3] In fact, while the two approaches show no difference in the rate of severe vaginal or perineal laceration, routine episiotomy brings an increased risk of posterior perineal tears and need for suturing. Restrictive use of episiotomy does increase the likelihood of anterior lacerations, however.[2,3] The WHO and the American College of Obstetricians and Gynecologists are among the many organizations that recommend restricted use of episiotomy.[4,5] In spite of the quality of the evidence and the consistency of policies and guidelines, there remains a wide variation in rates of episiotomy across countries, hospitals and even among care providers in the same hospital.[5]

Rates of trauma to the perineum were calculated using national hospitalization data.

Results

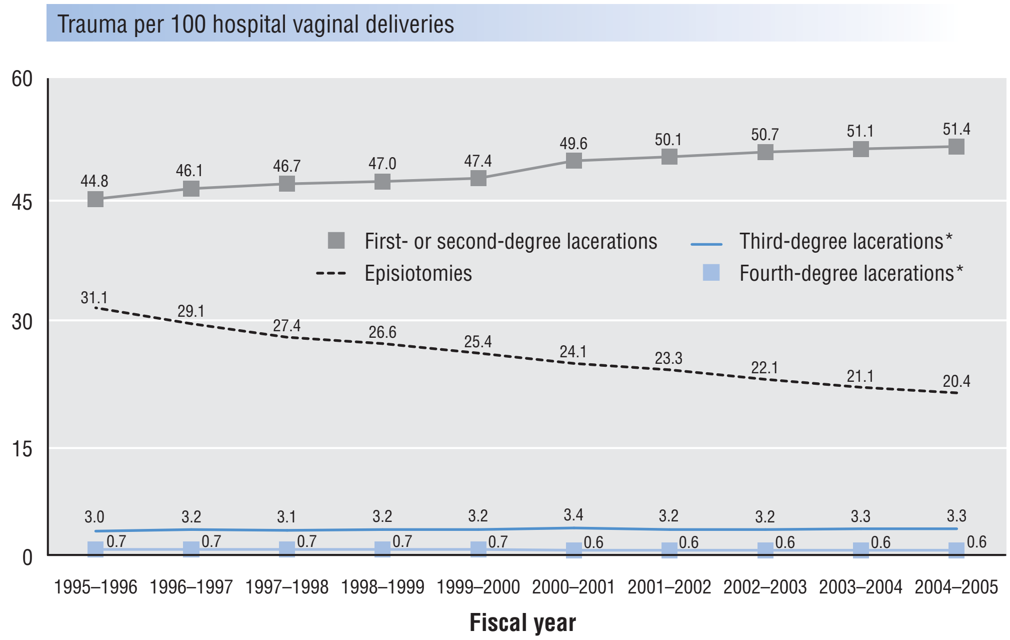
- In 2004–2005 the episiotomy rate in Canada was 20.4 episiotomies per 100 hospital vaginal deliveries. The rate has decreased by 34% since 1995–1996 (Figure 12.1). This dramatic decline is likely due to uptake of recommendations against routine episiotomy rather than a change in indications of fetal or maternal risk.

- The combined rate of first- and second-degree perineal lacerations has increased since 1995–1996, albeit more gradually. The rate of third-degree perineal laceration increased between 1995 and 2004, while the rate of fourth-degree perineal laceration decreased (Figure 12.1). The causes of this have not been studied and could include changes in diagnosis/labelling of third- and fourth-degree perineal tears, parity and rates of operative vaginal delivery.

- In 2004–2005, the use of episiotomy varied considerably among the provinces and territories (Figure 12.2). These variations may be due in part to differences in parity among the populations or to differences in reporting practices. It is also likely that persisting variations in professional practice contribute to the differences among the jurisdictions. In the combined years 2002–2003 to 2004–2005, the rates of third- and fourth-degree perineal laceration also varied among the provinces and territories, with no clear pattern emerging (Figure 12.3).

FIGURE 12.1 Rate of trauma to the perineum by perineal laceration and episiotomy

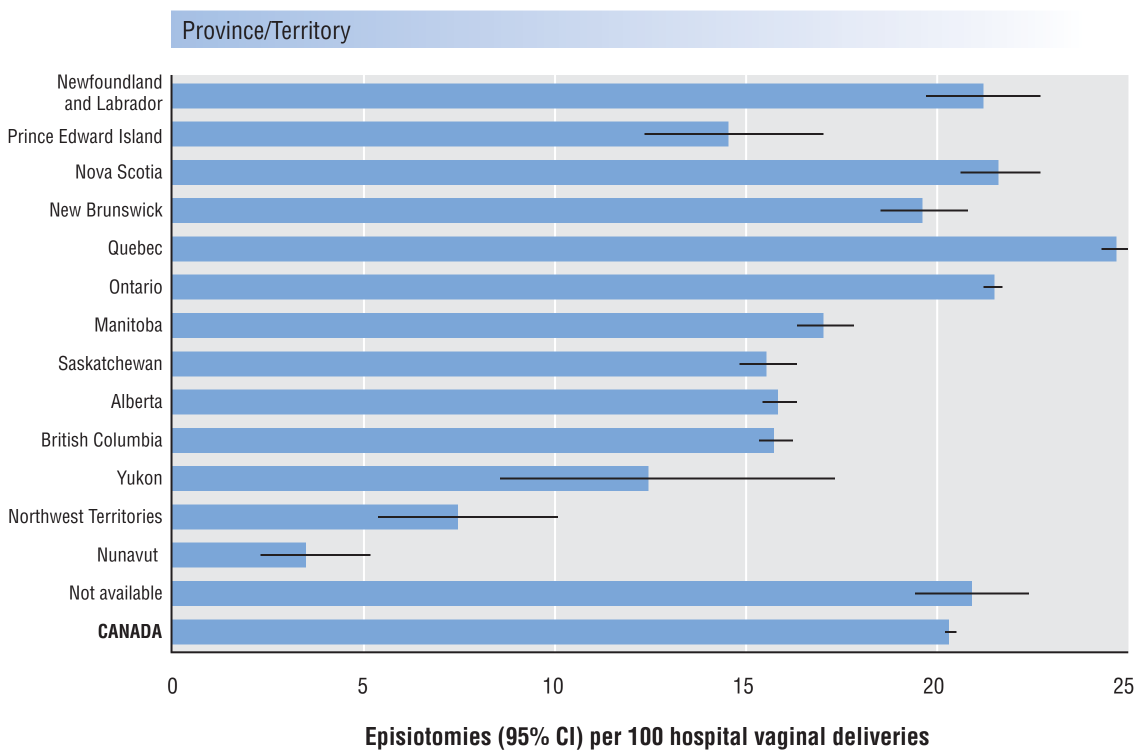
Canada, 1995–1996 to 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
* Data for Quebec were excluded because of data quality concerns.

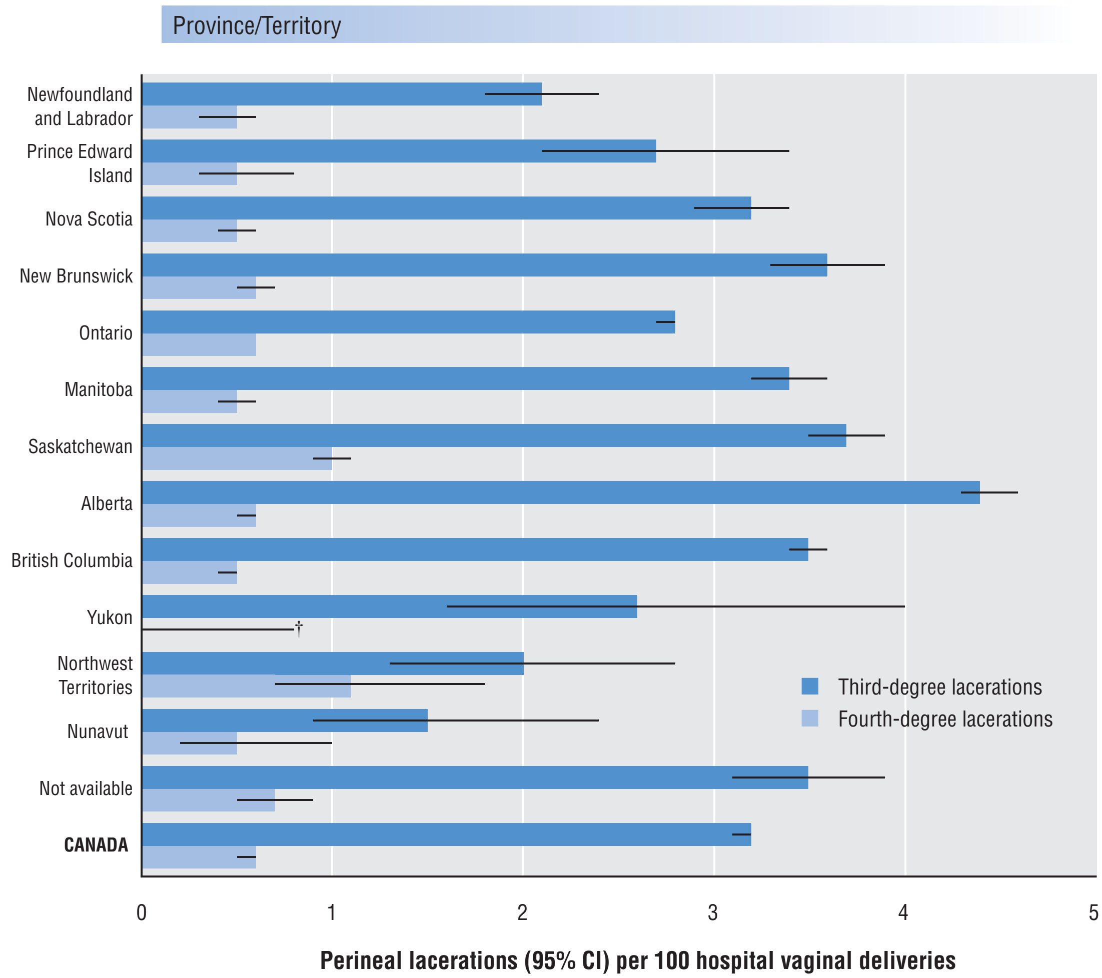
FIGURE 12.2 Rate of episiotomy, by province/territory

Canada, 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

FIGURE 12.3 **Rate of third- and fourth-degree perineal laceration, by province/territory**
*Canada (excluding Quebec), 2002–2003 to 2004–2005**



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
* Data from Quebec were excluded because of data quality concerns. Data for three years were combined because of small numbers.
† Rate suppressed due to small numbers.
CI—confidence interval

Data Limitations

These results do not include out-of-hospital births. Hospitalization data do not include national-level information about parity. Therefore, we cannot report separately for primiparous and multiparous women, even though episiotomy rates differ for the two groups.[5] Under-reporting of episiotomy may occur as a result of data coding practices. Also, it is likely that there are variations in the extent to which less severe perineal lacerations are reported.[6]

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13. Rate of Early Maternal Discharge from Hospital after Childbirth

Shiliang Liu and Maureen Heaman

The rate of early maternal discharge from hospital after childbirth is defined as the number of women discharged from hospital early (defined as within two days after vaginal delivery or within four days after cesarean delivery), expressed as a proportion of all women discharged from hospital after childbirth (in a given place and time).

The appropriate length of hospital stay for childbirth has been a controversial issue for decades.[1–3] A number of factors, other than the mother's health condition, affect length of stay, including health care policies and resources, characteristics of the health care delivery system, the availability of follow-up services in the community, and sociodemographic characteristics of the mother.[1–4]

Research has focused on the impact of early obstetrical discharge on maternal-neonatal outcomes such as breastfeeding duration, maternal and infant readmission, and infant morbidity and mortality.[2–5] A short postpartum length of stay may not provide adequate time for mothers to receive assistance with breastfeeding; women who leave the hospital earlier than the standard recommended stay are at a slightly increased risk of terminating breastfeeding early.[3,5,6] However, with evidence accumulating that early discharge of healthy mothers causes little harm to mothers' health, a trend towards decreasing length of hospital stay has been observed worldwide.[4–6]

Governmental and professional guidelines have recommended a postpartum follow-up visit shortly after hospital discharge.[3] A number of studies have evaluated the effectiveness of home visits for postpartum follow-up, usually in comparison with extended hospitalization or outpatient clinic visits, and have shown that mothers in early discharge programs feel they are cared for as well as or better than those who stayed in hospital longer.[3,7,8] The Society of Obstetricians and Gynaecologists of Canada (SOGC) recently issued a policy statement aimed at ensuring that postpartum women are discharged safely, and that appropriate arrangements for ongoing care are made prior to discharge.[8]

The length of stay for childbirth varies significantly by delivery method. Mode of delivery also affects readmission rates and the length of in-hospital stay for readmission.[9] Hence, results are presented separately for vaginal and cesarean deliveries.

Rates of early maternal discharge were calculated using national hospitalization data. Because information about the time of birth is not available on the mother's record, the length of stay for this analysis encompasses the time from admission for delivery to discharge, including time spent during labour and delivery.

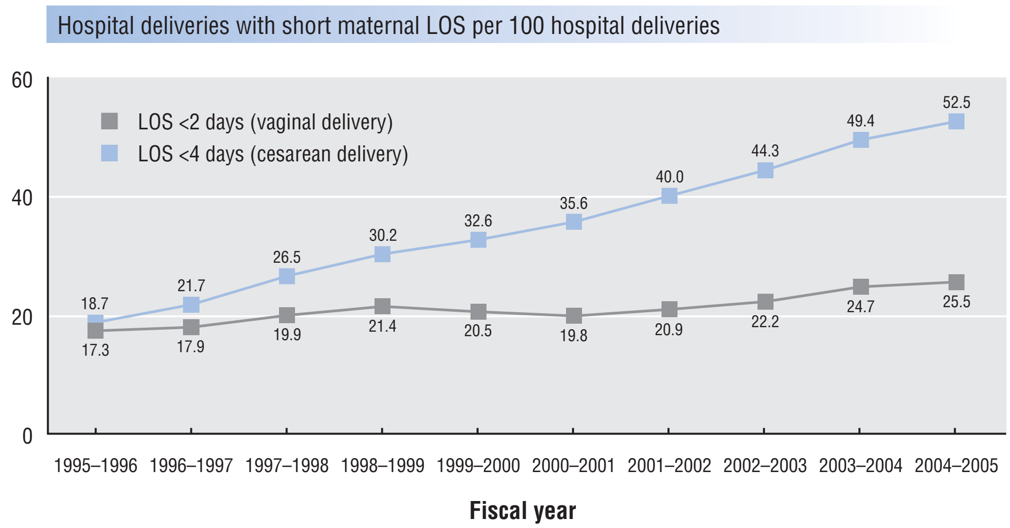
Results

- The proportion of mothers with a vaginal delivery who stayed in hospital for less than two days increased substantially, from 17.3% in 1995–1996 to 25.5% in 2004–2005. As well, the proportion of mothers with a cesarean delivery who stayed in hospital for less than four days increased dramatically, from 18.7% in 1995–1996 to 52.5% in 2004–2005 (Figure 13.1).
- Between 1995–1996 and 2004–2005, the mean maternal length of hospital stay for childbirth declined considerably from 2.6 to 2.2 days for vaginal delivery and from 5.0 to 3.9 days for cesarean delivery (Figure 13.2).
- In 2004–2005, the proportion of short maternal length of stay in hospital for childbirth varied significantly among Canadian provinces and territories, with the largest proportion in Alberta: 44.7 (95% CI: 44.1–45.3) per 100 hospital vaginal deliveries and 64.1 (95% CI: 63.1–65.0)

per 100 hospital cesarean deliveries, and the smallest proportion in Prince Edward Island: 1.9 (95% CI: 1.1–3.0) per 100 hospital vaginal deliveries and 9.8 (95% CI: 7.3–13.0) per 100 hospital cesarean deliveries (Figure 13.3).

- In 2004–2005, women in Alberta and Ontario had the shortest mean length of stay for vaginal delivery (1.8 and 2.1, respectively) and for cesarean delivery (3.6 and 3.7, respectively) (Figure 13.4).

FIGURE 13.1 Rate of short maternal length of stay (LOS) in hospital for childbirth
Canada, 1995–1996 to 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

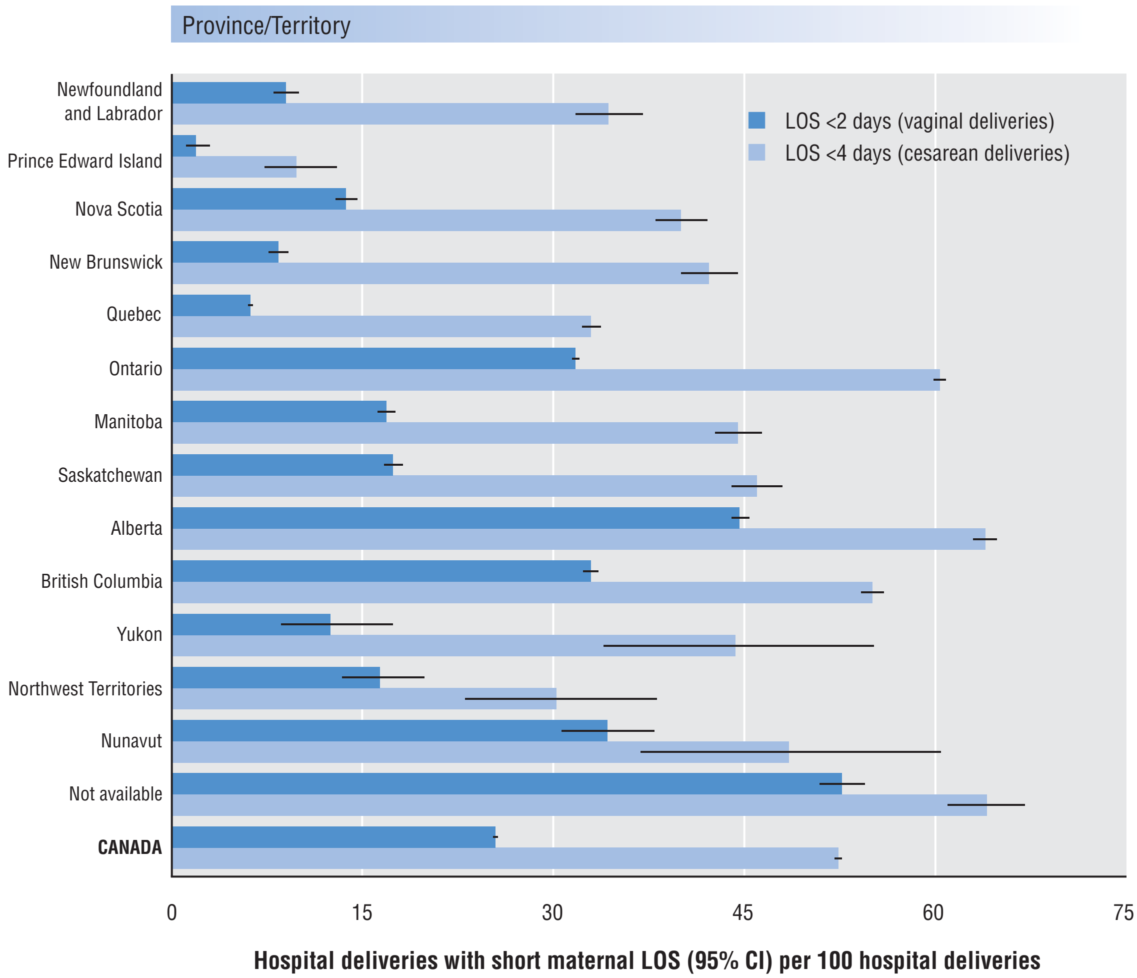
FIGURE 13.2 Average maternal length of stay (LOS) in hospital for childbirth
Canada, 1995–1996 to 2004–2005

Fiscal year	Vaginal delivery	Cesarean delivery
	Mean LOS in days (SD)	Mean LOS in days (SD)
1995–1996	2.6 (1.6)	5.0 (2.6)
1996–1997	2.5 (1.5)	4.8 (2.5)
1997–1998	2.4 (1.5)	4.6 (2.5)
1998–1999	2.4 (1.5)	4.5 (2.5)
1999–2000	2.4 (1.5)	4.5 (2.5)
2000–2001	2.4 (1.5)	4.4 (2.4)
2001–2002	2.4 (1.4)	4.2 (2.4)
2002–2003	2.3 (1.4)	4.1 (2.4)
2003–2004	2.3 (1.4)	4.0 (2.3)
2004–2005	2.2 (1.4)	3.9 (2.2)

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
SD—standard deviation

FIGURE 13.3 **Rate of short maternal length of stay (LOS) in hospital for childbirth, by province/territory**

Canada, 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

FIGURE 13.4 Average maternal length of stay (LOS) in hospital for childbirth, by province/territory
Canada, 2004–2005

Province/Territory	Mean LOS in days (SD) for vaginal delivery	Mean LOS in days (SD) for cesarean delivery
Newfoundland and Labrador	3.2 (2.0)	4.8 (3.1)
Prince Edward Island	3.1 (1.5)	5.0 (2.4)
Nova Scotia	2.9 (2.0)	4.4 (2.7)
New Brunswick	2.7 (1.5)	4.3 (2.5)
Quebec	2.6 (1.3)	4.3 (2.3)
Ontario	2.1 (1.3)	3.7 (2.0)
Manitoba	2.4 (1.3)	4.1 (2.4)
Saskatchewan	2.6 (1.5)	4.1 (2.2)
Alberta	1.8 (1.3)	3.6 (2.2)
British Columbia	2.2 (1.6)	3.9 (2.3)
Yukon	3.0 (1.5)	4.0 (1.8)
Northwest Territories	2.7 (1.8)	4.5 (2.1)
Nunavut	2.1 (1.4)	4.5 (2.9)
Not available	2.2 (1.4)	3.5 (2.6)
CANADA	**2.2 (1.4)**	**3.9 (2.2)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
SD—standard deviation

Data Limitations

Information on the time of birth is not available on the mother's record in the hospital database. Consequently, the maternal length of hospital stay reported includes the time between antepartum admission and delivery, in addition to the time between delivery and postpartum discharge. It would be preferable to report on length of postpartum stay rather than the overall length of hospital stay for childbirth.

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14. Rate of Early Neonatal Discharge from Hospital after Birth

Shiliang Liu and Reg Sauve

The rate of early neonatal discharge from hospital after birth is defined as the number of term newborns discharged from hospital early (defined here as within 48 hours of birth), expressed as a proportion of all term newborns discharged from hospital after birth (in a given place and time).

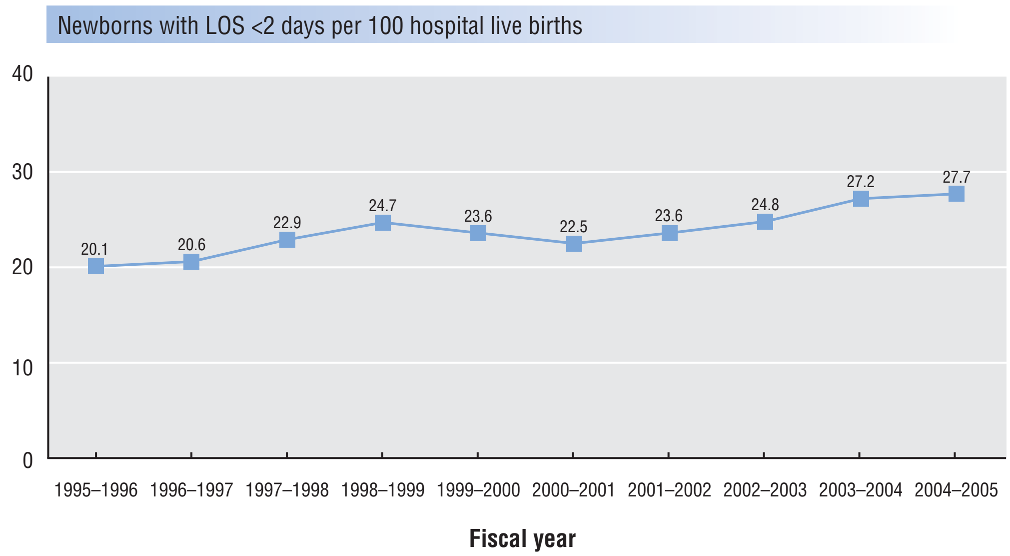
Early neonatal discharge, the practice of discharging newborns from the hospital at less than 48 hours after delivery, has been one of the most widely discussed public policy changes affecting pediatrics in the past decade.[1–5] In fact, trends toward earlier hospital discharge of healthy infants began in the 1970s and accelerated during the early 1990s amid increasing financial pressure on health care and hospital resources. Since the mid-1990s, however, researchers and professional organizations have raised concerns about the safety of very early newborn discharge. Some researchers have shown that early neonatal discharge was associated with an increased risk of neonatal mortality and morbidity requiring readmission, in particular due to jaundice and feeding problems.[1–3] In a joint statement published in 1996, the Canadian Paediatric Society (CPS) and the Society of Obstetricians and Gynaecologists of Canada (SOGC) recommended that 12 to 48 hours of hospital stay is adequate for women and their infants born at term, in the absence of maternal or neonatal illness or a lack of social supports.[2] Since then, programs such as early clinic and home follow-up visits have been put in place and their effectiveness has been demonstrated.[5–7] The SOGC recently issued a policy statement on safe discharge of newborns and appropriate arrangements for ongoing care.[4] Recent studies have provided evidence that measures to prevent very early discharge of newborns have resulted in increased length of stay and improved infant health outcomes, including reduced rehospitalization.[6–8]

Rates of early neonatal discharge were calculated using national hospitalization data. Since this data source did not always include gestational age, ICD-9 or ICD-10 codes (for birth weight ≥2,500 grams and/or gestational age ≥37 weeks) were used to identify “term newborns.”

Results

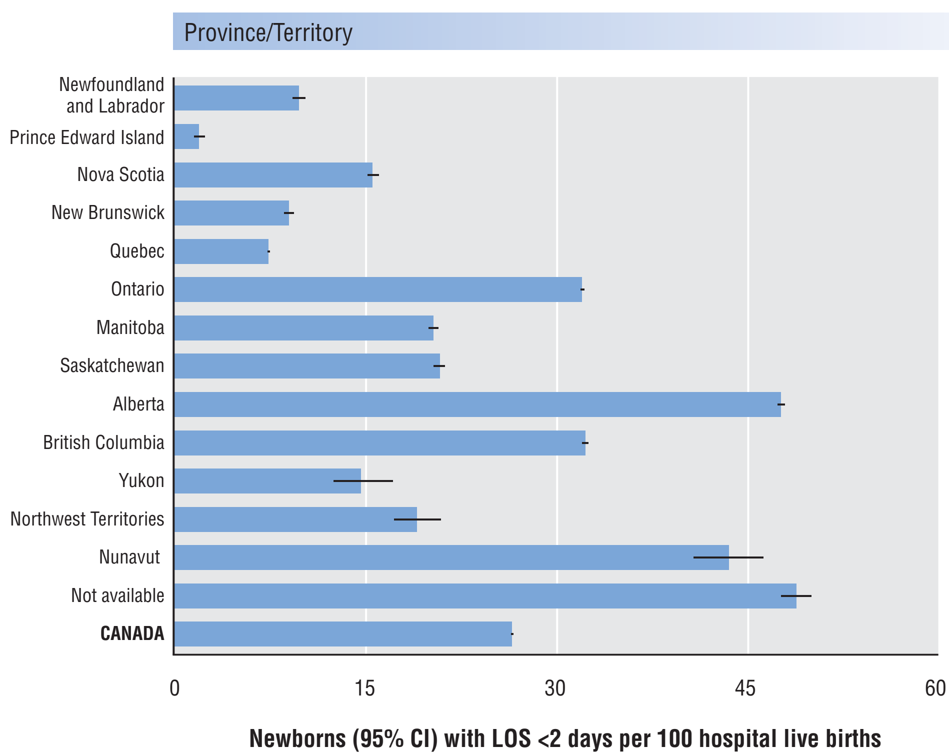
- The rate of early discharge among term newborns increased significantly from 20.1 per 100 hospital live births in 1995–1996 to 27.7 per 100 hospital live births in 2004–2005 (Figure 14.1).
- In the period 2002–2003 to 2004–2005, the proportion of term newborns discharged within two days of birth varied substantially among Canadian provinces and territories, with the largest proportion, 47.8 per 100 hospital live births (95% CI: 47.5–48.1), in Alberta, and the smallest proportion, 1.9 per 100 hospital live births (95% CI: 1.5–2.4), in Prince Edward Island (Figure 14.2).
- Among term newborns, the mean length of hospital stay after birth declined slightly, from 2.6 days in 1995–1996 to 2.3 days in 2004–2005 (Figure 14.3).
- In the period 2002–2003 to 2004–2005, the mean length of stay for term newborns varied substantially among Canadian provinces and territories, with the shortest stay in Alberta (1.9 days—standard deviation [SD] 1.3) and the longest stay in Prince Edward Island (3.4 days—SD 1.7) (Figure 14.4).

FIGURE 14.1 **Rate of early neonatal discharge from hospital after birth for term newborns**
Canada, 1995–1996 to 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
LOS—length of stay

FIGURE 14.2 **Rate of early neonatal discharge from hospital after birth for term newborns, by province/territory**
*Canada, 2002–2003 to 2004–2005 combined**



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
* Data for three years were combined because of small numbers.
CI—confidence interval
LOS—length of stay

FIGURE 14.3 Average neonatal length of stay (LOS) in hospital after birth for term newborns

Canada, 1995–1996 to 2004–2005

Fiscal year	Mean LOS in days (SD)
1995–1996	2.6 (1.7)
1996–1997	2.5 (1.6)
1997–1998	2.5 (1.6)
1998–1999	2.4 (1.6)
1999–2000	2.4 (1.6)
2000–2001	2.4 (1.5)
2001–2002	2.4 (1.5)
2002–2003	2.4 (1.5)
2003–2004	2.3 (1.5)
2004–2005	2.3 (1.5)

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
SD—standard deviation

FIGURE 14.4 Average neonatal length of stay (LOS) in hospital after birth for term newborns, by province/territory

*Canada, 2002–2003 to 2004–2005 combined**

Province/Territory	Mean LOS in days (SD)
Newfoundland and Labrador	2.9 (1.6)
Prince Edward Island	3.4 (1.7)
Nova Scotia	2.7 (1.7)
New Brunswick	2.8 (1.8)
Quebec	2.7 (1.5)
Ontario	2.2 (1.4)
Manitoba	2.4 (1.6)
Saskatchewan	2.5 (1.7)
Alberta	1.9 (1.3)
British Columbia	2.3 (1.6)
Yukon	2.9 (1.5)
Northwest Territories	2.7 (1.5)
Nunavut	2.0 (1.5)
Not available	2.0 (1.6)
CANADA	**2.3 (1.5)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
* Data for three years were combined because of small numbers.
SD—standard deviation

Data Limitations

The time of birth is not recorded in the Hospital Morbidity Database. Therefore, it was not possible to obtain the exact duration of hospital stay (in hours), which would be of significance—especially for infants discharged on the first day after birth. Also, using ICD codes for identifying term newborns may have resulted in some misclassification of gestational age.

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B

Maternal, Fetal and Infant Health Outcomes

Maternal Health Outcomes

15. Maternal Mortality Ratio

Sharon Bartholomew, Robert Liston and Beverley O'Brien

The maternal mortality ratio (MMR) is defined as the number of maternal deaths per 100,000 live births (in a given place and time). A country's MMR is considered an important indicator of the general health of the population.[1] Canada has among the lowest reported MMRs in the world.[2] This reflects our universal access to high quality medical care, our relatively healthy population and the generally favourable economic and social status of Canadian women.

The definition of **maternal death** under ICD-9 and ICD-10 is: "The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes." It is important to note that the deaths reported here are maternal deaths. This does not include deaths associated with the reproductive system, such as those due to sexually-transmitted infections, contraception or reproductive technologies, unless they are maternal deaths.

Maternal deaths are considered to be either:

a) **Direct obstetric deaths**—deaths resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from interventions, omissions or incorrect treatment, or from a chain of events resulting from any of the above; or

b) **Indirect obstetric deaths**—deaths resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by the physiologic effects of pregnancy.

Late maternal death, a new category of death under ICD-10, is defined as the death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy. The WHO recommends that these deaths **not** be included in the MMR for international reporting; however, they may be included in the calculation of national statistics.

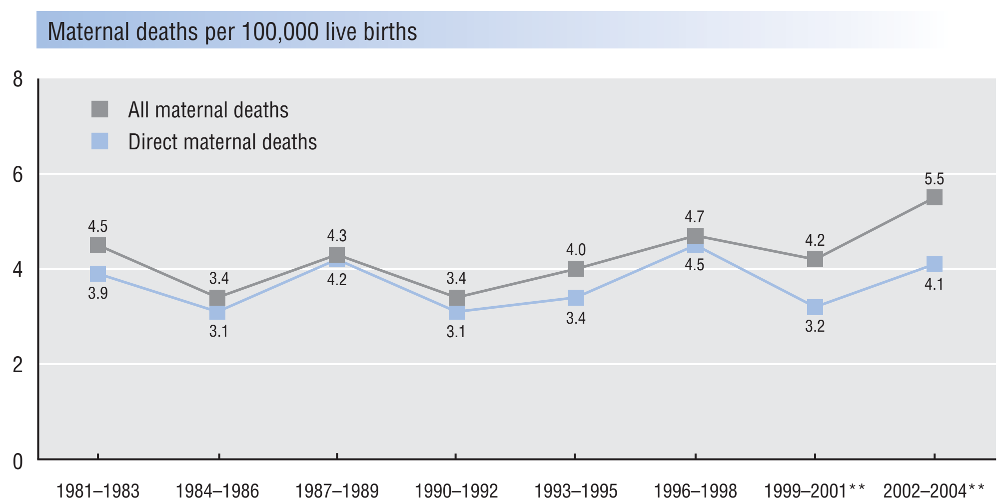
Pregnancy-related death, another new term under ICD-10, is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death. This category includes deaths of pregnant women due to causes such as motor vehicle collisions, poisoning or violence; these are sometimes referred to as incidental. Pregnancy-related deaths are **not** included in the MMR.

Maternal mortality ratios were calculated using the national vital statistics databases. In these databases, underlying causes of death between January 1, 1981, and December 31, 1999, were coded according to the Ninth Revision of the *International Classification of Diseases* (ICD–9), *Chapter 11: Complications of Pregnancy, Childbirth and the Puerperium* (630–676).[3] Deaths occurring in Canada beginning in 2000 have been coded using ICD-10, *Chapter XV: Pregnancy, childbirth and the puerperium* (O00–O99).[4] Further methodology details are provided in *Appendix A.*

Results

- The Canadian MMR fluctuated from a low of 3.4 per 100,000 live births in 1984–1986 and 1990–1992 to a high of 5.5 per 100,000 live births in 2002–2004 (Figure 15.1). If late maternal deaths were included in the ratio for the period 2002–2004, the MMR would be 5.8 per 100,000 live births.
- Direct obstetric deaths are the most common causes of maternal death in Canada. The trend observed for all deaths is therefore primarily due to the trend in direct deaths.
- Pulmonary embolism, diseases of the circulatory system, postpartum hemorrhage and hypertension were the most common causes of death for the period 1981–1986 (Figure 15.2). With the exception of deaths due to postpartum hemorrhage, which have decreased, these causes have consistently remained the leading causes of death since 1981. Deaths due to puerperal infection appear to be increasing. The rise in deaths due to other indirect causes probably reflects classification changes in ICD-10. For all the time periods, there were a relatively large number of deaths assigned to "other complications occurring mainly in the course of labour and delivery." This category includes deaths in association with such complications as: obstructed labour, obstetrical trauma and their treatment, as well as complications of the administration of anesthetic or other sedation in labour and delivery.

FIGURE 15.1 Maternal mortality ratio (MMR)
*Canada, 1981–2004**



Sources: Years 1981–1983,[5,6] Years 1984–2004: Statistics Canada. Canadian Vital Statistics System, 1984–2004.
* 1981–1999 deaths were classified according to ICD-9, 2000–2004 deaths were classified according to ICD–10.
** For the years 2000–2004 deaths due to ICD-10 codes O96 and O97 (late maternal deaths) are excluded so as to more accurately present the temporal trend.
Note: Deaths due to cerebrovascular disorders of the puerperium are considered indirect in ICD–10, in ICD–9 these were considered direct causes of death.

FIGURE 15.2 Maternal mortality ratios (MMRs), by cause

Canada, 1981–2004

Cause ICD-9 code	1981–1986		1987–1992		1993–1998		1999–2004	
	Number of deaths	Ratio (95% CI) per 1,000,000 live births	Number of deaths	Ratio (95% CI) per 1,000,000 live births	Number of deaths	Ratio (95% CI) per 1,000,000 live births	Number of deaths	Ratio (95% CI) per 1,000,000 live births
Ectopic and molar pregnancy (630–633)	6	2.7 (1.0–6.0)	4	1.7 (0.4–4.1)	9	4.1 (1.8–7.4)	4	2.0 (0.8–5.3)
Other pregnancy with abortive outcome (634–639)	3	1.3 (0.3–3.7)	6	2.6 (1.0–5.9)	3	1.4 (0.3–3.7)	2	1.0 (0.3–3.4)
Antepartum hemorrhage, abruptio placentae and placenta previa (641)	5	2.2 (0.8–5.6)	7	3.0 (1.1–6.3)	11	5.0 (2.2–9.3)	5	2.5 (0.9–5.8)
Hypertension complicating pregnancy, childbirth and the puerperium (642)	10	4.5 (2.0–7.8)	16	6.8 (3.8–11.1)	17	7.7 (4.3–12.0)	12	6.0 (3.4–10.3)
Other complications of pregnancy, NEC (640, 643, 644, 645, 646)	2	0.9 (0.4–3.3)	0	0 (0.0–1.4)	1	0.5 (0.2–2.8)	5	2.5 (0.9–5.8)
*Normal delivery, and other indications for care in pregnancy, labour and delivery (650–659)	0	0 (0.0–1.4)	1	0.4 (0.2–2.8)	2	0.9 (0.5–3.3)	1	0.5 (0.3–2.9)
Postpartum hemorrhage (666)	12	5.3 (3.0–9.6)	8	3.4 (1.3–6.7)	3	1.4 (0.3–3.7)	5	2.5 (0.9–5.8)
Other complications occurring mainly in the course of labour and delivery, NEC (660–665, 667–669)	14	6.2 (3.5–10.5)	7	3.0 (1.1–6.3)	7	3.2 (1.2–6.5)	13	6.5 (3.7–10.8)
Major puerperal infection (670)	0	0 (0.0–1.4)	3	1.3 (0.3–3.7)	3	1.4 (0.3–3.7)	6	3.0 (1.1–6.3)
Venous complications in pregnancy and the puerperium (671)	4	1.8 (0.4–4.2)	8	3.4 (1.3–6.7)	3	1.4 (0.3–3.7)	4	2.0 (0.8–5.3)
Obstetrical pulmonary embolism (673)	13	5.8 (3.3–10.1)	13	5.5 (3.1–9.8)	19	8.6 (5.1–13.8)	10	5.0 (2.2–9.3)
Other and unspecified complications of the puerperium, NEC (674.1–674.9)	4	1.8 (0.4–4.2)	9	3.8 (1.4–7.2)	3	1.4 (0.3–3.7)	6	3.0 (1.1–6.3)
**Diseases of the circulatory system	12	5.3 (3.0–9.6)	8	3.4 (1.3–6.8)	13	5.9 (3.3–10.2)	15	7.5 (4.2–12.8)
Includes: Cerebrovascular disorders in the puerperium (674.0)	5	2.2 (0.8–5.6)	3	1.3 (0.3–3.7)	6	2.7 (1.0–6.1)	13	6.5 (3.7–10.8)
648.5 (congenital cardiovascular) +648.6 (other cardiovascular diseases)	7	3.1 (1.2–6.5)	5	2.1 (0.8–4.5)	7	3.2 (1.2–6.5)	2‡	1.0 (0.3–3.4)
Other indirect causes (647, 648.0–648.4, 648.7–648.9)	2	0.9 (0.4–3.3)	0	0 (0.0–1.4)	2	0.9 (0.5–3.3)	9	4.5 (2.0–8.8)
Total, excluding late maternal deaths (MMR per 100,000 live births)	88	3.9 (3.2–4.8)	90	3.8 (3.1–4.7)	96	4.3 (3.5–5.3)	97	4.9 (3.9–5.9)
New ICD-10 Codes late maternal deaths (O96,O97)§	n/a	n/a	n/a	n/a	n/a	n/a	6§	3.0 (1.1–6.3)

Sources: Years 1981–1983,[5,6] Years 1984–2004: Statistics Canada. Canadian Vital Statistics System, 1984–2004.

* ICD–9 650–659 includes: delivery in a completely normal case, multiple gestation, malposition and malpresentation of fetus, disproportion, abnormality of organs and soft tissues of pelvis, known or suspected fetal abnormality affecting management of mother, other fetal and placental problems affecting management of mother, polyhydramnios, other problems associated with amniotic cavity and membranes, and other indications for care or intervention related to labour and delivery NEC.

** *Diseases of the circulatory system* is the title of ICD–10 O99.4. This was chosen rather than the previous ICD–9 code grouping for this figure as it more accurately reflects the impact these deaths have on maternal deaths in Canada and the changes to how they are classified in ICD–10.

‡ For years prior to 2000 only.

§ 2000–2004 only.

CI—confidence interval

NEC—not elsewhere classified

Data Limitations

Recent work has highlighted the limitations of reporting maternal mortality using national vital statistics. In 2004, the Canadian Perinatal Surveillance System released the results of a study which reviewed deaths on a national level (excluding Quebec) for the years 1997–2000 using vital statistics and hospitalization data as well as information collected directly from coroners/ medical examiners and maternal death review teams.[7] This study found the MMR for these years to be 6.1 per 100,000 live births. This result is consistent with estimates provided by a previous record-linkage study[8] and international estimates of the Canadian MMR which adjust for probable under-reporting.[2,9,10] However, the vital statistics estimate of the MMR for these same years was 3.8 per 100,000 live births for all of Canada.

Globally, enhanced surveillance and case investigation to improve the quality of maternal mortality reporting are becoming priorities.[11,12] In-depth case investigations and reports can increase awareness of the occurrence and preventability of maternal deaths and lead to the development of recommendations for specific actions to improve quality of care.[7]

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16. Severe Maternal Morbidity Rate

Ling Huang, Robert Liston and K.S. Joseph

The severe maternal morbidity rate is expressed as the number of women who experience severe life-threatening maternal morbidity per 1,000 deliveries (in a given place and time). The rate of severe maternal morbidity is an important index that supplements the maternal mortality ratio in industrialized countries and may represent the population burden of illness and disability that occurs as a consequence of "near misses."[1] There are no universally accepted criteria for identifying patients with severe maternal morbidity and hence the Canadian Perinatal Surveillance System (CPSS) has developed a list of severe maternal conditions (presented in the *Special Report on Maternal Mortality and Severe Morbidity in Canada*).[2] This section highlights amniotic-fluid embolism and postpartum hemorrhage.

Amniotic-fluid embolism is a serious obstetric complication whose diagnosis is difficult and whose etiology is poorly understood. Despite its rarity, amniotic-fluid embolism is one of the leading causes of maternal mortality in industrialized countries, accounting for 8%–13% of direct maternal deaths over the last two decades.[3–4] A recent epidemiologic study demonstrated an increased risk of amniotic-fluid embolism among women with medical induction of labour.[5] Higher risks were also seen among older women, those having a cesarean or instrumental delivery, and those with pregnancy complications. Young maternal age and dystocia were protective factors.[5]

Although postpartum hemorrhage is no longer a leading cause of maternal death in industrialized countries, it remains an important clinical concern. Severe postpartum hemorrhage (PPH) may be associated with additional serious morbidity such as adult respiratory distress syndrome, coagulopathy, shock and Sheehan syndrome.[6] Since the degree of PPH is somewhat subjective, information on its severity is poorly captured in large perinatal databases. For this reason, PPH requiring hysterectomy is often considered a surrogate measure for severe PPH.

Rates of amniotic-fluid embolism, PPH and PPH requiring hysterectomy were calculated using hospitalization data.

Results

- Amniotic-fluid embolism is a rare event in Canada. The overall incidence for the years 1995–1996 through 2004–2005 was 6.5 per 100,000 deliveries. No clear temporal trend was observed in the incidence of amniotic-fluid embolism over the past decade (Figure 16.1).
- Between 1995–1996 and 2004–2005, the overall incidence of PPH was 50.2 per 1,000 deliveries. The rates increased from 45.8 in 1995–1996 to 53.8 per 1,000 deliveries in 2000–2001 and decreased gradually thereafter. A similar temporal trend was observed for atonic PPH (hemorrhage within the first 24 hours following delivery of placenta due to atony [failure to contract] of the uterus) which accounted for 76.9% of overall PPH. The incidence of PPH requiring hysterectomy increased significantly from 35.1 in 1995–1996 to 45.6 per 100,000 deliveries in 1999–2000, and then fluctuated between 40.7 and 50.6 from 2000–2001 onwards (Figure 16.1). A CPSS study has shown that the increasing trends in rates of PPH and PPH requiring hysterectomy are due to increases in rates of atonic PPH.[7]

- In 2002–2003 to 2004–2005, rates of PPH varied substantially by province/territory, ranging from a low of 28.8 (95% CI: 23.9–34.4) in Prince Edward Island to a high of 139.6 (95% CI: 118.4–163.1) per 1,000 deliveries in the Yukon. Rates of atonic PPH also varied significantly from 21.2 (95% CI: 17.1–26.1) in Prince Edward Island to 120.0 (95% CI: 100.1–142.1) per 1,000 deliveries in the Yukon (Figure 16.2). Geographic variations in rates of amniotic-fluid embolism were not presented due to the small number of cases identified in some provinces and territories.

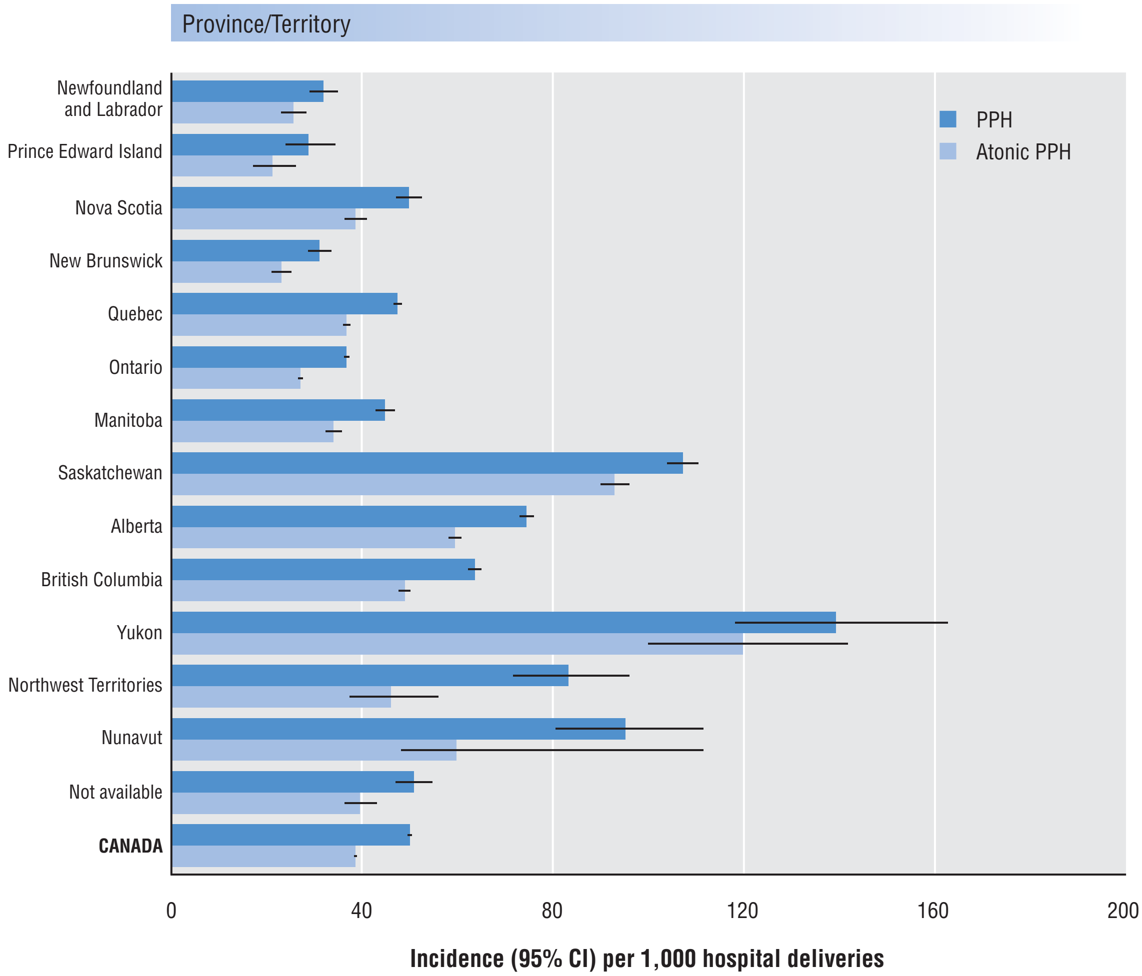
FIGURE 16.1 Incidence of amniotic-fluid embolism, postpartum hemorrhage (PPH), atonic PPH and PPH requiring hysterectomy
Canada, 1995–1996 to 2004–2005

Fiscal year	Amniotic-fluid embolism	PPH	Atonic PPH	PPH with hysterectomy
	Incidence per 100,000 hospital deliveries	Incidence per 1,000 hospital deliveries	Incidence per 1,000 hospital deliveries	Incidence per 100,000 hospital deliveries
1995–1996	6.7	45.8	33.8	35.1
1996–1997	6.4	47.8	36.3	32.6
1997–1998	7.8	48.5	36.5	37.0
1998–1999	5.6	51.0	39.3	39.6
1999–2000	3.3	53.6	42.0	45.6
2000–2001	4.9	53.8	42.4	43.4
2001–2002	7.6	52.0	40.4	46.7
2002–2003	9.5	51.0	39.4	44.3
2003–2004	6.9	49.4	37.9	50.6
2004–2005	6.6	49.8	38.7	40.7
TOTAL	**6.5**	**50.2**	**38.6**	**41.4**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

FIGURE 16.2 Incidence of postpartum hemorrhage (PPH) and atonic PPH, by province/territory

*Canada, 2002–2003 to 2004–2005**



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2000–2001 to 2004–2005.

* Data for three years were combined because of small numbers.

CI—confidence interval

Data Limitations

The selected maternal conditions were identified using the 16 hospitalization diagnosis codes (coded according to the International Classification of Diseases, 9th Revision [ICD-9] or the International Statistical Classification of Diseases and Related Health Problems, 10th Revision [ICD-10]) and/or 10 procedure codes (coded according to the Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures [CCP] or the Canadian Classification of Interventions [CCI]) available in the Hospital Morbidity Database. The observed temporal trends may have been affected by the code conversion from ICD-9 to ICD-10 and from CCP to CCI which occurred from 2001 to 2002 onwards. Amniotic-fluid embolism is known to be over-reported in hospitalization databases, given the much lower case fatality rates in such data compared with those in hospital-based studies.[8] Rates of amniotic-fluid embolism, PPH, atonic PPH and PPH with hysterectomy in this report differ from those published elsewhere because this report is based on the Hospital Morbidity Database and includes all Canadian provinces and territories (unlike the Discharge Abstract Database used in other publications).

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17. Induced Abortion Ratio

Catherine McCourt and Madeline Boscoe

The induced abortion ratio is defined as the number of induced abortions per 100 live births (in a given place and time). A related indicator is the age-specific induced abortion rate, defined as the number of induced abortions for women in a specified age category per 1,000 women in the same age category.

Access to safe and appropriate abortion services is an indicator of society's attitude toward women and their right to reproductive choice. Yet, worldwide, unsafe abortion results in an estimated 70,000 deaths of women each year, and it is the cause of 13% of maternal mortality in developing countries.[1] In 1969, Canada's Parliament passed a law to regulate abortion under the *Criminal Code.* This law permitted a qualified medical practitioner to perform an abortion, if prior approval had been obtained by a Therapeutic Abortion Committee. A 1988 Supreme Court of Canada decision found this process to be unconstitutional. The 1969 law was rendered unenforceable and abortion was effectively decriminalized.[2] Barriers to access remain, however, including unexpected costs (e.g., clinic facility fees) and requirements to travel for abortion services.[3]

Trained, qualified practitioners and their patients may choose medical or surgical methods for pregnancy termination, depending on the gestational age, the woman's medical situation and other factors.[4] Women seeking an abortion should receive supportive counselling that encompasses discussion of all the options including continuing the pregnancy, as well as contraceptive advice.[4]

The Canadian Institute for Health Information is responsible for national collection of data on abortions performed in hospital and clinic settings. The resulting statistics are then reported by Statistics Canada. The national data on induced abortions have considerable limitations, as outlined below, and they should be interpreted with much caution. It is important to acknowledge these problems, in the hope that efforts will be made to improve the data and thus our understanding of this issue.

Results

- In 2004, the reported induced abortion ratio was 31.7 per 100 live births in Canada (excluding Ontario) (Figure 17.1). The induced abortion ratio has increased since 1995, but it has been more stable in the past few years. The Canadian induced abortion rate for 2004 was 15.6 per 1,000 females aged 15 to 44 (excluding Ontario). As with the induced abortion ratio, there appears to be a leveling of the rate in the past few years. Given the data limitations, however, it is uncertain if these estimates provide an accurate picture of trends over time. Certainly, it is clear that these are underestimates of the number of Canadian women who had an induced abortion in 2004.

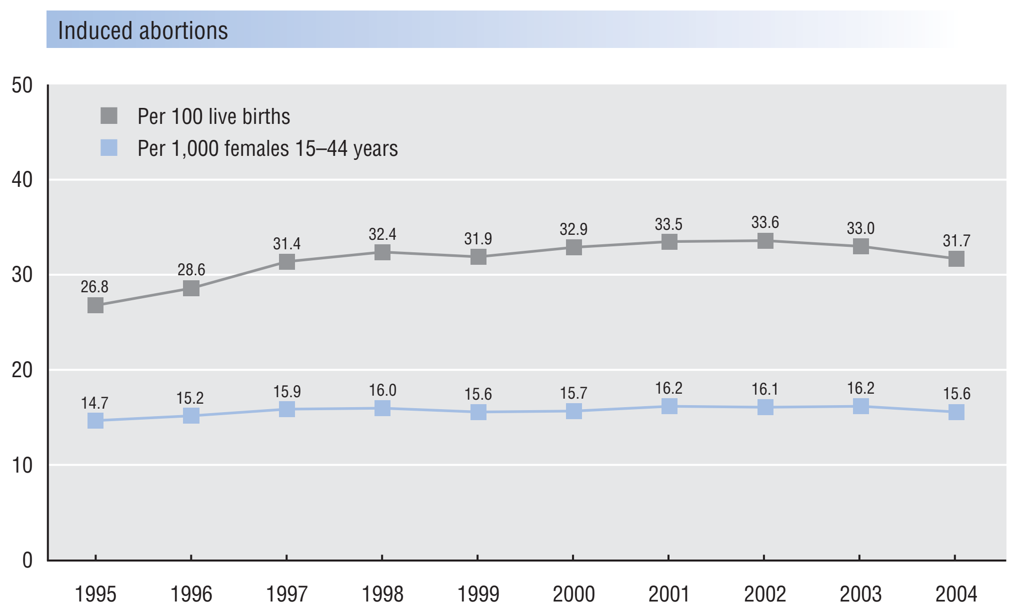
- In 2004, the reported provincial and territorial induced abortion ratios and rates varied markedly (Figure 17.2). The lowest statistics were reported in Prince Edward Island—an induced abortion ratio of 10.3 (95% CI: 8.7–12.0) per 100 live births and a rate of 4.9 (95% CI: 4.2–5.8) per 1,000 females aged 15 to 44. The highest induced abortion ratio was in Quebec at 41.3 (95% CI: 41.0–41.7) per 100 live births, and the highest rate was reported for the Northwest Territories at 24.8 (95% CI: 21.9–27.9) induced abortions per 1,000 females aged 15 to 44.

Again, the data limitations require caution in interpretation of these results. Variations among jurisdictions may be due to incomplete reporting, inaccurate assignment of residence, differences in access to office-based abortion services, differences in access to any abortion services, or differences in need.

- Women aged 20 to 24 years had the highest induced abortion rate in 2004, followed by the 25 to 29 year age group (Figure 17.3). The lowest rates were among the youngest and the oldest age groups. In contrast, the highest induced abortion ratios were in the teenage groups, followed by women in their early 20s, with a rise again for women aged 40 and older.
- In 2004, clinics accounted for 47% of the induced abortions reported nationally. This proportion has changed over time, as patterns of service delivery have changed; in 1996, 33% of reported induced abortions were clinic-based.[5]

FIGURE 17.1 Ratio and rate of induced abortion*

*Canada (excluding Ontario),** 1995–2004*



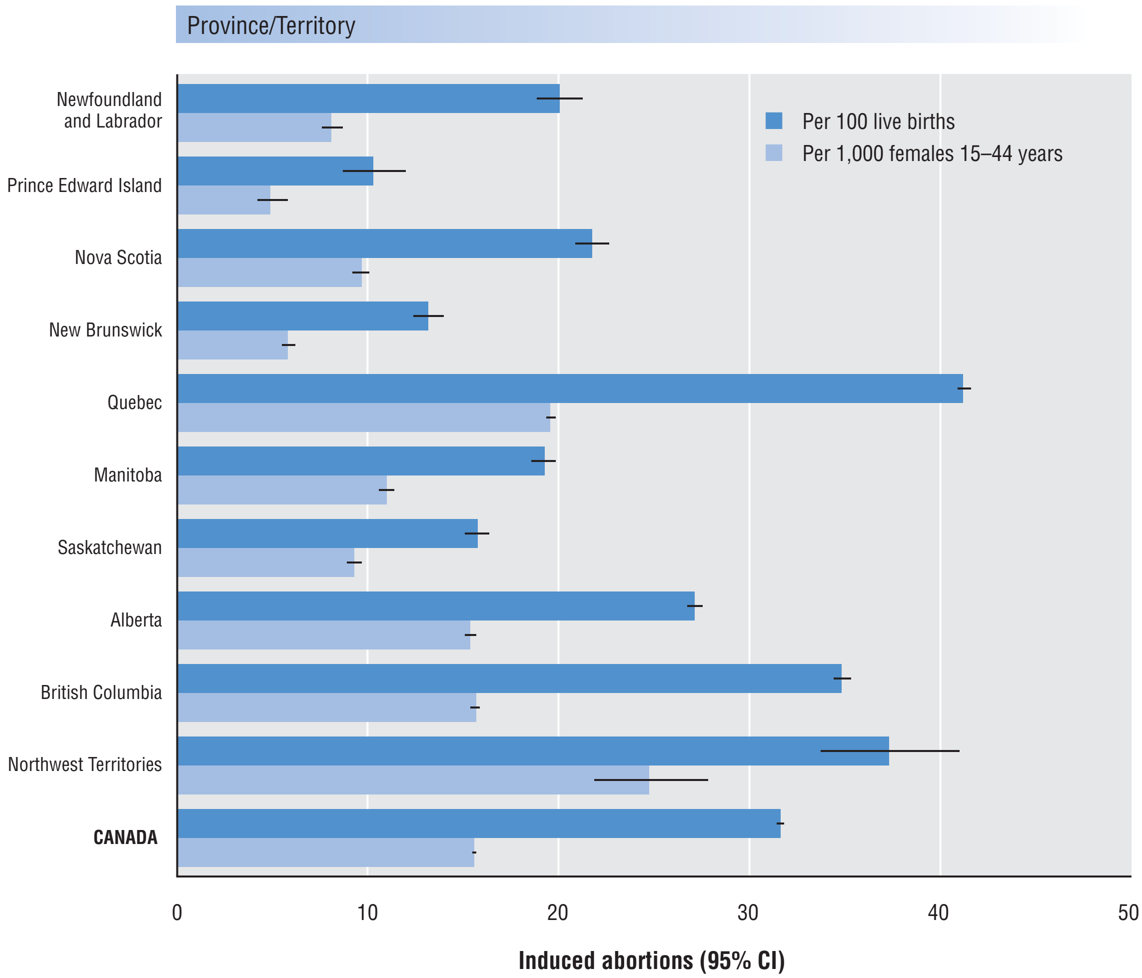
Sources: Statistics Canada. Pregnancy Outcomes 2004—Catalogue No. 82-224-XIE.
Statistics Canada. CANSIM II, table 051-0001—Canadian population estimates, 1995–2004.

* Includes abortions performed on Canadian residents in selected U.S. states (for years prior to 2004). Includes cases with age not specified as well as abortions to females ≤14 years of age and ≥45 years of age. Rate based on female population 15–44 years of age. May include some abortions performed in Canada on non-Canadian residents. For 2002 and 2003, data for Nunavut are excluded due to incomplete reporting.

** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

FIGURE 17.2 Ratio and rate of induced abortion,* by province/territory

*Canada (excluding Ontario, Yukon and Nunavut),** 2004*



Sources: Statistics Canada. Pregnancy Outcomes 2004—Catalogue No. 82-224-XIE.
Statistics Canada. CANSIM II, table 051–0001—Canadian population estimates, 1995–2004.

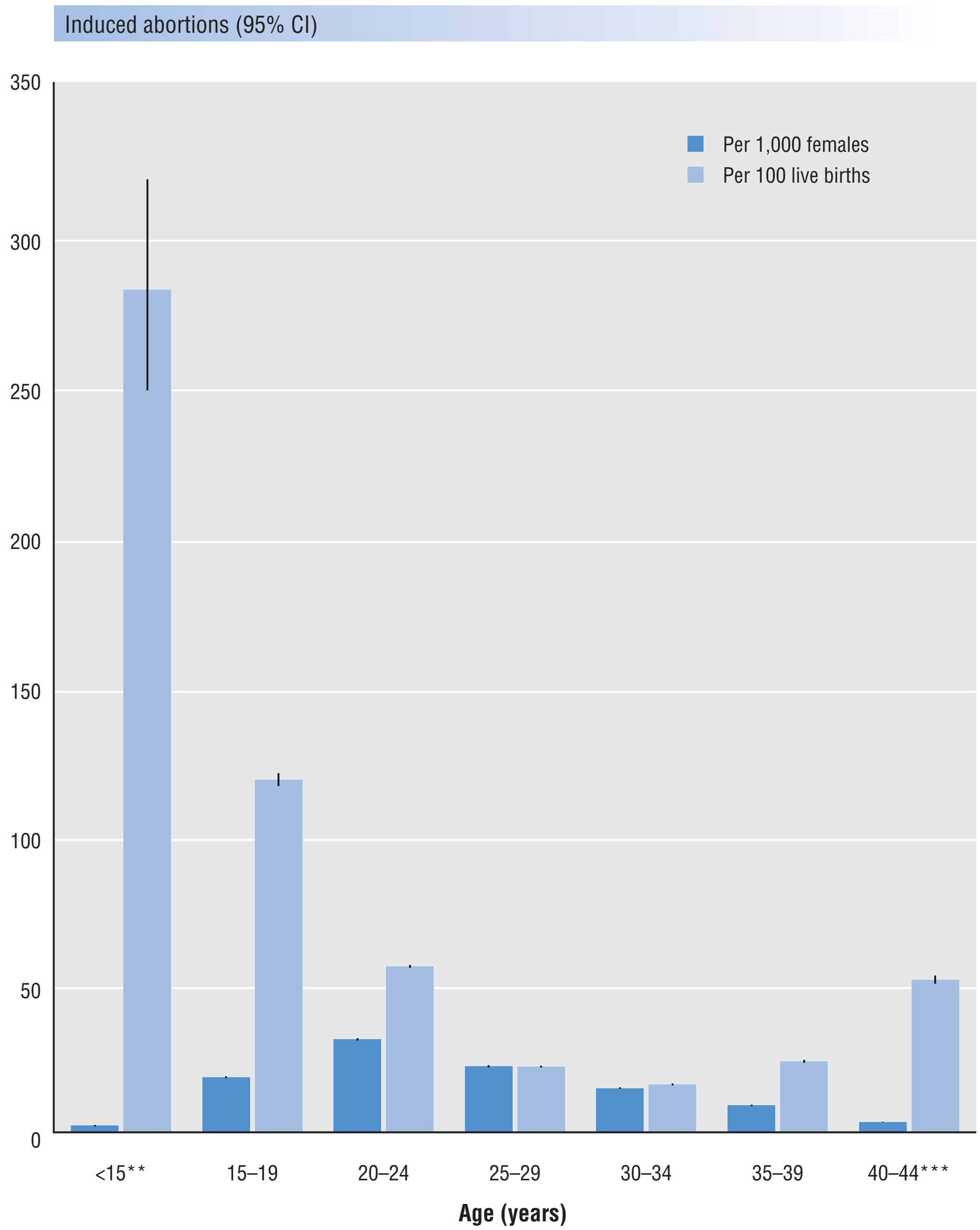
* Includes cases with age not specified as well as abortions to females ≤14 years of age and ≥45 years of age. Rate based on female population 15–44 years of age. Province/territory of residence may be imputed because of missing information. May include some abortions performed in Canada on non-Canadian residents.

** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H*. For 2004 the numbers were too small for reporting in Nunavut and Yukon territories.

CI—confidence interval

FIGURE 17.3 Age-specific induced abortion rate and ratio

Canada (excluding Ontario), 2004*



Sources: Statistics Canada. Pregnancy Outcomes 2004—Catalogue No. 82-224-XIE.
Statistics Canada. CANSIM II, table 051-0001—Canadian population estimates, 1995–2004.

* May include some abortions performed in Canada on non-Canadian residents. Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Rate based on female population aged 14 years.

*** Includes induced abortions to women ≥45 years of age. Rate based on female population aged 40–44 years.

CI—confidence interval

Data Limitations

The national induced abortion statistics have marked limitations,[6] and users must take care in interpretation of the data. Problems include exclusion of abortions performed in physicians' offices—either medical abortions or very early surgical abortions—and incomplete reporting from hospitals and clinics in Canada. For example, the 2004 data do not include information from clinics in Manitoba. Statistics provided to the national database by the provinces may exclude out-of-province patients altogether, or there may be incorrect assignment of province/territory of residence in the database. Some facilities do not even provide age groupings of patients, which requires imputation of age groups. The national induced abortion statistics do not include reason for the pregnancy termination, which is important information for comprehensive surveillance of abortions and congenital anomalies.

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18. Rate of Ectopic Pregnancy

Catherine McCourt, Shuqin Wei and William Fraser

The ectopic pregnancy rate is defined as the number of ectopic pregnancies per 1,000 reported pregnancies (in a given place and time).

Ectopic pregnancy, defined as the implantation of the blastocyst anywhere other than in the endometrial lining of the uterine cavity,[1] is a significant cause of maternal morbidity and mortality. In industrialized countries, ectopic pregnancy is the leading cause of maternal death during the first trimester of pregnancy, accounting for up to 10% of all maternal deaths.[2] In Canada, 6.5% of the maternal deaths reported by Statistics Canada for the years 1993–2004 were due to ectopic or molar pregnancy (see page 103 in this report).

The major risk factors for ectopic pregnancy are tubal damage from previous ectopic pregnancy, previous tubal surgery and tubal pathology. Previous pelvic inflammatory disease (due to genital chalmydia, gonorrhoea or other infection), infertility, history of more than one sexual partner, intrauterine contraceptive device use and smoking also increase the risk.[3] There is evidence that women undergoing treatment with assisted reproductive technology have an increased risk of ectopic pregnancy.[4] Rates of ectopic pregnancy increased in several countries between the 1970s and 1990s,[4–6] but are declining now.[4,6] This may be due to changes in risk factors resulting in changes in incidence, but factors such as earlier diagnosis, increase in outpatient management and other data issues may also play a role in the variations over time.[4,6]

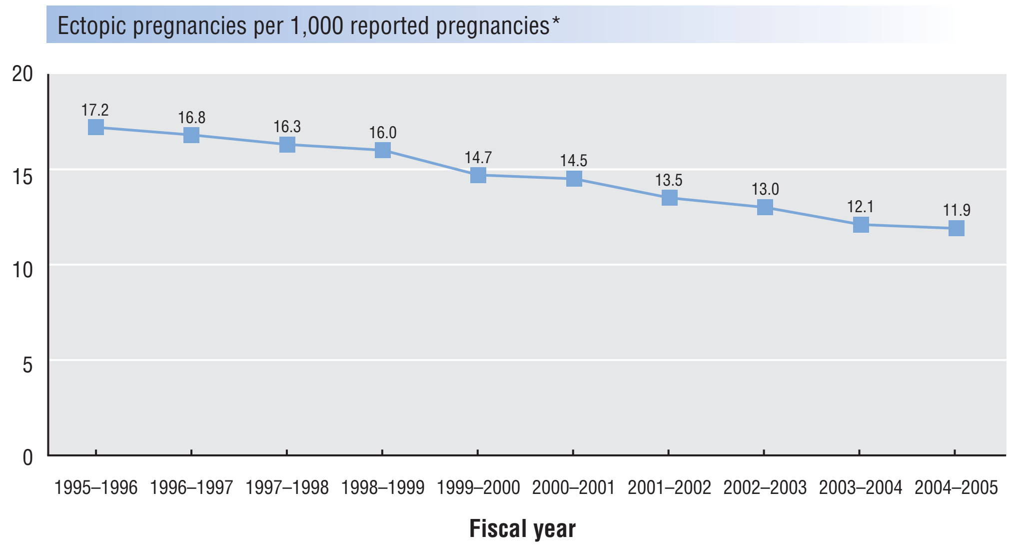
Ectopic pregnancy rates were calculated using hospitalization data.

Results

- In 2004–2005, the ectopic pregnancy rate in Canada was 11.9 per 1,000 reported pregnancies. The rate has been decreasing since 1995–1996 (Figure 18.1).
- The 2004–2005 provincial/territorial ectopic pregnancy rates ranged from 6.4 (95% CI: 2.9–12.2) per 1,000 reported pregnancies in Prince Edward Island to 31.8 (95% CI: 20.9–46.3) per 1,000 pregnancies in the Northwest Territories. Overall, the results suggest that the rates increase from east to west and especially to the north (note the wide confidence intervals for the territories and smaller provinces, Figure 18.2). This geographical variation is also seen in genital chlamydia and gonorrhea infection rates in 2004.[7]
- The 2004–2005 ectopic pregnancy rate increased with increasing maternal age (Figure 18.3). This may be partly due to an increased prevalence of damage of the fallopian tubes among older women.
- The increasing rates of sexually-transmitted infections observed in certain regions of Canada[7] could lead to increased rates of tubal damage during the early reproductive years and subsequent increased rates of ectopic pregnancy among women during the most active childbearing years.

FIGURE 18.1 Rate of ectopic pregnancy

Canada, 1995–1996 to 2004–2005

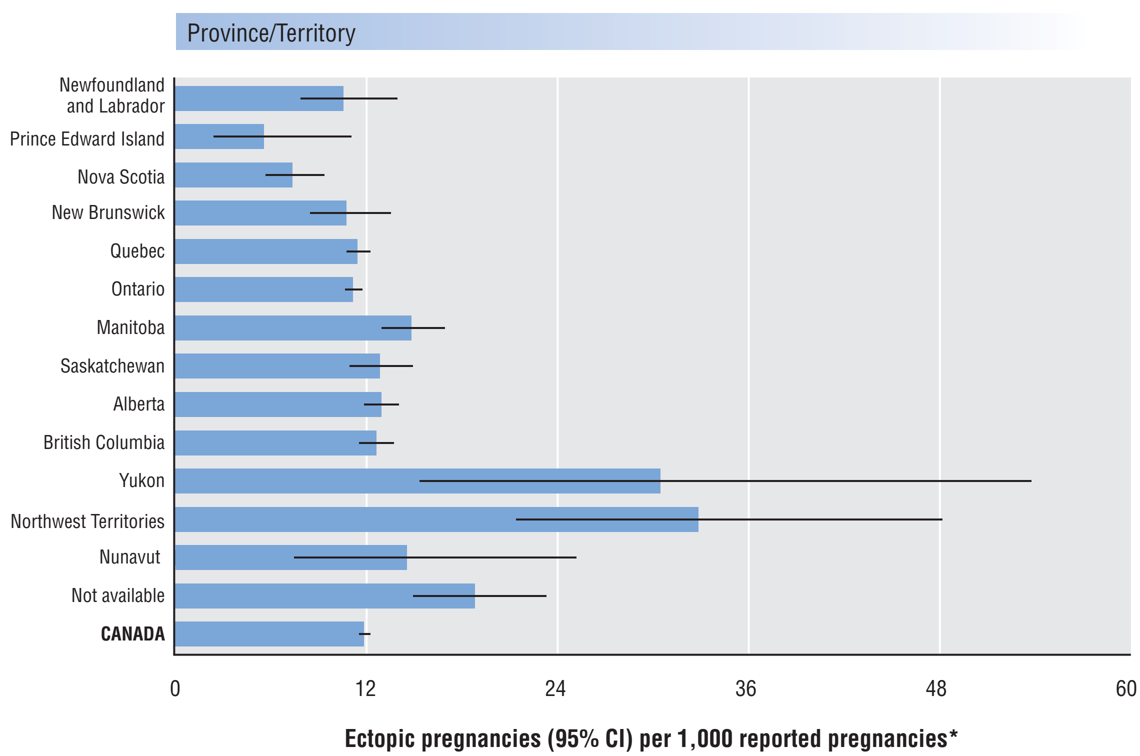


Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

* Reported pregnancies include all hospital deliveries, inpatient hospital-based induced abortions and ectopic pregnancies managed in the inpatient setting, but not spontaneous abortions, hospital day surgery induced abortions, clinic-based induced abortions or ectopic pregnancies managed in the outpatient setting.

FIGURE 18.2 Rate of ectopic pregnancy, by province/territory

Canada, 2004–2005



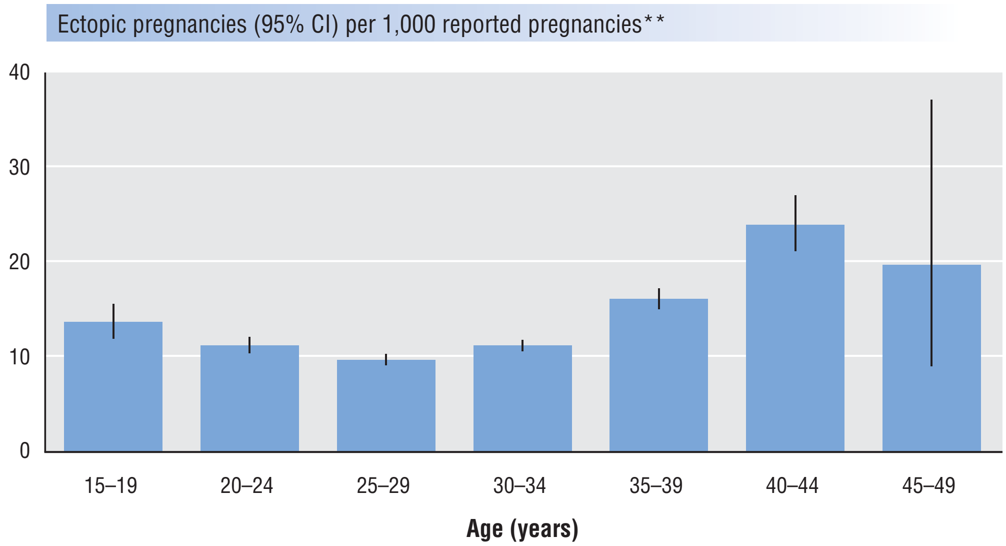
Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.

* Reported pregnancies include all hospital deliveries, inpatient hospital-based induced abortions and ectopic pregnancies managed in the inpatient setting, but not spontaneous abortions, hospital day surgery induced abortions, clinic-based induced abortions or ectopic pregnancies managed in the outpatient setting.

CI—confidence interval

FIGURE 18.3 Rate of ectopic pregnancy, by maternal age*

Canada, 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.

* Excludes cases of unknown maternal age.

** Reported pregnancies include all hospital deliveries, inpatient hospital-based induced abortions and ectopic pregnancies managed in the inpatient setting, but not spontaneous abortions, hospital day surgery induced abortions, clinic-based induced abortions or ectopic pregnancies managed in the outpatient setting.

CI—confidence interval

Data Limitations

An important limitation in the surveillance of ectopic pregnancy in Canada is the reliance on hospitalization data. In particular, the Hospital Morbidity Database contains inpatient data only. It lacks day surgery information, thereby excluding ectopic pregnancies that are managed in day surgery. Furthermore, as outpatient management of ectopic pregnancy through expectant management or methotrexate therapy becomes more common, the enumeration of ectopic pregnancy may be less complete. This analysis also excludes spontaneous abortions, hospital day surgery induced abortions and clinic-based induced abortions from the denominator (reported pregnancies).

There may be variation in the diagnosis of ectopic pregnancy, particularly at very early gestation, and the frequency of subclinical ectopic pregnancy is unknown.[8] The availability of risk factor information in hospital records is limited.

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19. Rate of Maternal Readmission after Discharge following Childbirth

Shiliang Liu and Maureen Heaman

The maternal hospital readmission rate is defined as the number of mothers readmitted to hospital within three months (90 days) of initial hospital discharge following childbirth, expressed as a proportion of the total number of women discharged from hospital following childbirth (in a given place and time).

Maternal readmission is an indicator of serious postpartum maternal morbidity and can serve as a proxy for serious complications related to childbirth, although some of the reasons (e.g., sterilization) for readmission are not directly related to delivery.[1–3] Many factors are associated with maternal readmission rates, including the severity of illness/obstetric condition, availability of hospital resources, distance to hospital, hospital admission policies and accessibility of outpatient services. Published studies indicate that a short length of hospital stay following a cesarean delivery or operative vaginal delivery increases the risk of maternal readmission.[1,3–6] Cesarean and operative vaginal deliveries have been associated with an increased risk of maternal readmission compared with spontaneous vaginal delivery, specifically due to pelvic injury/wounds, obstetric complications, venous disorders and thromboembolism, and major puerperal infection.[7] On the other hand, the impact of maternal readmission on maternal psychological well-being and breastfeeding has not been well documented in the scientific literature.[2,3,7]

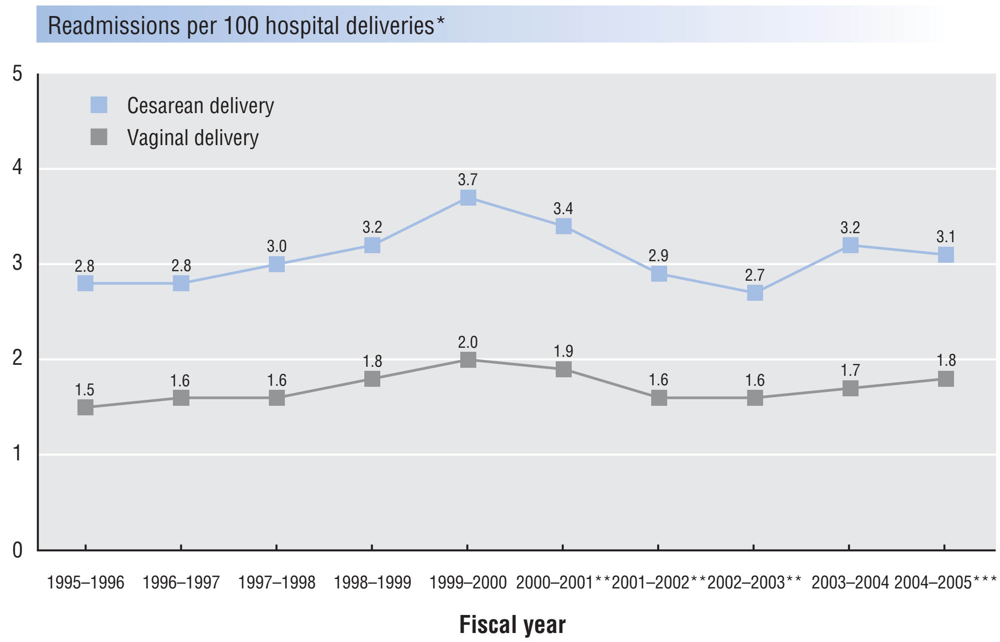
Readmission rates were calculated using national hospitalization data. Lower readmission rates for 1993 to 2000 reported here compared to previous reports are largely due to changes in linkage methodology and more readmissions flagged as “day surgery” in the current database.

Results

- The 90-day maternal readmission rate following vaginal delivery increased from 1.5% of deliveries in 1995–1996 to 2.0% in 1999–2000, then decreased slightly to 1.8% in 2004–2005. Readmission rates following cesarean delivery also increased from 2.8% of deliveries in 1995–1996 to 3.7% in 1999–2000, then declined thereafter to 3.1% in 2004–2005 (Figure 19.1).
- In the period 2002–2003 through 2004–2005, the 90-day maternal readmission rate varied significantly among provinces and territories, both for women with cesarean delivery and for those with vaginal delivery (Figure 19.2). These regional differences may be due, in part, to variations in hospital discharge (following childbirth) and admission policies or variations in availability of outpatient and other community-based services.
- In the time period 2002–2003 to 2004–2005, postpartum hemorrhage (PPH), major puerperal infection and gallbladder disorders were the most frequent primary diagnoses in cases of maternal readmission (Figure 19.3).
- The primary diagnosis for readmission differed for cesarean and vaginal deliveries. For example, women having had a cesarean delivery were more likely to be readmitted for major puerperal infection and puerperal complications of pregnancy, while PPH was the most common reason for readmission among women following vaginal delivery (Figure 19.3).

FIGURE 19.1 **Rate of maternal readmission within 90 days of discharge from hospital following childbirth**

Canada, 1995–1996 to 2004–2005



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

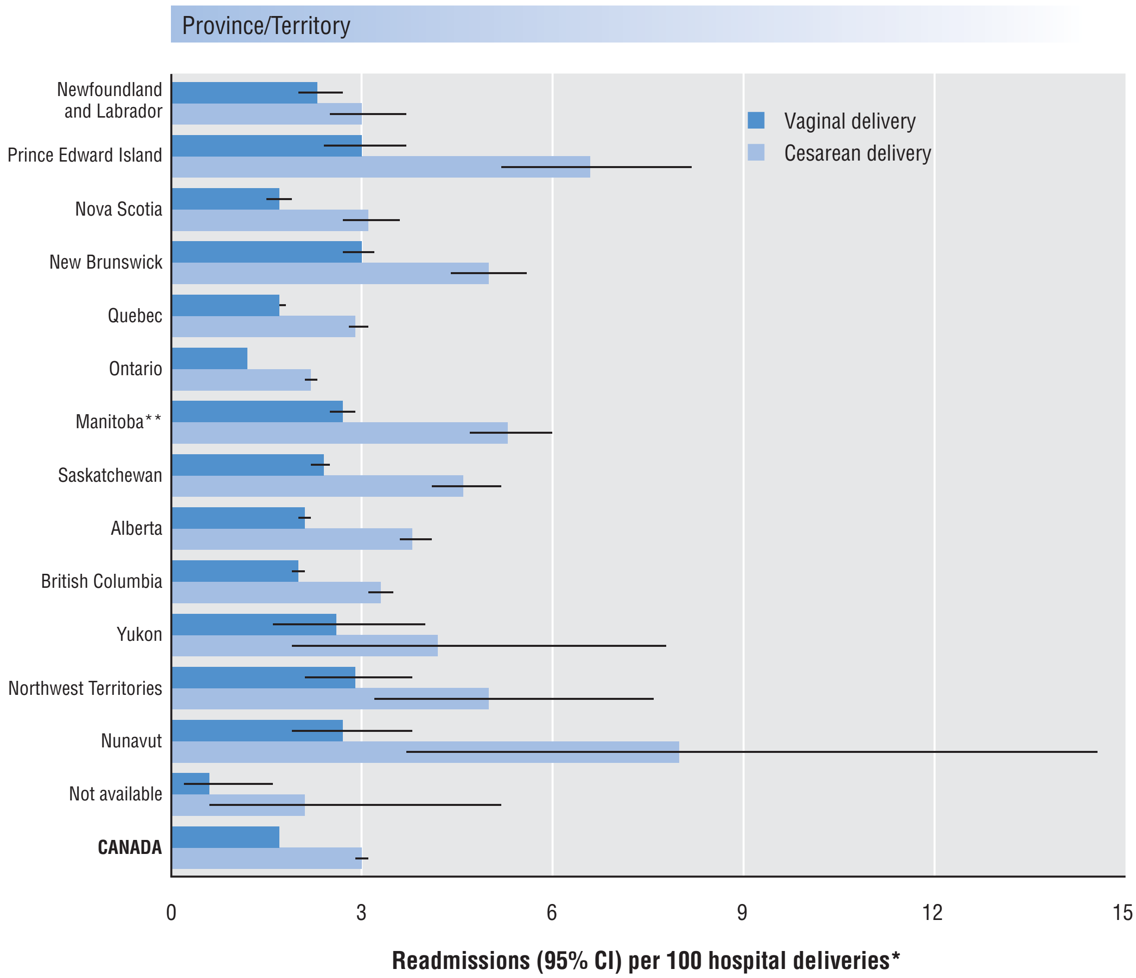
* Only for women for whom a scrambled health card number was available.

** 2000–2001 to 2002–2003 data for Manitoba were excluded because complete health card numbers were not available for approximately 70% of its hospital records in the HMDB, so linkage to readmitted cases was not possible. See *Appendix A* for further details.

*** For 2004–2005, the denominator (i.e., number of hospital deliveries) only includes the nine-month period from April 1, 2004, to December 31, 2004, to allow a 90-day time window in which readmissions could be ascertained.

FIGURE 19.2 Rate of maternal readmission within 90 days of discharge from hospital following childbirth,* by province/territory

*Canada,** 2002–2003 to 2004–2005 combined****



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.

* Only for women for whom a scrambled health card number was available.

** 2002–2003 data for Manitoba were excluded because complete health card numbers were not available for approximately 70% of its hospital records in the HMDB, so linkage to readmitted cases was not possible. See *Appendix A* for further details.

*** Data for three years were combined because of small numbers.

CI—confidence interval

FIGURE 19.3 Primary diagnosis for maternal readmissions within 90 days of discharge from hospital following childbirth,* by delivery mode

*Canada,** 2002–2003 to 2004–2005 combined****

Primary diagnosis at readmission	Percentage of maternal readmission*		
	Mode of delivery		
	Total	Cesarean	Vaginal
1. Postpartum hemorrhage	13.8	6.4	17.7
2. Major puerperal infection	11.2	12.4	10.5
3. Cholelithiasis	10.1	8.5	10.9
4. Complications of pregnancy, not elsewhere classified	7.7	15.9	3.3
5. Other and unspecified complication of puerperium	5.0	10.5	2.1
6. Person seeking consultation without complaint of sickness, postpartum care and examination	4.1	2.9	4.7
7. Other current conditions in the mother classifiable elsewhere, but complicating pregnancy, childbirth or the puerperium	3.1	3.6	2.9
8. Depressive disorder and mood/affective psychoses	2.8	2.0	3.2
9. Infection of the breast and nipple associated with childbirth	2.5	1.8	2.9
10. Acute appendicitis	2.2	1.6	2.6
11. Hypertension complicating pregnancy, childbirth and puerperium	2.0	2.1	1.9
12. Symptoms involving abdomen and pelvis	1.4	1.4	1.4
13. Acute pancreatitis	1.3	1.1	1.4
14. Retained placenta	1.1	0.5	1.5
15. Complication of procedures, not elsewhere classified	1.1	1.5	0.9
16. Calculus of kidney and ureter	1.0	0.8	1.1
17. Other diagnoses	29.5	27.0	30.9
TOTAL	**100**	**100**	**100**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
* Only for women for whom a scrambled health card number was available.
** 2002–2003 data for Manitoba were excluded because complete health card numbers were not available for approximately 70% of its hospital records in the HMDB, so linkage to readmitted cases was not possible. See *Appendix A* for further details.
*** Data for three years were combined due to small numbers.

Data Limitations

Maternal readmission cases were identified by linking obstetric delivery records and the subsequent admission records through the woman's scrambled health card number in the hospitalization database. Delivery records were excluded from linkage if a woman was directly transferred to another hospital, her in-hospital length of stay was >20 days, her (scrambled) health card number was invalid or missing, or if death occurred in hospital. A case of maternal readmission would be missed if a link was not made between the obstetric record and the subsequent admission record for any reason (including transcription errors in the records).

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Fetal and Infant Health Outcomes

20. Preterm Birth Rate

Shiliang Liu, Alexander Allen and William Fraser

The preterm birth rate is defined as the number of live births with a gestational age at birth of less than 37 completed weeks (<259 days) expressed as a proportion of all live births (in a given place and time).

Preterm birth is the leading cause of neonatal and infant mortality in industrialized countries and accounts for a substantial portion of all neonatal morbidity; 60%–80% of infant deaths without congenital anomalies are related to preterm birth.[1–4] Preterm birth is also associated with cerebral palsy and other long-term health sequelae.[3,5] One to two percent of all infants are delivered before 32 weeks of gestation and account for nearly 50% of all long-term neurological morbidity and about 60% of perinatal mortality.[1] However, mild and moderate preterm birth also puts infants at increased risk of death during infancy and constitutes an important public health issue.[1] The morbidity associated with preterm birth includes acute respiratory failure, gastrointestinal complications, immunologic deficiencies and central nervous system hemorrhage, as well as longer term motor, cognitive, visual, hearing, behavioural and growth problems.[1–4] Compared with their term counterparts, preterm infants incur higher costs that include early intervention, long-term hospital, outpatient medical, developmental and educational expenses.[6] The preterm birth rate has been increasing in many industrialized countries in recent years.

Preterm birth has a multifactorial etiology. Associated factors include individual-level behavioural and psychosocial factors, neighbourhood characteristics, environmental exposures, medical conditions, infertility treatments, biological factors and genetics.[7–9] Specific examples of these factors are single marital status, younger or older maternal age, previous preterm delivery, infection, smoking, low pre-pregnancy weight, low or high weight gain, multiple gestation and race/ethnicity.[3,4,7–9] More recently, maternal stress has also been identified as a potentially important risk factor for preterm birth.[7,10]

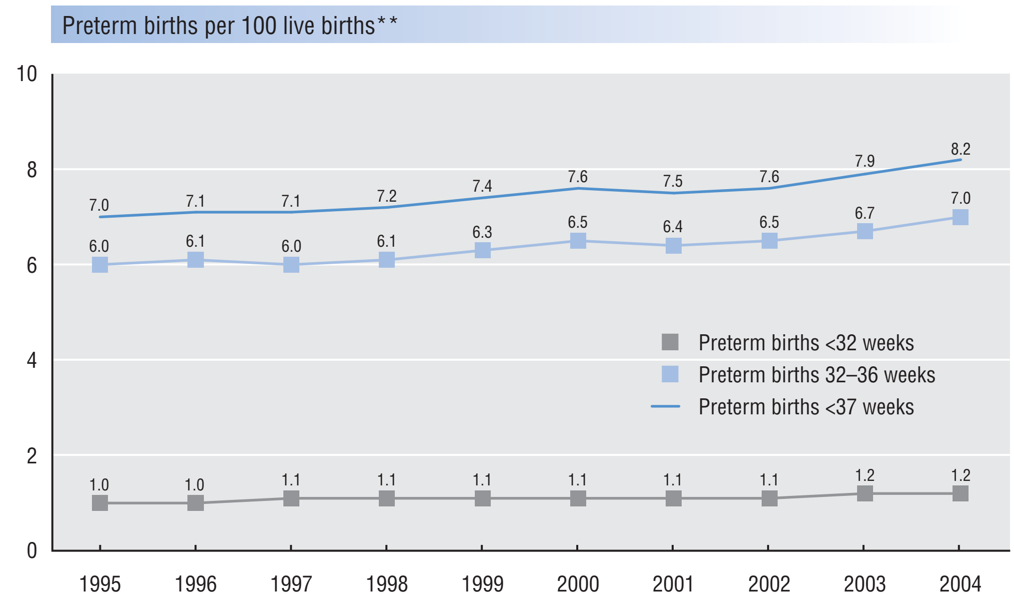
Preterm birth rates were calculated using vital statistics data.

Results

- The Canadian preterm birth rate increased from 7.0 per 100 live births in 1995 to 8.2 per 100 live births in 2004 (Figure 20.1). Explanations for this trend include increases in obstetric interventions (i.e., medically indicated labour induction and/or cesarean delivery), multiple births, older maternal age as well as increases in the use of ultrasound-based estimates of gestational age. The latter factor is responsible for an artefactual increase in preterm birth due to a change in the modality of gestational age ascertainment.[5,11]
- In absolute terms, the increase in the overall preterm birth rate was largely due to an increase in mild preterm birth (32–36 weeks), from 6.0 per 100 live births in 1995 to 7.0 per 100 live births in 2004. Preterm birth <32 weeks also increased from 1.0 per 100 live births in 1995 to 1.2 per 100 live births in 2004 (Figure 20.1)
- In 2004, 57.0% of twins and 96.1% of higher order multiple births were preterm (Figure 20.2). However, approximately 80% of all preterm births occurred among singletons.
- In 2004, provincial/territorial preterm birth rates varied widely, from a low of 7.4 (95% CI: 6.9–7.9) per 100 live births in Saskatchewan to a high of 12.2 (95% CI: 9.9–14.7) per 100 live births in Nunavut (Figure 20.3).

FIGURE 20.1 Rate of preterm birth

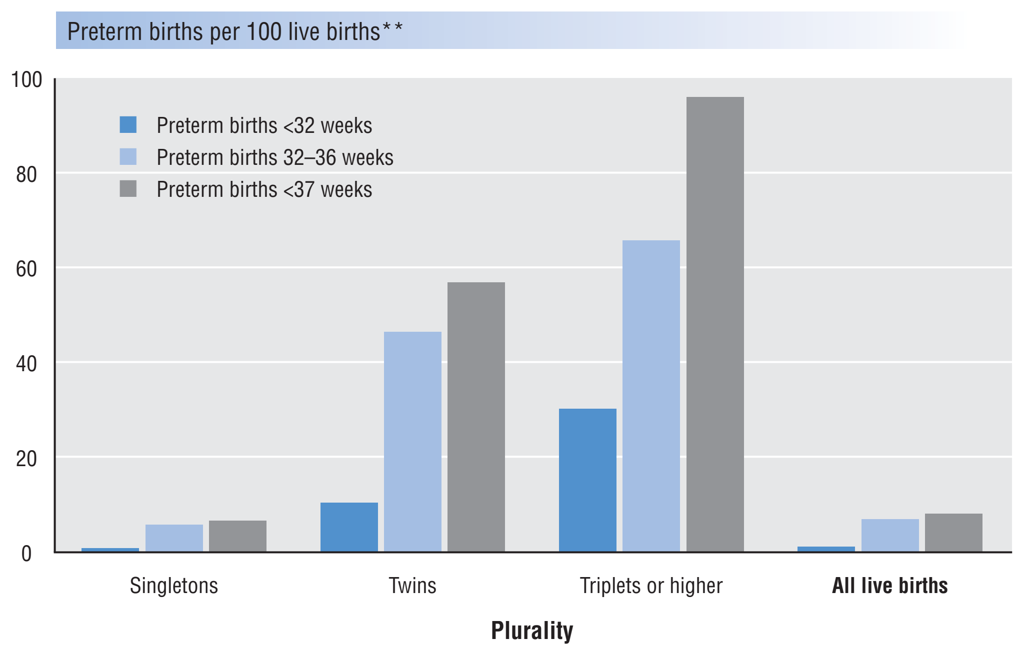
Canada (excluding Ontario), 1995–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age were excluded from this figure.

FIGURE 20.2 Rate of preterm birth among singleton and multiple births

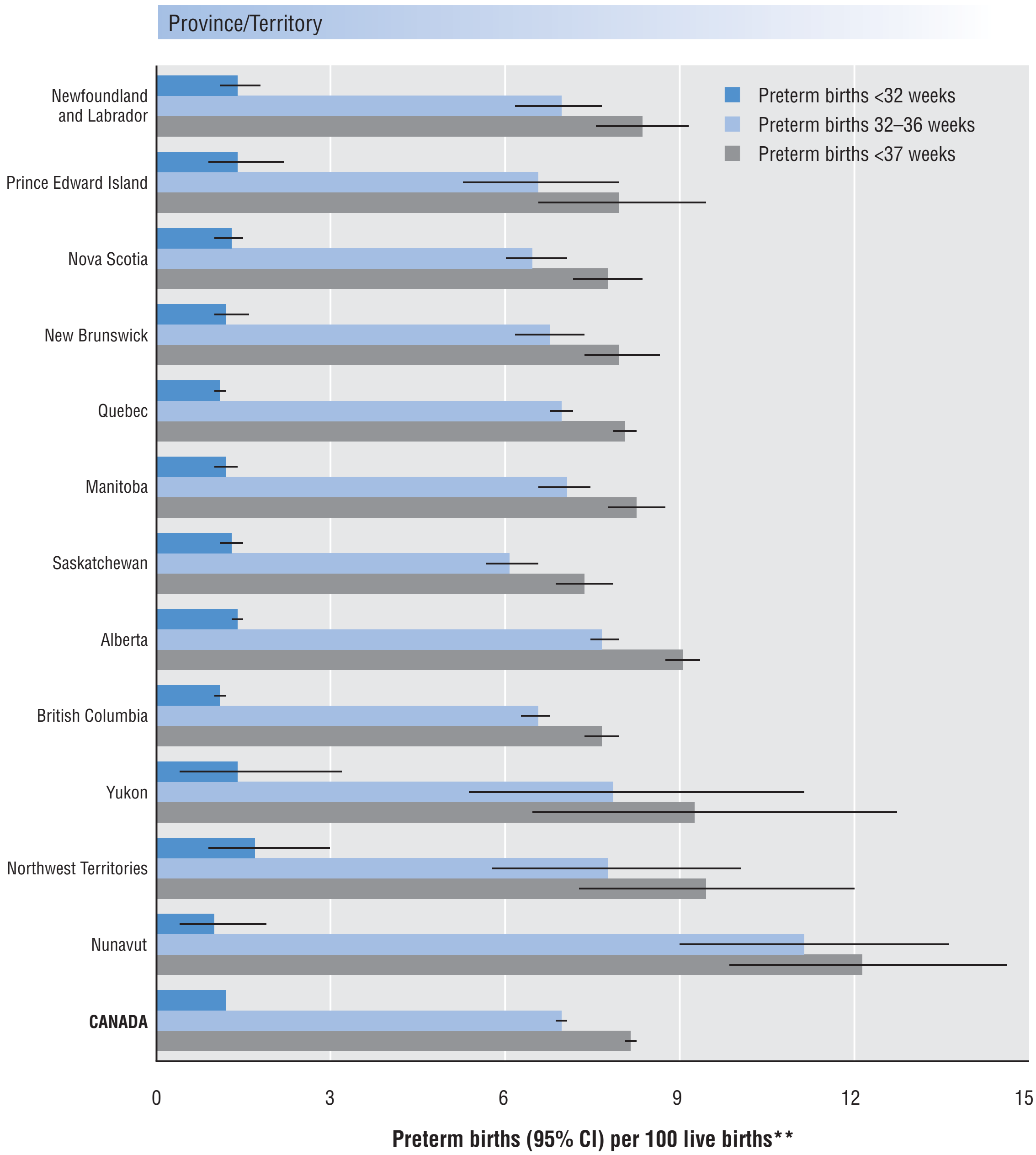
Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age were excluded from this figure.

FIGURE 20.3 Rate of preterm birth, by province/territory

Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H*.
** Live births with unknown gestational age were excluded from this figure.
CI—confidence interval

Data Limitations

An important limitation of data on preterm birth is error in reporting of gestational age, particularly when it is based on menstrual dates. Such errors arise due to inaccurate maternal reporting of the last menstrual period, the interpretation of postconception bleeding as normal menses, irregular menstrual cycles or intervening unrecognized pregnancy losses.[11] These errors have diminished in recent decades as ultrasound confirmation of gestational age is widely used across Canada.

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■ 21. Postterm Birth Rate

Juan Andrés León and David Young

The postterm birth rate is defined as the number of live births that occur at a gestational age of 42 or more completed weeks (294 days and beyond) of pregnancy, expressed as a proportion of all live births (in a given place and time).

As a group, postterm pregnancies are associated with more maternal complications (e.g., obstetric trauma, shoulder dystocia, postpartum hemorrhage, cesarean delivery) and perinatal morbidity (e.g., meconium aspiration, asphyxia, neonatal seizures) and mortality than term pregnancies.[1] Compared to that at 40 weeks, perinatal mortality at 43 weeks is four times higher and at 44 weeks is five to seven times higher.[2] The etiology of postterm pregnancy is largely unknown, although associations with maternal factors such as genetics,[3] nulliparity, previous postterm pregnancy, and recurrence of prolonged pregnancy across generations,[4] have been found. Rarely, major congenital anomalies that alter the mechanisms involved in the onset of labour may lead to postterm delivery.[5]

The frequency of postterm birth ranges from 4% to 14% and this variation depends on factors such as the method of gestational age estimation and the proportion of women who deliver via elective induction or cesarean.[6] The routine use of ultrasound early in pregnancy to estimate gestational age can reduce the number of pregnancies diagnosed as postterm; therefore, the overall rate of postterm birth.[7] The management of postterm pregnancy generally involves either inducing labour electively at 41–42 weeks or awaiting the onset of spontaneous labour with serial fetal health monitoring (expectant management). Advances in approaches to assess fetal well-being have helped ensure the safety of the expectant approach. However, compared to expectant management, elective labour induction at 41 completed weeks or beyond has been associated with fewer perinatal deaths with no increase in the use of cesarean delivery.[8]

Rates of postterm birth were estimated using vital statistics data.

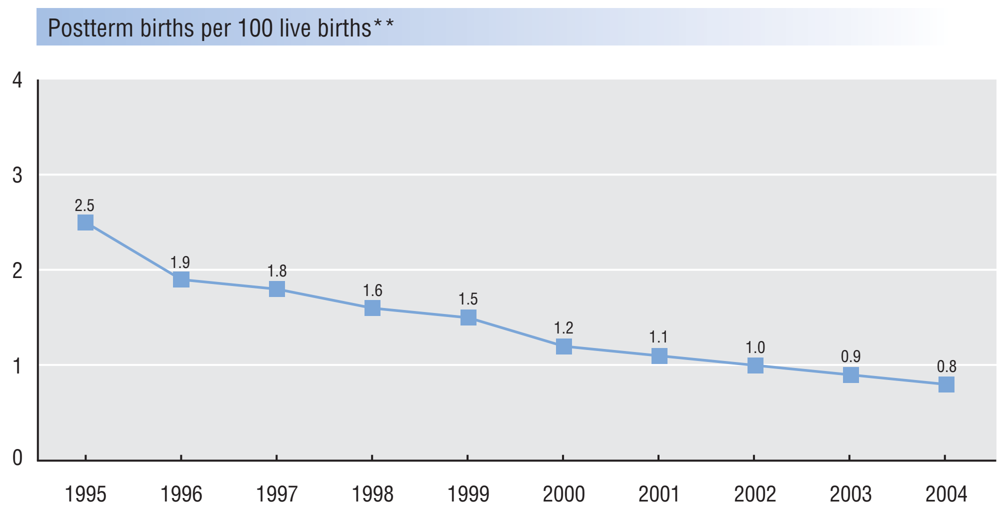
Results

- Between 1995 and 2004, the rate of postterm birth decreased from 2.5% to 0.8% (Figure 21.1). This reduction could be attributed in part to an increased use of ultrasound to estimate gestational age as well as to more pregnancies being induced at or over 41 weeks of gestation. The rate of postterm birth fell substantially after the study by Hannah and colleagues, which showed a lower rate of cesarean delivery following induction compared to serial antenatal monitoring for pregnancies at 41 or more completed weeks.[9]

- In 2004, the rates of postterm birth varied substantially among Canadian provinces and territories (Figure 21.2), with the lowest rate in Nunavut at 0.0 (95% CI: 0.0–0.5) and the highest rate in Yukon at 3.8 (95% CI: 2.1–6.4). These regional variations may reflect geographic differences in the use of ultrasound dating and induction of labour at or beyond term or unstable estimates due to small numbers.

FIGURE 21.1 Rate of postterm birth

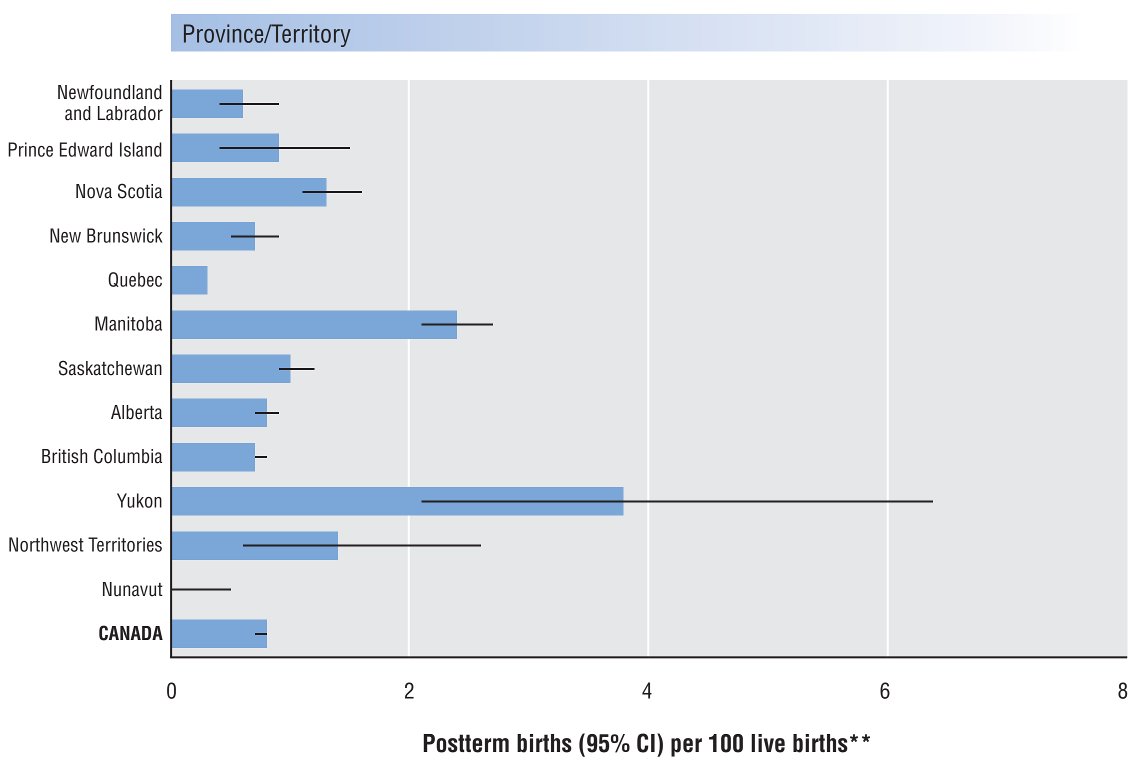
Canada (excluding Ontario), 1995–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age were excluded from this figure.

FIGURE 21.2 Rate of postterm birth, by province/territory

Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age were excluded from this figure.
CI—confidence interval

Data Limitations

An important limitation to postterm birth surveillance is the potential error in determining gestational age, particularly when it is based on the last normal menstrual period (LMP). Factors that may affect an accurate recollection of LMP include the interpretation of postconception bleeding as normal menses, irregular menstrual cycles and unrecognized pregnancy losses.

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22. Small-for-Gestational-Age Rate

Joan Lindsay, Grace Guyon and Alexander Allen

The small-for-gestational-age (SGA) rate is defined as the number of live births whose birth weight is below the standard 10th percentile of the sex-specific birth weight for gestational age, expressed as a proportion of all live births (in a given place and time). Alternative cut-offs to determine SGA, such as the 3rd percentile of birth weight for gestational age, have also been used. The term SGA is often used interchangeably with intrauterine growth restriction (IUGR), although there are distinctions between the two—IUGR refers to the occurrence of poor fetal growth which may happen through a number of mechanisms, while SGA describes an infant's position on growth charts after birth.

In industrialized countries, maternal cigarette smoking during pregnancy accounts for about 30%–40% of SGA births; "genetically related factors," such as history of SGA pregnancies, maternal race, short maternal stature and fetal sex account for about 20%–30%; nutritional factors (pre-pregnancy weight, weight gain and low caloric intake) for 10%–15%; and parity and general maternal morbidity for 5%–10%.[1]

SGA births are associated with increased fetal and infant morbidity and mortality.[2] SGA babies can also be low birth weight (defined as less than 2,500 grams); low birth weight has been associated with subsequent increased risk of type 2 diabetes and coronary heart disease later in life.[3,4]

SGA rates were calculated using vital statistics data. Only singleton live births were included in the calculations.

Results

- From 1995 to 2004, the rate of SGA among singleton live births in Canada decreased (Figure 22.1). This may be due, in part, to increases in maternal size, reduced cigarette smoking and changes in sociodemographic factors, as well as to more frequent use of ultrasound-assisted dating (which improves the accuracy of gestational age measurements).[5] The 2004 rate of SGA was 7.8 per 100 singleton live births.
- In 2004, the rate of SGA ranged from 5.1% (95% CI: 3.5–7.1) of singleton live births in the Northwest Territories to 8.4% (95% CI: 8.2–8.7) of singleton live births in Alberta (Figure 22.2). These regional variations in SGA rates may be due, in part, to geographic differences in the use of ultrasound dating or to ethnic, socioeconomic and demographic differences. Further research is needed to better understand these regional variations.

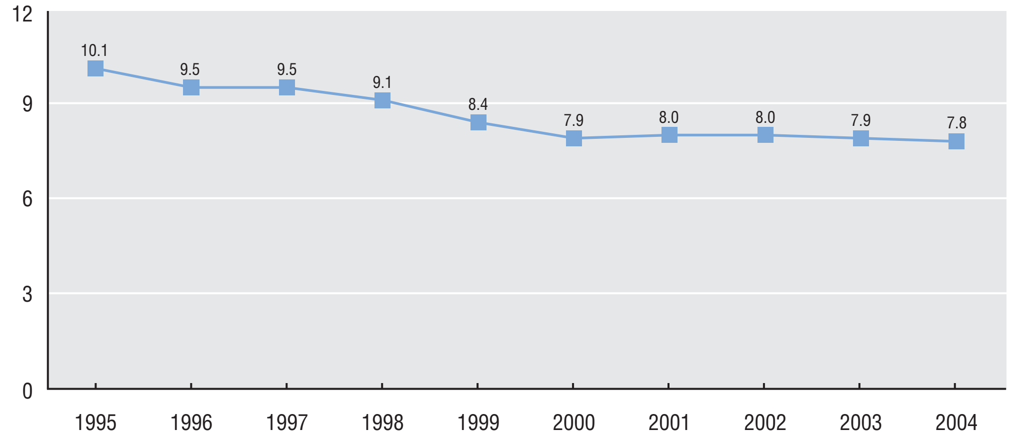
Data Limitations

An important limitation in the surveillance of SGA births is the potential for error in determining gestational age, particularly when menstrual dates are used.[5] The accuracy of gestational age estimation can be substantially improved by ultrasound-assisted dating early in pregnancy.[5] SGA is a relative measure and varies according to the standard used for calculation. The standard used for this report is the recently developed population-based Canadian reference for birth weight for gestational age.[6]

FIGURE 22.1 **Rate of small for gestational age (SGA)**

Canada (excluding Ontario), 1995–2004*

SGA singleton live births per 100 singleton live births**



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.

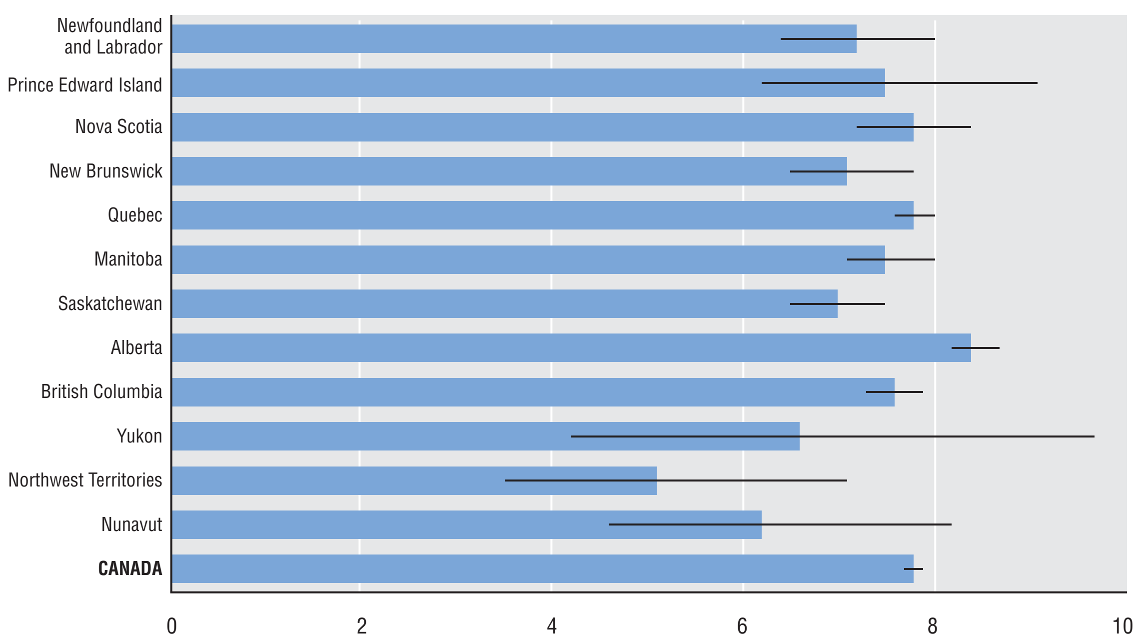
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. SGA cut-off used is based on the 10th percentile of the sex-specific birth weight for gestational age.[6]

FIGURE 22.2 **Rate of small for gestational age (SGA), by province/territory**

Canada (excluding Ontario), 2004*

Province/Territory



SGA singleton live births (95% CI) per 100 singleton live births**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. SGA cut-off used is based on the 10th percentile of the sex-specific birth weight for gestational age.[6]

CI—confidence interval

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23. Large-for-Gestational-Age Rate

Joan Lindsay, Grace Guyon and Janet Smylie

The large-for-gestational-age (LGA) rate is defined as the number of live births whose birth weight is above the standard 90th percentile of the sex-specific birth weight for gestational age, expressed as a proportion of all live births (in a given place and time). Alternative cut-offs to determine LGA can also be used, such as the 97th percentile of birth weight for gestational age.

Information on risk factors for LGA is sparse in the literature. Maternal diabetes is an important risk factor for LGA (and macrosomia).[1] Other factors, including genetic predisposition and maternal diet, may also play a role. Accelerated fetal growth can result in macrosomia with associated birth complications for both the infant (including shoulder dystocia, brachial plexus injury and Erb's palsy) and the mother (including postpartum hemorrhage).[1–3] In turn, high birth weight may increase the risk of type 2 diabetes later in the child's life.[4]

Because of the difficulty of in-utero measurement of growth, a cross-sectional measure of fetal growth—birth weight for gestational age—has been used in public health practice for setting clinical standards for identifying LGA fetuses.[2,5] Routine surveillance and serial monitoring of pregnancies, especially high-risk pregnancies, can be helpful in identifying fetuses at high risk of being LGA (and macrosomic) and in planning appropriate obstetric intervention.

LGA births have been reported to be more common among First Nations women,[6] particularly for those with gestational diabetes mellitus.[7] Programs aimed at optimizing birth weight may reduce type 2 diabetes in future generations of both First Nations and other Canadian populations.[4,8]

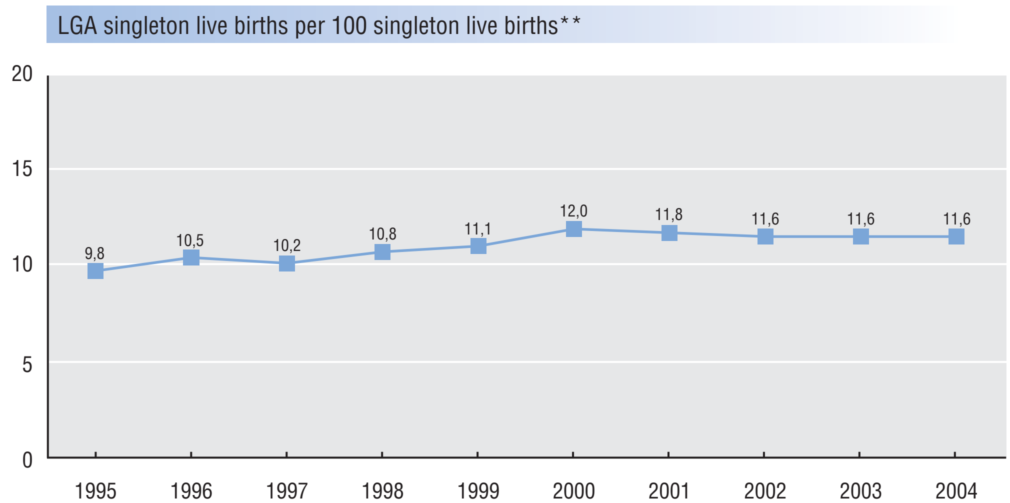
LGA rates were calculated using vital statistics data. Only singleton live births were included in the calculations.

Results

- From 1995 to 2000, the rate of LGA among singleton live births increased and peaked at 12.0 per 100 singleton live births, then decreased slightly and remained at 11.6 from 2002 to 2004 (Figure 23.1). A Canadian study found that the earlier increase may have been due to increases in maternal body mass index (BMI), reduced cigarette smoking and changes in sociodemographic factors, in addition to more accurate gestational age measurements using ultrasound.[9]
- In 2004, the rate of LGA ranged from 10.2% (95% CI: 10.0–10.4) of singleton live births in Quebec to 20.4% (95% CI: 17.3–23.8) in the Northwest Territories (Figure 23.2). These regional variations in LGA rates may be partly due to ethnic, socioeconomic and demographic differences or to differences in the use of ultrasound dating. Further research is needed to better understand these regional variations.

FIGURE 23.1 Rate of large for gestational age (LGA)

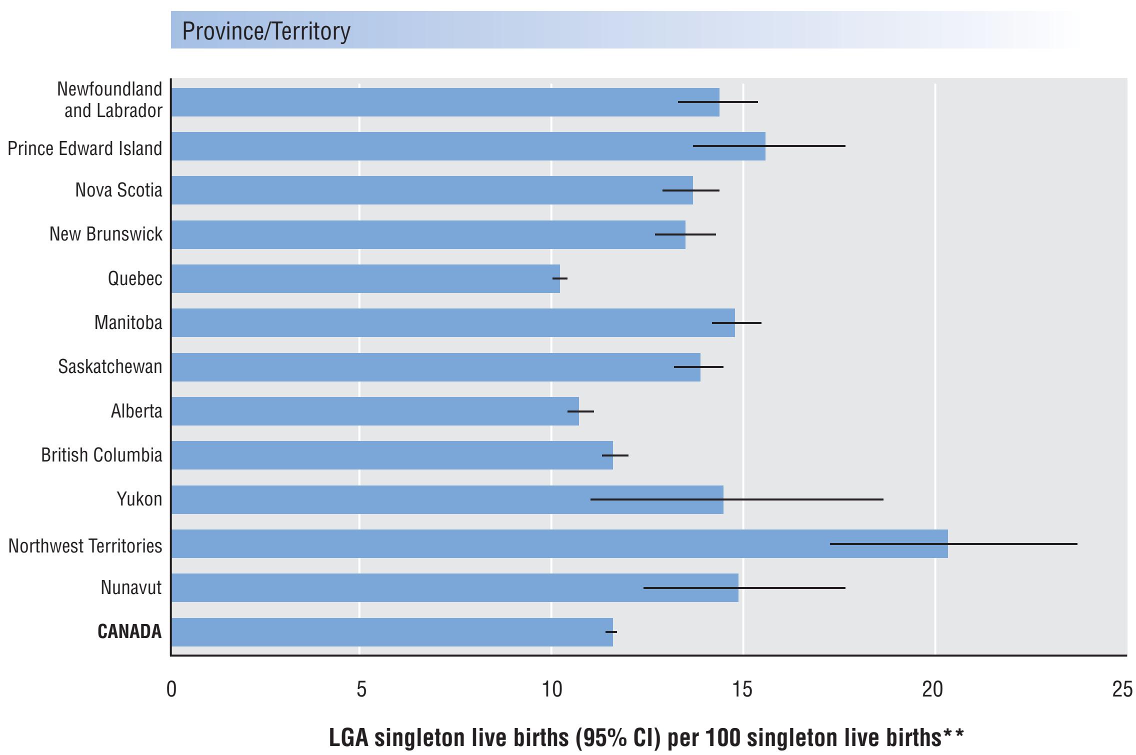
Canada (excluding Ontario), 1995–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H*.
** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks and multiple births. LGA cut-off used is based on the 90th percentile of the sex-specific birth weight for gestational age.[5]

FIGURE 23.2 Rate of large for gestational age (LGA), by province/territory

Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H*.
** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks and multiple births. LGA cut-off used is based on the 90th percentile of the sex-specific birth weight for gestational age.[5]
CI—confidence interval

Data Limitations

An important limitation in the surveillance and research of LGA births is the potential for error in determining gestational age, particularly when only menstrual dates are used.[5] The accuracy of gestational age estimation can be substantially improved by ultrasound-assisted dating in early pregnancy.[5] LGA is a relative measure and varies according to the standard used for its calculation. The standard used for this report is the recently developed population-based Canadian reference for birth weight for gestational age.[5]

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24. Fetal Mortality Rate

Ling Huang, Alexander Allen and Robert Liston

The fetal mortality rate is defined as the number of fetal deaths per 1,000 total births (live births and stillbirths) in a given place and time. The definition of stillbirth in most of Canada includes all fetal deaths with a gestation of 20 weeks or greater, or a birth weight of at least 500 grams. The definition varies slightly in Quebec where only the birth weight criterion applies (birth weight ≥500 grams). Information on reporting of stillbirths and live births in the provinces and territories of Canada is currently being prepared for health professionals.

Since the legal requirements for registration of fetal deaths and live births vary between and even within countries, the WHO recommends that, if possible, all fetuses and infants weighing at least 500 grams, whether alive or dead, be included in international statistics, and when the weight is unavailable, that a gestational age of ≥22 weeks be used.[1,2]

Although the stillbirth rate has decreased over the past four decades, the proportion of perinatal deaths that are stillbirths has increased.[3] Stillbirths currently account for more than half of all perinatal deaths and one third of all feto-infant deaths in industrialized countries.[4] See *Appendix E* for a definition of perinatal and feto-infant periods used in this report.

The reported stillbirth rate in the industrialized world is typically under 10 per 1,000 total births, regardless of the difference in registration criteria for stillbirth between or within countries.[3,5] Important causes of stillbirth include congenital anomalies, placental abruption, umbilical cord accidents, infection, and maternal complications of pregnancy such as hypertension and diabetes. Also, more than 25% of stillbirths are due to unknown causes. Risk factors for stillbirth include prior stillbirths, low socioeconomic status, advanced maternal age, primiparity, maternal smoking during pregnancy, high pre-pregnancy weight, small for gestational age (SGA), intrauterine growth restriction (IUGR) and multiple pregnancies.[3,4,6] The increasing use of assisted reproductive technology in industrialized countries has resulted in a dramatic increase in multiple pregnancies, which have a higher risk of fetal mortality.[7,8] As well, advanced maternal age and high pre-pregnancy weight have also increased in many industrialized countries.[9,10]

Fetal mortality rates were calculated using vital statistics data.

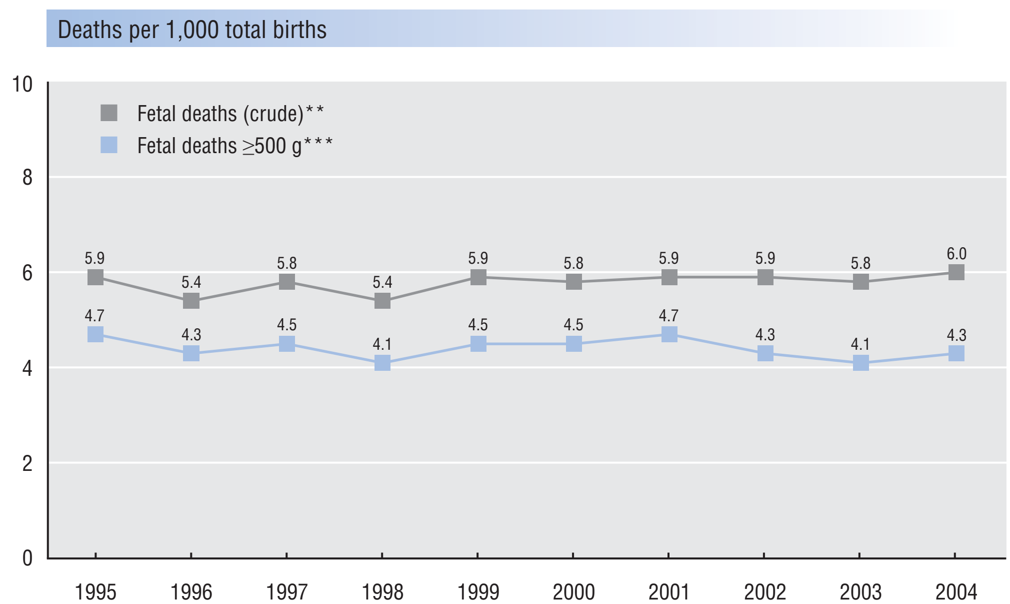
Results

- There was no clear trend in crude fetal mortality rates in the time period 1995–2004. The rates fluctuated between 5.4 and 6.0 per 1,000 total births (Figure 24.1).
- The rates of fetal mortality ≥500 grams (or gestational age ≥22 weeks if birth weight unknown) also fluctuated during the time period 1995–2004 from a low of 4.1 to a high of 4.7 per 1,000 total births, showing no clear trend (Figure 24.1).
- In 2004, the fetal mortality rate for ≥500 grams was highest in the three territories at 6.6 (95% CI: 3.5–11.8) per 1,000 total births (Figure 24.2). Newfoundland and Labrador had the lowest rate, at 3.6 (95% CI: 2.0–5.8) per 1,000 total births.

- In 2004, the crude fetal mortality rate was 6.0 per 1,000 total births, with a rate of 5.6 for singletons and 17.4 for multiple births. The fetal mortality rates for ≥500 grams were 4.3, 4.1 and 9.5 per 1,000 total births for overall, singletons and multiple births, respectively (Figure 24.3).
- Between 1995 and 2004, temporal reductions were observed in fetal mortality caused by congenital anomalies, intrauterine hypoxia and birth asphyxia and complications of placenta, cord and membranes. The rates due to congenital anomalies and complications of placenta, cord and membranes declined from 0.50 and 1.66 per 1,000 total births in 1995–1996 to 0.43 and 1.37 per 1,000 total births in 2003–2004, respectively (by 14.0% and 17.5%). A larger decline occurred for the rate due to intrauterine hypoxia and birth asphyxia, from 0.33 per 1,000 total births to 0.16 per 1,000 births for the same period (by 51.5%). There were no significant changes observed in fetal mortality rates due to maternal complications of pregnancy and unspecified cause (Figure 24.4).

FIGURE 24.1 Rate of fetal death

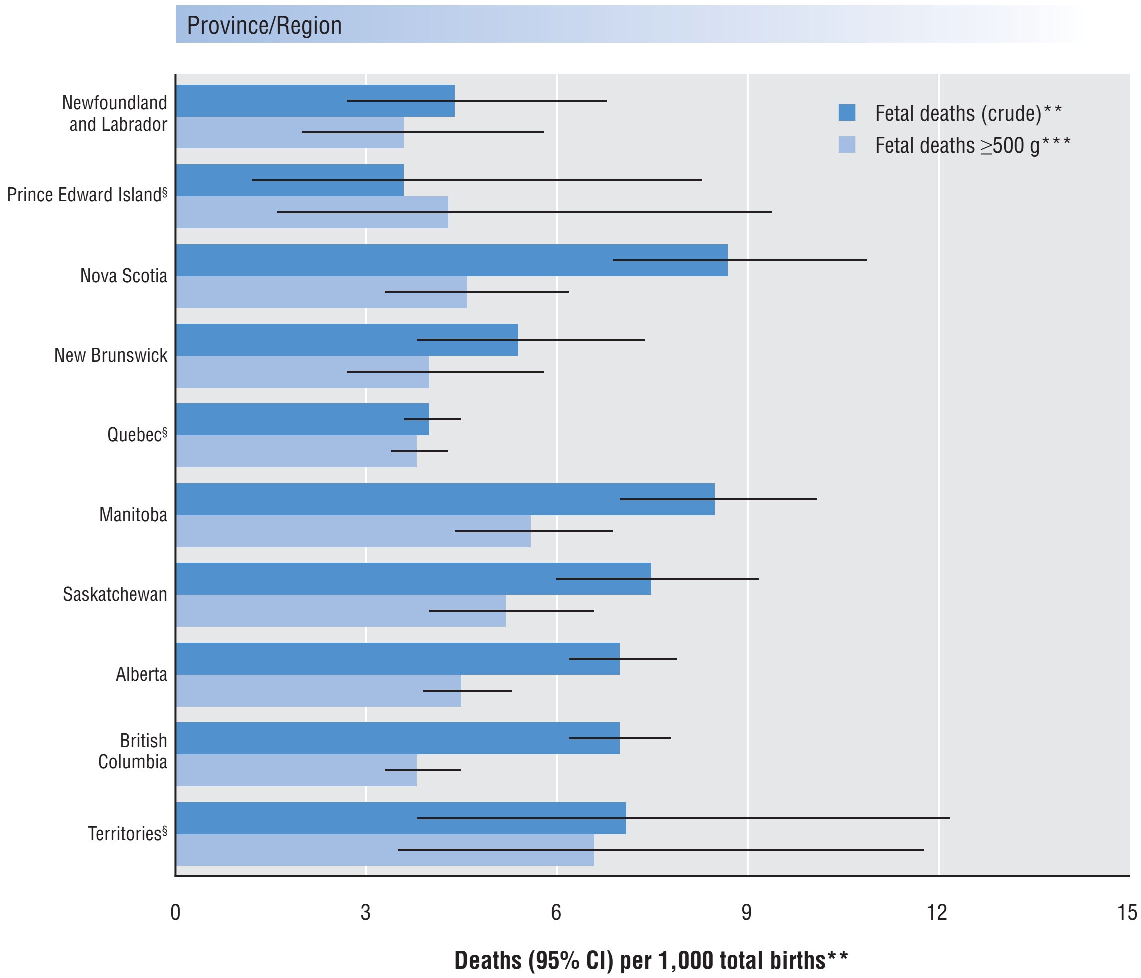
Canada (excluding Ontario), 1995–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age of <20 weeks.
*** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.

FIGURE 24.2 Rate of fetal death, by province/region

Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age of <20 weeks.

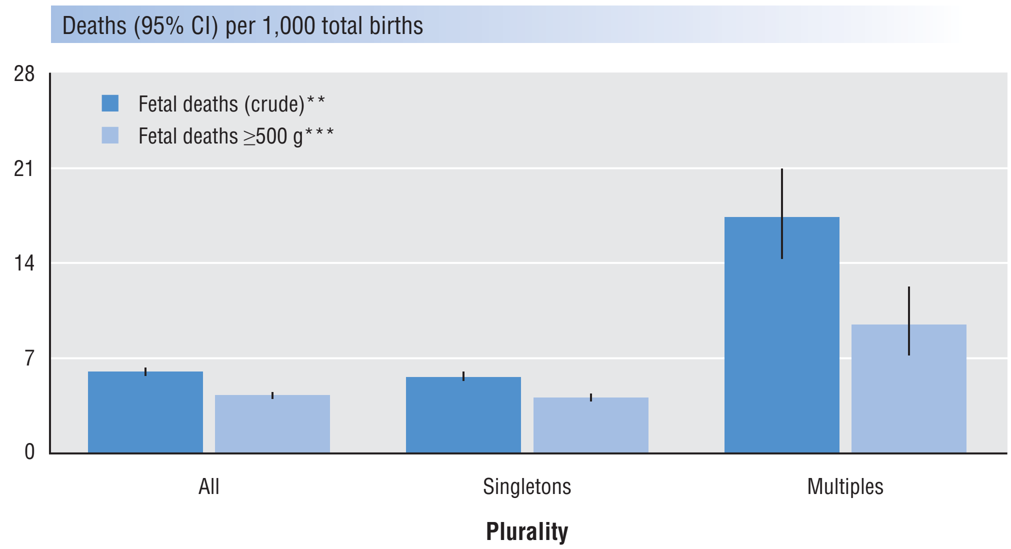
*** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.

§ Numbers of fetal deaths ≥500 g in Prince Edward Island, Quebec and the three territories represent an average of 2002–2004 deaths due to small numbers and concern about residual disclosure.

CI—confidence interval

FIGURE 24.3 **Rate of fetal death, by singleton and multiple births**

Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

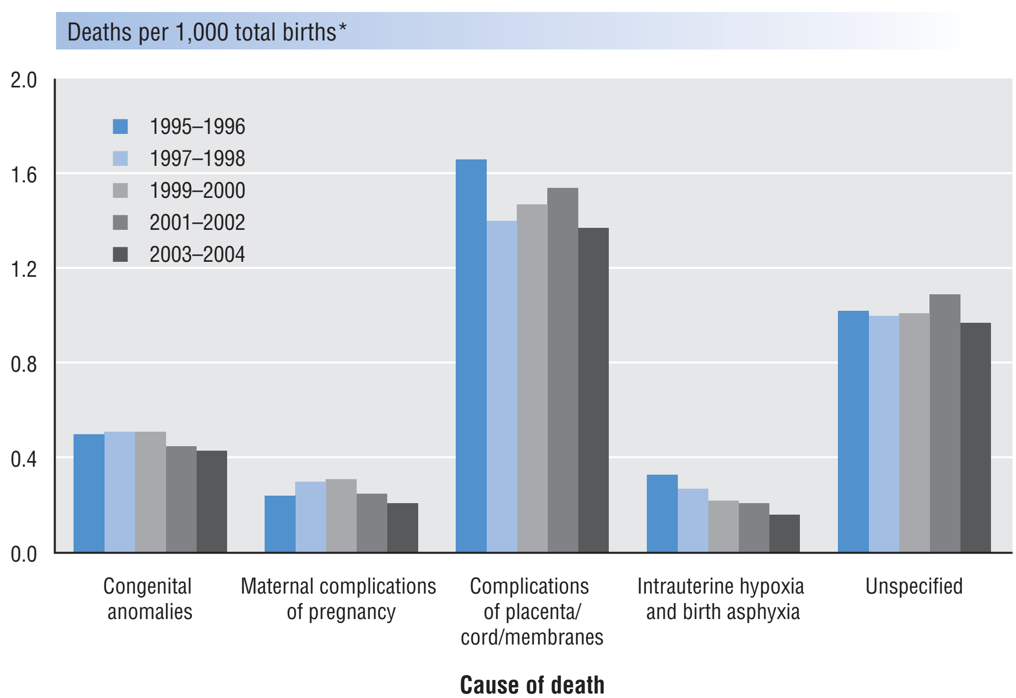
** Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age of <20 weeks.

*** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.

CI—confidence interval

FIGURE 24.4 **Cause-specific rates of fetal death ≥500 g***

*Canada (excluding Ontario),** 1995–1996 to 2003–2004*



Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.

* Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.

** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

Data Limitations

Vital statistics data may be affected by temporal and regional variations in birth registration practices, particularly for stillbirths and live births at the low end of the birth weight or gestational age range.[11] Causes of fetal deaths were identified by underlying cause on stillbirth registration forms. The accuracy of these underlying causes is uncertain due to a low autopsy rate of 40.1% performed on stillbirths (unpublished data from Statistics Canada).

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25. Infant Mortality Rate

Joan Lindsay, Susie Dzakpasu and Alexander Allen

The infant mortality rate is defined as the number of deaths of live born babies in the first year after birth per 1,000 live births (in a given place and time). Infant mortality can be divided into three components: early neonatal deaths (0–6 days), late neonatal deaths (7–27 days) and postneonatal deaths (28–364 days). Infant mortality rates can be refined by the calculation of birth weight- and age-at-death-specific mortality rates, and gestational age- and age-at-death-specific mortality rates. Infant mortality rates can also be examined by cause of death.

Infant mortality has been considered the single most comprehensive measure of health in a society. In almost all countries, infant mortality has decreased dramatically over the last century with improvements in sanitation, nutrition, infant feeding, and maternal and child health care,[1] although the decline has been slower in recent years.[2] Disparities in the risk of infant death across subpopulations have been reported previously in Canada.[3] Some of the geographic differences in infant mortality may be due to differences in reporting deaths of infants born at the borderline of viability.[4] Therefore, we have presented mortality rates for infants with a birth weight ≥500 grams in addition to mortality rates for infants of all birth weights (crude infant mortality).

Cause-specific infant mortality is presented according to modified International Collaborative Effort (ICE) groupings[5] comprising eight categories: congenital anomalies, asphyxia, immaturity, infection, sudden infant death syndrome (SIDS), other unexplained infant death, external causes, and other conditions. Detailed tables on birth weight- and gestational age-specific mortality can be found in *Appendix G*.

The **period infant mortality rate** is calculated by counting all births and all infant deaths occurring in a given calendar year. The **birth cohort infant mortality rate** is based on births occurring in the calendar year, whether the resulting infant deaths occurred in the same or the following year. Birth cohort infant mortality is shown for infants with a birth weight >500 grams. Infant mortality rates were calculated using vital statistics data.

Results

- The crude infant mortality rate decreased from 6.3 deaths per 1,000 live births in 1995 to 5.1 per 1,000 in 2004. For birth weight ≥500 grams, the infant mortality rate decreased from 5.3 per 1,000 live births in 1995 to 3.7 per 1,000 in 2003 (Figure 25.1). In 2004, apart from the Northwest Territories where no infant deaths were reported in that year, Prince Edward Island, New Brunswick and British Columbia had the lowest crude infant mortality rate, at 4.3 deaths per 1,000 live births (95% CI: 1.6–9.4, 2.9–6.1, and 3.7–5.0, respectively). Nunavut had the highest crude infant mortality rate for 2004, at 16.1 (95% CI: 8.3–27.9) per 1,000 live births. In 2003, for birth weight ≥500 grams, Yukon had the lowest infant mortality rate at 0.0 (95% CI: 0.0–11.0) per 1,000 live births, followed by Prince Edward Island at 2.1 (95% CI: 0.4–6.2). The highest rate was in Nunavut, at 13.2 infant deaths (95% CI: 6.3–24.1) per 1,000 live births weighing ≥500 grams (Figure 25.4).

- The crude neonatal mortality rate decreased from 4.2 deaths per 1,000 live births in 1995 to 3.7 per 1,000 in 2004. For birth weight ≥500 grams, the neonatal mortality rate decreased from 3.4 per 1,000 live births in 1995 to 2.5 per 1,000 in 2003 (Figure 25.1). In 2004, the Northwest Territories reported no neonatal deaths, with the next lowest rate occurring in New Brunswick at 2.4 deaths (95% CI: 1.4–3.9) per 1,000 live births. Nunavut had the highest crude neonatal mortality rate at 9.4 (95% CI: 3.8–19.2) per 1,000. In 2003, for birth weight ≥500 grams, Quebec had the lowest reportable neonatal mortality rate at 2.0 (95% CI: 1.7–2.4) per 1,000 live births, followed by British Columbia at 2.1 (95% CI: 1.6–2.5). Nunavut reported the highest rate, at 6.6 neonatal deaths (95% CI: 2.1–15.3) per 1,000 live births weighing ≥500 grams (Figure 25.2).

- The crude postneonatal mortality rate also decreased, from 2.1 deaths per 1,000 neonatal survivors in 1995 to 1.3 per 1,000 in 2004. For birth weight ≥500 grams, the postneonatal mortality rate per 1,000 neonatal survivors decreased from 1.9 in 1995 to 1.3 in 2003 (Figure 25.1). In 2004, Quebec had the lowest reportable postneonatal mortality rate at 0.9 (95% CI: 0.7–1.2) per 1,000 neonatal survivors, followed by British Columbia at 1.2 (95% CI: 0.9–1.6). Nunavut had the highest crude postneonatal mortality rate at 6.8 deaths (95% CI: 2.2–15.7) per 1,000 neonatal survivors. In 2003, for birth weight ≥500 grams, Quebec also had the lowest reportable postneonatal mortality rate at 0.7 (95% CI: 0.6–1.0) per 1,000 neonatal survivors, followed again by British Columbia at 1.2 (95% CI: 0.9–1.6). Nunavut reported the highest postneonatal mortality rate at 6.6 deaths (95% CI: 2.2–15.4) per 1,000 neonatal survivors (Figure 25.3).

- In 2004, the leading cause of infant death in Canada was immaturity, followed by congenital anomalies and asphyxia (Figure 25.5). This contrasts with the situation in 1999 when congenital anomalies were the leading cause of infant mortality.[6] There is evidence to suggest that increases in prenatal diagnosis and pregnancy termination for congenital anomalies have been responsible for the decreases in overall infant mortality.[7] The infant mortality rate due to congenital anomalies decreased from 1.4 per 1,000 live births in 1999 to 1.2 in 2004; the rate of SIDS decreased by 50% from 0.6 to 0.3 per 1,000 live births during the same time period (Figure 25.6). In 2004, immaturity was the leading cause of death in the neonatal period, and congenital anomalies were the leading cause of death in the postneonatal period.

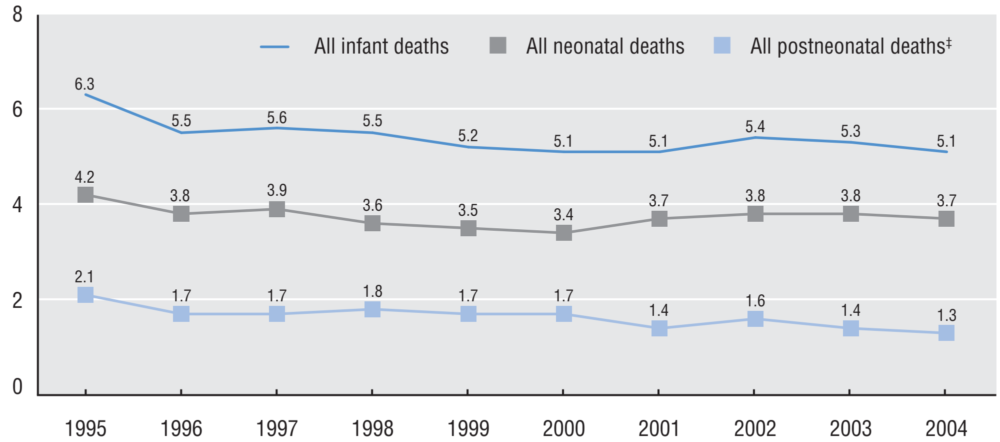
Data Limitations

Vital statistics data may be affected by regional variations in birth registration, particularly for extremely small, immature newborns.[4,8–9]

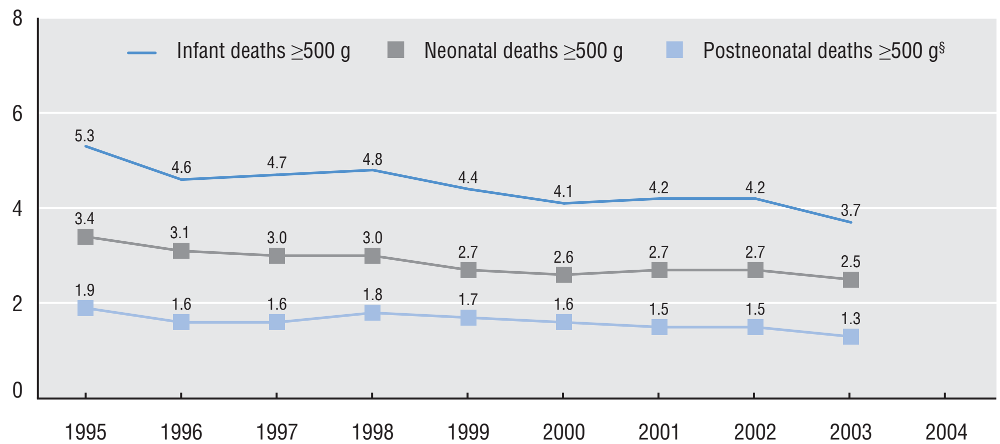
FIGURE 25.1 **Rates of neonatal, postneonatal and infant death**

Canada (excluding Ontario), 1995–2004*

A Deaths per 1,000 live births**



B Deaths per 1,000 live births ≥500 g***



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 1995–2003 (cohort calculation) and Unlinked File, 1995–2004 (period calculation).

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Includes deaths for the specified calendar year (period calculation).

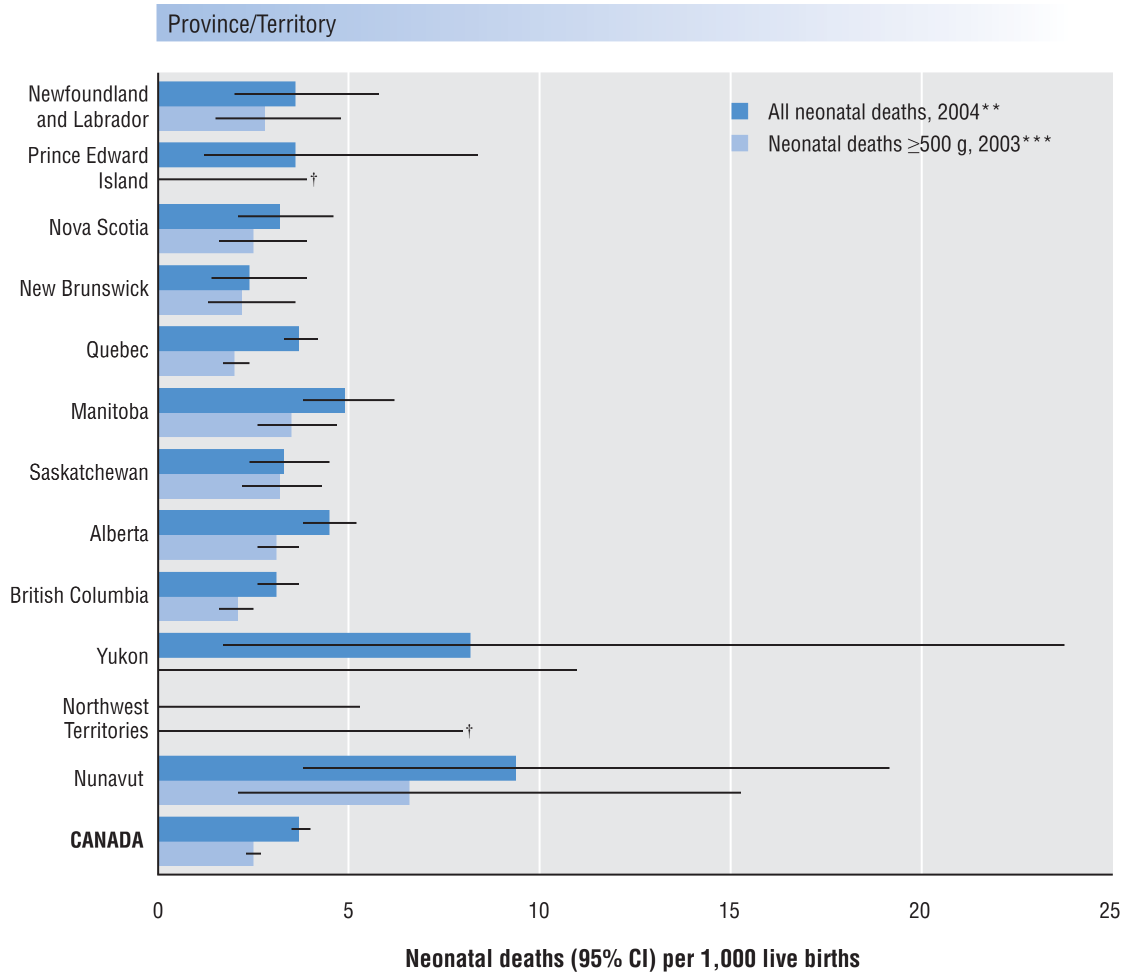
*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.

‡ Per 1,000 neonatal survivors.

§ Per 1,000 neonatal survivors ≥500 g.

FIGURE 25.2 Rate of neonatal death, by province/territory

Canada (excluding Ontario), 2003 and 2004*



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 2003 (cohort calculation) and Unlinked File, 2004 (period calculation).

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H*.

** Includes deaths for the specified calendar year (period calculation).

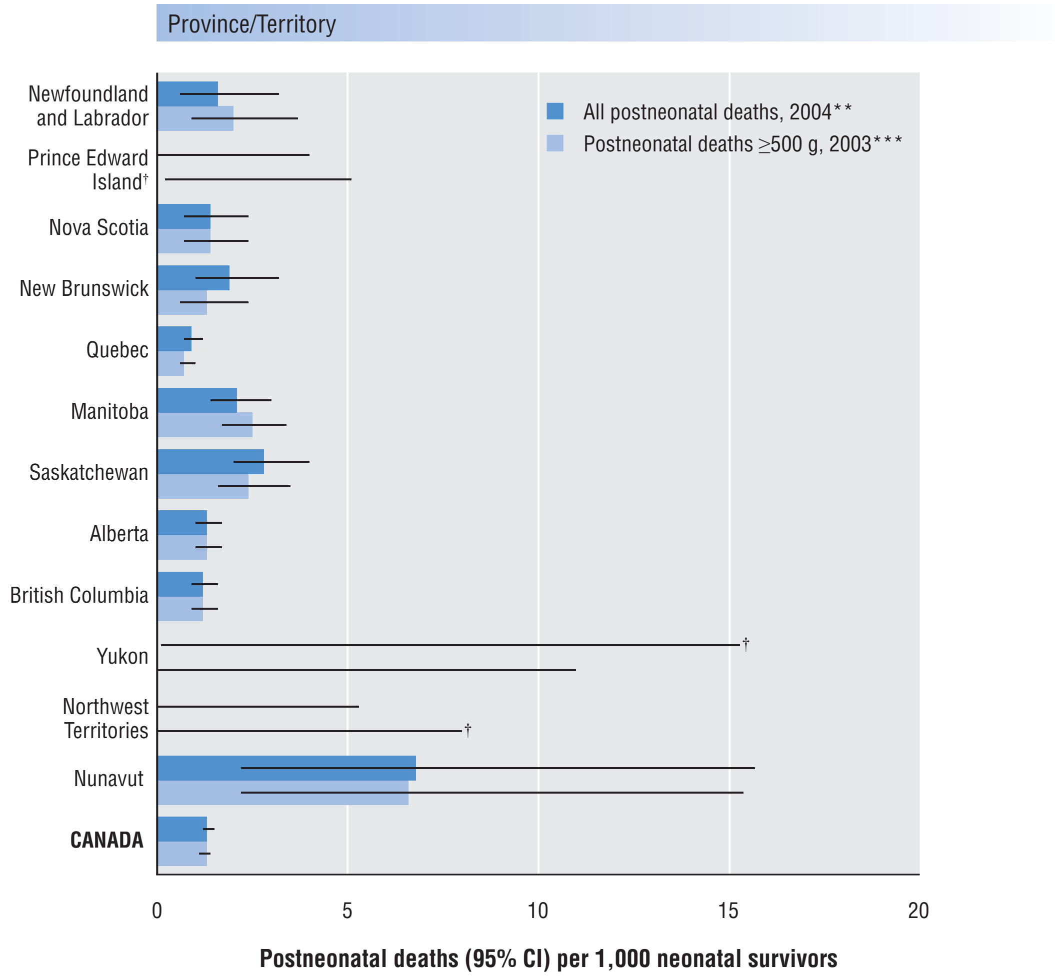
*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.

† Rate suppressed due to small numbers.

CI—confidence interval

FIGURE 25.3 Rate of postneonatal death, by province/territory

Canada (excluding Ontario), 2003 and 2004*



Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 2003 (cohort calculation) and Unlinked File, 2004 (period calculation).

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Includes deaths for the specified calendar year (period calculation).

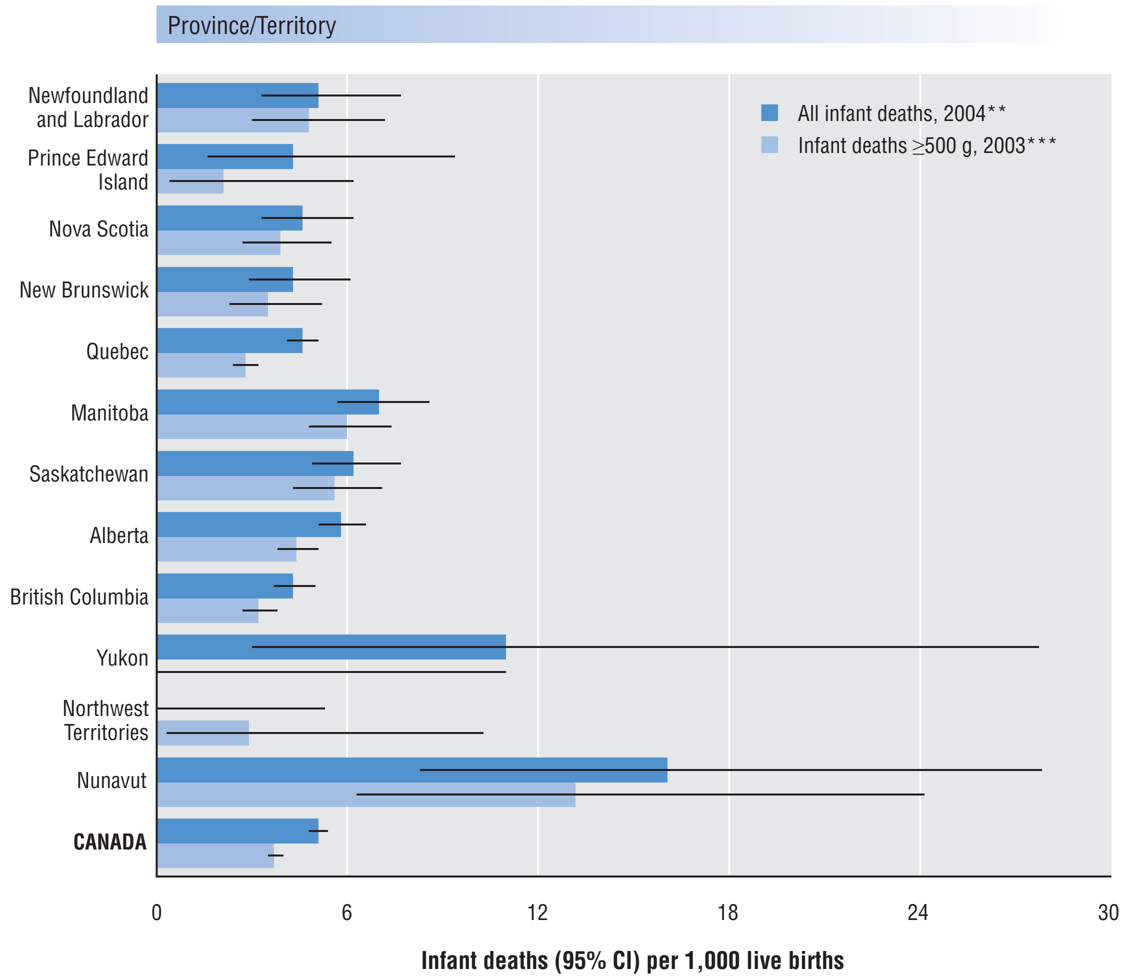
*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.

† Rate suppressed due to small numbers.

CI—confidence interval

FIGURE 25.4 **Rate of infant death, by province/territory**

Canada (excluding Ontario), 2003 and 2004*



Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2003 (cohort calculation) and Unlinked File, 2004 (period calculation).

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Includes deaths for the specified calendar year (period calculation).

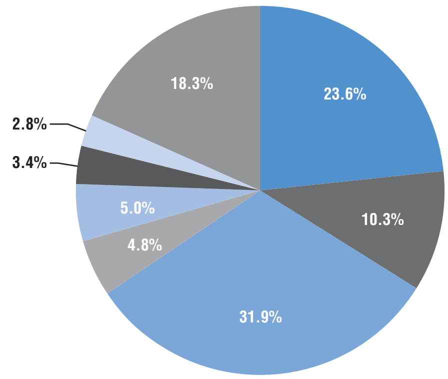
*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.

CI—confidence interval

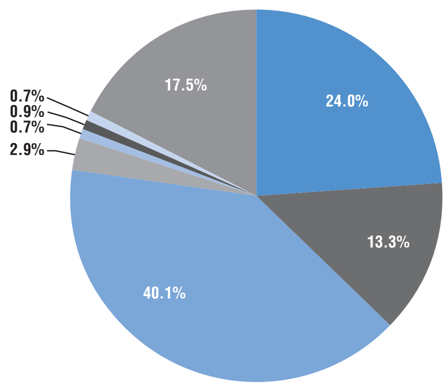
FIGURE 25.5 Causes of infant death

Canada (excluding Ontario), 2004*

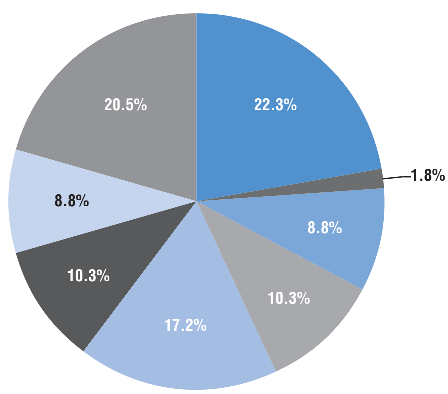
Proportion (%) of deaths among all infant deaths**



Proportion (%) of deaths among all neonatal deaths**



Proportion (%) of deaths among all postneonatal deaths**



- Congenital anomalies
- Immaturity
- Sudden infant death syndrome (SIDS)
- External causes
- Asphyxia
- Infection
- Other unexplained infant death
- Other

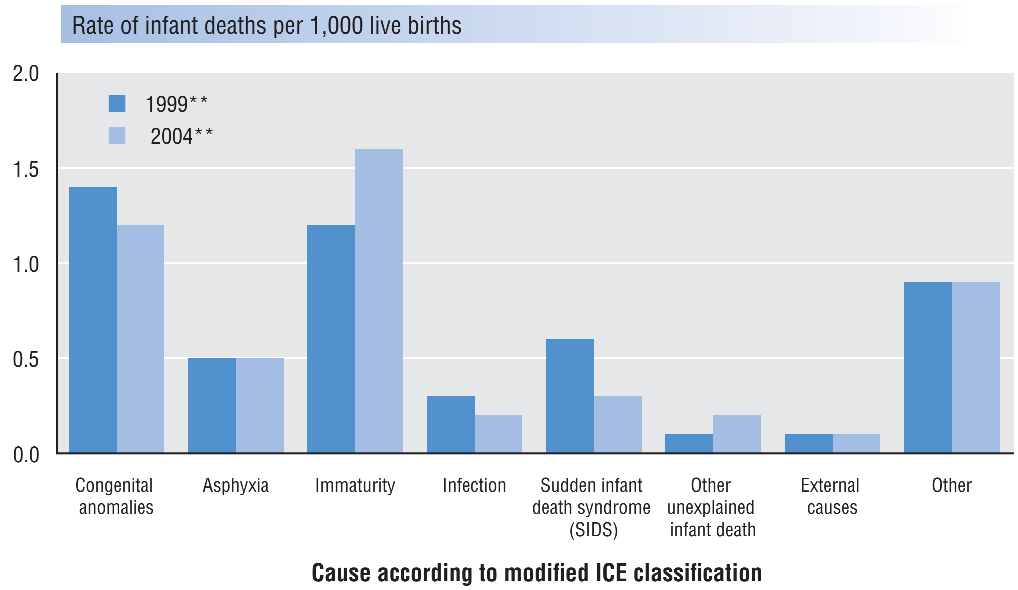
Source: Statistics Canada. Canadian Vital Statistics System, Unlinked File, 2004.

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

** Includes deaths for the specified calendar year (period calculation).

FIGURE 25.6 Cause-specific rates of infant death

Canada (excluding Ontario), 1999 and 2004*



Source: Statistics Canada. Canadian Vital Statistics System, Unlinked File, 1999 and 2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Includes deaths for the specified calendar year (period calculation).

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26. Severe Neonatal Morbidity Rate

Shiliang Liu, Reg Sauve and Shoo K. Lee

The severe neonatal morbidity rate is defined as the number of infants identified as having severe morbidity in the first month after birth, expressed as a proportion of all live born infants (in a given place and time).

Severe morbid conditions during the neonatal period (including severe respiratory distress syndrome (RDS), sepsis, seizures, severe intraventricular hemorrhage (IVH), persistent fetal circulation and multiple congenital anomalies) are important predictors of postneonatal morbidity and long-term disability.[1–5] Many of these conditions are associated with preterm birth and are factors in the higher rates of infant mortality and impaired early childhood development that occur in preterm infants. Neurodevelopmental impairment rates have recently decreased among extremely low birth weight infants.[6] A variety of perinatal and neonatal factors have been associated with the improved outcomes, including interventions such as use of antenatal steroids and cesarean delivery.[6]

This section reports rates of neonatal intubation, sepsis and length of hospital stay (used as a proxy for severe neonatal morbidity that may prolong hospital stay) among infants with a birth weight <1,000 grams, 1,000–2,499 grams and ≥2,500 grams. The presentation of rates by birth weight category highlights the differences in risk of morbidity among the different groups of newborn infants.

Rates of severe neonatal morbidity were calculated using national hospitalization data.

Results

- Among newborn infants with a birth weight <1,000 grams, the rate of intubation increased from 41.4 per 100 hospital live births in 1995–1996 to 55.0 per 100 hospital live births in 2004–2005 (Figure 26.1A). The rate of neonatal sepsis increased from 26.2 per 100 hospital live births in 1995–1996 to 29.4 in 2001–2002, and then decreased to 22.4 per 100 hospital live births in 2004–2005 (Figure 26.1B). The mean length of stay for infants weighing <1,000 grams increased from 25.9 days to 26.5 days over the same period (Table G26.1 in *Appendix G)*.

- For infants with a birth weight of 1,000–2,499 grams, the rate of intubation almost doubled, from 7.9 per 100 hospital live births in 1995–1996 to 13.1 per 100 hospital live births in 2004–2005. The rate of neonatal sepsis increased from 10.7 per 100 hospital live births in 1995–1996 to 13.1 per 100 hospital live births in 2001–2002, and then dropped dramatically to 4.8 per 100 hospital live births in 2004–2005. The mean length of stay for this birth weight group declined from 10.2 days to 9.1 days (Table G26.1 in *Appendix G*).

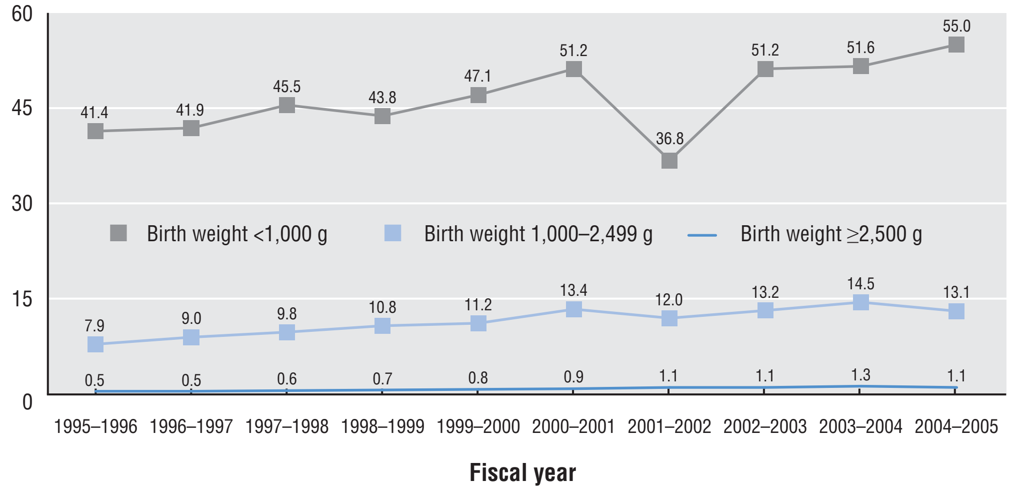
- For infants with a birth weight of ≥2,500 grams, the rate of intubation was relatively low but increased from 0.5 per 100 hospital live births in 1995–1996 to 1.1 per 100 hospital live births in 2004–2005. The rate of neonatal sepsis also increased from 1.4 per 100 hospital live births in 1995–1996 to 1.8 in 2001–2002, and then declined sharply to 0.6 per 100 hospital live births in 2004–2005. The mean length of stay declined slightly over this period from 2.6 days to 2.3 days (Table G26.1 in *Appendix G*).

- The cause of the observed decline in neonatal sepsis rates in recent years is uncertain. The CPSS will carry out an investigation to determine possible causes, which may include an increased use of intrapartum antibiotics, change in coding (from ICD-9 to ICD-10), or the correction of possible earlier errors in Ontario data (the reported rate of neonatal sepsis in Ontario for 2000–2001 was 43.4 per 1,000 live births[7]).

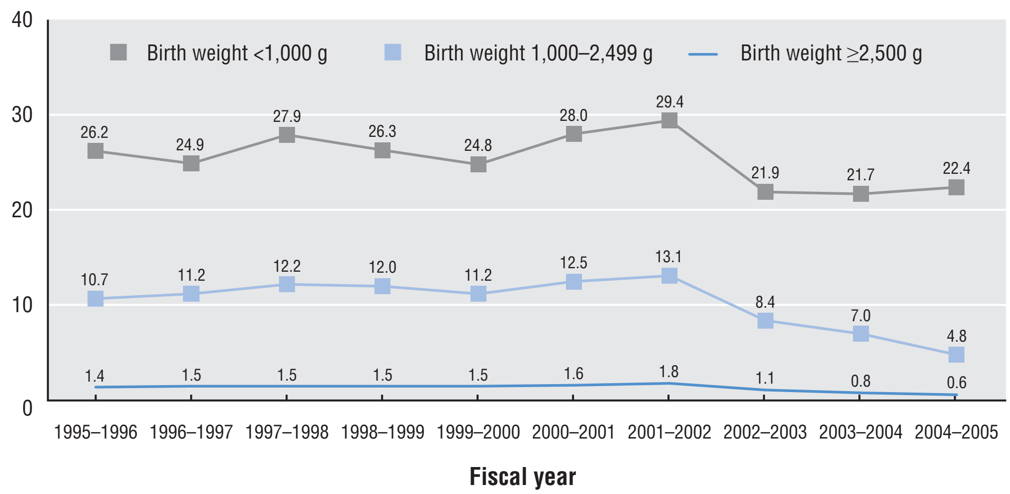
- Provincial and territorial rates of intubation varied widely in the period 2002–2003 to 2004–2005. For example, for newborns with a birth weight of 1,000–2,499 grams, the rate was 8.0 (95% CI: 7.6–8.5) per 100 hospital live births in Quebec, and 17.6 (95% CI: 16.8-18.4) per 100 hospital live births in Alberta (Figure 26.2). On the other hand, newborns in every birth weight category appeared to have a significantly shorter hospital stay in certain provinces/territories (Figure 26. 4).

FIGURE 26.1 Rates of intubation and neonatal sepsis, by birth weight category
Canada, 1995–1996 to 2004–2005

A Intubations per 100 hospital live births

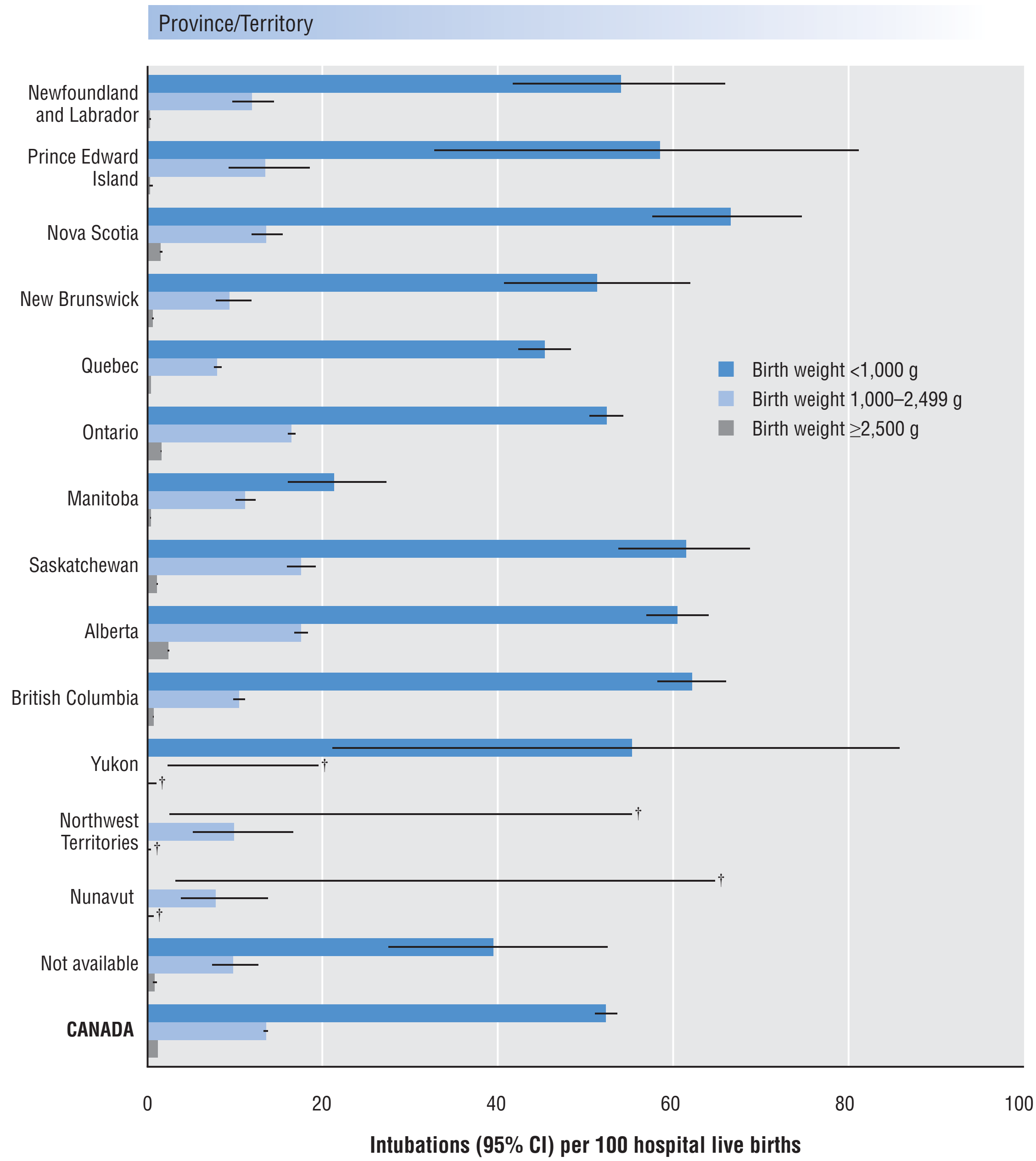


B Neonatal sepsis per 100 hospital live births



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

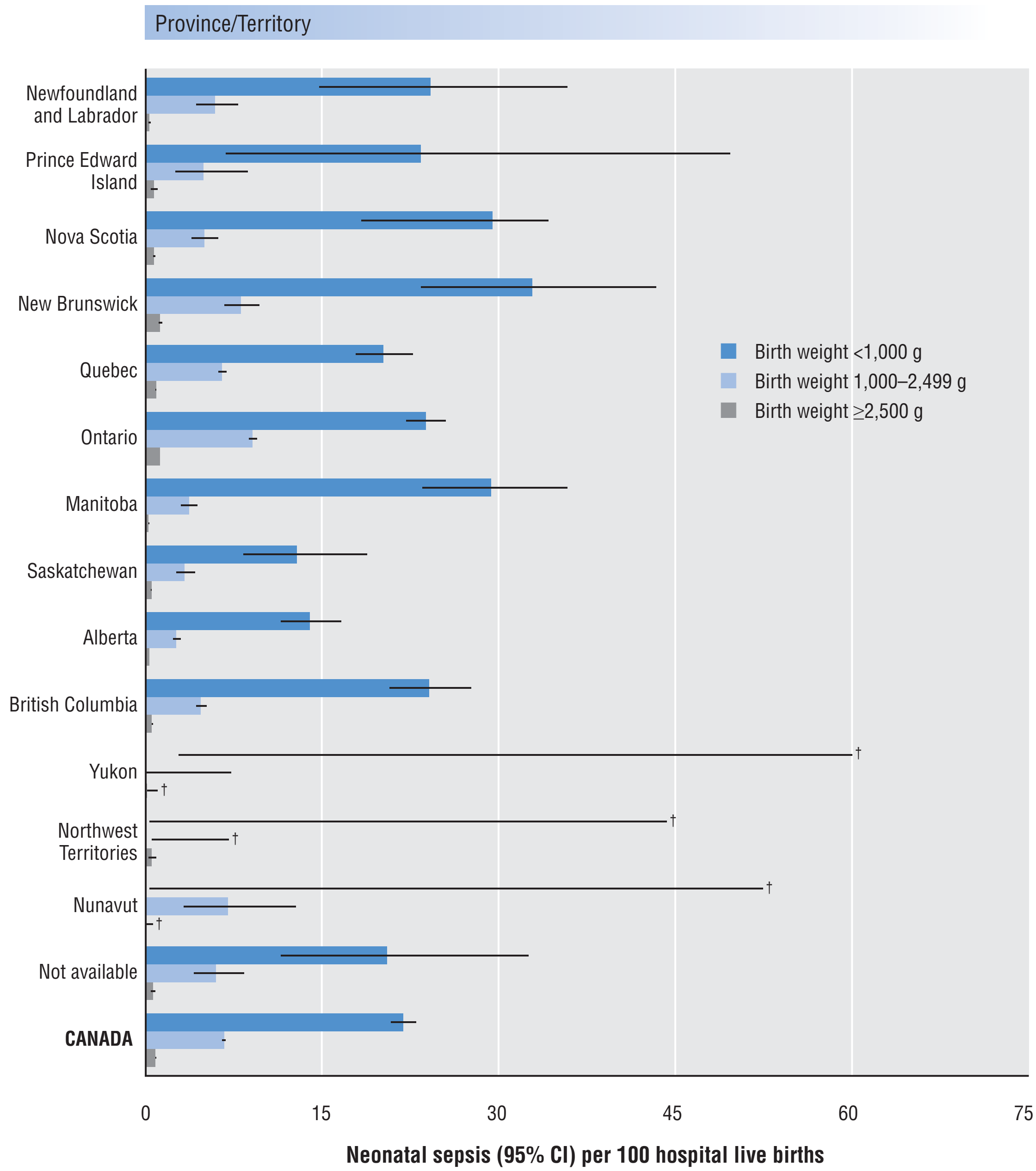
FIGURE 26.2 **Rates of intubation, by birth weight category and province/territory**
Canada, 2002–2003 to 2004–2005 combined



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
† Rate suppressed due to small numbers.
CI—confidence interval

FIGURE 26.3 Rates of neonatal sepsis, by birth weight category and province/territory

Canada, 2002–2003 to 2004–2005 combined



Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
† Rate suppressed due to small numbers.
CI—confidence interval

FIGURE 26.4 Average length of stay (LOS), by birth weight category and province/territory
Canada, 2002–2003 to 2004–2005 combined

Province/Territory	Mean LOS in days (SD)		
	Birth weight <1,000 g	Birth weight 1,000–2,499 g	Birth weight ≥2,500 g
Newfoundland and Labrador	38.2 (32.7)	13.5 (12.6)	2.9 (1.6)
Prince Edward Island	39.3 (31.0)	15.2 (11.0)	3.4 (1.7)
Nova Scotia	45.0 (30.8)	13.7 (11.9)	2.7 (1.7)
New Brunswick	39.1 (28.7)	13.6 (11.7)	2.8 (1.8)
Quebec	26.3 (30.1)	9.6 (0.5)	2.7 (1.5)
Ontario	23.2 (28.0)	8.6 (9.1)	2.2 (1.4)
Manitoba	26.6 (31.5)	11.7 (11.3)	2.4 (1.5)
Saskatchewan	35.3 (32.9)	11.7 (11.3)	2.5 (1.7)
Alberta	23.2 (27.1)	8.7 (9.2)	1.9 (1.3)
British Columbia	26.7 (29.4)	9.4 (9.4)	2.3 (1.6)
Yukon	29.4 (34.3)	8.3 (9.0)	2.9 (1.5)
Northwest Territories	7.8 (13.4)	6.7 (8.2)	2.7 (1.5)
Nunavut	20.4 (31.2)	8.8 (9.9)	2.0 (1.5)
Not available	13.5 (22.2)	9.4 (10.8)	2.0 (1.6)
CANADA	**25.5 (29.1)**	**9.4 (9.9)**	**2.3 (1.5)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
SD—standard deviation

Data Limitations

Limitations in the surveillance of severe neonatal morbidity are primarily related to limitations of the hospitalization databases and data availability. In general, insufficient information on neonates in the databases used may lead to underestimates of severe neonatal morbidity. Variations in case definitions and coding of neonatal conditions may affect reporting of cases. As well, data were not available to determine the duration or indication for intubation. Available information, as coded, does not distinguish between the degrees of severity of a particular condition.

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27. Multiple Birth Rate

Juan Andrés León and Arne Ohlsson

The multiple birth rate is defined as the number of live births and stillbirths following a multiple gestation pregnancy, expressed as a proportion of all live births and stillbirths (in a given place and time).

Multiple pregnancies are accompanied by an increased risk of several health problems in the mother and offspring. For instance, mothers of multiples are more likely to experience anemia, pre-eclampsia, preterm labour and cesarean delivery; whereas the infants are at higher risk of having low birth weight, poor fetal growth, preterm birth and perinatal death.[1,2] Abnormal presentations of the fetuses during delivery occur in 5%–15% of cases.[3] In the long term, children born from a multiple pregnancy may be at increased risk for cerebral palsy and other neurodevelopmental disabilities.[4]

The recent rise in multiple births reflects the increased use of medical and surgical treatments to enhance fertility and older maternal age at conception.[5] Compared with natural ovulation fertilization, in vitro fertilization (IVF) is accompanied by a 20-fold increased risk of twins and a 400-fold increased risk of triplets or quadruplets.[6] It is estimated that two thirds of the increase in multiple births is attributable to infertility treatments and the remaining one third to the shift to older maternal age.[7] Although older mothers have an increased likelihood of natural multiple pregnancy, it is difficult to separate the effect of advanced maternal age and that of assisted reproductive techniques. Older women are at increased risk of infertility, which predisposes to receiving such treatment.[8] There is growing evidence that techniques that reduce pregnancies with three or more fetuses to twin pregnancies,[9] or that limit the number of embryos transferred in IVF[10] may lead to a decrease of adverse outcomes associated with multiple pregnancies.

The rising number of multiple births has substantial socioeconomic implications for affected families and society. The costs include providing health and other services to preterm babies born from a multiple pregnancy. Additional costs for families result from the psychosocial, financial and practical demands of caring for their babies.

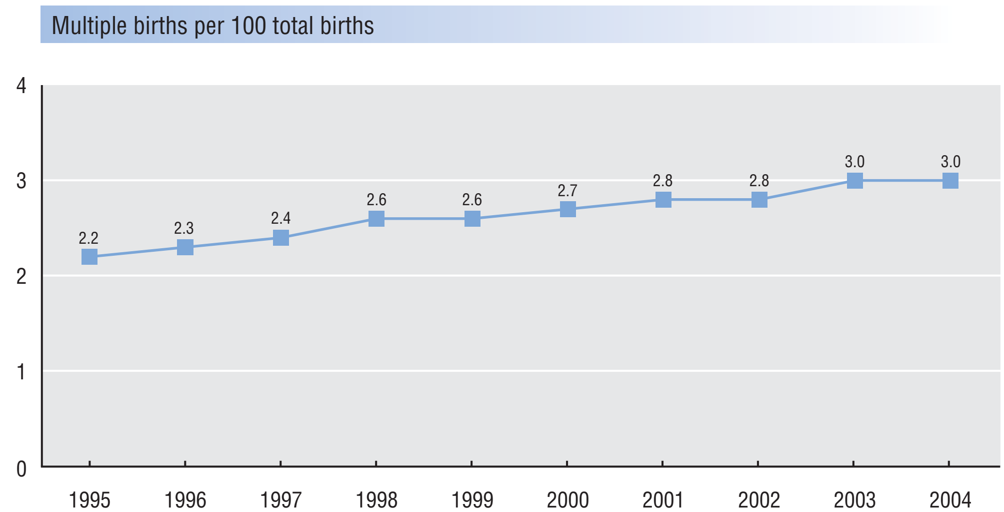
Rates of multiple birth were estimated using vital statistics data.

Results

- Over the period 1995–2004, the rate of multiple birth showed a steady increase from 2.2% to 3.0% (Figure 27.1).
- In 2004, the rates of multiple birth varied across provinces and territories; however, the small numbers (and therefore unstable estimates) in some jurisdictions must be kept in mind (Figure 27.2). Nunavut had the lowest multiple birth rate at 1.1% (95% CI: 0.5–2.1), and Yukon had the highest rate at 4.1% (95% CI: 2.3–6.7). The variations may be due in part to differences in access and use of methods to enhance fertility or to demographic differences among the populations.

FIGURE 27.1 **Rate of multiple birth**

Canada (excluding Ontario), 1995–2004*

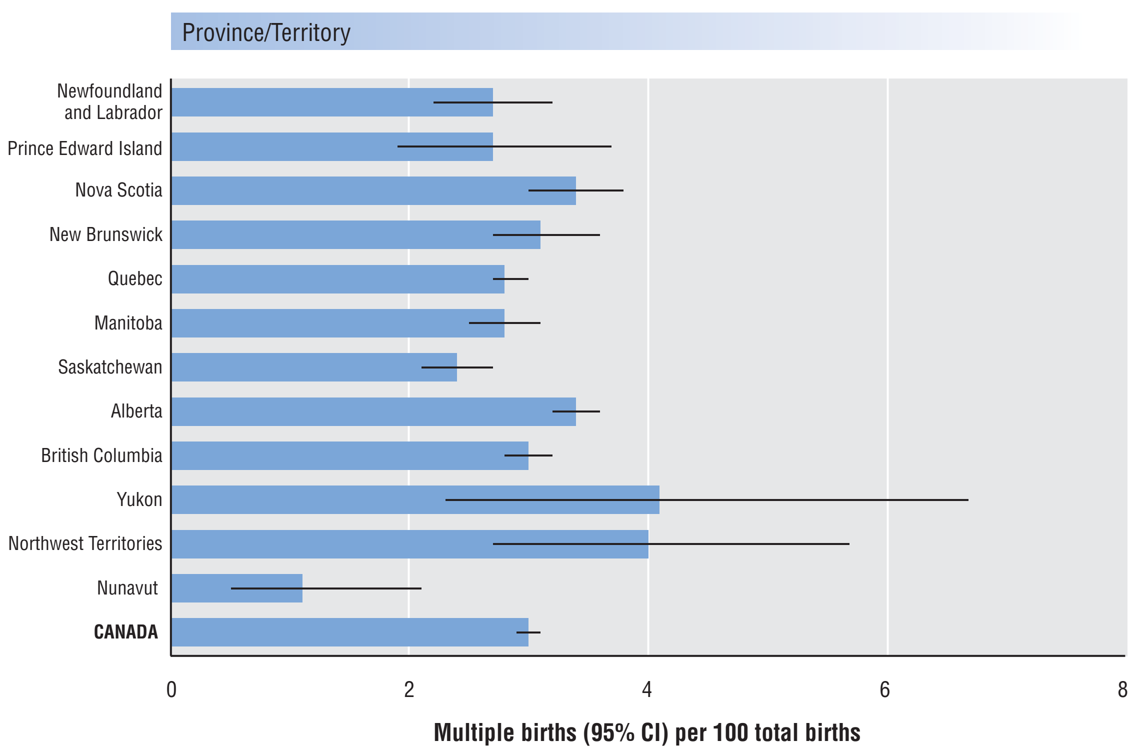


Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H*.

FIGURE 27.2 **Rate of multiple birth, by province/territory**

Canada (excluding Ontario), 2004*



Source: Statistics Canada. Canadian Vital Statistics System, 2004.

* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

CI—confidence interval

Data Limitations

Data on multiple births in Canada were obtained from birth registrations, which may be subject to some transcribing errors.

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■ 28. Prevalence of Congenital Anomalies

Juan Andrés León, Jane Evans and Cathie Royle

The prevalence of congenital anomalies (CAs) at birth is defined as the number of live born or stillborn babies identified as having at least one CA, expressed as a proportion of the total number of live births and stillbirths (in a given place and time).

Congenital anomalies, birth defects and congenital malformations are synonymous terms that describe an abnormality of structure or function present at birth.[1] They are part of a spectrum of adverse pregnancy outcomes that may include spontaneous abortions, stillbirths and infant deaths.[2] Congenital anomalies are a leading cause of infant death and potential years of life lost. Estimates of their prevalence at birth obtained through registries or surveillance systems vary depending on the inclusion criteria and ascertainment methods used.[3] The increasing availability of prenatal diagnosis and subsequent termination of pregnancies affected by severe anomalies have resulted in marked reductions in infant deaths from CAs.[4] The most prevalent subgroups of CAs in Canada are musculoskeletal anomalies, congenital heart defects and urinary system anomalies.[5]

This report highlights three of the most commonly recognized CAs: Down syndrome (DS), neural tube defects (NTDs) and orofacial clefts (OCs).

Down syndrome is highlighted because the proportion of births to women of advanced maternal age, a factor associated with DS, has increased in recent years and also because of the increased capacity for prenatal testing for DS.

Neural tube defects, which primarily include anencephaly, spina bifida (SB) and encephalocele, are of particular importance because of the established potential to reduce the incidence through effective strategies such as fortification of food with folic acid[6] and folic acid supplementation during the periconceptional period.[7] There has been a reduction in the birth prevalence of NTDs in Canada since the late 1990s that can be attributed mainly to fortification of flour and other cereal grain products with folic acid, which became mandatory in November 1998. Data from a seven-province study of NTDs from 1993–2002 that also ascertained NTDs in terminated pregnancies indicate that an east to west trend in NTD prevalence was apparent before food fortification was introduced. Newfoundland and Labrador had the highest rate compared to Nova Scotia, Prince Edward Island, Quebec, Manitoba, Alberta and British Columbia. After full fortification had been achieved, declines in prevalence were apparent in all seven provinces; however, the observed decrease was greater in those provinces with higher initial rates, thus the east to west trend was much less apparent.[8]

Orofacial clefts frequently occur in association with other major anomalies. As with many other CAs, they represent a substantial burden to affected individuals and families and their management requires considerable expenditures in terms of health services.[9] OCs include two distinct manifestations—cleft palate (CP), and cleft lip with or without cleft palate (CL/P).

The prevalence of CAs at birth was estimated using hospitalization data from the Canadian Congenital Anomalies Surveillance System (CCASS).

Results

Congenital anomalies

- In 2004, the birth prevalence of identified CAs in Canada was 4.8% (or 479.8 per 10,000 total births). Between 1995 and 2004, the rate remained relatively constant ranging from 452.8 per 10,000 total births in 1995 to 522.8 per 10,000 total births in 2001 (Table G28 in *Appendix G*).

Down syndrome

- Between 1995 and 2003, the birth prevalence of DS increased slightly from 13.4 to 15.5 per 10,000 total births, before dropping to 13.5 per 10,000 total births in 2004 (Figure 28.1).
- For the years 2001–2004 combined, the birth prevalence of DS varied substantially among Canadian provinces and territories (Figure 28.2). The regional differences may be due to variation in maternal age distribution, the availability and use of prenatal screening and diagnosis, and the termination rates of pregnancies with DS.

Neural tube defects

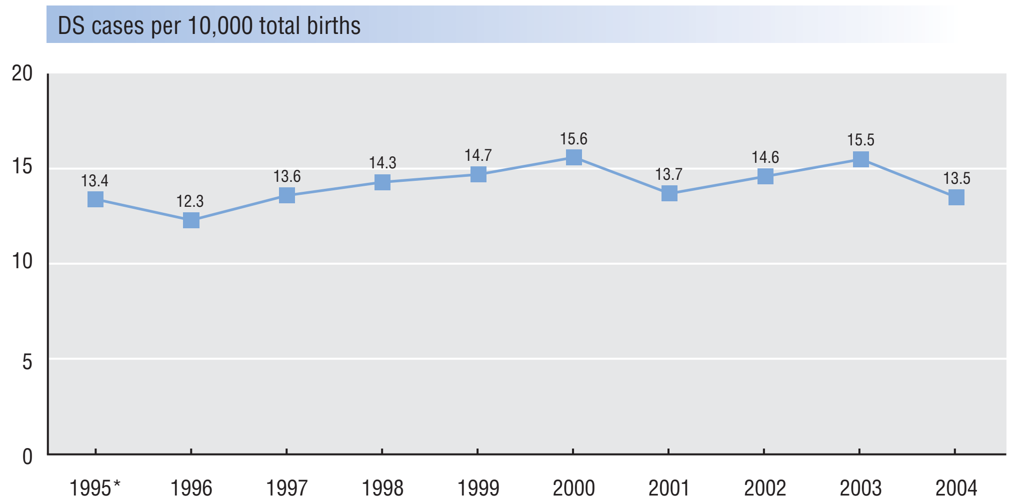
- From 1995 to 2004, the birth prevalence of NTDs in Canada decreased by more than half from 9.2 to 4.0 per 10,000 total births. A reduction was observed in the birth prevalence of both anencephaly and similar anomalies (from 1.8 to 1.1 per 10,000 total births) and spina bifida (from 6.5 to 2.6 per 10,000 total births) (Figure 28.3).
- For the years 2001–2004, the birth prevalence of NTDs, anencephaly and similar anomalies and spina bifida varied substantially across Canadian provinces and territories (Figure 28.4). This variation may reflect geographic differences in the availability and use of prenatal screening and diagnosis services, and the termination rates of pregnancies affected with an NTD.

Orofacial clefts

- In 2004, the birth prevalence of CP and CL/P in Canada was 6.5 and 9.7 per 10,000 total births, respectively. Between 1995 and 2004, the birth prevalence of CP fluctuated between 6.2 and 8.2 per 10,000 total births, whereas that of CL/P decreased slightly from 11.2 to 9.7 per 10,000 total births (Figure 28.5).
- The 2001–2004 birth prevalence of CP and CL/P varied substantially among provinces and territories (Figure 28.6). Regional differences may be influenced by population characteristics, such as genetic predisposition and proportion of Aboriginal Canadians who have a higher risk than non-Aboriginal Canadians.[10] Orofacial clefts are amenable to prenatal diagnosis by ultrasound. It is unlikely that many cases with isolated OCs would be terminated. However, the association of OCs with other anomalies including chromosomal defects would mean that many affected cases might be prenatally diagnosed and the pregnancies terminated.

FIGURE 28.1 Rate of Down syndrome (DS)

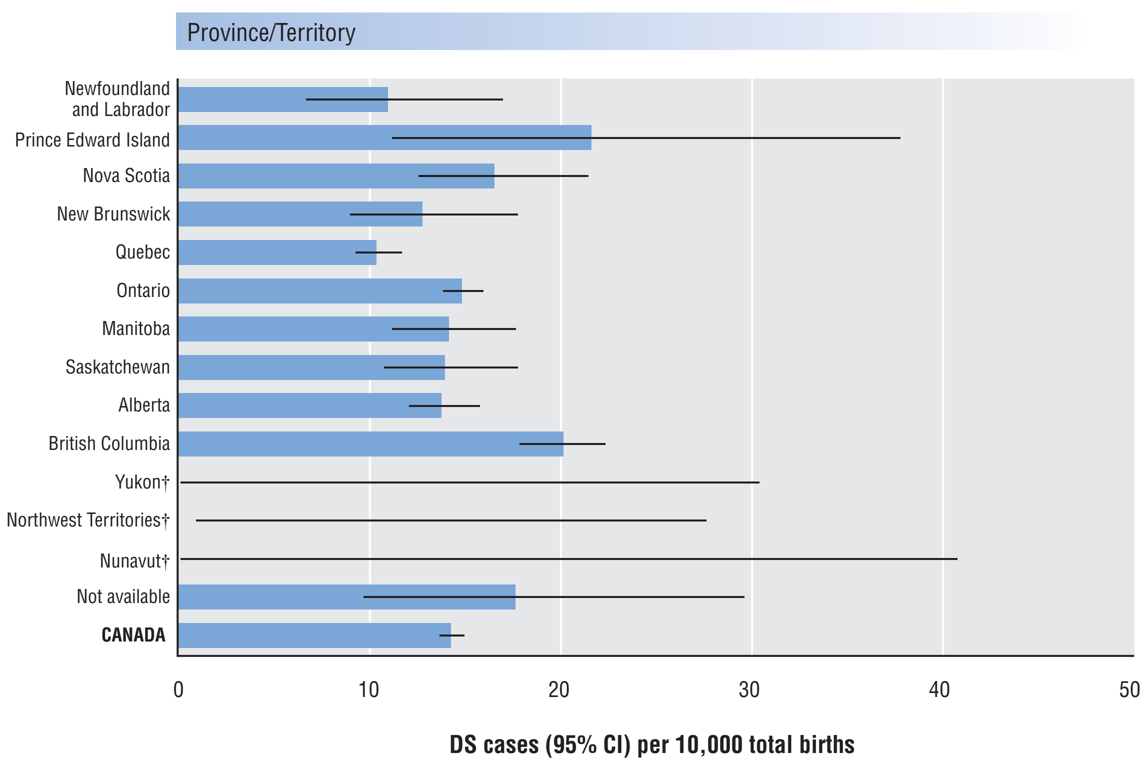
Canada, 1995–2004*



Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System (CCASS), 1995–2004.
* Nova Scotia data were not available to CCASS before 1996.

FIGURE 28.2 Rate of Down syndrome (DS), by province/territory

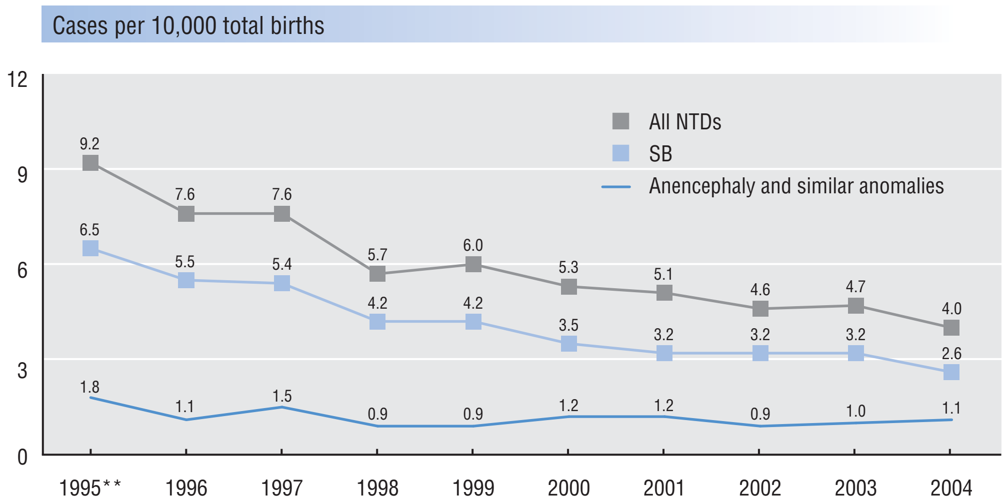
Canada, 2001–2004 combined



Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System, 2001–2004.
† Rate suppressed due to small numbers.
CI—confidence interval

FIGURE 28.3 **Rate of neural tube defects (NTDs), spina bifida (SB), and anencephaly and similar anomalies***

*Canada,** 1995–2004*



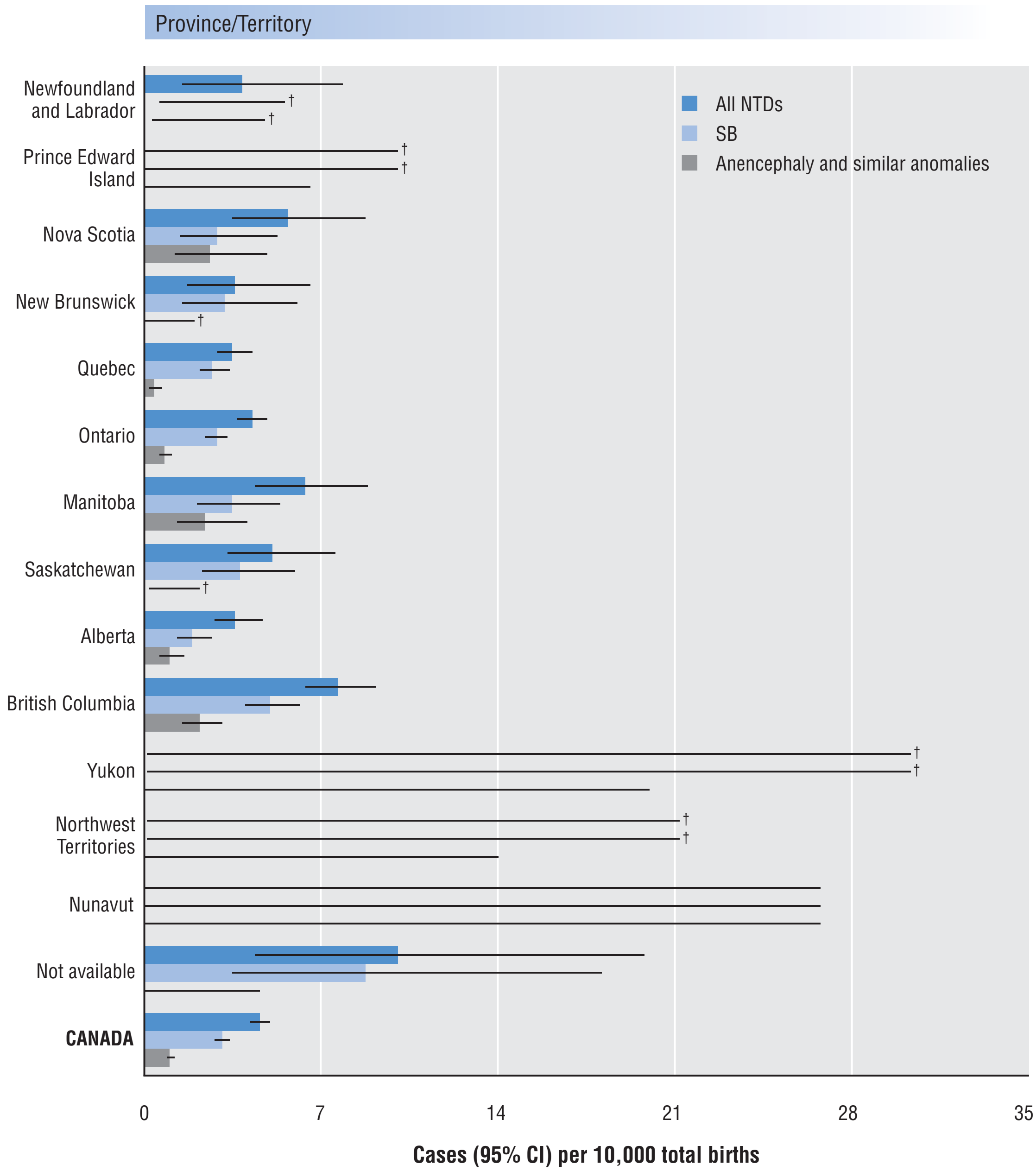
Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System (CCASS), 1995–2004.

* Similar anomalies include craniorachischisis, iniencephaly, encephalocele and microcephaly.

** Nova Scotia data were not available to CCASS before 1996.

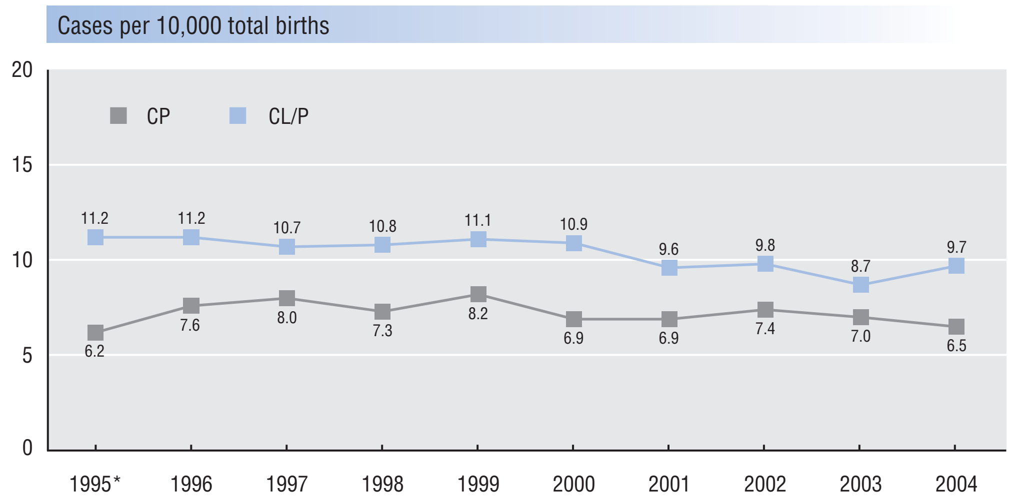
FIGURE 28.4 Rate of neural tube defects (NTDs), spina bifida (SB), and anencephaly and similar anomalies,* by province/territory

Canada, 2001–2004 combined



Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System, 2001–2004.
* Similar anomalies include craniorachischisis, iniencephaly, encephalocele and microcephaly.
† Rate suppressed due to small numbers.
CI—confidence interval

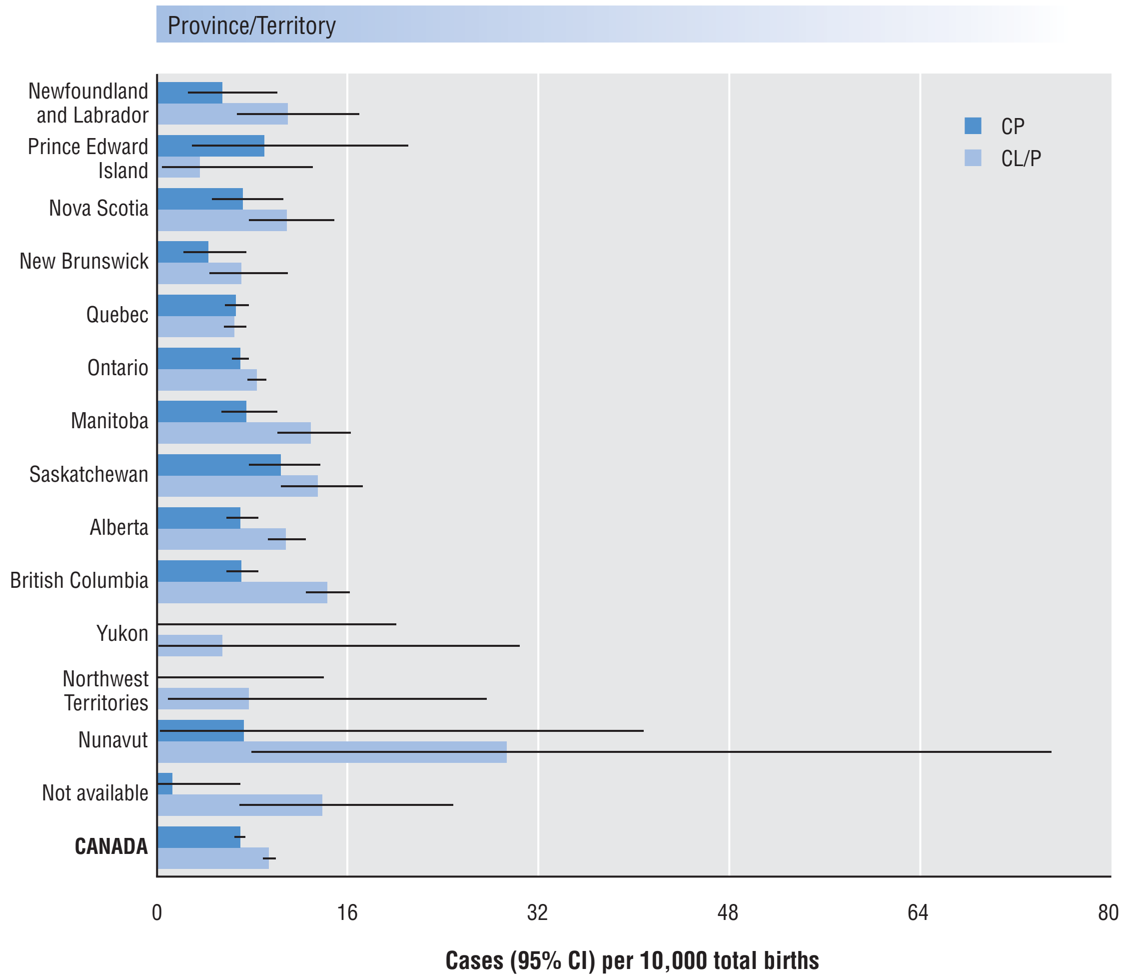
FIGURE 28.5 Rate of cleft palate (CP) and cleft lip with or without cleft palate (CL/P), *Canada,* 1995–2004*



Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System (CCASS), 1995–2004.
* Nova Scotia data were not available to CCASS before 1996.

FIGURE 28.6 Rate of cleft palate (CP) and cleft lip with or without cleft palate (CL/P), by province/territory

Canada, 2001–2004 combined



Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System, 2001–2004.
CI—confidence interval

Data Limitations

Incomplete ascertainment of cases and inconsistent coding practices due to lack of standardized case definitions and inclusion and exclusion criteria are important limitations for population-based CAs surveillance systems.

Another important limitation is the lack of data on pregnancy terminations prior to 20 weeks. The data from the CCASS capture natural stillbirths and terminations of pregnancy at ≥20 weeks of gestation, but earlier terminations or spontaneous losses will not be identified, even if the fetus had a CA. This results in underestimations of the incidence of CAs, such as NTDs and DS, and also limits the interpretation of temporal and geographical patterns and the impact of prenatal diagnosis and termination of affected pregnancies. Comparisons of the seven-province NTD study rates in the period of full fortification (April 1, 2000–December 31, 2002) with those identified by the CCASS (see above for the 2001–2004 figures) clearly indicate that the CCASS data are incomplete.[8]

Differences in the birth prevalence of the reported CAs across jurisdictions may be due to variations in case ascertainment and coding, as well as variations in availability, access and use of prenatal screening and diagnostic services, and termination rates of affected pregnancies. In addition, the small number of cases and the resulting large confidence intervals observed in jurisdictions with lower birth numbers (e.g., Nunavut, Yukon, Northwest Territories and Prince Edward Island) warrant consideration when interpreting these estimates.

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29. Rate of Neonatal Hospital Readmission after Discharge following Birth

Shiliang Liu, Reg Sauve and Michael Graven

The rate of neonatal hospital readmission after discharge following birth is defined as the number of readmissions of newborns within 28 days of birth, expressed as a proportion of all newborns discharged from hospital after birth (in a given place and time).

Newborn readmission rates have been used to evaluate the quality of perinatal health care. Several reports have related neonatal readmission to a short length of hospital stay following birth (e.g., initial length of hospital stay <48 hours).[1–3] Income and geography are strongly associated with neonatal hospital readmission.[4] Furthermore, neonatal readmission may reflect hospital, practitioner and community approaches to monitoring and treating neonatal jaundice, severe congenital anomalies (CAs), and initiation and support of breastfeeding approaches.[3,5–7]

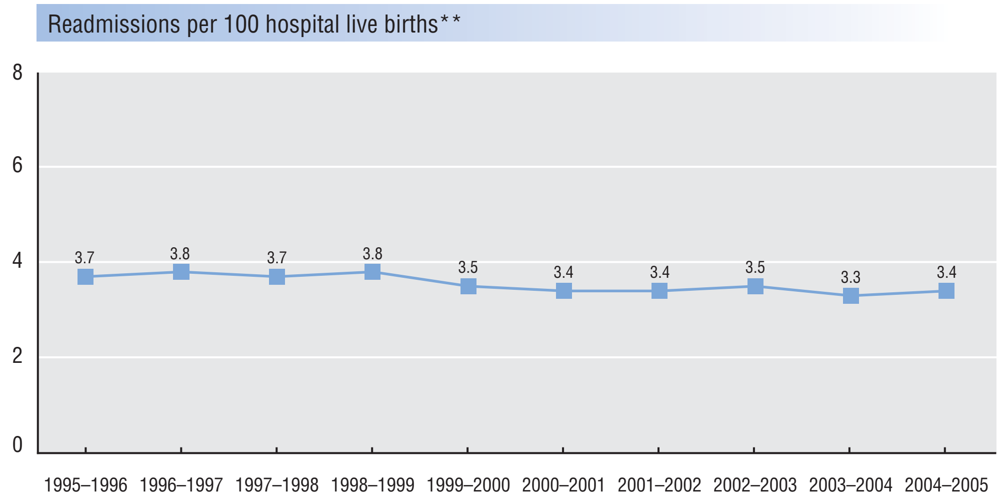
Neonatal hospital readmission rates were calculated using national hospitalization data.

Results

- Between 1995–1996 and 2004–2005, the neonatal hospital readmission rate in Canada (excluding Quebec and Manitoba) decreased from 3.7 readmissions per 100 hospital live births to 3.4 per 100 hospital live births. The rates declined starting in 1999–2000 and stabilized thereafter (Figure 29.1). Increases in length of hospital stay for low birth weight newborns and improvements in the application of guidelines for hospital discharge after childbirth probably explain the recent decreases in neonatal readmission rates.[5,6]
- In the years 2002–2003 to 2004–2005 combined, neonatal readmission rates varied widely across Canadian provinces and territories (Figure 29.2). The readmission rate was highest in Nunavut, at 5.5 readmissions (95% CI: 4.2–6.9) per 100 hospital live births. It was lowest in Nova Scotia and Newfoundland and Labrador at 2.1 (95% CI: 1.9–2.3 and 1.9–2.4, respectively) per 100 hospital live births.
- The most common reason for neonatal readmission was neonatal jaundice, followed by respiratory conditions, healthy infant accompanying sick person (mother or sibling), feeding problems, congenital anomalies, neonatal sepsis, dehydration, urinary tract infection and inadequate weight gain (Figure 29.3). These principal causes of neonatal readmission changed considerably over time. For example, neonatal jaundice accounted for 39.1% of readmissions in 1995–1996, compared with 46.9% in 2004–2005. The neonatal readmission rate for jaundice increased from 14.3 admissions per 1,000 hospital live births in 1995–1996 to 16.2 per 1,000 in 2004–2005 (Figure 29.3).

FIGURE 29.1 Rate of neonatal hospital readmission after discharge following birth

Canada (excluding Quebec and Manitoba), 1995–1996 to 2004–2005*



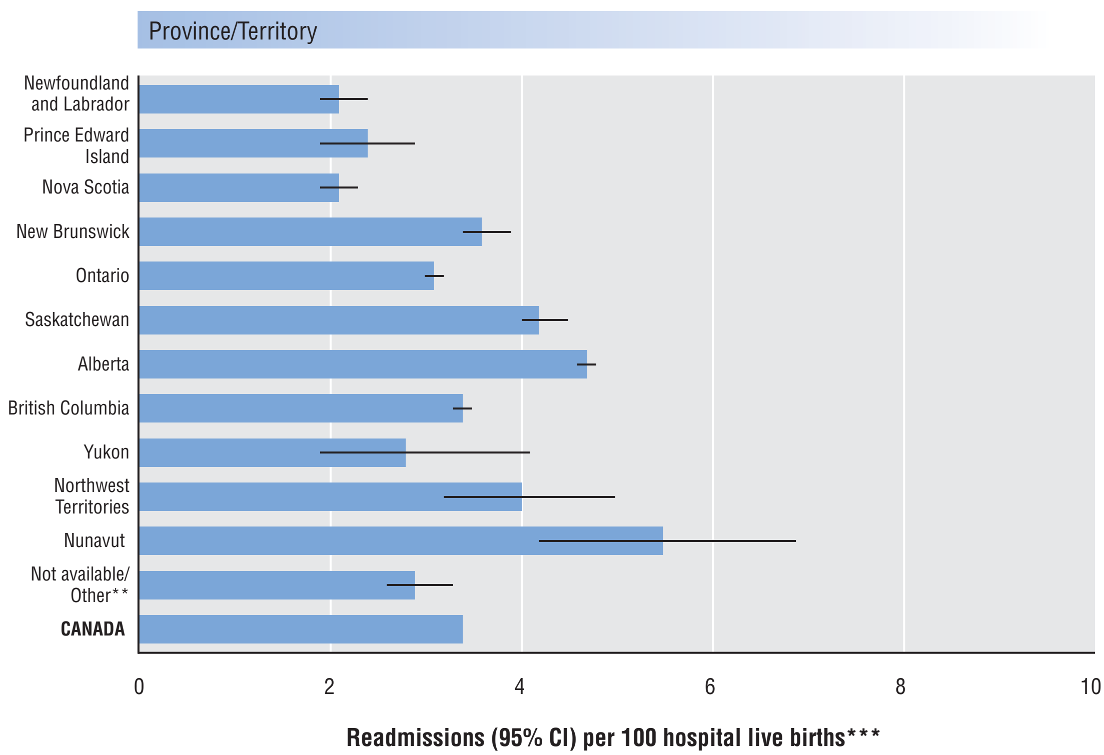
Source: Canadian Institute for Health Information. Discharge Abstract Database (DAD), 1995–1996 to 2004–2005.

* Complete data for Quebec and Manitoba were not available in the DAD.

** Newborns who weighed <1,000 g and newborns with initial length of stay >20 days were excluded from this analysis. Cases of neonatal readmission were included up to 28 days after birth. Hospitalizations for newborns who were directly transferred to another hospital after birth were not included in neonatal readmission counts, and day surgery after discharge from birth hospitalization was not considered as a readmission.

FIGURE 29.2 Rate of neonatal hospital readmission after discharge following birth, by province/territory

Canada (excluding Quebec and Manitoba), 2002–2003 to 2004–2005*



Source: Canadian Institute for Health Information. Discharge Abstract Database (DAD), 2002–2003 to 2004–2005.

* Complete data for Quebec and Manitoba were not available in the DAD; data for three years were combined because of small numbers.

** "Other" includes residents of Quebec and Manitoba who were hospitalized in other provinces/territories.

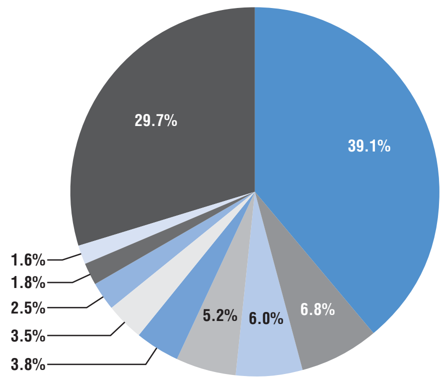
*** Newborns who weighed <1,000 g and newborns with initial length of stay >20 days were excluded from this analysis. Cases of neonatal readmission were included up to 28 days after birth. Hospitalizations for newborns who were directly transferred to another hospital after birth were not included in neonatal readmission counts, and day surgery after discharge from birth hospitalization was not considered as a readmission.

CI—confidence interval

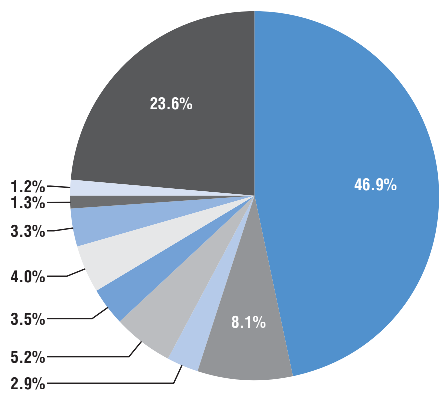
FIGURE 29.3 Principal diagnosis for readmitted newborns

Canada (excluding Quebec and Manitoba), 1995–1996 and 2004–2005*

Percentage of readmitted newborns,** 1995–1996



Percentage of readmitted newborns,** 2004–2005



Principal Diagnosis

- Jaundice
- Healthy infant accompanying sick person
- Congenital anomalies
- Dehydration
- Inadequate weight gain
- Respiratory conditions
- Feeding problems
- Sepsis
- Urinary tract infections
- Others

Source: Canadian Institute for Health Information. Discharge Abstract Database (DAD), 1995–1996 and 2004–2005.

* Complete data for Quebec and Manitoba were not available in the DAD.

** Newborns who weighed <1,000 g and newborns with initial length of stay >20 days were excluded from this analysis. Cases of neonatal readmission were included up to 28 days after birth. Hospitalizations for newborns who were directly transferred to another hospital after birth were not included in neonatal readmission counts, and day surgery after discharge from birth hospitalization was not considered as a readmission.

CI—confidence interval

Data Limitations

Health card numbers are unavailable or incomplete for over 10% of newborn hospital records in the Discharge Abstract Database (DAD). Furthermore, some newborns were tentatively given their mothers' health card numbers at birth hospitalization. No other identification variables or combination of variables could be used for a deterministic linkage between birth admissions and readmitted cases. In this report, therefore, cases of neonatal readmission were identified by an internal record search algorithm (as described in the notes above), in which repeated neonatal readmission cases for the same infant may have been counted more than once. Hence, this methodology change led to a higher readmission rate than that in the previous *Canadian Perinatal Health Report, 2003,* in which a deterministic linkage of neonatal readmission records and the live births was implemented.

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Appendices

Appendix A

Data Sources and Methods

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Data Sources

The principal data sources for this *Perinatal Health Report* were vital statistics, hospitalization data (Hospital Morbidity Database [HMDB], Discharge Abstract Database [DAD]), and the Canadian Community Health Survey (CCHS). Population estimates from Statistics Canada and the Therapeutic Abortion Survey from the Canadian Institute for Health Information (CIHI) were also used.

TABLE A1 **Principal data sources for each indicator**

Indicator	Data Source		
	Vital Statistics	Hospitalization	CCHS
Behaviours and Practices			
1. Rate of maternal smoking during pregancy			•
2. Rate of maternal exposure to second-hand smoke during pergnancy			•
3. Rate of maternal alcohol consumption during pregnancy			•
4. Rate of breastfeeding			•
5. Rate of periconceptional folic acid supplementation			•
6. Rate of low maternal education			•
7. Rate of live births to teenage mothers	•		
8. Rate of live births to older mothers	•		
Health Services			
9. Rate of labour induction		•	
10. Rate of cesarean delivery		•	
11. Rate of operative vaginal delivery		•	
12. Rate of trauma to the perineum		•	
13. Rate of early maternal discharge from hospital after childbirth		•	
14. Rate of early neonatal discharge from hospital after birth		•	
Maternal Health Outcomes			
15. Maternal mortality ratio	•		
16. Severe maternal morbidity rate		•	
17. Induced abortion ratio	•	•	
18. Rate of ectopic pregnancy		•	
19. Rate of maternal readmission after discharge following childbirth		•	

Indicator	Data Source		
	Vital Statistics	Hospitalization	CCHS
Fetal and Infant Health Outcomes			
20. Preterm birth rate	•		
21. Postterm birth rate	•		
22. Small-for-gestational-age rate	•		
23. Large-for-gestational-age rate	•		
24. Fetal mortality rate	•		
25. Infant mortality rate	•		
26. Severe neonatal morbidity rate		•	
27. Multiple birth rate	•		
28. Prevalence of congenital anomalies	•	•	
29. Rate of neonatal hospital readmission after discharge following childbirth		•	

Vital Statistics

Registration of births and deaths is compulsory under provincial and territorial Vital Statistics Acts or equivalent legislation. While Vital Statistics Acts may vary slightly among the provinces and territories, they follow a model Vital Statistics Act that was developed to promote uniformity of legislation and reporting among the provinces and territories. Every year, the provinces and territories send their live birth, stillbirth and death registration data to Statistics Canada. Statistics Canada compiles these data into national databases of live births, stillbirths and deaths, called the Canadian Vital Statistics System.[1-4]

The Canadian Vital Statistics System covers all births and deaths occurring in Canada. Some births and deaths of Canadian residents occurring in the United States are also included, being reported under a reciprocal agreement. However, births and deaths of Canadian residents occurring in countries other than Canada and the United States are not reported.[1] The preparation and maintenance of the databases in the Canadian Vital Statistics System require incorporation of late registrations and amendments as well as elimination of duplicate registrations.

As part of the Canadian Perinatal Surveillance System (CPSS) initiative, Statistics Canada, under contract to the Health Surveillance and Epidemiology Division, has developed a mechanism by which information on live births and infant deaths have been linked from 1985 onwards.[5] With the permission of the provinces and territories, the resulting birth cohort infant mortality analysis file is an important data source for CPSS analyses. This file has personal identifiers removed.

The birth and death statistics in this Report may differ slightly from those previously published by Statistics Canada as a result of updates to the data files, as well as updates to population estimates received by the Public Health Agency of Canada (PHAC).

Data quality

Coverage for births and deaths in the Canadian Vital Statistics System is virtually complete. Because of the large number of records, analysis within subpopulations is possible. An additional strength is that the legislation for the collection of vital statistics data is similar across all provinces and territories, as are data forms, most definitions and collection methods. Data are also available at the individual level and can therefore be linked to other data sources. Finally, causes of death are coded using an international classification scheme—the International Classification of Diseases, Ninth Revision (ICD-9), for deaths and stillbirths occurring from 1979 to 1999, and the International Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10), for deaths and stillbirths occurring from 2000 onwards.[6,7]

National vital statistics data also have some limitations. The province of Quebec uses a definition of stillbirth different from that used in the other provinces and territories. And, even among the jurisdictions sharing the same definitions of live birth and stillbirth, varying interpretation and application of these definitions have resulted in inconsistent approaches to registration of births at the borderline of viability. In Quebec, registration of stillbirth is required only if the fetus has a birth weight of 500 grams or more. In the other provinces and territories, the criteria for registration is a gestation of 20 or more completed weeks at extraction or expulsion, or a birth weight of 500 grams or more. The CPSS, with the collaboration of other organizations, is developing information materials that aim to promote national consistency in registration of live births and stillbirths.

Another limitation of national vital statistics data is that they are not available on as timely a basis as is needed. At the time this Report was being prepared, the last year of birth and death data provided to PHAC by Statistics Canada was 2004. The last year of de-identified individual level data available to PHAC was 2000. In addition, cause of death information in the national databases may not always incorporate the results of coroner and medical examiner investigations.

The most serious limitation of national vital statistics data relates to the quality and completeness of data from Ontario. Studies have identified systematic errors in the data on birth weight and gestational age in Ontario during the early and mid-1990s.[8,9] Although the errors related to birth weight were corrected and recent data on birth weight and gestational age appear to be free from the previously identified problems, other concerns persist.[10] The introduction of a birth registration fee by some municipalities (including Toronto) in mid-1996 and 1997 appears to have negatively affected the registration process. The CPSS project to link data from live birth registrations with data from infant death registrations has been successful in all provinces and territories of Canada except Ontario. Linkage of live birth and infant death data for Ontario has consistently resulted in a substantial proportion of unlinked infant deaths—i.e., infant deaths for which a birth registration could not be located. For the birth cohort of 2003, approximately 42.3% of infant deaths in Ontario could not be linked to a corresponding birth registration, compared with 1.1% of infant deaths in the rest of Canada. Information on multiple births, birth weight, gestational age and all other data elements only available on the birth registration are therefore not available for unlinked deaths. Because of these data quality issues, Ontario data were not included in the calculation of most national indicators based on vital statistics. Ontario data were analyzed separately and are presented in *Appendix H*.

It should be noted that Ontario has taken some steps to address the problems with vital statistics in that province. In September 2006, the Ontario government announced that it would be ending the requirement for parents to pay for birth registration. In July 2007, the Ontario Ministry of Health and Long-Term Care introduced a policy change for circumstances in which an infant is born and subsequently dies in hospital. In these instances, hospitals are now asked to submit on behalf of the parents the Statement of Live Birth and the accompanying fee. In September 2007, the Ontario Office of the Registrar General implemented the Integrated Birth Record Initiative across Ontario, in which parents who register a birth electronically will not be required to pay a fee.

Use of vital statistics data in this Report

Period vital statistics tabulations were supplied by Statistics Canada as requested by the Maternal and Infant Health Section for the years 2000–2004. For earlier years, the de-identified individual-level data files that had been provided to PHAC were used. The linked birth-infant death files (without identifying information) that are created at CPSS's request and provided to the Maternal and Infant Health Section were the basis of calculation of indicators using birth cohort mortality data.

Therapeutic Abortion Survey

Induced abortion statistics were obtained from the Therapeutic Abortion Survey which collects information on abortions performed in hospitals and clinics in Canada, as well as abortions performed on Canadian residents in selected American states, especially those along the border, for the years prior to 2004. Statistics Canada transferred responsibility for the Therapeutic Abortion Survey to CIHI in 1994–1995.

There are several data sources and formats used in the creation of the Therapeutic Abortion Survey database. CIHI obtains data from provincial and territorial departments of health, hospitals and clinics. Some information on Canadian residents having abortions in the United States is also obtained from some U.S. border states for the years prior to 2004. Depending upon the source, the format can also vary from a single sheet of paper with aggregate counts to detailed electronic records submitted through CIHI's DAD.

Data quality

The limitations to the Therapeutic Abortion Survey have been well documented[11]—these include missing or aggregated information on maternal age, especially for abortions performed in clinics. As a result, age group information was imputed when necessary. In some cases, information on the residence of the woman was also not available, and imputations have been done for these cases. The survey does not include information about reason for the pregnancy termination, which is important information for comprehensive surveillance of abortions and congenital anomalies.

Hospitalization Data

Two sources of hospitalization data were used: the Discharge Abstract Database (DAD) and the Hospital Morbidity Database (HMDB), both from CIHI. All hospitalization data were compiled on a fiscal-year basis (April 1–March 31). Contrary to the previous two reports, which reported statistics from the DAD, most of the hospitalization data used in this Report were from the HMDB.

Discharge Abstract Database

CIHI maintains the DAD, which captures hospital separation information—transfer, discharge or death—from the majority of Canada's acute care hospitals. The DAD is an electronic database that includes information on inpatient acute, chronic and rehabilitation care and day surgery, accounting for about 80% of all hospital inpatient discharges in Canada. The information is obtained directly from participating hospitals.[12] The DAD contains considerable data on each hospitalization, including demographic and residence information, length of stay, most responsible diagnosis, secondary and co-morbid diagnoses, and procedures performed during the hospitalization. In the DAD, up to 2000–2001, diagnoses were coded according to the International Classification of Diseases, Ninth Revision (ICD-9), and procedures were coded according to the Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures (CCP).[13] Beginning in 2001–2002, the Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems for diagnoses (ICD-10-CA) and the Canadian Classification of Health Interventions for procedures (CCI)[14] were gradually adopted by most jurisdictions (Table A2). ICD-10-CA is an enhanced version of ICD-10 developed by CIHI for morbidity classification in Canada. For the years when both ICD-9 and ICD-10 codes were in use, the ICD-10 codes were mapped to the ICD-9 codes.

TABLE A2 **Year of ICD-10-CA and CCI implementation in provinces/territories submitting data to DAD and/or HMDB**

Province/Territory	Year			
	2001–2002	2002–2003	2003–2004	2004–2005
Newfoundland and Labrador	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Prince Edward Island	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Nova Scotia	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
New Brunswick	ICD-9-CM	ICD-9-CM	ICD-10-CA/CCI	ICD-10-CA/CCI
Quebec	ICD-9/CCP	ICD-9/CCP	ICD-9/CCP	ICD-9/CCP
Ontario	ICD-9/CCP and ICD-9-CM	ICD-10-CA/ CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Manitoba	ICD-9-CM	ICD-9-CM	ICD-9-CM	ICD-10-CA/CCI
Saskatchewan	ICD-10-CA/ CCI (partial)	ICD-10-CA/ CCI (full)	ICD-10-CA/CCI	ICD-10-CA/CCI
Alberta	ICD-9-CM	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
British Columbia	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Yukon	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Northwest Territories	ICD-9-CM	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Nunavut	ICD-9-CM	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI

Source: Executive Summary: Data Quality Documentation, Hospital Morbidity Database, 2004–2005 [accessed 2007 Aug 27]. Available from: http://secure.cihi.ca/cihiweb/en/downloads/HMDB_2003-2004_DQ%

Data quality

The Health Surveillance and Epidemiology Division investigated and evaluated the DAD, to see whether it could serve the needs of a national perinatal surveillance system.[15,16] The quality of data for delivering mothers and their newborns recorded in the DAD from April 1, 1984, to March 31, 1995, was examined. The number of illogical and out-of-range values was found to be low, the occurrence of maternal and infant diseases estimated from the data was similar to that in the literature, and major medical or obstetric complications recorded in the DAD were good predictors of adverse pregnancy outcomes.[15]

In 2001, CIHI conducted a re-abstraction study to assess the validity of 1999–2000 hospital discharge data. This involved comparison of information in medical charts with information coded in the DAD for a sample of hospitals. The CPSS collaborated with CIHI to expand this study to include specific maternal and newborn diagnoses. The results showed that procedures and straightforward diagnoses recorded in routine hospital discharge abstract data can be used for perinatal health surveillance and research, but improvements in data quality are needed for complicated diagnoses.[17] Accuracy is also likely to be lower for codes other than the primary or most responsible diagnosis.

Hospital Morbidity Database

The HMDB is a national database that captures administrative, clinical and demographic information on hospital in-patient events.[18] The HMDB is populated by a subset of DAD data for those provinces and territories that submit discharge statistics to the DAD. The HMDB's main advantage over the DAD is that it appends data from non-DAD jurisdictions to be nationally comprehensive. For example, data from the Quebec hospital discharge abstract database—the Système de maintenance et d'exploitation des données pour l'étude de la clientèle hospitalière (MED-ÉCHO)—are included in the HMDB. The transition to ICD-10 and CCI codes was the same for the HMDB as for the DAD (see Table A2).

Comparison of national level availability of selected variables in the DAD and the HMDB

Variables	DAD	HMDB
	(excludes Quebec; Manitoba incomplete)	(includes all provinces/territories)
Mother's scrambled health card number	Yes	Manitoba 2000–2001 to 2002–2003 incomplete
Infant's scrambled health card number	Yes	Not available for Quebec; Manitoba 2000–2001 to 2002–2003 incomplete
Common field for mother and newborn	Yes	No
Stillbirths	Yes	No
Birth weight	Yes	No
Parity	No	No
Gestational age	No	No
Transfer from/to other institutions	Yes	No
Day surgery	Yes	No
Intensive care unit (ICU) visit	Yes	No

Use of hospitalization data in this Report

Because of comprehensiveness of coverage, and for consistency of reporting across jurisdictions, the **HMDB, rather than the DAD**, was chosen for the reporting of most indicators related to hospitalization for this edition of the *Perinatal Health Report.* This is a change from the previous reports. One exception is the rate of neonatal readmission. Scrambled health card number and identification of inter-institutional transfer are important variables for calculation of this rate; therefore, the DAD was used for this indicator. HMDB data were not used in previous reports because, at the time, the HMDB was less up to date than the DAD.

Another change from previous reports is that hospitalization-based indicators are presented based on the province/territory issuing the health card number (deemed to be the province/territory of residence), rather than the province/territory of hospitalization. In the previous *Perinatal Health Reports,* for indicators using the DAD, province/territory referred to the province/territory of hospitalization (the reporting hospital) because information on the province/territory issuing the health card number (usually province/territory of residence) was not available or complete for those years. For this Report, the province/territory issuing the health card number was available from fiscal year 2001–2002 and was therefore used for reporting for interprovincial/territorial comparisons. However, a new category called "Not available" had to be added because for 1.2% of maternal records and 0.6% of newborns records, the province/territory of residence was not stated. Please refer to *Appendix A.1* for examples of indicators reported using province/territory of hospitalization compared to province/territory issuing the health card number.

Canadian Congenital Anomalies Surveillance System

Canadian Congenital Anomalies Surveillance System (CCASS) data are largely culled from the DAD. Quebec data are from that province's hospitalization database, the MED-ÉCHO, and Alberta uses its own reporting system—the Alberta Congenital Anomalies Surveillance System (ACASS). The primary sources of data for ACASS are vital statistics, hospital reporting and special communications with genetics clinics, specialty pediatric clinics and laboratories. Data from Quebec and Alberta are sent to the Maternal and Infant Health Section and merged with data from the DAD to create the CCASS database. Since 2001, as a result of birth dates no longer being available in the DAD, ascertainment of congenital anomalies in an infant is limited to 30 days following birth. With birth date information, readmissions of the same infant could be linked for a preferred follow-up period of one year.

Data quality

CCASS is the only ongoing population-based congenital anomaly surveillance database that is able to estimate the Canadian birth prevalence of specific congenital anomalies. CCASS provides temporal trends at the national level in addition to provincial/territorial and international comparisons.

One of the most significant limitations of CCASS is its inability to monitor the impact of prenatal diagnoses on the birth prevalence of selected congenital anomalies. Affected pregnancies that are terminated before meeting the jurisdictional criteria for a stillbirth are not captured in CCASS data. This directly limits the assessment of primary and secondary preventive strategies. Additional strengths and limitations of CCASS are outlined elsewhere.[19]

Canadian Community Health Survey

The Canadian Community Health Survey (CCHS) is an ongoing cross-sectional survey, managed by Statistics Canada, that collects information related to health status, health care utilization and health determinants for the Canadian population. The CCHS operates on a two-year collection cycle.

The CCHS sample consists of people 12 years and older who live in private dwellings in the ten provinces and three territories. This Report used data from the 2000–2001, 2003 and 2005 cycles reported by women aged 15 to 55 who had given birth in the five years preceding the survey.

Analyses using the CCHS were based on microdata obtained in Health Canada's Data Analysis and Information System (DAIS) from the *Canadian Community Health Survey, cycles 2000–2001, 2003 and 2005*, prepared by the Health Statistics Division, Statistics Canada.

Data quality

As is evident in the table below, the sample sizes were generally large enough for analysis of data from women who had given birth in the past five years, according to various behaviours, by five-year age group or by province/territory (see *Appendix B: Guide to the Interpretation of Statistical Information in the Canadian Perinatal Health Report, 2008 Edition*).

TABLE A3 Canadian Community Health Survey response rates (%), sample sizes and number of women who had given birth in the preceding five years represented in the Canadian population, 2000–2001, 2003 and 2005

Response rates and sample information	2000–2001*	2003**	2005***
Household-level response rate	91.4	87.1	84.9
Individual-level response rate	91.9	92.6	92.9
Combined response rate	84.7	80.7	78.9
Number of women who had given birth in preceding five years: sample size	7,629	7,399	7,179
Number of women the sample represented in the Canadian population	1,527,890	1,419,220	1,459,227

Sources:
* Statistics Canada. Canadian Community Health Survey (CCHS), Cycle 1.1 (2000–2001). *Public Use Microdata File Documentation.* Ottawa: Statistics Canada, 2003.
** Statistics Canada. CCHS, Cycle 2.1 (2003). *Public Use Microdata File Documentation.* Ottawa: Statistics Canada, 2005.
*** Statistics Canada. CCHS, Cycle 3.1 (2005). *Public Use Microdata File (PUMF) User Guide.* Ottawa: Statistics Canada, 2006.

Data limitations include the fact that mothers reported on behaviours up to five years preceding the survey, which may have affected the accuracy of their recall. Additionally, knowledge that behaviours like smoking and alcohol consumption can adversely affect the outcome of a pregnancy may have led mothers to under-report their smoking and alcohol consumption during pregnancy.

Use of CCHS rather than the National Longitudinal Survey of Children and Youth in this Report

In previous CPSS *Perinatal Health Reports,* data from the National Longitudinal Survey of Children and Youth (NLSCY) were used to report rates of smoking and alcohol consumption during pregnancy, breastfeeding rates, and level of maternal education. However, due to small sample sizes, some age groups and provinces had to be grouped and there were no data for the territories. Therefore, it was decided to use data from the CCHS for relevant indicators in the current report since the sample sizes were larger and the territories were included. In addition, the CCHS contains data on exposure to second-hand smoke during pregnancy and folic acid supplementation for all three cycles of the survey. Information to estimate exclusive breastfeeding is available in the 2003 and 2005 cycles. This led to the addition of new indicators on second-hand smoke and folic acid supplement use, as well as information on exclusive breastfeeding to the breastfeeding indicator.

Methods

Statistical methods were primarily descriptive and consisted of calculation of frequencies, rates, ratios and means. Results based on rare events or on a small sample have been flagged, and caution should be exercised in interpreting them. Records with key information missing were excluded from analysis. Statistics presented for most indicators consist of the following:

1. Temporal trends at the national level: Temporal trends date back to 1981, depending on the data source and the indicator. In order to cover a 10-year period, for most indicators using vital statistics, trends begin in 1995. For indicators using hospitalization data, trends begin in 1995–1996. For indicators using CCHS data, trends begin in 2000–2001, when the first cycle of this survey was carried out. If complete provincial data were not available for all years of a temporal trend, data from that province were excluded from the trend. In some cases, when events were rare, data for several years were aggregated.

2. Interprovincial/territorial comparisons: For most indicators, interprovincial/territorial comparisons are presented for the most recent year for which data were available. Geographical differences were assessed and interpreted using standard deviations or 95% confidence intervals.

The majority of indicators are presented graphically. Data tables corresponding to all figures are presented in *Appendix G.* Some results are broken down by relevant factors, such as maternal age or birth weight categories. Tables A4 to A6 describe specific methods used for each indicator. All indicators were calculated for the time and place specified in the chapter.

Methods Specific to Indicators Using Vital Statistic Data as Principal Data Source

TABLE A4 Methods for each indicator using vital statistics

Indicator	Method
Rate of live births to teenagers	Age-specific live birth rate (general) = $\frac{\text{Number of live births to mothers in a specific age group}}{\text{Number of females in that age group}} \times 1{,}000$ Proportion of live births to teenage mothers = $\frac{\text{Number of live births to females in a specific teen age group}}{\text{Number of live births}} \times 100$ **Exclusions:** Live births to mothers with unknown age or 50+. **Age categories:** 10–14, 15–17, 18–19
Rate of live births to older mothers	Age-specific live birth rate (general) = $\frac{\text{Number of live births to mothers in a specific age group}}{\text{Number of females in that age group}} \times 1{,}000$ Proportion of live births to older mothers = $\frac{\text{Number of live births to mothers in a specific older age group}}{\text{Number of live births}} \times 100$ **Exclusions:** Live births to mothers with unknown age or 50+. **Age categories:** 35–39, 40–44, 45–49
Maternal mortality ratio (MMR)	**For 1981–1999** $\frac{\text{Number of deaths with cause of death ICD-9 630–676}}{\text{Total number of live births}} \times 100{,}000$ **For 2000–2004** $\frac{\text{Number of deaths with cause of death ICD-10 O00–O95, O98, O99}}{\text{Total number of live births}} \times 100{,}000$ The WHO recommends that ICD-10 codes O96 and O97 for late maternal deaths are not included in the MMR for international reporting. However, they may be useful for the calculation of national statistics. Changes in coding for ICD-10 impact the way in which indirect deaths are considered. Cerebrovascular disorders were classified as direct deaths in ICD-9, but as indirect in ICD-10. Also, the list of causes classifiable as indirect is specific in ICD-9, but under ICD-10 any cause other than perinatal, injury and poisoning is classifiable as indirect if the underlying condition was believed to have been aggravated by pregnancy.[21,22] For the purposes of examining detailed causes of death (Figure 15.2), maternal deaths for 2000–2004 have been converted back to ICD-9 codes with the exception of a new grouping created to represent diseases of the circulatory system. This new category more accurately reflects the impact these deaths have on maternal deaths in Canada and the changes to how they are classified in ICD-10. As of 2000, all cases of ICD-9 674.0, 648.5 and 648.6 were coded as ICD-10 O99.4. When converting back to ICD-9, these cases would all fall under 674.0, which results in the loss of distinction between 674.0, 648.5 and 648.6. Unlike other chapters in this Report which use vital statistics data, **Ontario is included in the MMR data.** This is because the impact of the data quality issues for Ontario is minimal for maternal mortality because of the already very small numbers of maternal deaths and large numbers of births. Data were aggregated into three- and six-year intervals because of the small numbers of maternal deaths each year. Statistics Canada publications (corrected for under-registration) estimate Newfoundland and Labrador vital statistics prior to 1991, as data for Newfoundland and Labrador before 1991 are incomplete.

Indicator	Method
Preterm birth rate	$\frac{\text{Number of live births with gestational age <37 completed weeks}}{\text{Number of live births}} \times 100$ **Exclusions:** Live births with unknown gestational age. **Gestational age categories:** <32 weeks, 32–36 weeks, <37 weeks
Postterm birth rate	$\frac{\text{Number of live births with gestational age >41 completed weeks}}{\text{Number of live births}} \times 100$ **Exclusions:** Live births with unknown gestational age.
Small-for-gestational-age rate	$\frac{\text{Number of singleton live births with sex-specific birth weight below the 10th percentile for gestational age}}{\text{Number of singleton live births}} \times 100$ **Exclusions:** Live births with unknown gestational age, live births with gestational age <22 weeks or gestational age >43 weeks, live births with unknown birth weight and multiple births.
Large-for-gestational-age rate	$\frac{\text{Number of singleton live births with sex-specific birth weight above the 90th percentile for gestational age}}{\text{Number of singleton live births}} \times 100$ **Exclusions:** Live births with unknown gestational age, live births with gestational age <22 weeks or gestational age >43 weeks, live births with unknown birth weight and multiple births.
Fetal mortality rate	Crude fetal mortality (stillbirth) rate = $\frac{\text{Number of fetal deaths}}{\text{Number of fetal deaths and live births}} \times 1{,}000$ **Exclusions:** Stillbirths and live births with a birth weight <500 g and a gestational age <20 weeks were excluded. In the 2003 Report, no stillbirths were excluded; therefore, there may be slight differences in the crude rates between the two reports. Fetal mortality (stillbirth) rate ≥500 g = $\frac{\text{Number of fetal deaths}}{\text{Number of fetal deaths and live births}} \times 1{,}000$ **Exclusions:** Stillbirths and live births with a birth weight <500 g and, if birth weight unknown, with a gestational age <22 weeks were excluded. **ICD-9 causes of fetal mortality** *Congenital anomalies:* 740–759.9 *Maternal complications of pregnancy:* 761 *Complications of placenta/cord/membranes:* 762 *Intrauterine hypoxia and birth asphyxia:* 768 *Unspecified:* 779.9 **ICD-10 causes of fetal mortality** *Congenital anomalies:* Q00–Q99 *Maternal complications of pregnancy:* P01 *Complications of placenta/cord/membranes:* P02 *Intrauterine hypoxia and birth asphyxia:* P20; P21 *Unspecified:* P95; P96.9
Infant mortality rate	Infant mortality rate = $\frac{\text{Number of deaths among infants <1 year (365 days) of age}}{\text{Number of live births}} \times 1{,}000$ Neonatal death rate = $\frac{\text{Number of deaths among infants <28 days of age}}{\text{Number of live births}} \times 1{,}000$

Indicator	Method
Infant mortality rate (cont.)	Postneonatal death rate = Number of deaths among infants ≥28 days and <1 year of age / Number of infants ≥28 days of age x 1,000 **ICD-9 and ICD-10 causes of infant mortality** See *Appendix A.2,* Table A.2.4. For trend and feasibility purposes, ICD-10 codes were matched to ICD-9 codes using conversion tables. In the birth cohort infant mortality files, all live births at <22 weeks and <500 g were assumed to have died on the first day after birth and were classified as such.
Multiple birth rate	Number of live births and stillbirths following a multiple gestation pregnancy / Number of live births and stillbirths x 100

Methods Specific to Indicators Using Hospitalization Data as Principal Data Source

The majority of analyses using hospitalization data were carried out on two sets of records—obstetric delivery records and newborn records. Obstetric delivery records in the HMDB were identified by means of the algorithm described below. The algorithm used 16 diagnosis fields and 10 procedure fields in the HMDB. Unless otherwise specified, all of these fields were also used in the analysis of each indicator. All obstetric delivery records without a code indicating a cesarean procedure (CCP code 86.0, 86.1, 86.2, 86.8 or 86.9 or CCI code 5.MD.60^^) were identified as vaginal deliveries.

Algorithm for identifying obstetric records

For records using ICD-9

a) Any diagnostic code starting with V27 or 650.
b) Any diagnostic code between 640 and 676.9 with the 5th digit of 1 or 2 (episode of care was delivery).

For records using ICD-10

a) Any diagnostic code starting with Z37.
b) Any diagnostic code between O10 and O99.8 with the 5th and 6th digits of 01 or 02 (episode of care was delivery).

Termination of pregnancies

ICD-9: Diagnostic codes from 630 to 639.9 were categorized as termination of pregnancies.
ICD-10: Diagnostic codes from O00 to O08.9 were categorized as termination of pregnancies.

Algorithm for identifying newborn records

The HMDB has an age code of "B" for all newborns. This variable was used to extract newborn records.

^^ Includes any/all matching codes.

TABLE A5 **Methods for each indicator using hospitalization data**

Indicator	Method
Labour induction rate	Medical labour induction rate = $\frac{\text{Number of deliveries with CCP code 85.5}}{\text{Number of deliveries}}$ x 100 Surgical labour induction rate = $\frac{\text{Number of deliveries with CCP code 85.01}}{\text{Number of deliveries}}$ x 100 Labour induction rate = $\frac{\text{Number of deliveries with CCP code 85.5 or 85.01}}{\text{Number of deliveries}}$ x 100 *Medical labour induction ICD-10 codes:* 5.AC.30.AL-I2; 5.AC.30.CA-I2; 5.AC.30.GU-I2; 5.AC.30.HA-I2; 5.AC.30.YA-I2; 5.AC.30.YB-I2; 5.AC.30.ZZ-I2 *Surgical labour induction ICD-10 codes:* 5.AC.30.AP *Labour induction ICD-10 codes:* 5.AC.30.AL-I2; 5.AC.30.CA-I2; 5.AC.30.GU-I2; 5.AC.30.HA-I2; 5.AC.30.YA-I2; 5.AC.30.YB-I2; 5.AC.30.ZZ-I2; 5.AC.30.AP
Cesarean delivery rate	Cesarean delivery rate = $\frac{\text{Number of deliveries with CCP code 86.0, 86.1, 86.2, 86.8 or 86.9}}{\text{Number of deliveries}}$ x 100 Primary cesarean delivery rate = $\frac{\text{Number of deliveries with CCP code 86.0, 86.1, 86.2, 86.8 or 86.9 that do not have ICD-9 code 654.2 (previous cesarean)}}{\text{Number of deliveries excluding those with an ICD-9 code 654.2}}$ x 100 Repeat cesarean delivery rate = $\frac{\text{Number of deliveries with CCP code 86.0, 86.1, 86.2, 86.8 or 86.9 that do have ICD-9 code 654.2 (previous cesarean)}}{\text{Number of deliveries with ICD-9 code 654.2}}$ x 100 *Cesarean delivery CCI codes:* 5.MD.60^^ *Previous cesarean ICD-10 codes:* O75.7; O34.2
Rate of operative vaginal deliveries	Forceps rate = $\frac{\text{Number of deliveries with CCP code 84.0, 84.1, 84.2 or 84.3}}{\text{Number of vaginal deliveries}}$ x 100 Vacuum extraction rate = $\frac{\text{Number of deliveries with CCP code 84.7}}{\text{Number of vaginal deliveries}}$ x 100 Rate of operative vaginal deliveries = $\frac{\text{Number of deliveries with CCP code 84.0, 84.1, 84.2, 84.3 or 84.7}}{\text{Number of vaginal deliveries}}$ x 100 *Forceps CCI codes:* 5.MD.53.KL; 5.MD.53.KN; 5.MD.53.KJ; 5.MD.53.KK; 5.MD.53.KM; 5.MD.53.KH; 5.MD.55^^ *Vacuum extraction CCI codes:* 5.MD.54^^
Rate of trauma to the perineum	Rate of first- and second-degree lacerations = $\frac{\text{Number of deliveries with ICD-9 code 664.0 or 664.1}}{\text{Number of vaginal deliveries}}$ x 100 Rate of third-degree lacerations = $\frac{\text{Number of deliveries with ICD-9 code 664.2}}{\text{Number of vaginal deliveries}}$ x 100

^^ Includes any/all matching codes.

Indicator	Method
Rate of trauma to the perineum (cont.)	Rate of fourth-degree lacerations = Number of deliveries with ICD-9 code 664.3 x 100 Number of vaginal deliveries Episiotomy rate = Number of deliveries with CCP code 84.1, 84.21, 84.31, 84.71 or 85.7 x 100 Number of vaginal deliveries *First- and second-degree lacerations CCI codes:* O70.0; O70.1 *Third-degree lacerations CCI codes:* O70.2 *Fourth-degree lacerations CCI codes:* O70.3 *Episiotomy CCI codes*: 5.MD.50.GH; 5.MD.53.KS; 5.MD.53.JE; 5.MD.53.KL; 5.MD.53.KN; 5.MD.53.KJ; 5.MD.54.KJ; 5.MD.54.KL; 5.MD.54.KN; 5.MD.54.NF; 5.MD.55.KN; 5.MD.55.KL; 5.MD.55.KJ; 5.MD.55.KR
Rate of early maternal discharge from hospital after childbirth	Number of vaginal deliveries with length of stay (LOS) <2 days x 100 Number of vaginal deliveries Number of cesarean deliveries with LOS <4 days x 100 Number of cesarean deliveries If the LOS was >20 days, it was set to 20 days for the calculation of the mean LOS.
Rate of early neonatal discharge from hospital after birth	Number of term live births with LOS <2 days x 100 Number of term live births If the LOS was >20 days, it was set to 20 days for the calculation of the mean LOS. **Exclusions:** Term newborns were defined here as newborns with birth weight ≥2,500 g and/or gestational age ≥37 weeks. Since live births with a birth weight ≥2,500 g or gestational age ≥37 completed weeks do not have specific ICD-9 and ICD-10 codes, they are derived by exclusion of the following codes: *For ICD-9: by excluding codes 765.1 (1,000–2,499 g or gestation between 28 and 37 weeks [sic]) and 765.0 (<1,000 g or gestation <28 weeks).* *For ICD-10: by excluding codes P070 (< 1,000 g), P071 (1,000–2,499 g), P072 (extreme prematurity) and P073 (length of gestation 28 weeks to <37 weeks).*
Induced abortion ratio	Induced abortion ratio = Number of induced abortions x 100 Number of live births Induced abortion rate = Number of induced abortions x 1,000 Number of females 15–44 years of age Age-specific induced abortion rate = Number of induced abortions in a specific age category x 1,000 Number of females in that age category Prior to 2004, the Canadian ratio and rate include cases of unknown area of residence and abortions performed on Canadian residents in selected U.S. states. Ratios and overall rates include cases with age not specified, as well as abortions to females ≤14 years of age and ≥45 years of age. However, denominators of overall rates are based on the female population 15–44 years of age. May include abortions performed in Canada on non-Canadian residents. *Statistics Canada. Pregnancy Outcomes 2004.* *Catalogue No. 82-224-XIE.* *Publication was used to produce the induced abortion indicator.*

Indicator	Method
Ectopic pregnancy rate	$\frac{\text{Number of ectopic pregnancies ICD-9 code 633.0, 633.1, 633.2, 633.8 or 633.9}}{\text{Number of ectopic pregnancies, inpatient hospital-based abortions (ICD-9 code 630–639) and hospital deliveries}} \times 1{,}000$ **Exclusions:** All ectopic pregnancies managed in outpatient or community setting. All spontaneous abortions, and all induced abortions managed in outpatient or community settings. *Ectopic pregnancy ICD-10 codes:* O000–O002; O008; O009 *Abortion ICD-10 codes*: O00–O08
Severe maternal morbidity ratio	Amniotic fluid embolism incidence rate = $\frac{\text{Number of deliveries with ICD-9 code 673.1}}{\text{Number of deliveries}} \times 100{,}000$ Postpartum hemorrhage = $\frac{\text{Number of deliveries with ICD-9 code 666.0, 666.1, 666.2 or 666.3}}{\text{Number of deliveries}} \times 1{,}000$ Atonic postpartum hemorrhage = $\frac{\text{Number of deliveries with ICD-9 code 666.1}}{\text{Number of deliveries}} \times 1{,}000$ Postpartum hemorrhage with hysterectomy = $\frac{\text{Number of deliveries with ICD-9 code 666.0, 666.1, 666.2 or 666.3 (postpartum hemorrhage) and CCP codes 80.2 to 80.3 (hysterectomy)}}{\text{Number of deliveries}} \times 100{,}000$ *Amniotic fluid embolism ICD-10 code:* O88.1 *Postpartum hemorrhage ICD-10 codes:* O72.0; O72.1; O72.2; O72.3 *Atonic postpartum hemorrhage ICD-10 code:* O72.1 *Hysterectomy CCI codes*: 5.MD.60.KE; 5.MD.60.RC; 5.MD.60.CB; 5.MD.60.RD; 1.RM.87.LA-GX (1.RM.89.LA without 1.PL.74; 1.RS.80; 1.RS.74)
Rate of maternal readmission after discharge following childbirth	$\frac{\text{Number of women who had vaginal births and were readmitted to hospital within 90 days of a hospital discharge for childbirth}}{\text{Number of vaginal deliveries}} \times 100$ $\frac{\text{Number of women who had a cesarean and were readmitted to hospital within 90 days of a hospital discharge for childbirth}}{\text{Number of cesarean deliveries}} \times 100$ Linkage of mother's scrambled health card number was used to identify maternal readmission cases. For most of the Canadian provinces/territories, the scrambled health card number was available and complete for over 95% of the hospital records including childbirth hospitalizations. However, data for Manitoba were not included because the Manitoba Hospital Abstract System does not include health card numbers for approximately 70% of their hospital records. The number of readmissions was counted for up to 90 days after the discharge following childbirth. **Exclusions:** Manitoba data for 2000–2001 to 2002–2003 were excluded due to incomplete data. Women who were directly transferred after childbirth, women with initial length of hospital stay greater than 20 days, and women who had day surgery admissions. The primary diagnosis at readmission was based on the principal discharge diagnosis only.

Indicator	Method
Rate of maternal readmission after discharge following childbirth (cont.)	Primary diagnosis at readmission: • postpartum hemorrhage • major puerperal infection • cholelithiasis • complications of pregnancy, not elsewhere classified • other and unspecified complication of puerperium • person seeking consultation without complaint of sickness, postpartum care and examination • other current conditions in the mother classifiable elsewhere, but complicating pregnancy, childbirth or the puerperium • depressive disorder and mood affective psychoses • infection of the breast and nipple associated with childbirth • acute appendicitis • hypertension complicating pregnancy, childbirth and puerperium • symptoms involving abdomen and pelvis • acute pancreatitis • retained placenta • complication of procedures, not elsewhere classified • calculus of kidney and ureter • other diagnoses See *Appendix A.2,* Table A.2.2, for list of ICD-9 and ICD-10 codes used.
Severe neonatal morbidity rate	Rate of intubation = $\frac{\text{Number of live births with CCP codes 13.62 or 13.63}}{\text{Number of live births in specific birth weight category}} \times 100$ Rate of neonatal sepsis = $\frac{\text{Number of live births with ICD-9 code 771.8}}{\text{Number of live births in specific birth weight category}} \times 100$ Mean LOS = $\frac{\text{Sum of LOS of live births in specific birth weight category}}{\text{Number of live births in specific birth weight category}}$ **Birth weight categories:** <1,000 g, 1,000–2,499 g, ≥2,500 g *ICD-9 codes:* *Birth weight <1,000 g: ICD-9 code 765.0 (<1,000 g or gestation <28 weeks)* *Birth weight 1,000–2,499 g: ICD-9 code 765.1 (1,000–2,499 g or gestation between 28 and 37 weeks [sic])* *Birth weight ≥2,500 g: inferred by excluding ICD-9 codes 765.0 and 765.1* *ICD-10 codes:* *Birth weight <1,000 g: ICD-10 code P070 (<1,000 g) or P072 (extreme prematurity)* *Birth weight 1,000–2,499 g: ICD-10 code P071 (1,000—2,499 g) or P073 (length of gestation 28 weeks to <37 weeks)* *Birth weight ≥2,500 g: inferred by excluding ICD-10 codes P070, P071, P072 and P073* **LOS cut-off by birth weight categories for calculation of the mean LOS.** *If the LOS was >70 days, it was set to 70 days for the calculation of the mean LOS for the birth weight <1,000 g category.* *If the LOS was >40 days, it was set to 40 days for the calculation of the mean LOS for the birth weight 1,000–2,499 g category.* In the *Perinatal Health Report, 2003,* ICD-9 codes 771.8 or 771.4 were used to define neonatal sepsis. In this Report, only 771.8 has been used to define neonatal sepsis; therefore, the rates reported are slightly different from the previous report. *Intubation CCI codes:* 1.GZ.31.CB-ND; 1.GZ.30.^^; 1.GZ.31.CA-MP; 1.GZ.31.CA-ND *Sepsis ICD-10 codes:* P36.0–P36.9; P39.2–P39.9

^^ Includes any/all matching codes.

Indicator	Method
Prevalence of congenital anomalies	Congenital anomalies case rate = $\frac{\text{Number of live births and stillbirths with ICD-9 codes 740–759.9}}{\text{Number of live births and stillbirths}} \times 10{,}000$ Cleft palate rate = $\frac{\text{Number of live births and stillbirths with ICD-9 code 749.0}}{\text{Number of live births and stillbirths}} \times 10{,}000$ Cleft lip with or without cleft palate rate = $\frac{\text{Number of live births and stillbirths with ICD-9 codes 749.1 and 749.2}}{\text{Number of live births and stillbirths}} \times 10{,}000$ Down syndrome rate = $\frac{\text{Number of live births and stillbirths with ICD-9 code 758.0}}{\text{Number of live births and stillbirths}} \times 10{,}000$ Neural tube defect rate = $\frac{\text{Number of live births and stillbirths with ICD-9 codes 740.0–740.2, 741.0–741.9 and 742.0}}{\text{Number of live births and stillbirths}} \times 10{,}000$ Anencephaly rate = $\frac{\text{Number of live births and stillbirths with ICD-9 codes 740.0–740.2}}{\text{Number of live births and stillbirths}} \times 10{,}000$ Spina bifida rate = $\frac{\text{Number of live births and stillbirths with ICD-9 codes 741.0–741.9}}{\text{Number of live births and stillbirths}} \times 10{,}000$ Congenital anomaly cases were identified using the CCASS database. *Congenital anomalies cases ICD-10 codes*: Q00–Q99 *Cleft palate ICD-10 codes*: Q35.0–Q35.9 *Cleft lip with or without cleft palate ICD-10 codes*: Q36; Q36.0; Q36.1; Q36.9; Q37; Q37.0–Q37.5; Q37.8; Q37.9 *Down syndrome ICD-10 codes*: Q90.0–Q90.2; Q90.9 *Neural tube defects ICD-10 codes*: Q00.0–Q00.2; Q05.0–Q05.9; Q07.0; Q01.0–Q01.2; Q01.8; Q01.9 *Anencephaly ICD-10 codes*: Q00.0–Q00.2 *Spina bifida ICD-10 codes:* Q05.0–Q05.9, Q07.0
Rate of neonatal hospital readmission after discharge at birth	$\frac{\text{Number of infants who were readmitted to hospital within 28 days of birth}}{\text{Number of hospital live births}} \times 100$ Since the current HMDB did not contain health card numbers for Quebec (particularly newborn records) and Manitoba (more than 70% of their records for some years), we instead extracted the possible readmissions from hospital records with a restriction of age from day 1 to day 28. However, since information on transfers was also not available in this dataset, we were unable to differentiate the transferred newborns from the real readmissions. Therefore, we used the DAD for this indicator. In the *Perinatal Health Report, 2003*, we used the DAD and deterministic linkage of birth and readmitted neonatal cases. Key information in this linkage was the six-digit postal code; however, only the three-digit postal code was retained in the current DAD, thus the previous linkage method could not be used. In this Report, therefore, cases of neonatal readmission were identified by an internal record search algorithm (i.e., search for those hospital records age day 1 to day 28 excluding birth records, as the possible neonatal readmissions). The frequency of neonatal readmission is counted for 28 days after birth.

Indicator	Method
Rate of neonatal hospital readmission after discharge at birth (cont.)	Further, the information on transfer (inter-hospital or -department) was used to differentiate newborn transfers from readmissions. Because of the change in methods, the readmission rates reported in this Report are slightly different from the previous report. **Exclusions:** Quebec and Manitoba were excluded because it was not possible to link readmission with the birth record due to incomplete scrambled health card numbers. Also excluded were newborns who were directly transferred after birth, newborns with initial length of hospital stay >20 days, newborns with birth weight <1,000 g, newborns discharged on the same day of birth, and day surgery admissions. The primary diagnosis at readmission was based on the principal discharge diagnosis only. $\frac{\text{Number of infants who were readmitted to hospital within 28 days of birth with any condition below}}{\text{Number of hospital readmissions}} \times 100$ **ICD-9 and ICD-10 codes for primary diagnosis at readmission** See *Appendix A.2*, Table A.2.6.

Methods Specific to Indicators Using CCHS Data

Tabulations were based on the first three large national cycles of the CCHS in 2000–2001, 2003 and 2005. Women aged 15 to 55, who had given birth in the previous five years, were asked several questions related to their maternity experiences. These included use of folic acid supplements prior to finding out they were pregnant, smoking, exposure to second-hand smoke and alcohol consumption during pregnancy, and breastfeeding. The CCHS is a cross-sectional survey, so there is likely very little overlap between surveys, i.e., different women would have been sampled from one survey to the next, as a general rule.

All estimates presented in this Report were calculated using sample weights provided by Statistics Canada. Estimates based on a sample of 10 or more were included, regardless of the size of the coefficient of variation (estimates based on a sample size of less than 10 were excluded). Ninety-five percent confidence intervals were included for all estimates, and those with a coefficient of variation over 33.3% were flagged, see *Appendix B: Guide to the Interpretation of Statistical Information in the Canadian Perinatal Health Report, 2008 Edition.* The calculation of the confidence intervals was based on the bootstrap method[22] that takes the design effects of the survey into consideration.

In calculating the rates, the denominators *excluded* responses of “do not know,” “not stated,” and refusal to answer. Non-response rates for the selected indicators for the three years ranged from 0.02% to 3.6%.

TABLE A6 Methods for each indicator using CCHS data

Indicator	Methods
Rate of maternal smoking during pregnancy	Rate of maternal smoking = Number of women who reported smoking during pregnancy x 100 Number of women who gave birth in the last 5 years* Rate of prenatal exposure to >10 cigarettes per day = Number of mothers who reported smoking >10 cigarettes per day during pregnancy x 100 Number of women who gave birth in the last 5 years* **Survey questions used:** 2000–2001: Did you smoke during your last pregnancy? How many cigarettes did you smoke each day during your last pregnancy? 2003 and 2005: During your last pregnancy did you smoke daily, occasionally or not at all? Daily smokers only—How many cigarettes did you usually smoke each day? * Excludes responses of "do not know," "not stated," and refusal to answer.
Rate of maternal exposure to second-hand smoke	Rate of maternal exposure to second-hand smoke = Number of women who reported exposure to second-hand smoke during and shortly after pregnancy x 100 Number of women who gave birth in the last 5 years* **Survey questions used:** Did anyone regularly smoke in your presence during or after the pregnancy (about 6 months after)? * Excludes responses of "do not know," "not stated," and refusal to answer.
Rate of maternal alcohol consumption during pregnancy	Rate of maternal alcohol consumption = Number women who reported drinking any alcohol during pregnancy x 100 Number of women who gave birth in the last 5 years* **Survey questions used:** How frequently did you consume alcohol during your pregnancy with . . . (e.g., beer, wine, liquor)? * Excludes responses of "do not know," "not stated," and refusal to answer.
Prevalence of breastfeeding	Breastfeeding initiation rate = Number women who reported breastfeeding (regardless of duration) x 100 Number of women who gave birth in the last 5 years* Rate of exclusive breastfeeding for 6+ months = Number women who reported breastfeeding exclusively for 6+ months (who were not still exclusively breastfeeding**) x 100 Number of women who gave birth in the last 5 years* (who were not still exclusively breastfeeding**) **Survey questions used:** All cycles: Did you breastfeed or try to breastfeed your child even if only for a short time? 2003 and 2005: Are you still breastfeeding? How long did you breastfeed (your last baby)?

Indicator	Methods
Prevalence of breastfeeding (cont.)	How old was your (last) baby when you first added any other liquids (e.g., milk, formula, water, teas, herbal mixtures) or solid foods to the baby's feeds? * Excludes responses of "do not know," "not stated," and refusal to answer. ** Since the birth date of the baby was not known, it was not possible to estimate the length of time a woman had been exclusively breastfeeding if she was still exclusively breastfeeding.
Rate of periconceptional folic acid supplementation	Rate of periconceptional folic acid supplementation* = Number of women who reported taking folic acid supplements prior to pregnancy x 100 Number of women who gave birth in the last 5 years** **Survey questions used:** Did you take a vitamin supplement containing folic acid before your pregnancy, that is, before you found out that you were pregnant? * The CCHS question asked women only about the use of folic acid supplementation *prior to* finding out about their pregnancy; however, this was likely to be indicative of supplementation during the periconceptional period. ** Excludes responses of "do not know," "not stated," and refusal to answer.
Proportion of women with a low educational level	Number of women who had a particular level of education x 100 Number of women who gave birth in the last 5 years* **Survey questions used:** Variable derived by Statistics Canada: highest level of education of the respondent—four levels: 1. Less than high school 2. High school graduate (no post-secondary education) 3. Some post-secondary education (no college or university degree) 4. University/college graduate * Excludes responses of "do not know," "not stated," and refusal to answer.

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Appendix A.1

Impact of Analysis by Province/Territory of Residence versus Province/Territory of Hospitalization

Surveillance information is typically reported by place of residence. In previous *Perinatal Health Reports,* indicators based on hospitalization data were analyzed using province/territory of hospitalization, because reporting on residence was not complete in earlier years. In this Report, we have changed to reporting by jurisdiction of residence.

In most instances, whether a given indicator is analyzed using province/territory of residence or hospitalization has little impact on the results. Exceptions may apply for indicators that measure health conditions or events that require specialized care not necessarily available in the jurisdiction of residence. In these instances, rates based on province/territory of hospitalization will tend to inflate rates of occurrence for referral jurisdictions and similarly under-count rates of occurrence for the "home" jurisdictions. The jurisdictions determined to be the most affected because of higher rates of referral (in or out) are mainly the territories (especially Nunavut) and Prince Edward Island, Nova Scotia and New Brunswick. These jurisdictions are subject to some usually minor differences in rates when comparing by province/territory of hospitalization versus province/territory of residence.

Also, in analysis of the hospitalization databases, a patient's jurisdiction of residence is determined using the variable "province/territory where the health card number was issued." However, this may not always be the actual province/territory of residence. Inconsistencies are most likely to occur for residents of areas close to a provincial/territorial boundary.

For 2004–2005 data, only 1.2% of delivery records were missing information on the province/territory issuing the health card number (residence) and 0.6% of newborn records were missing this information. Province/territory of hospitalization was complete on all records in the hospitalization databases.

Some examples illustrate the impact of the change from using province/territory of hospitalization in previous reports to using province/territory of residence in this Report. In the first example, the rate of cesarean delivery shows little difference between province/territory of hospitalization and province/territory of residence. Even among the territories, there was little effect except for the Northwest Territories, even though, for Nunavut, the number of cesarean deliveries was almost double for province/territory of residence compared to province/territory of hospitalization. However, for rate of early neonatal discharge, there are greater differences—especially for Nunavut.

In the following example (Table A.1.1), the rates of cesarean delivery for Nunavut are quite similar even though the actual counts are very different. However, in the next example for Nunavut (Table A.1.2), the rate of early neonatal discharge for province/territory of residence is very different from province/territory of hospitalization.

TABLE A.1.1 Rate of cesarean delivery, by province/territory

Canada, 2004–2005

Province/Territory	Province/Territory of hospitalization			Province/Territory of residence		
	Number of cesarean deliveries	Number of hospital deliveries	Cesarean deliveries (95% CI) per 100 hospital deliveries	Number of hospital deliveries	Number of hospital deliveries	Cesarean deliveries (95% CI) per 100 hospital deliveries
Newfoundland and Labrador	1,282	4,444	28.8 (27.5–30.2)	1,257	4,364	28.8 (27.5–30.2)
Prince Edward Island	450	1,351	33.3 (30.8–35.9)	457	1,367	33.4 (30.9–36.0)
Nova Scotia	2,328	8,397	27.7 (26.8–28.7)	2,322	8,319	27.9 (26.9–28.9)
New Brunswick	1,931	6,748	28.6 (27.5–29.7)	1,856	6,548	28.3 (27.3–29.5)
Quebec	15,805	71,302	22.2 (21.9–22.5)	15,964	71,792	22.2 (21.9–22.5)
Ontario	36,114	135,221	26.7 (26.5–26.9)	35,344	132,145	26.7 (26.5–27.0)
Manitoba	2,839	14,007	20.3 (19.6–20.9)	2,788	13,525	20.6 (19.9–21.3)
Saskatchewan	2,404	11,792	20.4 (19.7–21.1)	2,372	11,737	20.2 (19.5–20.9)
Alberta	10,178	39,980	25.5 (25.0–25.9)	10,092	39,748	25.4 (25.0–25.8)
British Columbia	11,753	39,306	29.9 (29.4–30.4)	11,579	38,683	29.9 (29.5–30.4)
Yukon	90	343	26.2 (21.7–31.2)	90	330	27.3 (22.5–32.4)
Northwest Territories	133	728	18.3 (15.5–21.3)	152	675	22.5 (19.4–25.9)
Nunavut	**34**	**355**	**9.6 (6.7–13.1)**	**74**	**751**	**9.9 (7.8–12.2)**
Not available	–	–	–	994	3,990	24.9 (23.6–26.3)
CANADA	**85,341**	**333,974**	**25.6 (25.4–25.7)**	**85,341**	**333,974**	**25.6 (25.4–25.7)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

TABLE A.1.2 Rate of early neonatal discharge from hospital after birth for term newborns, by province/territory

Canada, 2002–2003 to 2004–2005 combined

Province/Territory	Province/Territory of hospitalization (birth weight >2,500 g)	Province/Territory of residence (birth weight >2,500 g)
	Newborns with LOS <2 days (95% CI) per 100 hospital live births	Newborns with LOS <2 days (95% CI) per 100 hospital live births
Newfoundland and Labrador	9.7 (9.2–10.2)	9.8 (9.3–10.3)
Prince Edward Island	1.7 (1.4–2.2)	1.9 (1.5–2.4)
Nova Scotia	15.7 (15.3–16.2)	15.6 (15.2–16.1)
New Brunswick	9.0 (8.6–9.4)	9.0 (8.6–9.4)
Quebec	7.3 (7.1–7.4)	7.4 (7.3–7.5)
Ontario	32.3 (32.1–32.4)	32.1 (32.0–32.3)
Manitoba	20.5 (20.1–20.9)	20.4 (20.0–20.8)
Saskatchewan	21.1 (20.6–21.5)	20.9 (20.4–21.3)
Alberta	47.9 (47.6–48.2)	47.8 (47.5–48.1)
British Columbia	32.7 (32.5–33.0)	32.4 (32.1–32.6)
Yukon	15.8 (13.6–18.3)	14.7 (12.5–17.2)
Northwest Territories	16.8 (15.2–18.5)	19.1 (17.3–21.0)
Nunavut	**69.2 (65.5–72.7)**	**43.7 (40.9–46.4)**
Not available	–	49.0 (47.8–50.2)
CANADA	**26.6 (26.5–26.7)**	**26.6 (26.5–26.7)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
CI—confidence interval
LOS—length of stay

Appendix A.2

ICD-9 and ICD-10 Code Conversions for Selected Indicators

TABLE A.2.1 Indication for cesarean delivery

Conditions	ICD-9	ICD-10
Breech presentation	652.2	O32.1
Dystocia	652.0; 652.2–652.4; 652.6–652.9; 653.0–653.9; 659.0; 659.1; 660.0–660.9; 661.0–661.2; 661.4; 661.9; 662.0–662.3	O32.0; O32.2; O32.3; O32.5; O32.6; O32.8; O32.9; O33.0–O33.9; O61.0; O61.1; O61.8; O61.9; O62.0–O62.2; O62.4; O62.8; O62.9; O63.0–O63.2; O63.9; O64.0–O64.5; O64.8; O64.9; O65.0–O65.5; O65.8; O65.9; O66.0; O66.1–O66.5; O66.8; O66.9; O80.1; O83.1
Fetal distress	656.3; 663.0	O36.3; O68.0–O68.3; O68.8; O68.9; O690
Miscellaneous	054; 430–434; 641; 642; 647.6; 648.0; 648.8; 651; 654.6; 654.7; 654.9; 655.0; 656.1; 656.5; 656.6; 658.0; 658.4; 665.0; 665.1	I63.1–I63.5; I63.8; I63.9; I65.0–I65.3; I65.8; I65.9; I66.0–I66.4; I66.8; I66.9; I67.2; I67.6; I68.8; O10.0–O10.4; O10.9; O14.0; O14.1; O14.9; O15.0; O15.1; O15.2; O15.9; O24.0–O24.4; O24.9; O34.4; O34.6; O34.8;O34.9; O35.0; O36.0; O36.5; O36.6; O41.0; O41.1; O43.8; O44.0; O44.1; O45.0; O45.8; O45.9; O46.0; O46.8; O46.9; O67.0; O67.8; O67.9; O71.0; O71.1; O98.4; O98.5; O99.8; O11; O13; O16; O30.0–O30.2; O30.8; O30.9; O31.8; O84.0; O84.9
Elective repeat/Other	None of the above	None of the above

TABLE A.2.2 Maternal readmission diagnosis

Conditions	ICD-9	ICD-10
Postpartum hemorrhage	666.0–666.3	O72.0–O72.3
Major puerperal infection	670	A34; O85; O86.8
Cholelithiasis	574.0–574.5	K80.0–K80.8
Complication of pregnancy not elsewhere classified (NEC)	646.0–646.9	O12.0–O12.2; O23.0–O23.9; O26.0–O26.4; O26.6–O26.9; O31.0–O31.2; O86.0–O86.4; O95
Other and unspecified complication of puerperium NEC	674.0–674.4; 674.8; 674.9	O88.2; O90.0–O90.5; O90.8; O90.9
Person seeking consultation without complaint of sickness, postpartum care and examination	V65.0–V65.5; V65.8–V65.9; V24.0–V24.2	F68.1; Z58.0–Z58.9; Z64.2; Z64.3; Z70.0–Z72.1; Z72.3–Z72.9; Z73.6–Z73.9; Z76.3–Z76.9; Z39.0–Z39.2

Conditions	ICD-9	ICD-10
Other current condition in the mother classifiable elsewhere but complicating pregnancy, childbirth or the puerperium	648.0–648.9	O24.0–O25; O99.0–O99.8
Depressive disorder and mood affective psychoses	296.0–296.6; 296.8; 296.9; 311	F30.0–F31.9; F32.2–F32.9; F33.1; F33.2; F33.4; F33.8–F34.9; F38.0–F39; F53.0
Infection of the breast and nipple associated with childbirth	675.0–675.2; 675.8; 675.9	O91.0–O91.2; O92.2
Acute appendicitis	540.0; 540.1; 540.9	K35.0–K35.9; K65.0; K65.8
Hypertension complicating pregnancy childbirth and puerperium	642.0–642.7; 642.9	O10.0–O11; O13–O16
Symptoms involving abdomen and pelvis	789.0–789.5; 789.9	R10.0–R10.4; R16.0–R16.1; R18; R19.0; R19.3; R19.8
Acute pancreatitis	577.0	K85; K87.1
Retained placenta	667.0; 667.1	O73.0; O73.1
Complication of procedures, NEC	998.0–998.9	T81.0–T81.6; T81.8–T81.9; T88.4; T88.9
Calculus of kidney and ureter	592.0; 592.1; 592.9	N20.0–N20.9; N22.0; N22.8
Others	Any code not mentioned above	Any code not mentioned above

NEC—not elsewhere classified

TABLE A.2.3 Fetal mortality (stillbirth) causes

Causes	ICD-9	ICD-10
Congenital anomalies	740–759.9	Q00–Q99
Maternal complication of pregnancy	761	P01
Complication of placenta/cord/ membrane	762.0–762.9	P02.0–P02.9
Intrauterine hypoxia and birth asphyxia	768	P20; P21
Unspecified	779.9	P95; P96.9

TABLE A.2.4 Infant mortality causes

Causes	ICD-9	ICD-10
Congenital anomalies	740–759.9	Q00–Q99
Asphyxia-related conditions	761.6; 761.7; 762.0–762.2; 762.6; 763; 766–768; 770.1; 772.2; 779.0; 779.2	O43.8; O83.4; P01.6–P01.7; P02.0–P02.2; P02.6; P03.0–P04.0; P08.0–P08.2; P10.0–P10.1; P10.3–P21.9; P24.0-P24.9; P52.4–P52.5; P52.8; P90–P91.0; P91.4–P91.5; P91.9
Immaturity-related conditions	761.3–761.5; 761.8; 761.9; 762.7; 764.0–765.1; 769; 770.2–770.9; 772.1; 774.0–774.7; 777.5; 777.6; 778.2; 779.6; 779.8	D58.9; P01.3–P01.5; P01.8–P01.9; P02.7; P05.0–P05.9; P07.0–P07.3; P10.2; P22.0–P22.9; P25.0–P29.2; P29.4–P29.9; P52.0–P52.3; P57.8–P59.9; P77; P78.0; P80.0; P91.1–P91.2; P91.8; P94.1–P94.9; P96.0; P96.3–P96.5
Infections	001–139; 320–326; 382; 420–422; 460-466; 475-477; 480–491; 510; 511; 513; 540; 541; 566; 567; 570; 590; 591; 770.0; 771; 790	A00.0–B19.9; B25.0–B99; D86.0–D86.9; E79.0; G00.0–G09; G36.1; G37.3–G37.4; G92; G93.3–G93.4; G94.8; G96.1; H66.0–H67.8; H75.0; I30.0–I30.9; I32.0–I33.9; I39.8–I41.2; I42.3; I43.0; I52.0–I52.1; I72.9; I88.8; J00–J30.4; J36–J37.1; J39.9–J42; J44.1–J44.8; J65; J85.0–J92.9; J94.0–J94.9; J98.0; J98.4; J99.8; K35.0–K35.9; K37; K52.9; K61.0–K61.4; K65.0–K65.9; K67.0–K67.8; K72.0; K72.9; K76.2; K90.8; K93.0; L08.1; L44.8; L94.6; M02.1; M02.3; M35.2; N10–N13.3; N13.6; N15.1–N16.8; N17.2; N28.8; N29.1; N34.1; O98.0–O98.1; P23.0–P23.9; P35.0–P39.9; R06.5; R09.1; R29.1; R70.0–R71; R73.0–R74.9; R77.0–R78.0; R78.7–R79.9; R89.7; T62.9
Sudden infant death syndrome (SIDS)	798.0	R95
Other unexplained infant death	798.1; 798.2; 798.9; E913; 799	J96.0–J96.9; R09.0; R09.2; R41.8; R45.0; R45.2–R45.6; R45.8–R46.3; R46.5–R46.7; R53; R64; R68.1; R68.8; R69; R96.0–R99; Z71.1; W75–W77; W81–W84
External causes	260–263; 507; E800–E912; E914–E999	E40–E46; E64.0; J69.0–J69.8; J95.8; V01–Y98 (except W75–W77; W81–W84)
Others	Any code not mentioned above	Any code not mentioned above

TABLE A.2.5 Congenital anomalies

Congenital anomalies	ICD-9	ICD-10
Cases	740–759.9	Q00–Q99
Cleft palate	749.0	Q35.0–Q35.9
Cleft lip with or without cleft palate	749.1; 749.2	Q36; Q36.0; Q36.1; Q36.9; Q37; Q37.0–Q37.5; Q37.8; Q37.9
Down syndrome	758.0	Q90.0–Q90.2; Q90.9
Neural tube defects	740.0–740.2; 741.0–741.9; 742.0	Q00.0–Q00.2; Q01.0–Q01.2; Q01.8; Q01.9; Q05.0–Q05.9; Q07.0
Anencephaly	740.0–740.2	Q00.0–Q00.2
Spina bifida	741.0–741.9	Q05.0–Q05.9; Q07.0

TABLE A.2.6 Neonatal readmission diagnosis

Conditions	ICD-9	ICD-10
Jaundice	773.1; 774.2; 774.3; 774.6; 774.7	P55.1; P57.8; P57.9; P58.8; P59.0; P59.3–P59.9
Respiratory conditions	466.0; 466.1; 770	J18.0; J20.0–J22; P21.9; P22.1; P22.8–P28.9
Healthy infant accompanying sick person	V65.0	Z76.3; Z76.4
Feeding problems	779.3; 783.3	P92.0–P92.9; R63.3
Sepsis	771.8	P36.0–P36.9; P39.2–P39.9
Dehydration	276.0; 276.5; 775.5; 778.4	E86; E87.0; P71.8; P74.1–P74.4; P81.0–P81.9
Inadequate weight gain	783.2; 783.4	E34.3; R62.0–R62.9; R63.4
Congenital anomalies	740–759.9	Q00–Q99
Urinary tract infections	599.0	N39.0

TABLE A.2.7 Codes used for selected indicators

Conditions	ICD-9	ICD-10	CCP	CCI	Other
Cesarean delivery			86.0–86.2; 86.8; 86.9	5.MD.60^^	
Previous cesarean	654.2	O34.2; O75.7			
Vaginal delivery					All deliveries not cesarean deliveries
Medical induction of labour			85.5	5.AC.30.AL-I2; 5.AC.30.CA-I2; 5.AC.30.GU-I2; 5.AC.30.HA-I2; 5.AC.30.YA-I2; 5.AC.30.YB-I2; 5.AC.30.ZZ-I2	
Surgical induction of labour			85.01	5.AC.30.AP	
Forceps delivery			84.0–84.3	5.MD.53.KL; 5.MD.53.KN; 5.MD.53.KJ; 5.MD.53.KK; 5.MD.53.KM; 5.MD.53.KH; 5.MD.55^^	
Vacuum delivery			84.7	5.MD.54^^	
First- and second-degree lacerations	664.0; 664.1	O70.0; O70.1			
Third-degree lacerations	664.2	O70.2			
Fourth-degree lacerations	664.3	O70.3			
Episiotomy			84.1; 84.21; 84.31; 84.71; 85.7	5.MD.50.GH; 5.MD.53.KS; 5.MD.53.JE; 5.MD.53.KL; 5.MD.53.KN; 5.MD.53.KJ; 5.MD.54.KJ; 5.MD.54.KL; 5.MD.54.KN; 5.MD.54.NF; 5.MD.55.KN; 5.MD.55.KL; 5.MD.55.KJ; 5.MD.55.KR	

^^ Includes any/all matching codes.

Conditions	ICD-9	ICD-10	CCP	CCI	Other
Ectopic pregnancy	633.1–633.2; 633.8; 633.9	O000–O002; O008; O009			
Babies <1,000 g	765.0	P07.0; P07.2			
Babies 1,000–2,499 g	765.1	P07.1; P07.3			
Babies ≥2,500 g	Not (765.0; 765.1)	Not (P07.0; P07.2; P07.1; P07.3)			
Postpartum hemorrhage	666.0–666.3	O72.0–O72.3			
Atonic postpartum hemorrhage	666.1	O72.1			
Postpartum hemorrhage with hysterectomy	666.0–666.3	O72.0–O72.3	80.2; 80.3	5.MD.60.KE; 5.MD.60.RC; 5.MD.60.CB; 5.MD.60.RD; 1.RM.87.LA-GX; (1.RM.89. LA without 1.PL.74; 1.RS.80; 1.RS.74)	
Amniotic fluid embolism	673.1	O88.1			
Intubation			13.62; 13.63	1.GZ.31.CB-ND; 1.GZ.30.^^; 1.GZ.31.CA-MP; 1.GZ.31.CA-ND	
Sepsis	771.8	P36.0–P36.9; P39.2–P39.9			

^^ Includes any/all matching codes.

Appendix B

Guide to the Interpretation of Statistical Information in the *Canadian Perinatal Health Report, 2008 Edition*

K.S. Joseph, Catherine McCourt and Reg Sauve

This *Perinatal Health Report* presents contrasts of various indicators over time and between provinces and territories. In keeping with traditions in the medical, epidemiologic and surveillance literature,[1] the focus is on providing the reader with a sense of the precision (amount of information) associated with each rate estimate. P values and statistical tests are generally eschewed in favour of point estimates and 95% confidence intervals (CIs). A brief explanation regarding specific statistical issues, as they relate to 95% CIs and their interpretation, is provided below.

Calculation of 95% CIs on rates based on national, provincial and territorial data

Sampling variation underlies the need for expressing the precision of an estimate. Providing 95% CIs on rates obtained from census data would therefore appear moot. For instance, the infant mortality rate in 2004 in Canada (5.1 per 1,000 live births) was based on a count of all infant deaths and all live births in Canada in 2004 (no sampling involved, minor operational errors notwithstanding). This would appear to obviate the need for a 95% CI on the estimated rate.

Nevertheless, there are important reasons for providing 95% CIs on all the rates presented in this *Report*. First, for the purposes of surveillance, the rate for a region for a particular calendar year has to be considered a sample in time. The alternative (i.e., regarding the rate as being derived from a census) would mean that any minuscule increase in the rate from one year to the next (e.g., infant mortality increase from 5.10 per 1,000 live births in 2004 to 5.11 per 1,000 live births in 2005) would represent an "increase." A second reason for providing an expression of precision around the rates relates to the need for distinguishing between the stability of estimates based on small versus large numbers. Thus, the 95% CI around the infant mortality rate in Quebec in 2004 (4.6 per 1,000 live births, 95% CI: 4.1–5.1) suggests that this rate is far more stable than the same rate in the Yukon (11.0 per 1,000 live births, 95% CI: 3.0 to 27.8). The infant mortality rate in the Northwest Territories in 2004 (0.0 per 1,000 live births, 95% CI: 0.0–5.3) is another case in point; treating the rate as a census would suggest a perfect state of infant health in that territory, whereas treating the rate as an estimate with an inherent sampling variability would be a more realistic description of the state of infant health.

95% CIs versus data suppression rules based on the coefficient of variation

One alternative to expressing the uncertainty around indicator estimates is to provide the point estimate for rates that are based on a large amount of information (robust rates) and to suppress rates that are very unstable and fragile. Various metrics, such as the coefficient of variation, can be used to identify stable versus unstable estimates. For instance, Statistics Canada typically suppresses survey data when the coefficient of variation exceeds 33.3%. The decision to provide 95% CIs in this *Report* on all estimates irrespective of such considerations is based on the logic that:

- Decisions on such cut-offs for data suppression are necessarily arbitrary.
- Some information, along with necessary caveats, is better than no information.
- Data suppression typically affects the data from the territories and small provinces. Creating quasi-jurisdictions (e.g., by combining the three territories) that have little policy-making capacity achieves a limited surveillance purpose.

It should be recognized, however, that use of 95% CIs, the coefficient of variation and other measures of statistical precision represent variations on the same theme. Ultimately, choice of method is guided by appeal and by the culture prevalent in any particular discipline.

Relationship between 95% CIs and P values when comparing two rates

Since P values and 95% CIs have the same theoretical underpinnings, it is possible to use 95% CIs as a partial surrogate for a test of significance at the 5% level.

a) 95% CI of one rate contains the point estimate of the other rate

This implies a P value **>0.05** for the contrast. For example, the crude infant mortality rates in Quebec and British Columbia in 2004 were 4.6 per 1,000 live births (95% CI: 4.1–5.1) and 4.3 per 1,000 live births (95% CI: 3.7–5.0), respectively (Figure B.1). The CIs of the rate for Quebec includes the point estimate for British Columbia. This implies a P value of >0.05 and thus no statistically significant difference between the two crude infant death rates.

b) 95% CIs do not overlap

This implies a P value **<0.05** for the contrast. For example, the infant mortality rates in Quebec and Manitoba in 2004 were 4.6 per 1,000 live births (95% CI: 4.1–5.1) and 7.0 per 1,000 live births (95% CI: 5.7–8.6), respectively (Figure B.1). The CIs of the two rates do not overlap. This suggests a P value of <0.05 and a statistically significant difference between the two infant death rates.

c) 95% CIs overlap but the 95% CI of one rate does not include the point estimate of the other

This is an ambiguous situation and it is not possible to ascertain the P value for the contrast without carrying out a formal statistical test of significance. For example, the infant mortality rates in Quebec and Saskatchewan in 2004 were 4.6 per 1,000 live births (95% CI: 4.1–5.1) and 6.2 per 1,000 live births (95% CI: 4.9 to 7.7), respectively (Figure B.1). The confidence intervals of the two rates overlap but the 95% CI of one rate does not contain the point estimate of the other rate. It is unclear whether the two rates are different at the 5% level of statistical significance and a formal statistical test is required.

Other considerations

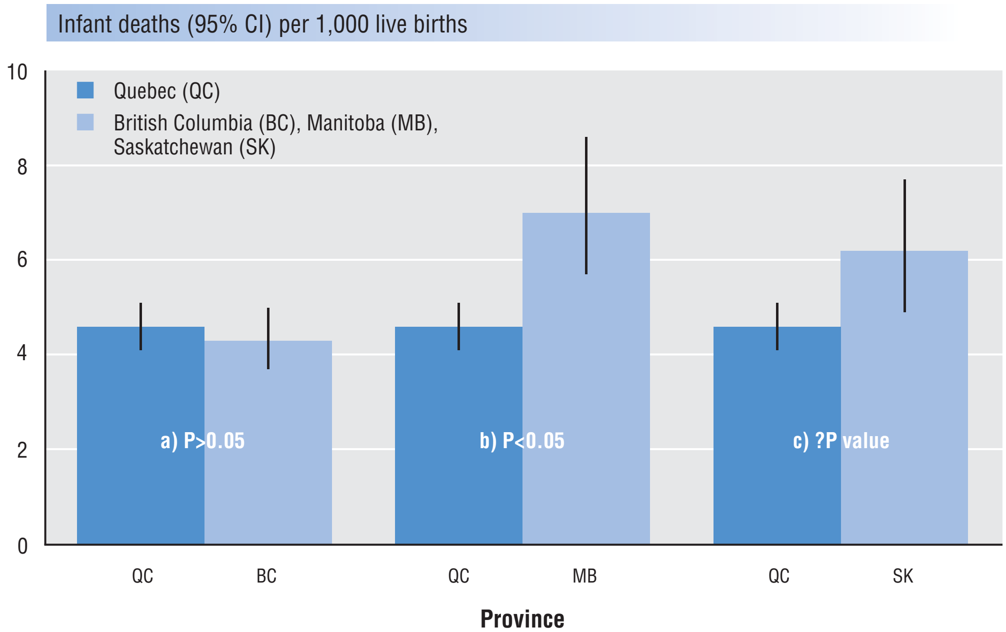
Although statistical issues are important, they constitute but one consideration in the interpretation of surveillance information. Data quality, clinical and public health significance of potential differences and various substantive issues can often overwhelm the statistical interpretation associated with any particular contrast. The interpretation of the above-mentioned differences in crude infant mortality, for instance, needs to be modified by the understanding that regional differences in birth registration makes crude infant mortality rates less than ideal for provincial/territorial comparison of infant death rates.

Reference

1. Rothman KJ, Greenland S, editors. *Modern Epidemiology.* 2nd ed. Philadelphia: Lippincott-Raven Publishers; 1998.

FIGURE B.1 **Crude infant mortality rates**

Quebec, British Columbia, Manitoba and Saskatchewan, 2004



CI—confidence interval

Appendix C

List of Perinatal Health Indicators

A health indicator is a measurement that, when compared with either a standard or desired level of achievement, provides information regarding a health outcome or important health determinant.[1] The Maternal and Infant Health Section and the CPSS Steering Committee undertook a process to identify the perinatal health indicators that should be monitored by a national perinatal surveillance system.[2] The group considered the importance of the health outcome or determinant, the scientific properties of the indicator, such as its validity in measuring that outcome or determinant, and the feasibility of collecting the data required to construct it. Below is the set of indicators that resulted from this process. The first 43 indicators listed are ranked according to the Steering Committee's assessment of health importance. Nine additional indicators were added to the list after subsequent consultations. This Report contains 29 of these perinatal health indicators—highlighted in this list—for which we currently have national data.

* Fetal and infant mortality rates were ranked first. Fetal growth comprising SGA and LGA was ranked second.

References

1. Buehler JW. Surveillance. In: Rothman KJ, Greenland S, editors. *Modern Epidemiology.* 2nd ed. Philadelphia: Lippincott-Raven; 1998. p. 435–57.

2. Health Canada. *Perinatal Health Indicators for Canada: A Resource Manual.* Ottawa: Minister of Public Works and Government Services Canada; 2000. Catalogue No.: H49-135/2000E.

Appendix D

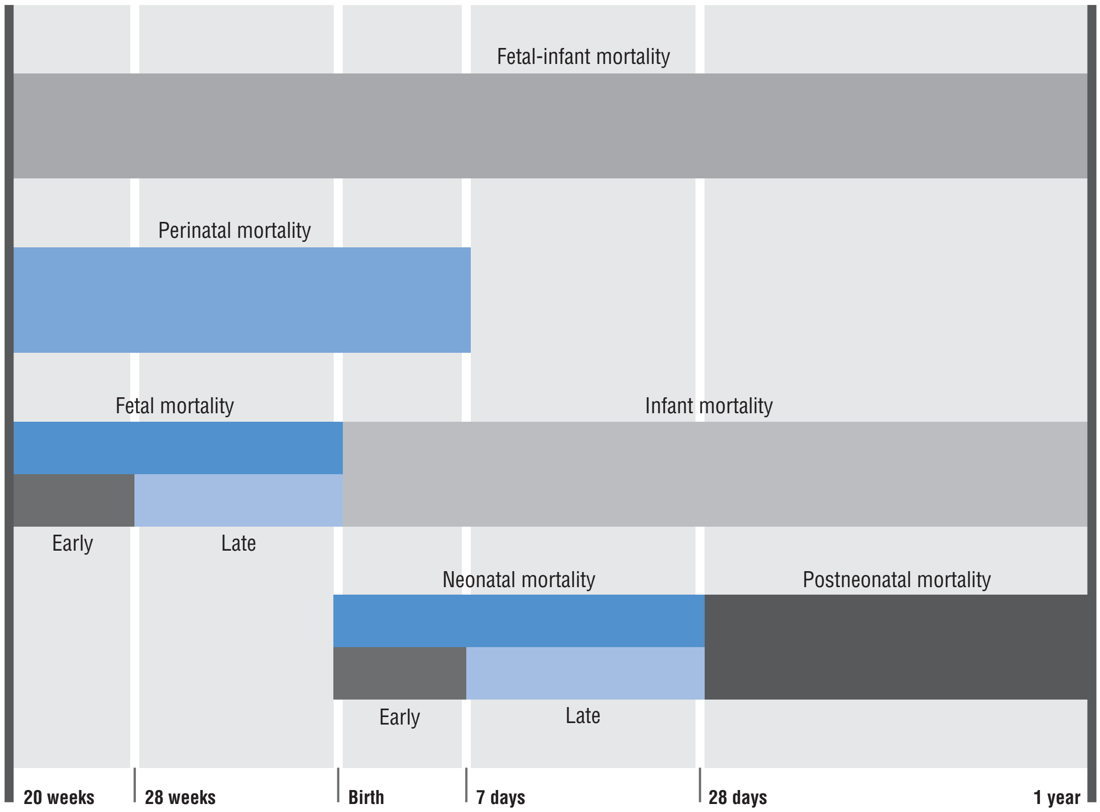
List of Acronyms

ACASS	Alberta Congenital Anomalies Surveillance System
AROM	artificial rupture of membranes
CA	congenital anomaly
CANSIM	Canadian Socio-economic Information Management System
CCASS	Canadian Congenital Anomalies Surveillance System
CCHS	Canadian Community Health Survey
CCI	Canadian Classification of Health Interventions
CCP	Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures
CDC	Centers for Disease Control and Prevention
CI	confidence interval
CIHI	Canadian Institute for Health Information
CL/P	cleft lip with or without cleft palate
CP	cleft palate
CPS	Canadian Paediatric Society
CPSS	Canadian Perinatal Surveillance System
DAD	Discharge Abstract Database
DC	Dieticians of Canada
DS	Down syndrome
FAS	fetal alcohol syndrome
FASD	fetal alcohol spectrum disorder
FIHSG	Fetal and Infant Health Study Group
HMDB	Hospital Morbidity Database
ICD-9	International Classification of Diseases, Ninth Revision
ICD-10	International Classification of Diseases and Related Health Problems, Tenth Revision
ICE	International Collaborative Effort (on perinatal and infant mortality)
IMR	infant mortality rate
IUGR	intrauterine growth restriction
LGA	large for gestational age
LMP	last normal menstrual period
LOS	length of stay

MED-ÉCHO	Système de maintenance et d'exploitation des données pour l'étude de la clientèle hospitalière
MES	Maternity Experiences Survey
MESG	Maternity Experiences Study Group
MHSG	Maternal Health Study Group
MIHS	Maternal and Infant Health Section
MMR	maternal mortality ratio
ND	neonatal death
NLSCY	National Longitudinal Survey of Children and Youth
NTD	neural tube defect
OC	orofacial cleft
RDS	respiratory distress syndrome
SB	spina bifida
Sb	stillbirth
SC	Steering Committee (of the CPSS)
SD	standard deviation
SGA	small for gestational age
SIDS	sudden infant death syndrome
SOGC	Society of Obstetricians and Gynaecologists of Canada
UNICEF	United Nations Children's Fund
VBAC	vaginal birth after cesarean
WHO	World Health Organization

Appendix E

Components of Fetal-Infant Mortality



Adapted from Péron Y, Strohmenger C. *Demographic and Health Indicators: Presentation and Interpretation.* Ottawa: Minister of Supply and Services Canada; 1985. Catalogue No. 82-543E; and Monnier A. Les méthodes d'analyse de la mortalité infantile. In: *Manuel d'analyse de la mortalité.* Paris: INED; 1985. p. 52–5.

In calculating the fetal-infant mortality rate, perinatal mortality rate and stillbirth rate, the denominator reflects total births (live births and stillbirths), whereas in calculating the infant mortality rate, neonatal mortality rate (early and late) and postneonatal mortality rate, the denominator includes only live births.

Appendix F

Data Tables Accompanying *An Overview of Perinatal Health in Canada*

TABLE F1.A Numbers of live births, stillbirths and neonatal deaths in specific birth weight categories and due to specific causes of death

Canada (excluding Ontario, and Newfoundland and Labrador), 1985–2003*

Birth year	Live births	Stillbirths	Live births <500 g	Stillbirths <500 g	Stillbirths <500 g due to congenital anomalies	Stillbirths <500 g due to pregnancy termination
1985	234,862	1,441	97	172	17	3
1986	230,642	1,416	115	163	23	†
1987	227,077	1,383	102	170	16	†
1988	230,992	1,334	103	218	31	†
1989	239,261	1,438	93	201	27	3
1990	246,582	1,408	176	209	22	†
1991	243,682	1,440	144	257	29	8
1992	240,980	1,410	133	261	40	†
1993	234,046	1,319	154	217	36	†
1994	231,729	1,315	147	195	47	†
1995	225,953	1,336	184	271	63	11
1996	220,430	1,191	187	212	43	15
1997	210,172	1,225	193	222	42	22
1998	204,801	1,107	157	235	35	26
1999	201,114	1,198	183	261	65	27
2000	195,607	1,152	176	213	16	41
2001	197,323	1,173	200	183	23	51
2002	195,636	1,170	223	320	34	100
2003	199,650	1,163	247	324	32	99

Birth year	Neonatal deaths	Neonatal deaths with missing birth weight	Neonatal deaths <500 g	Neonatal deaths <500 g due to congenital anomalies	Neonatal deaths <500 g due to pregnancy termination	Neonatal deaths ≥500 g due to congenital anomalies	Neonatal deaths ≥500 g due to pregnancy termination
1985	1,233	73	84	†	†	401	0
1986	1,216	65	110	†	0	397	†
1987	1,084	55	89	5	0	355	0
1988	1,071	62	96	3	0	369	0
1989	1,101	59	89	3	0	343	†
1990	1,137	53	154	9	0	393	0
1991	947	47	137	9	†	310	†
1992	948	33	122	8	0	333	0
1993	930	28	142	4	0	296	0
1994	980	44	139	13	†	315	†
1995	934	19	171	9	†	298	†
1996	832	26	169	16	3	240	6
1997	816	23	179	9	†	237	5
1998	768	11	149	21	10	223	9
1999	708	14	173	27	4	177	5
2000	668	5	170	18	30	152	14
2001	730	14	187	28	18	174	8
2002	746	12	210	33	7	164	†
2003	722	20	228	36	9	141	4

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1985–2003.
* Data for Ontario were excluded because of data quality concerns. Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.
† Number suppressed due to small cell size.

TABLE F1.B **Rates of stillbirth and neonatal death, by birth weight and cause, including those due to congenital anomalies (CAs) or pregnancy termination (PT)***

*Canada (excluding Ontario, and Newfoundland and Labrador),** 1985–2003**

Birth year	Live births <500 g per 10,000 live births	Stillbirths <500 g per 100 stillbirths	Stillbirths <500 g due to CAs as a percent of stillbirths <500 g	Stillbirths <500 g due to CAs or PT as a percent of stillbirths <500 g
1985	4.1	12.8	9.9	11.6
1986	5.0	12.3	14.1	15.3
1987	4.5	13.1	9.4	10.0
1988	4.5	17.4	14.2	14.7
1989	3.9	14.8	13.4	14.9
1990	7.2	15.7	10.5	11.0
1991	5.9	18.8	11.3	14.4
1992	5.5	19.6	15.3	15.7
1993	6.6	18.1	16.6	17.1
1994	6.4	16.2	24.1	25.1
1995	8.2	21.7	23.2	27.3
1996	8.5	18.7	20.3	27.4
1997	9.2	19.8	18.9	28.8
1998	7.7	22.8	14.9	26.0
1999	9.1	23.5	24.9	35.2
2000	9.0	20.6	7.5	26.8
2001	10.1	17.2	12.6	40.4
2002	11.4	28.4	10.6	41.9
2003	12.4	29.2	9.9	40.4

Birth year	Neonatal deaths per 1,000 live births	Neonatal deaths <500 g per 100 neonatal deaths	Neonatal deaths <500 g due to CAs as a percent of neonatal deaths <500 g	Neonatal deaths <500 g due to CAs or PT as a percent of neonatal deaths <500 g	Neonatal deaths <500 g due to CAs per 100,000 live births	Neonatal deaths <500 g due to CAs or PT per 100,000 live births	Neonatal deaths ≥500 g due to CAs per 100,000 live births	Neonatal deaths ≥500 g due to CAs or PT per 100,000 live births
1985	5.2	7.2	2.4	3.6	0.9	1.3	170.7	170.7
1986	5.3	9.6	1.8	1.8	0.9	0.9	172.1	173.0
1987	4.8	8.6	5.6	5.6	2.2	2.2	156.3	156.3
1988	4.6	9.5	3.1	3.1	1.3	1.3	159.7	159.7
1989	4.6	8.5	3.4	3.4	1.3	1.3	143.4	143.8
1990	4.6	14.2	5.8	5.8	3.6	3.6	159.4	159.4
1991	3.9	15.2	6.6	7.3	3.7	4.1	127.2	127.6
1992	3.9	13.3	6.6	6.6	3.3	3.3	138.2	138.2
1993	4.0	15.7	2.8	2.8	1.7	1.7	126.5	126.5
1994	4.2	14.9	9.4	10.1	5.6	6.0	135.9	136.4
1995	4.1	18.7	5.3	6.4	4.0	4.9	131.9	132.3
1996	3.8	21.0	9.5	11.2	7.3	8.6	108.9	111.6
1997	3.9	22.6	5.0	6.1	4.3	5.2	112.8	115.1
1998	3.7	19.7	14.1	20.8	10.3	15.1	108.9	113.3
1999	3.5	24.9	15.6	17.9	13.4	15.4	88.0	90.5
2000	3.4	25.6	10.6	28.2	9.2	24.5	77.7	84.9
2001	3.7	26.1	15.0	24.6	14.2	23.3	88.2	92.2
2002	3.8	28.6	15.7	19.0	16.9	20.4	83.8	84.9
2003	3.6	32.5	15.8	19.7	18.0	22.5	70.6	72.6

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1985–2003.
* All birth weight-specific rates exclude those with missing birth weight.
** Data for Ontario were excluded because of data quality concerns. Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.

TABLE F2.A Gestational age-specific stillbirth rates and gestational age-specific neonatal death rates per 1,000 fetuses at risk*

*Canada (excluding Ontario),** 2003*

Gestational age (weeks)	Live births	Stillbirths	Neonatal deaths	Fetuses at risk	Stillbirths per 1,000 fetuses at risk	Neonatal deaths per 1,000 fetuses at risk
<24	367	447	329	204,612	2.18	1.61
24	111	48	60	203,798	0.24	0.29
25	140	30	35	203,639	0.15	0.17
26	156	30	23	203,469	0.15	0.11
27	204	40	23	203,283	0.20	0.11
28	230	19	17	203,039	0.10	0.08
29	270	34	11	202,790	0.17	0.05
30	396	26	14	202,486	0.13	0.07
31	527	30	6	202,064	0.15	0.03
32	754	38	10	201,507	0.19	0.05
33	1,088	40	11	200,715	0.20	0.05
34	1,936	40	21	199,587	0.20	0.11
35	3,142	36	19	197,611	0.18	0.10
36	6,705	55	20	194,433	0.28	0.10
37	13,780	72	20	187,673	0.38	0.11
38	34,039	64	32	173,821	0.37	0.18
39	49,103	54	31	139,718	0.39	0.22
40	59,283	58	29	90,561	0.64	0.32
41	29,322	19	16	31,220	0.61	0.51
42+	1,875	4	0	1,879	2.13	0.00
Not available	863	14	12	(–)	16.0	13.9
TOTAL	**204,291**	**1,198**	**739**	**(–)**	**5.8**	**3.6**

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 2003.

* The numerator for the gestational age-specific stillbirth/neonatal death rate was the number of stillbirths/neonatal deaths at any gestation, while the denominator was the number of fetuses at risk for stillbirth/neonatal death at the same gestation (commonly referred to as the fetuses at risk approach).

** Data for Ontario were excluded because of data quality concerns.

TABLE F2.B Gestational age-specific stillbirth rates and gestational age-specific neonatal death rates per 1,000 fetuses at risk*

England, Wales and Northern Ireland, 2005

Gestational age (weeks)	Live births	Stillbirths	Neonatal deaths	Fetuses at risk	Stillbirths per 1,000 fetuses at risk	Neonatal deaths per 1,000 fetuses at risk
<24	600	0	655	642,085	0.00	1.02
24	600	324	254	641,485	0.51	0.40
25	600	246	139	640,561	0.38	0.22
26	800	215	124	639,715	0.34	0.19
27	900	204	73	638,700	0.32	0.11
28	1,000	166	80	637,596	0.26	0.13
29	1,200	141	50	636,430	0.22	0.08
30	1,400	147	46	635,089	0.23	0.07
31	1,900	125	51	633,542	0.20	0.08
32	2,600	145	43	631,517	0.23	0.07
33	3,600	153	44	628,772	0.24	0.07
34	5,900	149	53	625,019	0.24	0.08
35	9,000	184	53	618,970	0.30	0.09
36	17,000	205	71	609,786	0.34	0.12
37	35,900	218	79	592,581	0.37	0.13
38	87,600	238	123	556,463	0.43	0.22
39	136,900	236	116	468,625	0.50	0.25
40	181,900	246	123	331,489	0.74	0.37
41	121,300	214	97	149,343	1.43	0.65
42+	27,800	29	18	27,829	1.04	0.65
Not available	200	91	64	(–)	312.7	320.0
TOTAL	**638,700**	**3,676**	**2,356**	**(–)**	**5.7**	**3.5**

Source: Confidential Enquiry into Maternal and Child Health (CEMACH). *Perinatal mortality 2005: England Wales and Northern Ireland*. London: CEMACH; 2007.

* The numerator for the gestational age-specific stillbirth/neonatal death rate was the number of stillbirths/neonatal deaths at any gestation, while the denominator was the number of fetuses at risk for stillbirth/neonatal death at the same gestation (commonly referred to as the fetuses at risk approach).

TABLE F2.C Birth weight- and gestational age-specific stillbirth and neonatal death rates*

*Canada (excluding Ontario),** 2003, and England, Wales and Northern Ireland, 2005*

Index	Canada				
	Live births	Stillbirths	Neonatal deaths	Stillbirths per 1,000 total births (95% CI)	Neonatal deaths per 1,000 live births (95% CI)
All	204,291	1,198	739	5.8 (5.5–6.2)	3.6 (3.4–3.9)
Birth weight ≥1,000 g	203,307	611	279	3.0 (2.8–3.2)	1.4 (1.2–1.5)
Gestational age ≥28 weeks	203,313	603	269	3.0 (2.7–3.2)	1.3 (1.2–1.5)

Index	England, Wales and Northern Ireland				
	Live births	Stillbirths	Neonatal deaths	Stillbirths per 1,000 total births (95% CI)	Neonatal deaths per 1,000 live births (95% CI)
All	668,497	3,676	2,356	5.5 (5.3–5.6)	3.5 (3.4–3.7)
Birth weight ≥1,000 g	665,157	2,495	1,125	3.7 (3.6–3.9)	1.7 (1.6–1.8)
Gestational age ≥28 weeks	635,200	2,687	1,111	4.2 (4.1–4.4)	1.7 (1.6–1.9)

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 2003.
Confidential Enquiry into Maternal and Child Health (CEMACH). *Perinatal mortality 2005: England Wales and Northern Ireland*. London: CEMACH; 2007.
* Birth weight-specific rates exclude those <1,000 g and gestational age-specific rates exclude those <28 weeks.
** Data for Ontario were excluded because of data quality concerns.
CI—confidence interval

TABLE F3.A Birth cohort-based crude and birth weight-specific infant mortality rates*

*Canada (excluding Ontario),** 1991–2003*

Year	Number of live births	Number of live births <500 g	Number of live births ≥500 g	Number of live births ≥1,000 g	Number of live births with missing birth weight
1991	250,848	151	249,552	248,776	1,145
1992	247,898	136	246,759	246,015	1,003
1993	240,468	160	240,062	239,319	246
1994	238,069	152	237,562	236,732	355
1995	231,813	187	231,336	230,597	290
1996	226,180	191	224,614	223,855	1,375
1997	215,588	196	215,202	214,409	190
1998	209,795	161	209,355	208,610	279
1999	206,169	187	205,831	205,122	151
2000	200,476	178	200,241	199,531	57
2001	202,039	203	201,759	201,051	77
2002	200,287	227	199,200	198,491	860
2003	204,279	251	203,184	202,451	844

Year	All infant deaths	Infant deaths <500 g	Infant deaths ≥500 g	Infant deaths ≥1,000 g	Infant deaths with missing birth weight	Number of unlinked infant deaths	Crude infant mortality rate per 1,000 live births (95% CI)	Infant mortality rate ≥500 g (95% CI)	Infant mortality rate ≥1,000 g (95% CI)
1991	1,593	141	1,390	1,047	35	27	6.4 (6.1–6.7)	5.8 (5.5–6.1)	4.4 (4.2– 4.7)
1992	1,580	125	1,410	1,114	20	25	6.4 (6.1–6.7)	5.9 (5.6–6.2)	4.7 (4.4–5.0)
1993	1,487	149	1,306	968	8	24	6.2 (5.9–6.5)	5.6 (5.3–5.9)	4.2 (3.9–4.4)
1994	1,508	145	1,309	940	25	29	6.4 (6.1–6.7)	5.7 (5.4–6.0)	4.2 (3.9–4.5)
1995	1,415	174	1,215	919	13	13	6.1 (5.8–6.4)	5.4 (5.1–5.7)	4.1 (3.8–4.4)
1996	1,226	176	1,011	740	24	15	5.4 (5.1–5.7)	4.6 (4.4–4.9)	3.5 (3.2–3.7)
1997	1,192	182	976	692	13	21	5.5 (5.2–5.9)	4.7 (4.4–5.0)	3.4 (3.1–3.6)
1998	1,169	153	999	705	5	12	5.6 (5.3–5.9)	4.8 (4.6–5.1)	3.5 (3.2–3.7)
1999	1,082	178	888	637	9	7	5.2 (4.9–5.6)	4.4 (4.1–4.7)	3.2 (2.9–3.4)
2000	1,003	172	819	575	6	6	5.0 (4.7–5.3)	4.1 (3.9–4.4)	2.9 (2.7–3.2)
2001	1,042	190	831	552	8	13	5.2 (4.9–5.5)	4.2 (3.2–4.5)	2.8 (2.6–3.1)
2002	1,060	215	824	554	9	12	5.3 (5.0–5.6)	4.2 (3.9–4.5)	2.9 (2.7–3.1)
2003	995	233	736	488	14	12	4.9 (4.6–5.2)	3.7 (3.5–4.0)	2.5 (2.3–2.8)

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1991–2003.
* Birth weight-specific infant mortality rates include infant deaths with missing birth weight and unlinked infant deaths.
** Data for Ontario were excluded because of data quality concerns.
CI—confidence interval

TABLE F3.B **Birth cohort-based crude and birth weight-specific infant mortality rates* by province/territory**

*Canada (excluding Ontario),** 2001–2003*

Province/Territory	Number of live births	Number of live births <500 g	Number of live births ≥500 g	Number of live births ≥1,000 g	Number of live births with missing birth weight
Newfoundland and Labrador	13,996	11	13,932	13,892	53
Prince Edward Island	4,125	8	4,117	4,107	0
Nova Scotia	26,229	38	26,185	26,091	6
New Brunswick	21,358	13	21,344	21,270	1
Quebec	220,086	238	218,332	217,577	1,516
Manitoba	41,830	52	41,774	41,620	4
Saskatchewan	36,076	25	36,045	35,920	6
Alberta	116,597	170	116,423	115,955	4
British Columbia	121,137	116	120,850	120,434	171
Yukon	1,018	3	1,015	1,009	0
Northwest Territories	1,951	6	1,935	1,934	10
Nunavut	2,194	1	2,185	2,178	8
Unknown	8	0	6	6	2
CANADA	**606,605**	**681**	**604,143**	**601,993**	**1,781**

Province/Territory	All infant deaths	Infant deaths <500 g	Infant deaths ≥500 g	Infant deaths ≥1,000 g	Infant deaths with missing birth weight	Number of unlinked infant deaths
Newfoundland and Labrador	69	9	51	41	1	8
Prince Edward Island	18	8	10	7	0	0
Nova Scotia	136	37	98	65	1	0
New Brunswick	84	12	72	44	0	0
Quebec	956	227	713	442	10	6
Manitoba	300	49	246	172	2	3
Saskatchewan	218	21	190	127	0	7
Alberta	733	164	567	376	2	0
British Columbia	529	103	403	283	14	9
Yukon	8	2	6	4	0	0
Northwest Territories	16	6	7	7	0	3
Nunavut	30	0	28	26	1	1
Unknown	0	0	0	0	0	0
CANADA	**3,097**	**638**	**2,391**	**1,594**	**31**	**37**

TABLE F3.B (cont.)

Province/Territory	Crude infant mortality rate per 1,000 live births (95% CI)	Infant mortality rate ≥500 g (95% CI)	Infant mortality rate ≥1,000 g (95% CI)
Newfoundland and Labrador	4.9 (3.8–6.2)	4.3 (3.3–5.5)	3.6 (2.7–4.7)
Prince Edward Island	4.4 (2.6–6.9)	2.4 (1.2–4.5)	1.7 (0.7–3.5)
Nova Scotia	5.2 (4.4–6.1)	3.8 (3.1–4.6)	2.5 (1.9–3.1)
New Brunswick	3.9 (3.1–4.9)	3.4 (2.6–4.2)	2.1 (1.5–2.8)
Quebec	4.3 (4.1–4.6)	3.3 (3.1–3.6)	2.1 (1.9–2.3)
Manitoba	7.2 (6.4–8.0)	6.0 (5.3–6.8)	4.3 (3.7–4.9)
Saskatchewan	6.0 (5.3–6.9)	5.5 (4.7–6.3)	3.7 (3.1–4.4)
Alberta	6.3 (5.8–6.8)	4.9 (4.5–5.3)	3.3 (2.9–3.6)
British Columbia	4.4 (4.0–4.7)	3.5 (3.2–3.9)	2.5 (2.3–2.8)
Yukon	7.9 (3.4–15.4)	5.9 (2.2–12.8)	4.0 (1.1–10.1)
Northwest Territories	8.2 (4.7–13.3)	5.1 (2.5–9.4)	5.1 (2.5–9.4)
Nunavut	13.7 (9.2–19.5)	13.7 (9.2–19.5)	12.8 (8.5–18.5)
Unknown	0.0 (–)	0.0 (–)	0.0 (–)
CANADA	**5.1 (4.9–5.3)**	**4.1 (3.9–4.2)**	**2.8 (2.7–2.8)**

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1991–2003.
* Birth weight-specific infant mortality rates include infant deaths with missing birth weight and unlinked infant deaths.
** Data for Ontario were excluded because of data quality concerns.
CI—confidence interval

TABLE F4 Rates of live births <500 g* and neonatal deaths <500 g due to congenital anomalies (CAs) or pregnancy termination (PT)

*Alberta and the rest of Canada (excluding Ontario),** 2000–2003*

Birth year	Alberta				
	Live births*	Live births <500 g	Live births <500 g per 10,000 live births (95% CI)	Neonatal deaths <500 g due to CAs or PT	Neonatal deaths <500 g due to CAs or PT per 100,000 live births
2000	37,005	48	13.0 (9.6–17.2)	16	43.2 (24.7–70.2)
2001	37,617	43	11.4 (8.3–15.4)	16	42.5 (24.3–69.1)
2002	38,691	62	16.0 (12.3–20.5)	13	33.6 (17.9–57.5)
2003	40,285	65	16.1 (12.5–20.6)	16	39.7 (22.7–64.5)

Birth year	Rest of Canada				
	Live births*	Live births <500 g	Live births <500 g per 10,000 live births (95% CI)	Neonatal deaths <500 g due to CAs or PT	Neonatal deaths <500 g due to CAs or PT per 100,000 live births
2000	163,414	130	8.0 (6.7–9.5)	33	20.2 (13.9–28.6)
2001	164,345	160	9.7 (8.3–11.4)	30	18.3 (12.7–27.0)
2002	160,736	165	10.3 (8.8–12.0)	28	17.4 (11.4–25.2)
2003	163,150	186	11.4 (9.9–13.3)	29	17.8 (12.2–26.3)

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 2000–2003.
* Excluding those with missing birth weight.
** Data for Ontario were excluded because of data quality concerns.
CI—confidence interval

TABLE F5 **Gestational age-specific rates of birth and fetal-infant death among fetuses at risk, by population group***

Quebec, 1995–1997

Gestational age in weeks	French					North American Indian		Inuit	
	Stillbirths and live births	Fetal and infant deaths	Fetuses at risk	Births per 1,000 fetuses at risk	Fetal-infant deaths per 1,000 fetuses at risk	Births per 1,000 fetuses at risk	Fetal-infant deaths per 1,000 fetuses at risk*	Births per 1,000 fetuses at risk	Fetal-infant deaths per 1,000 fetuses at risk*
<20	66	66	656,824	0.1	0.1	0.0	0.0	0.0	0.0
20	122	116	656,758	0.2	0.2	0.2	0.6	0.0	0.4
21	160	157	656,636	0.2	0.2	0.2	0.6	0.0	1.6
22	301	298	656,476	0.5	0.5	0.2	0.6	0.4	2.3
23	408	394	656,175	0.6	0.6	0.2	1.0	1.2	3.1
24	432	329	655,767	0.7	0.5	0.6	1.3	0.8	4.3
25	444	256	655,335	0.7	0.4	0.6	1.3	1.9	4.3
26	506	190	654,891	0.8	0.3	1.1	1.7	2.3	3.1
27	613	172	654,385	0.9	0.3	0.2	1.7	1.6	1.6
28	692	165	653,772	1.1	0.3	1.3	2.1	1.2	1.6
29	857	160	653,080	1.3	0.2	0.8	1.5	2.0	2.0
30	1,115	164	652,223	1.7	0.3	1.2	1.9	1.2	2.4
31	1,348	144	651,108	2.1	0.2	1.0	1.7	2.8	2.4
32	2,221	176	649,760	3.4	0.3	3.8	2.3	8.7	2.4
33	3,147	205	647,539	4.9	0.3	4.2	2.5	6.0	2.8
34	5,734	233	644,392	8.9	0.4	6.0	2.9	6.4	4.0
35	9,609	224	638,658	15.0	0.4	14.4	3.1	20.9	5.6
36	20,848	317	629,049	33.1	0.5	33.0	3.6	56.7	8.6
37	44,028	381	608,201	72.4	0.6	77.5	5.9	122.9	9.6
38	109,225	489	564,173	193.6	0.9	216.9	7.1	254.3	11.4
39	163,720	495	454,948	359.9	1.1	417.6	7.6	435.7	10.0
40	192,168	517	291,228	659.9	1.8	684.0	6.3	737.9	13.0
41	89,424	266	99,060	902.7	2.7	832.3	6.2	842.3	22.5
42+	9,636	31	9,636	1,000.0	3.2	1,000.0	9.2	1,000.0	57.1
Not available	5,402	94	(–)	(–)	(–)	(–)	(–)	(–)	(–)
TOTAL	**662,226**	**6,039**	**656,824**	**1,000.0**	**9.1**	**1,000.0**	**17.2**	**1,000.0**	**27.0**

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked File, 1995–1997.

* The numerator for the gestational age-specific birth/fetal-infant death rate was the number of births/fetal-infant deaths at any gestation, while the denominator was the number of fetuses at risk for birth/fetal-infant death at the same gestation (commonly referred to as the fetuses at risk approach). The rate of fetal-infant death was cumulated over three weeks of gestation to provide stability to rates. Small numbers precluded the publication of the numbers of births and deaths for North American Indian (5,242 total births) and Inuit populations (2,577 total births).

TABLE F6 Rates of unlinked infant deaths*

*Ontario and the rest of Canada (excluding Newfoundland and Labrador),** 1985–2003*

Birth year	Live births (Canada**)	Live births (Ontario)	Unlinked infant deaths (Canada**)	Unlinked infant deaths (Ontario)	Unlinked infant deaths per 1,000 live births (Canada**)	Unlinked infant deaths per 1,000 live births (Ontario)
1985	234,862	132,539	43	122	0.2	0.9
1986	230,642	134,009	38	164	0.2	1.2
1987	227,077	134,972	38	173	0.2	1.3
1988	230,992	139,023	39	229	0.2	1.6
1989	239,261	145,720	39	268	0.2	1.8
1990	246,582	150,806	40	274	0.2	1.8
1991	243,682	150,504	22	205	0.1	1.4
1992	240,980	150,547	25	183	0.1	1.2
1993	234,046	147,818	24	173	0.1	1.2
1994	231,729	147,695	28	207	0.1	1.4
1995	225,953	146,463	12	220	0.1	1.5
1996	220,430	140,195	12	214	0.1	1.5
1997	210,172	133,003	18	194	0.1	1.5
1998	204,801	132,614	10	195	0.0	1.5
1999	201,114	131,080	6	202	0.0	1.5
2000	195,607	127,408	6	223	0.0	1.8
2001	197,323	131,709	10	228	0.1	1.7
2002	195,636	128,600	9	226	0.0	1.8
2003	199,650	130,927	10	295	0.1	2.3

Source: Statistics Canada. Canadian Vital Statistics System, Birth-Death Linked Files, 1985–2003.
* Unlinked infant deaths refer to infant death registrations for which no corresponding birth registration documents could be located.
** Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.

TABLE F7 Small-for-gestational-age (SGA), preterm birth and low birth weight (<2,500 g) live births*

*Canada (excluding Ontario),** 1995–2004*

Year	Live births	Singleton live births	SGA singleton live births	SGA live births per 100 singleton live births	Preterm births <37 weeks	Preterm births per 100 live births	Low birth weight live births	Low birth weight live births per 100 live births
1995	231,436	224,864	22,704	10.1	16,125	7.0	13,231	5.7
1996	224,520	218,246	20,726	9.5	15,892	7.1	12,663	5.6
1997	214,414	207,926	19,783	9.5	15,174	7.1	12,373	5.8
1998	209,629	204,004	18,649	9.1	15,009	7.2	11,998	5.7
1999	206,004	200,486	16,904	8.4	15,213	7.4	11,313	5.5
2000	200,358	194,919	15,354	7.9	15,291	7.6	11,009	5.5
2001	201,068	194,524	15,634	8.0	15,110	7.5	11,100	5.5
2002	199,435	193,071	15,521	8.0	15,140	7.6	11,211	5.6
2003	203,422	196,624	15,471	7.9	16,022	7.9	11,631	5.7
2004	203,565	196,472	15,283	7.8	16,681	8.2	11,999	5.9

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Live births with unknown gestational age or birth weight, gestational age <22 weeks or >43 weeks, and multiple births were excluded for SGA rate calculations.
** Data for Ontario were excluded because of data quality concerns.

TABLE F8 Age-specific live birth rates among females 20–44 years of age

Canada, 1962, 1982 and 2004

Birth year	20–24 years	25–29 years	30–34 years	35–39 years	40–44 years
1962	232.4	215.6	143.4	77.0	27.5
1982	91.1	120.9	67.5	19.9	3.1
2004	51.0	97.4	95.8	40.1	6.9

Source: Statistics Canada. Canadian Vital Statistics System, Births Database, 1962, 1982 and 2004.

TABLE F9 Temporal trends in the rates of multiple births,* including stillbirths and live births

*Canada (excluding Ontario, and Newfoundland and Labrador),** 1985–2004*

Year	Number of singleton births	Number of twin births	Number of triplet+ births	Total births	Twin births per 1,000 total births	Triplet+ births per 100,000 total births
1985	231,740	4,549	99	236,388	19.2	41.9
1986	227,785	4,402	101	232,288	19.0	43.5
1987	223,897	4,654	134	228,685	20.4	58.6
1988	227,698	4,722	120	232,540	20.3	51.6
1989	236,101	4,782	97	240,980	19.8	40.3
1990	243,190	5,005	132	248,327	20.2	53.2
1991	240,223	4,975	133	245,331	20.3	54.2
1992	237,390	5,018	129	242,537	20.7	53.2
1993	230,347	4,899	202	235,448	20.8	85.8
1994	227,885	4,992	144	233,021	21.4	61.8
1995	222,147	4,970	120	227,237	21.9	52.8
1996	216,537	4,954	145	221,636	22.4	65.4
1997	206,229	4,956	221	211,406	23.4	104.5
1998	200,612	5,087	200	205,899	24.7	97.1
1999	196,976	5,125	198	202,299	25.3	97.9
2000	191,481	5,089	171	196,741	25.9	86.9
2001	192,971	5,321	196	198,488	26.8	98.7
2002	191,296	5,279	211	196,786	26.8	107.2
2003	194,832	5,748	226	200,806	28.6	112.5
2004	195,225	5,781	232	201,238	28.7	115.3

Source: Statistics Canada. Canadian Vital Statistics System, 1985–2004.
* Triplet births include triplet and higher order multiple births.
** Data for Ontario were excluded because of data quality concerns. Data for Newfoundland and Labrador were excluded because they were not available prior to 1991.

Appendix G

Data Tables for Figures Presented in Sections A and B

Live Births and Female Population Estimates

Section A: Determinants of Maternal, Fetal and Infant Health

Behaviours and Practices

Health Services

Section B: Maternal, Fetal and Infant Health Outcomes

Maternal Health Outcomes

Fetal and Infant Health Outcomes

Live Births and Female Population Estimates

TABLE G1.A Number of live births, by maternal age*

*Canada (excluding Ontario),** 1995–2004*

Year	10–14 years	15–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–44 years	45–49 years	Total
1995	182	5,124	10,535	48,008	75,803	66,240	22,634	3,088	107	231,721
1996	176	4,786	9,844	46,188	73,433	64,339	23,896	3,383	121	226,166
1997	170	4,422	9,212	43,762	69,586	60,756	24,047	3,517	113	215,585
1998	153	4,343	9,160	42,954	67,078	58,149	24,118	3,609	119	209,683
1999	142	4,079	8,890	42,016	65,466	56,630	24,915	3,867	136	206,141
2000	111	3,664	8,369	40,621	63,712	54,840	24,855	4,138	128	200,438
2001	90	3,443	7,942	39,768	64,016	57,095	25,228	4,288	150	202,020
2002	100	3,089	7,569	38,982	63,390	57,384	25,131	4,470	148	200,263
2003	82	2,900	7,242	38,655	65,330	59,100	26,030	4,731	195	204,265
2004	90	2,879	6,875	37,571	65,470	60,055	26,335	5,007	218	204,500

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Excludes live births to mothers ≥50 years and those with unknown maternal age.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G1.B Number of live births, by maternal age* and province/territory

*Canada (excluding Ontario),** 2004*

Province/Territory	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years	Total
Newfoundland and Labrador	95	199	906	1,344	1,378	478	88	4,488
Prince Edward Island	25	58	263	446	390	172	36	1,390
Nova Scotia	140	308	1,698	2,612	2,640	1,146	189	8,733
New Brunswick	122	291	1,565	2,309	1,885	680	107	6,959
Quebec	544	1,786	12,603	26,231	22,120	9,096	1,688	74,068
Manitoba	443	775	3,002	4,211	3,614	1,477	289	13,811
Saskatchewan	423	794	2,981	3,862	2,683	1,023	215	11,981
Alberta	618	1,504	7,961	12,903	11,803	4,991	996	40,776
British Columbia	435	989	6,109	11,086	13,176	7,102	1,587	40,484
Yukon	10	17	87	96	102	43	10	365
Northwest Territories	27	59	159	195	167	76	15	698
Nunavut	87	95	237	175	97	51	5	747
CANADA	**2,969**	**6,875**	**37,571**	**65,470**	**60,055**	**26,335**	**5,225**	**204,500**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Excludes live births to mothers ≥50 years and those with unknown maternal age.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G2.A Number of females, by age

Canada (excluding Ontario), 1995–2004*

Year	10–14 years	15–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–44 years	45–49 years
1995	618,739	371,099	245,807	613,042	660,886	800,021	808,068	730,176	645,407
1996	617,381	378,659	248,304	615,777	653,065	780,379	819,053	750,562	667,627
1997	615,925	380,810	250,009	619,314	645,349	755,743	822,862	773,900	677,740
1998	613,631	379,389	255,075	621,555	637,583	723,956	824,420	791,830	691,505
1999	613,165	377,967	258,805	628,935	630,855	694,955	821,222	803,644	710,513
2000	617,659	378,255	257,905	636,691	624,966	672,706	810,941	812,849	731,875
2001	622,443	379,316	256,659	647,154	621,523	662,447	788,976	822,486	751,017
2002	627,817	376,776	258,805	656,377	628,434	658,190	763,606	825,772	772,513
2003	630,099	373,361	259,174	664,507	637,685	654,870	734,287	828,485	789,926
2004	626,871	373,748	258,586	671,750	651,910	653,406	709,169	828,169	802,650

Source: Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G2.B Number of females, by age and province/territory

Canada (excluding Ontario), 2004*

Province/Territory	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years
Newfoundland and Labrador	25,715	7,349	17,950	15,577	17,462	20,450	44,125
Prince Edward Island	7,745	2,071	4,810	4,280	4,430	4,663	11,085
Nova Scotia	47,459	12,542	31,272	29,240	31,319	34,191	79,224
New Brunswick	37,035	9,983	24,695	23,897	25,283	27,581	63,156
Quebec	368,740	90,800	249,108	253,080	240,746	271,524	639,005
Manitoba	66,071	16,589	39,934	38,108	37,758	39,424	90,030
Saskatchewan	58,422	15,265	35,649	30,864	29,253	31,360	76,115
Alberta	175,195	46,102	119,803	117,432	114,967	117,474	265,879
British Columbia	207,121	56,173	144,596	135,514	148,017	158,363	354,272
Yukon	1,735	512	1,058	993	1,111	1,254	3,149
Northwest Territories	2,865	641	1,656	1,662	1,831	1,873	3,330
Nunavut	2,516	559	1,219	1,263	1,229	1012	1,449
CANADA	**1,000,619**	**258,586**	**671,750**	**651,910**	**653,406**	**709,169**	**1,630,819**

Source: Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G3.A Proportion (%) of live births, by maternal age*

*Canada (excluding Ontario),** 1995–2004*

Year	10–14 years	15–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–44 years	45–49 years	10–19 years	35–49 years
1995	0.08	2.21	4.55	20.72	32.71	28.59	9.77	1.33	0.05	6.84	11.15
1996	0.08	2.12	4.35	20.42	32.47	28.45	10.57	1.50	0.05	6.55	12.11
1997	0.08	2.05	4.27	20.30	32.28	28.18	11.15	1.63	0.05	6.40	12.84
1998	0.07	2.07	4.37	20.49	31.99	27.73	11.50	1.72	0.06	6.51	13.28
1999	0.07	1.98	4.31	20.38	31.76	27.47	12.09	1.88	0.07	6.36	14.03
2000	0.06	1.83	4.18	20.27	31.79	27.36	12.40	2.06	0.06	6.06	14.53
2001	0.04	1.70	3.93	19.69	31.69	28.26	12.49	2.12	0.07	5.68	14.68
2002	0.05	1.54	3.78	19.47	31.65	28.65	12.55	2.23	0.07	5.37	14.85
2003	0.04	1.42	3.55	18.92	31.98	28.93	12.74	2.32	0.10	5.01	15.15
2004	0.04	1.41	3.36	18.37	32.01	29.37	12.88	2.45	0.11	4.81	15.43

Source: Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls
* Excludes live births to mothers ≥50 years and those with unknown maternal age.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G3.B Proportion (%) of live births, by maternal age* and province/territory

*Canada (excluding Ontario),** 2004*

Province/Territory	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years	10–19 years	35–49 years
Newfoundland and Labrador	2.12	4.43	20.19	29.95	30.70	10.65	1.96	6.55	12.61
Prince Edward Island	1.80	4.17	18.92	32.09	28.06	12.37	2.59	5.97	14.96
Nova Scotia	1.60	3.53	19.44	29.91	30.23	13.12	2.16	5.13	15.29
New Brunswick	1.75	4.18	22.49	33.18	27.09	9.77	1.54	5.93	11.31
Quebec	0.73	2.41	17.02	35.41	29.86	12.28	2.28	3.15	14.56
Manitoba	3.21	5.61	21.74	30.49	26.17	10.69	2.09	8.82	12.79
Saskatchewan	3.53	6.63	24.88	32.23	22.39	8.54	1.79	10.16	10.33
Alberta	1.52	3.69	19.52	31.64	28.95	12.24	2.44	5.20	14.68
British Columbia	1.07	2.44	15.09	27.38	32.55	17.54	3.92	3.52	21.46
Yukon	2.74	4.66	23.84	26.30	27.95	11.78	2.74	7.40	14.52
Northwest Territories	3.87	8.45	22.78	27.94	23.93	10.89	2.15	12.32	13.04
Nunavut	11.65	12.72	31.73	23.43	12.99	6.83	0.67	24.36	7.50
CANADA	**1.45**	**3.36**	**18.37**	**32.01**	**29.37**	**12.88**	**2.56**	**4.81**	**15.43**

Source: Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls
* Excludes live births to mothers ≥50 years and those with unknown maternal age.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G4.A Maternal age-specific live birth rate per 1,000 females*

*Canada (excluding Ontario),** 1995–2004*

Year	10–14 years	15–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–44 years	45–49 years	10–19 years	35–49 years
1995	0.29	13.81	42.86	78.31	114.70	82.80	28.01	4.23	0.17	12.82	11.83
1996	0.29	12.64	39.64	75.01	112.44	82.45	29.18	4.51	0.18	11.90	12.25
1997	0.28	11.61	36.85	70.66	107.83	80.39	29.22	4.54	0.17	11.07	12.17
1998	0.25	11.45	35.91	69.11	105.21	80.32	29.25	4.56	0.17	10.94	12.07
1999	0.23	10.79	34.35	66.80	103.77	81.49	30.34	4.81	0.19	10.49	12.38
2000	0.18	9.69	32.45	63.80	101.94	81.52	30.65	5.09	0.17	9.69	12.36
2001	0.14	9.08	30.94	61.45	103.00	86.19	31.98	5.21	0.20	9.12	12.56
2002	0.16	8.20	29.25	59.39	100.87	87.18	32.91	5.41	0.19	8.52	12.60
2003	0.13	7.77	27.94	58.17	102.45	90.25	35.45	5.71	0.25	8.10	13.16
2004	0.14	7.70	26.59	55.93	100.43	91.91	37.14	6.05	0.27	7.82	13.49

Sources: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls
* Excludes live births to mothers ≥50 years and those with unknown maternal age.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G4.B Maternal age-specific live birth rate per 1,000 females,* by province/territory

*Canada (excluding Ontario),** 2004*

Province/Territory	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years	10–19 years	35–49 years
Newfoundland and Labrador	3.69	27.08	50.47	86.28	78.91	23.37	1.99	8.89	8.77
Prince Edward Island	3.23	28.01	54.68	104.21	88.04	36.89	3.25	8.46	13.21
Nova Scotia	2.95	24.56	54.30	89.33	84.29	33.52	2.39	7.47	11.77
New Brunswick	3.29	29.15	63.37	96.62	74.56	24.65	1.69	8.78	8.67
Quebec	1.48	19.67	50.59	103.65	91.88	33.50	2.64	5.07	11.84
Manitoba	6.70	46.72	75.17	110.50	95.71	37.46	3.21	14.74	13.64
Saskatchewan	7.24	52.01	83.62	125.13	91.72	32.62	2.82	16.52	11.52
Alberta	3.53	32.62	66.45	109.88	102.66	42.49	3.75	9.59	15.62
British Columbia	2.10	17.61	42.25	81.81	89.02	44.85	4.48	5.41	16.95
Yukon	5.76	33.20	82.23	96.68	91.81	34.29	3.18	12.02	12.04
Northwest Territories	9.42	92.04	96.01	117.33	91.21	40.58	4.50	24.53	17.49
Nunavut	34.58	169.95	194.42	138.56	78.93	50.40	3.45	59.19	22.75
CANADA	**2.97**	**26.59**	**55.93**	**100.43**	**91.91**	**37.14**	**3.20**	**7.82**	**13.49**

Sources: Statistics Canada. Canadian Vital Statistics System, 2004.
Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls
* Excludes live births to mothers ≥50 years and those with unknown maternal age.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

Section A: Determinants of Maternal, Fetal and Infant Health

TABLE G1.1A Rate of maternal smoking during pregnancy, by maternal age

Canada, 2000–2001, 2003 and 2005

Maternal age (years)	Mothers* who reported smoking during pregnancy					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
15–19	49.4	(40.1–58.7)	43.8	(27.8–59.7)	37.2	(24.4–49.9)
20–24	33.5	(28.4–38.7)	33.5	(26.9–40.0)	28.0	(22.1–33.9)
25–29	19.5	(17.3–21.7)	21.4	(18.5–24.3)	21.5	(18.6–24.3)
30–34	16.1	(14.1–18.2)	13.7	(12.0–15.4)	13.0	(11.2–14.7)
35–39	13.7	(11.7–15.8)	13.2	(10.9–15.6)	8.8	(7.3–10.4)
≥40	14.0	(11.2–16.7)	11.9	(8.9–14.9)	9.0	(6.9–11.1)
All ages	**17.7**	**(16.6–18.8)**	**16.0**	**(14.8–17.1)**	**13.4**	**(12.4–14.4)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G1.1B Rate (%) of maternal smoking ≤10 and >10 cigarettes per day among pregnant women,*

Canada, 2000–2001, 2003 and 2005

Amount smoked	2000–2001**	2003**	2005**
≤10 cigarettes per day	12.8	13.0	11.8
>10 cigarettes per day	4.9	2.8	1.7

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey.
** Denominators exclude responses of "do not know" and "not stated," and refusal to answer.

TABLE G1.2 Rate of maternal smoking during pregnancy, by province/territory

Canada, 2000–2001, 2003 and 2005

Province/Territory	Mothers* who reported smoking during pregnancy					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Newfoundland and Labrador	26.0	(18.3–33.8)	19.5	(12.3–26.8)	22.8	(16.8–28.8)
Prince Edward Island	28.2	(21.6–34.9)	15.7	(8.8–22.6)	14.7	(7.9–21.5)
Nova Scotia	17.5	(12.7–22.3)	22.0	(16.0–27.9)	23.6	(17.7–29.6)
New Brunswick	23.3	(17.7–28.9)	22.0	(15.3–28.7)	15.8	(10.6–20.9)
Quebec	21.3	(18.3–24.2)	22.0	(18.8–25.2)	17.2	(14.5–20.0)
Ontario	14.1	(12.3–15.9)	12.2	(10.7–13.8)	10.3	(9.0–11.7)
Manitoba	21.5	(16.5–26.4)	21.4	(14.9–27.8)	15.1	(10.4–19.9)
Saskatchewan	27.8	(23.2–32.3)	23.6	(18.5–28.6)	20.5	(16.0–25.1)
Alberta	18.3	(15.1–21.6)	17.4	(12.8–21.9)	13.9	(10.8–17.0)
British Columbia	14.8	(12.3–17.2)	8.7	(6.4–11.1)	9.7	(7.4–12.0)
Yukon	22.8	(12.5–33.2)	22.3#	(7.0–37.5)	26.4	(9.4–43.4)
Northwest Territories	36.7	(29.3–44.0)	25.0	(13.0–37.0)	32.8	(22.0–43.6)
Nunavut	64.7	(55.8–73.6)	80.8	(74.4–87.2)	59.5	(43.4–75.5)
CANADA	**17.7**	**(16.6–18.8)**	**16.0**	**(14.8–17.1)**	**13.4**	**(12.4–14.4)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
\# High level of sampling variability.
CI—confidence interval

TABLE G2.1 Rate of maternal exposure to second-hand smoke, by maternal age

Canada, 2000–2001, 2003 and 2005

Maternal age (years)	Mothers* who reported exposure to second-hand smoke during and shortly after pregnancy					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
15–19	63.2	(54.2–72.2)	55.9	(39.8–72.0)	41.9	(27.7–56.2)
20–24	39.9	(34.4–45.4)	35.2	(29.0–41.4)	33.3	(27.3–39.3)
25–29	26.5	(23.5–29.5)	24.5	(21.2–27.8)	22.3	(19.3–25.4)
30–34	19.7	(17.7–21.8)	15.3	(13.2–17.3)	12.9	(11.1–14.7)
35–39	18.1	(15.5–20.7)	13.5	(11.1–15.9)	9.2	(7.5–11.0)
≥40	16.1	(13.1–19.2)	11.8	(9.3–14.4)	9.7	(7.4–12.0)
All ages	**22.4**	**(21.1–23.7)**	**17.2**	**(16.0–18.5)**	**14.1**	**(13.1–15.1)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G2.2 Rate (%) of maternal exposure to second-hand smoke alone and in combination with smoking during pregnancy*

Canada, 2000–2001, 2003 and 2005

Smoking status	2000–2001	2003	2005
Second-hand smoke only	9.8	8.2	6.4
Second-hand smoke and smoking during pregnancy	12.6	9.0	7.8
Total second-hand smoke exposure**	**22.4**	**17.2**	**14.1**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
** Rates may not add due to rounding.

TABLE G2.3 Rate of maternal exposure to second-hand smoke, by province/territory

Canada, 2000–2001, 2003 and 2005

Province/Territory	Mothers* who reported exposure to second-hand smoke during and shortly after pregnancy					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Newfoundland and Labrador	30.8	(22.7–39.0)	18.6	(11.9–25.2)	17.1	(10.6–23.5)
Prince Edward Island	28.8	(20.9–36.7)	17.9	(10.2–25.6)	†	
Nova Scotia	28.4	(22.4–34.3)	22.3	(16.2–28.5)	22.3	(16.9–27.7)
New Brunswick	28.5	(22.5–34.5)	23.9	(17.6–30.2)	15.3	(10.1–20.5)
Quebec	27.1	(23.7–30.5)	20.4	(17.5–23.2)	17.8	(15.1–20.6)
Ontario	19.3	(17.2–21.3)	15.8	(13.6–17.9)	11.2	(9.8–12.7)
Manitoba	27.5	(21.4–33.7)	22.3	(15.7–28.8)	19.8	(14.1–25.5)
Saskatchewan	34.5	(29.6–39.4)	23.0	(18.1–28.0)	21.7	(17.2–26.3)
Alberta	22.0	(18.4–25.6)	19.7	(16.0–23.5)	15.9	(12.5–19.2)
British Columbia	14.5	(12.0–17.0)	7.6	(5.3–9.9)	8.9	(6.7–11.1)
Yukon	26.3	(13.0–39.7)	17.7	(6.6–28.8)	19.4#	(6.7–32.2)
Northwest Territories	32.1	(23.9–40.4)	38.5	(18.9–58.2)	34.7	(21.6–47.9)
Nunavut	37.6	(30.1–45.1)	52.9	(40.3–65.6)	35.2	(24.4–46.1)
CANADA	**22.4**	**(21.1–23.7)**	**17.2**	**(16.0–18.5)**	**14.1**	**(13.1–15.1)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
† Estimate not shown because sample size was less than 10.
\# High level of sampling variability.
CI—confidence interval

TABLE G3.1 Rate of maternal alcohol consumption during pregnancy, by maternal age

Canada, 2000–2001, 2003 and 2005

Maternal age (years)	Mothers* who reported drinking any alcohol during pregnancy					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
15–19	10.6	(5.4–15.9)	4.9#	(0.5–9.4)	15.7#	(2.9–28.4)
20–24	9.9	(6.8–13.0)	7.8	(4.4–11.2)	4.2	(2.3–6.2)
25–29	9.6	(7.5–11.8)	10.5	(8.1–12.9)	10.2	(7.9–12.5)
30–34	11.9	(10.0–13.8)	12.5	(10.5–14.6)	8.5	(6.9–10.0)
35–39	14.1	(11.8–16.4)	12.8	(10.6–15.0)	11.3	(9.4–13.2)
≥40	13.7	(11.0–16.4)	15.1	(12.2–18.0)	13.3	(10.8–15.9)
All ages	**12.2**	**(11.1–13.2)**	**12.4**	**(11.3–13.6)**	**10.5**	**(9.5–11.4)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
# High level of sampling variability.
CI—confidence interval

TABLE G3.2 Rate of maternal alcohol consumption during pregnancy, by province/region

Canada, 2000–2001, 2003 and 2005

Province/Region	Mothers* who reported drinking any alcohol during pregnancy					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Newfoundland and Labrador	4.9#	(1.5–8.2)	†		4.1#	(0.9–7.3)
Prince Edward Island	†		†		†	
Nova Scotia	6.6	(3.7–9.4)	9.3	(5.2–13.3)	8.6	(4.4–12.9)
New Brunswick	6.6	(3.4–9.9)	7.9	(3.8–12.0)	5.4#	(1.7–9.1)
Quebec	22.4	(19.0–25.7)	26.9	(23.0–30.8)	17.7	(15.1–20.2)
Ontario	10.2	(8.7–11.7)	10.1	(8.5–11.7)	9.7	(8.1–11.4)
Manitoba	5.0	(2.3–7.6)	6.1	(3.1–9.0)	5.8	(3.1–8.4)
Saskatchewan	8.3	(5.0–11.6)	6.6	(4.0–9.2)	7.2	(4.0–10.4)
Alberta	7.9	(5.5–10.5)	5.5	(3.3–7.7)	5.9	(3.7–8.1)
British Columbia	10.3	(8.0–12.7)	9.5	(6.9–12.1)	8.9	(6.3–11.4)
Territories	7.6	(5.0–10.3)	8.9	(3.4–14.5)	6.0	(2.8–9.2)
CANADA	**12.2**	**(11.1–13.2)**	**12.4**	**(11.3–13.6)**	**10.5**	**(9.5–11.4)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
# High level of sampling variability.
† Estimates not shown because sample size was less than 10.
CI—confidence interval

TABLE G4.1 Rate of breastfeeding initiation, by maternal age

Canada 2000–2001, 2003 and 2005

Maternal age (years)	Mothers* who reported breastfeeding initiation					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
15–19	74.8	(66.1–83.4)	76.5	(64.7–88.3)	76.0	(65.6–86.4)
20–24	77.8	(73.8–81.7)	81.1	(77.4–84.9)	82.3	(77.5–87.0)
25–29	81.5	(79.1–83.8)	84.3	(82.1–86.6)	84.2	(81.9–86.5)
30–34	82.0	(79.9–84.2)	86.0	(83.9–88.1)	88.7	(87.0–90.3)
35–39	82.0	(79.1–84.9)	84.8	(81.3–88.2)	89.1	(87.0–91.2)
≥40	84.9	(80.8–89.1)	88.0	(84.0–92.0)	87.6	(83.3–91.9)
All ages	**81.6**	**(80.3–82.8)**	**84.9**	**(83.6–86.1)**	**87.0**	**(85.9–88.0)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G4.2 Rate of breastfeeding initiation, by province/territory

Canada, 2000–2001, 2003 and 2005

Province/Territory	Mothers* who reported breastfeeding initiation					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Newfoundland and Labrador	58.0	(49.0–66.9)	63.9	(56.2–71.5)	62.3	(54.9–69.8)
Prince Edward Island	68.9	(61.7–76.2)	76.6	(68.2–85.0)	72.1	(61.9–82.2)
Nova Scotia	78.4	(73.8–82.9)	76.1	(69.2–83.0)	75.1	(68.8–81.3)
New Brunswick	67.6	(61.1–74.1)	64.1	(56.8–71.4)	77.0	(70.9–83.0)
Quebec	72.6	(69.3–75.9)	76.3	(72.8–79.7)	82.2	(79.5–84.8)
Ontario	82.8	(80.5–85.1)	87.2	(85.3–89.2)	88.0	(86.2–89.9)
Manitoba	81.9	(76.2–87.6)	88.5	(84.8–92.2)	88.8	(84.1–93.5)
Saskatchewan	86.7	(83.6–89.8)	86.9	(82.6–91.2)	88.1	(84.8–91.5)
Alberta	89.4	(86.5–92.3)	91.4	(87.6–95.2)	92.7	(90.6–94.8)
British Columbia	93.5	(91.6–95.4)	93.4	(91.0–95.8)	93.0	(90.0–95.9)
Yukon	90.0	(82.9–97.1)	87.7	(68.7–106.8)	98.8	(96.5–101.1)
Northwest Territories	80.0	(72.4–87.6)	75.4	(60.8–90.0)	93.6	(86.7–100.6)
Nunavut	81.8	(76.0–87.5)	72.4	(55.5–89.3)	73.7	(50.3–97.1)
CANADA	**81.6**	**(80.3–82.8)**	**84.9**	**(83.6–86.1)**	**87.0**	**(85.9–88.0)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G4.3 Rate of exclusive breastfeeding for six months or more, by maternal age

Canada, 2003 and 2005

Maternal age (years)	Mothers* who reported exclusive breastfeeding for six months or more			
	2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI
15–19	†		†	
20–24	7.2	(4.7–9.7)	11.3	(8.1–14.6)
25–29	11.4	(9.3–13.6)	11.3	(9.3–13.3)
30–34	15.0	(12.7–17.2)	17.2	(15.1–19.3)
35–39	15.4	(13.2–17.6)	19.9	(17.1–22.6)
≥40	25.5	(19.6–31.4)	22.4	(16.8–27.9)
All ages	**14.2**	**(13.0–15.4)**	**16.4**	**(15.2–17.6)**

Source: Statistics Canada. Canadian Community Health Survey, 2003, 2005.
Please note that rates of exclusive breastfeeding cannot be obtained for the period 2000–2001.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," refusal to answer, and women still exclusively breastfeeding.
† Estimates not shown because sample size was less than 10.
CI—confidence interval

TABLE G4.4 Rate of exclusive breastfeeding for six months or more, by province/territory

Canada, 2003 and 2005

Province/Territory	Mothers* who reported exclusive breastfeeding for six months or more			
	2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI
Newfoundland and Labrador	8.8	(3.7–14.0)	12.9	(7.7–18.1)
Prince Edward Island	10.3#	(3.4–17.3)	†	
Nova Scotia	9.7	(5.2–14.3)	13.8	(7.9–19.6)
New Brunswick	6.8	(3.3–10.2)	10.6	(5.2–16.1)
Quebec	8.4	(6.2–10.6)	11.8	(9.5–14.1)
Ontario	14.5	(12.5–16.6)	15.8	(13.9–17.7)
Manitoba	15.9	(10.4–21.4)	21.1	(15.2–27.0)
Saskatchewan	18.0	(13.6–22.3)	18.3	(13.8–22.7)
Alberta	18.5	(14.7–22.2)	19.1	(15.3–22.9)
British Columbia	21.4	(17.6–25.2)	24.3	(20.4–28.2)
Yukon	†		27.7	(9.7–45.7)
Northwest Territories	19.5#	(6.4–32.6)	12.6	(6.1–19.0)
Nunavut	8.3#	(0.1–16.4)	9.1#	(2.9–15.3)
CANADA	**14.2**	**(13.0–15.4)**	**16.4**	**(15.2–17.6)**

Source: Statistics Canada. Canadian Community Health Survey, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," refusal to answer, and women still exclusively breastfeeding.
\# High level of sampling variability.
† Estimates not shown because sample size was less than 10.
CI—confidence interval

TABLE G5.1 Rate of periconceptional folic acid supplementation, by maternal age

Canada, 2000–2001, 2003 and 2005

Maternal age (years)	Mothers* who reported taking folic acid before finding out that they were pregnant					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
15–19	26.9	(18.8–35.1)	33.9	(17.7–50.0)	29.8	(14.7–44.9)
20–24	37.8	(32.3–43.3)	38.3	(31.3–45.3)	33.1	(25.8–40.5)
25–29	44.3	(40.5–48.1)	47.1	(43.3–50.9)	49.4	(45.6–53.2)
30–34	52.3	(49.2–55.4)	58.8	(55.7–61.8)	60.1	(57.2–63.1)
35–39	50.4	(47.1–53.8)	56.3	(53.0–59.6)	64.5	(61.7–67.2)
≥40	44.0	(39.7–48.2)	58.8	(54.8–62.9)	60.1	(56.3–63.9)
All ages	**47.2**	**(45.6–48.9)**	**54.6**	**(52.9–56.3)**	**57.8**	**(56.2–59.4)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G5.2 Rate of periconceptional folic acid supplementation, by province/territory

Canada, 2000–2001, 2003 and 2005

Province/Territory	Mothers* who reported taking folic acid before finding out that they were pregnant					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Newfoundland and Labrador	44.9	(36.4–53.4)	63.5	(55.5–71.4)	52.7	(44.4–61.0)
Prince Edward Island	43.3	(35.7–50.8)	53.1	(43.3–62.8)	55.2	(44.0–66.4)
Nova Scotia	50.2	(42.8–57.6)	58.1	(51.7–64.5)	51.1	(43.7–58.4)
New Brunswick	46.0	(38.4–53.7)	56.9	(49.1–64.7)	57.6	(50.3–64.8)
Quebec	31.4	(27.6–35.1)	41.9	(38.2–45.7)	47.4	(44.0–50.9)
Ontario	53.9	(51.1–56.7)	55.6	(52.6–58.6)	62.8	(60.1–65.5)
Manitoba	48.1	(41.0–55.1)	51.6	(43.4–59.8)	47.4	(40.3–54.5)
Saskatchewan	44.7	(38.9–50.5)	57.9	(51.9–63.9)	52.9	(47.1–58.6)
Alberta	50.9	(46.3–55.5)	58.7	(53.7–63.8)	60.9	(55.9–65.8)
British Columbia	52.7	(48.7–56.6)	66.7	(62.3–71.2)	64.0	(59.6–68.3)
Yukon	40.8	(26.0–55.6)	56.5	(35.0–78.0)	67.7	(49.1–86.2)
Northwest Territories	35.7	(29.7–41.7)	41.3	(23.5–59.1)	44.0	(30.4–57.5)
Nunavut	49.7	(41.4–58.1)	33.5	(24.8–42.2)	37.5	(22.6–52.3)
CANADA	**47.2**	**(45.6–48.9)**	**54.6**	**(52.9–56.3)**	**57.8**	**(56.2–59.4)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G6.1 Rate of maternal education levels

Canada, 2000–2001, 2003 and 2005

Highest level of maternal education	Mothers'* educational level					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Less than high school	13.4	(12.3–14.4)	10.0	(9.1–11.1)	8.4	(7.5–9.2)
High school graduate (no post-secondary education)	20.8	(19.3–22.2)	19.5	(18.0–20.9)	14.3	(13.1–15.4)
Some post-secondary (no college or university degree)	9.0	(8.0–10.0)	7.5	(6.7–8.4)	7.7	(6.8–8.7)
College/university graduate	56.9	(55.2–58.6)	62.9	(61.2–64.6)	69.6	(68.1–71.2)

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G6.2 Rate of maternal education level less than high school, by province/territory

Canada, 2000–2001, 2003 and 2005

Province/Territory	Mothers* who reported less than high school education					
	2000–2001		2003		2005	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Newfoundland and Labrador	19.5	(13.2–25.8)	12.8	(7.0–18.7)	9.5	(5.1–13.9)
Prince Edward Island	10.5	(5.3–15.7)	†		9.6#	(3.3–15.9)
Nova Scotia	11.8	(7.9–15.6)	9.4	(5.6–13.3)	8.8	(5.0–12.7)
New Brunswick	13.5	(8.5–18.6)	11.8	(6.3–17.4)	5.7	(2.6–8.8)
Quebec	14.7	(11.9–17.5)	11.8	(9.1–14.4)	9.6	(7.6–11.6)
Ontario	10.9	(9.2–12.6)	9.6	(7.7–11.4)	7.3	(5.8–8.8)
Manitoba	19.5	(14.6–24.3)	14.8	(9.8–19.8)	16.7	(11.0–22.4)
Saskatchewan	14.0	(10.5–17.5)	9.7	(6.3–13.0)	9.5	(6.6–12.4)
Alberta	17.2	(13.8–20.5)	10.6	(7.8–13.4)	9.2	(6.5–11.9)
British Columbia	12.2	(9.8–14.6)	6.0	(3.5–8.6)	5.5	(3.3–7.7)
Yukon	14.5	(6.0–23.1)	36.4#	(12.2–60.5)	27.1#	(8.3–45.9)
Northwest Territories	42.2	(33.4–51.1)	25.6	(13.8–37.5)	23.0	(8.5–37.6)
Nunavut	69.9	(61.8–78.1)	68.3	(61.2–75.4)	45.4	(32.3–58.4)
CANADA	**13.4**	**(12.3–14.4)**	**10.0**	**(9.1–11.1)**	**8.4**	**(7.5–9.2)**

Source: Statistics Canada. Canadian Community Health Survey, 2000–2001, 2003, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
† Estimate not shown because sample size was less than 10.
\# High level of sampling variability.
CI—confidence interval

TABLE G6.3 Rate of maternal smoking, exposure to second-hand smoke and alcohol consumption during pregnancy, by maternal education level

Canada, 2005

Highest level of maternal education	Mothers* who reported behaviour during pregnancy					
	Smoking		Exposure to second-hand smoke		Alcohol consumption	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Less than high school	39.0	(34.0–43.9)	38.1	(32.7–43.4)	7.5	(4.8–10.1)
High school graduate (no post-secondary education)	17.6	(15.1–20.2)	19.1	(16.2–21.9)	6.7	(4.7–8.8)
Some post-secondary (no college or university degree)	19.7	(15.0–24.4)	21.5	(16.9–26.1)	13.4	(8.8–18.0)
College/university graduate	8.9	(8.0–9.9)	9.4	(8.3–10.4)	11.4	(10.2–12.6)

Source: Statistics Canada. Canadian Community Health Survey, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G6.4 Rate of breastfeeding and periconceptional folic acid supplementation, by maternal education level

Canada, 2005

Highest level of maternal education	Mothers* who reported practice during pregnancy					
	Breastfeeding initiation		Breastfeeding for six months or more		Folic acid supplementation	
	Rate (%)	95% CI	Rate (%)	95% CI	Rate (%)	95% CI
Less than high school	71.6	(66.4–76.8)	9.1	(5.5–12.7)	34.3	(28.8–39.7)
High school graduate (no post-secondary education)	80.6	(77.6–83.7)	15.6	(12.5–18.7)	45.9	(41.8–50.0)
Some post-secondary (no college or university degree)	86.9	(82.7–91.1)	15.5	(11.1–19.8)	47.4	(42.1–52.8)
College/university graduate	90.3	(89.1–91.4)	17.7	(16.2–19.2)	64.4	(62.4–66.4)

Source: Statistics Canada. Canadian Community Health Survey, 2005.
* Women who gave birth in the five years preceding the survey; denominators exclude responses of "do not know" and "not stated," and refusal to answer.
CI—confidence interval

TABLE G7.1 Age-specific live birth rates, females 10–14, 15–17 and 18–19 years

Canada (excluding Ontario), 1995–2004*

Year	10–14 years			15–17 years			18–19 years		
	Number of females	Number of live births	Live births per 1,000 females	Number of females	Number of live births	Live births per 1,000 females	Number of females	Number of live births	Live births per 1,000 females
1995	618,739	182	0.29	371,099	5,124	13.8	245,807	10,535	42.9
1996	617,381	176	0.29	378,659	4,786	12.6	248,304	9,844	39.6
1997	615,925	170	0.28	380,810	4,422	11.6	250,009	9,212	36.8
1998	613,631	153	0.25	379,389	4,343	11.4	255,075	9,160	35.9
1999	613,165	142	0.23	377,967	4,079	10.8	258,805	8,890	34.4
2000	617,659	111	0.18	378,255	3,664	9.7	257,905	8,369	32.4
2001	622,443	90	0.14	379,316	3,443	9.1	256,659	7,942	30.9
2002	627,817	100	0.16	376,776	3,089	8.2	258,805	7,569	29.2
2003	630,050	82	0.13	373,361	2,900	7.8	259,174	7,242	27.9
2004	626,871	90	0.14	373,748	2,879	7.7	258,586	6,875	26.6

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue 91-213-XPB, Annual, Ottawa, 2006.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G7.2 Proportion (%) of live births to teenage mothers 10–19 years

Canada (excluding Ontario), 1995–2004*

Year	Number of live births**	Live births to mothers 10–14 years		Live births to mothers 15–17 years		Live births to mothers 18–19 years	
		Number	Percent	Number	Percent	Number	Percent
1995	231,721	182	0.08	5,124	2.21	10,535	4.55
1996	226,166	176	0.08	4,786	2.12	9,844	4.35
1997	215,585	170	0.08	4,422	2.05	9,212	4.27
1998	209,683	153	0.07	4,343	2.07	9,160	4.37
1999	206,141	142	0.07	4,079	1.98	8,890	4.31
2000	200,438	111	0.06	3,664	1.83	8,369	4.18
2001	202,020	90	0.04	3,443	1.70	7,942	3.93
2002	200,263	100	0.05	3,089	1.54	7,569	3.78
2003	204,265	82	0.04	2,900	1.42	7,242	3.55
2004	204,500	90	0.04	2,879	1.41	6,875	3.36

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Excludes live births to mothers ≥50 years and those with unknown maternal age.

TABLE G7.3 Age-specific live birth rates, females 10–19 years, by province/territory

Canada (excluding Ontario), 2004*

Province/Territory	10–17 years				18–19 years			
	Number of females	Number of live births	Live births per 1,000 females	95% CI	Number of females	Number of live births	Live births per 1,000 females	95% CI
Newfoundland and Labrador	25,715	95	3.7	(3.0–4.5)	7,349	199	27.1	(23.5–31.1)
Prince Edward Island	7,745	25	3.2	(2.1–4.8)	2,071	58	28.0	(21.3–36.1)
Nova Scotia	47,459	140	2.9	(2.5–3.5)	12,542	308	24.6	(21.9–27.4)
New Brunswick	37,035	122	3.3	(2.7–3.9)	9,983	291	29.1	(25.9–32.6)
Quebec	368,740	544	1.5	(1.4–1.6)	90,800	1,786	19.7	(18.8–20.6)
Manitoba	66,071	443	6.7	(6.1–7.4)	16,589	775	46.7	(43.6–50.0)
Saskatchewan	58,422	423	7.2	(6.6–8.0)	15,265	794	52.0	(48.5–55.7)
Alberta	175,195	618	3.5	(3.3–3.8)	46,102	1,504	32.6	(31.0–34.3)
British Columbia	207,121	435	2.1	(1.9–2.3)	56,173	989	17.6	(16.5–18.7)
Yukon	1,735	10	5.8	(2.8–10.6)	512	17	33.2	(19.5–52.6)
Northwest Territories	2,865	27	9.4	(6.2–13.7)	641	59	92.0	(70.8–117.1)
Nunavut	2,516	87	34.6	(27.8–42.5)	559	95	169.9	(139.7–203.7)
CANADA	**1,000,619**	**2,969**	**3.0**	**(2.9–3.1)**	**258,586**	**6,875**	**26.6**	**(26.0–27.2)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
CI—confidence interval

TABLE G7.4 Proportion (%) of live births to teenage mothers 10–19 years, by province/territory

Canada (excluding Ontario), 2004*

Province/Territory	Number of live births**	Live births to mothers 10–17 years		Live births to mothers 18–19 years		Live births to mothers 10–19 years	
		Number	Percent (95% CI)	Number	Percent (95% CI)	Number	Percent (95% CI)
Newfoundland and Labrador	4,488	95	2.1 (1.7–2.6)	199	4.4 (3.9–5.1)	294	6.6 (5.8–7.3)
Prince Edward Island	1,390	25	1.8 (1.2–2.6)	58	4.2 (3.2–5.4)	83	6.0 (4.8–7.3)
Nova Scotia	8,733	140	1.6 (1.4–1.9)	308	3.5 (3.1–3.9)	448	5.1 (4.7–5.6)
New Brunswick	6,959	122	1.8 (1.5–2.1)	291	4.2 (3.7–4.7)	413	5.9 (5.4–6.5)
Quebec	74,068	544	0.7 (0.7–0.8)	1,786	2.4 (2.3–2.5)	2,330	3.1 (3.1–3.3)
Manitoba	13,811	443	3.2 (2.9–3.5)	775	5.6 (5.2–6.0)	1,218	8.8 (8.4–9.3)
Saskatchewan	11,981	423	3.5 (3.2–3.9)	794	6.6 (6.2–7.1)	1,217	10.2 (9.6–10.7)
Alberta	40,776	618	1.5 (1.4–1.6)	1,504	3.7 (3.5–3.9)	2,122	5.2 (5.0–5.4)
British Columbia	40,484	435	1.1 (1.0–1.2)	989	2.4 (2.3–2.6)	1,424	3.5 (3.3–3.7)
Yukon	365	10	2.7 (1.3–5.0)	17	4.7 (2.7–7.4)	27	7.4 (4.9–10.6)
Northwest Territories	698	27	3.9 (2.6–5.6)	59	8.5 (6.5–10.8)	86	12.3 (10.0–15.0)
Nunavut	747	87	11.6 (9.4–14.2)	95	12.7 (10.4–5.3)	182	24.4 (21.3–27.6)
CANADA	**204,500**	**2,969**	**1.5 (1.4–1.5)**	**6,875**	**3.4 (3.3–3.4)**	**9,844**	**4.8 (4.7–4.9)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
** Excludes live births to mothers ≥50 years and those with unknown maternal age.
CI—confidence interval

TABLE G8.1 Age-specific live birth rates, females 35–49 years*

*Canada (excluding Ontario),** 1995–2004*

Year	35–39 years			40–44 years			45–49 years		
	Number of females	Number of live births	Live births per 1,000 females	Number of females	Number of live births	Live births per 1,000 females	Number of females	Number of live births	Live births per 1,000 females
1995	808,068	22,634	28.0	730,176	3,088	4.2	645,407	107	0.17
1996	819,053	23,896	29.2	750,562	3,383	4.5	667,627	121	0.18
1997	822,862	24,047	29.2	773,900	3,517	4.5	677,740	113	0.17
1998	824,420	24,118	29.3	791,830	3,609	4.5	691,505	119	0.17
1999	821,222	24,915	30.3	803,644	3,867	4.8	710,513	136	0.19
2000	810,941	24,855	30.6	812,849	4,138	5.1	731,875	128	0.17
2001	788,976	25,228	32.0	822,486	4,288	5.2	751,017	150	0.20
2002	763,606	25,131	32.9	825,772	4,470	5.4	772,513	148	0.19
2003	734,287	26,030	35.4	828,485	4,731	5.7	789,926	195	0.25
2004	709,169	26,335	37.1	828,169	5,007	6.0	802,650	218	0.27

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.
* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G8.2 Proportion (%) of live births to older mothers 35–49 years*

*Canada (excluding Ontario),** 1995–2004*

Year	Number of live births*	Live births to mothers 35–39 years		Live births to mothers 40–49 years***	
		Number	Percent	Number	Percent
1995	231,721	22,634	9.8	3,195	1.4
1996	226,166	23,896	10.6	3,504	1.5
1997	215,585	24,047	11.2	3,630	1.7
1998	209,683	24,118	11.5	3,728	1.8
1999	206,141	24,915	12.1	4,003	1.9
2000	200,438	24,855	12.4	4,266	2.1
2001	202,020	25,228	12.5	4,438	2.2
2002	200,263	25,131	12.5	4,618	2.3
2003	204,265	26,030	12.7	4,926	2.4
2004	204,500	26,335	12.9	5,225	2.6

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
*** Age groups 40–44 and 45–49 were combined because of small numbers.

TABLE G8.3 Age-specific live birth rate, females 35–49 years,* by province/territory

*Canada (excluding Ontario),** 2004*

Province/Territory	35–39 years				40–49 years***			
	Number of females	Number of live births	Live births per 1,000 females	95% CI	Number of females	Number of live births	Live births per 1,000 females	95% CI
Newfoundland and Labrador	20,450	478	23.4	(21.3–25.5)	44,125	88	2.0	(1.6–2.5)
Prince Edward Island	4,663	172	36.9	(31.7–42.7)	11,085	36	3.2	(2.3–4.5)
Nova Scotia	34,191	1,146	33.5	(31.6–35.5)	79,224	189	2.4	(2.1–2.8)
New Brunswick	27,581	680	24.7	(22.9–26.6)	63,156	107	1.7	(1.4–2.0)
Quebec	271,524	9,096	33.5	(32.8–34.2)	639,005	1,688	2.6	(2.5–2.8)
Manitoba	39,424	1,477	37.5	(35.6–39.4)	90,030	289	3.2	(2.9–3.6)
Saskatchewan	31,360	1,023	32.6	(30.7–34.6)	76,115	215	2.8	(2.5–3.2)
Alberta	117,474	4,991	42.5	(41.3–43.7)	265,879	996	3.7	(3.5–4.0)
British Columbia	158,363	7,102	44.8	(43.8–45.9)	354,272	1,587	4.5	(4.3–4.7)
Yukon	1,254	43	34.3	(24.9–45.9)	3,149	10	3.2	(1.5–5.8)
Northwest Territories	1,873	76	40.6	(32.1–50.5)	3,330	15	4.5	(2.5–7.4)
Nunavut	1,012	51	50.4	(37.7–65.7)	1,449	5	3.5	(1.1–8.0)
CANADA	**709,169**	**26,335**	**37.1**	**(36.7–37.6)**	**1,630,819**	**5,225**	**3.2**	**(3.1–3.3)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.
* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
*** Age groups 40–44 and 45–49 were combined because of small numbers.
CI—confidence interval

TABLE G8.4 Proportion (%) of live births to older mothers 35–49 years,* by province/territory

*Canada (excluding Ontario),** 2004*

Province/Territory	Number of live births	Live births to mothers 35–39 years		Live births to mothers 40–49 years***		Live births to mothers 35–49 years	
		Number	Percent (95% CI)	Number	Percent (95% CI)	Number	Percent (95% CI)
Newfoundland and Labrador	4,488	478	10.7 (9.8–11.6)	88	2.0 (1.6–2.4)	566	12.6 (11.7–13.6)
Prince Edward Island	1,390	172	12.4 (10.7–14.2)	36	2.6 (1.8–3.6)	208	15.0 (13.1–16.9)
Nova Scotia	8,733	1,146	13.1 (12.4–13.8)	189	2.2 (1.9–2.5)	1,335	15.3 (14.5–16.1)
New Brunswick	6,959	680	9.8 (9.1–10.5)	107	1.5 (1.3–1.9)	787	11.3 (10.6–12.1)
Quebec	74,068	9,096	12.3 (12.0–12.5)	1,688	2.3 (2.2–2.4)	10,784	14.6 (14.3–14.8)
Manitoba	13,811	1,477	10.7 (10.2–11.2)	289	2.1 (1.9–2.3)	1,766	12.8 (12.2–13.4)
Saskatchewan	11,981	1,023	8.5 (8.0–9.1)	215	1.8 (1.6–2.0)	1,238	10.3 (9.8–10.9)
Alberta	40,776	4,991	12.2 (11.9–12.6)	996	2.4 (2.3–2.6)	5,987	14.7 (14.3–15.0)
British Columbia	40,484	7,102	17.5 (17.2–17.9)	1,587	3.9 (3.7–4.1)	8,689	21.5 (21.1–21.9)
Yukon	365	43	11.8 (8.7–15.5)	10	2.7 (1.3–5.0)	53	14.5 (11.1–18.6)
Northwest Territories	698	76	10.9 (8.7-13.4)	15	2.1 (1.2–3.5)	91	13.0 (10.6–15.8)
Nunavut	747	51	6.8 (5.1–8.9)	5	0.7 (0.2–1.6)	56	7.5 (5.7–9.6)
CANADA	**204,500**	**26,335**	**12.9 (12.7–13.0)**	**5,225**	**2.6 (2.5–2.6)**	**31,560**	**15.4 (15.3–15.6)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for live births to mothers ≥50 years were not available due to small numbers; excludes live births to mothers with unknown maternal age.
** Data for Ontario were excluded because of data quality concerns; they are presented in *Appendix H.*
*** Age groups 40–44 and 45–49 were combined because of small numbers.
CI—confidence interval

TABLE G9.1 Rate of labour induction, *Canada, 1995–1996 to 2004–2005*

Fiscal year	Number of hospital deliveries	Number of medical inductions	Medical inductions per 100 hospital deliveries	Number of surgical inductions	Surgical inductions per 100 hospital deliveries	Number of medical and/or surgical inductions	Medical and/ or surgical inductions per 100 hospital deliveries
1995–1996	373,731	63,311	16.9	29,994	8.0	77,474	20.7
1996–1997	359,101	63,306	17.6	27,153	7.6	75,021	20.9
1997–1998	345,713	64,781	18.7	28,118	8.1	76,602	22.2
1998–1999	338,368	63,478	18.8	25,602	7.6	73,924	21.9
1999–2000	335,656	66,255	19.7	25,407	7.6	76,173	22.7
2000–2001	324,631	63,847	19.7	24,798	7.6	73,170	22.5
2001–2002	329,607	67,896	20.6	27,826	8.4	78,259	23.7
2002–2003	325,277	63,044	19.4	27,694	8.5	73,151	22.5
2003–2004	334,154	64,033	19.2	27,990	8.4	73,718	22.1
2004–2005	333,974	63,629	19.1	28,163	8.4	72,936	21.8

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

TABLE G9.2 Rate of labour induction, by province/territory, *Canada, 2004–2005*

Province/Territory	Number of hospital deliveries	Number of medical inductions	Medical inductions (95% CI) per 100 hospital deliveries	Number of surgical inductions	Surgical inductions (95% CI) per 100 hospital deliveries	Number of medical and/or surgical inductions	Medical and/or surgical inductions (95% CI) per 100 hospital deliveries
Newfoundland and Labrador	4,364	989	22.7 (21.4–23.9)	265	6.1 (5.4–6.8)	1,088	24.9 (23.7–26.2)
Prince Edward Island	1,367	295	21.6 (19.4–23.9)	212	15.5 (13.6–17.5)	351	25.7 (23.4–28.1)
Nova Scotia	8,319	1,959	23.5 (22.6–24.5)	920	11.1 (10.4–11.8)	2,107	25.3 (24.4–26.3)
New Brunswick	6,548	1,432	21.9 (20.9–22.9)	658	10.1 (9.3–10.8)	1,712	26.2 (25.1–27.2)
Quebec	71,792	15,784	22.0 (21.7–22.3)	7,087	9.9 (9.7–10.1)	18,273	25.5 (25.1–25.8)
Ontario	132,145	22,272	16.9 (16.7–17.1)	12,730	9.6 (9.5–9.8)	26,769	20.3 (20.0–20.5)
Manitoba	13,525	2,642	19.5 (18.9–20.2)	593	4.4 (4.0–4.7)	2,929	21.7 (21.0–22.4)
Saskatchewan	11,737	2,331	19.9 (19.1–20.6)	516	4.4 (4.0–4.8)	2,470	21.0 (20.3–21.8)
Alberta	39,748	9,078	22.8 (22.4–23.2)	3,445	8.7 (8.4–8.9)	9,704	24.4 (24.0–24.8)
British Columbia	38,683	6,025	15.6 (15.2–15.9)	1,387	3.6 (3.4–3.8)	6,544	16.9 (16.4–17.2)
Yukon	330	45	13.6 (10.1–17.8)	†	† (0.0–2.6)	47	14.2 (10.7–18.5)
Northwest Territories	675	85	12.6 (10.2–15.3)	51	7.6 (5.7–9.8)	122	18.1 (15.2–21.1)
Nunavut	751	89	11.9 (9.6–14.4)	36	4.8 (3.4–6.6)	117	15.6 (13.1–18.4)
Not available	3,990	603	15.1 (14.0–16.3)	260	6.5 (5.8–7.3)	703	17.6 (16.4–18.8)
CANADA	**333,974**	**63,629**	**19.1 (18.9–19.2)**	**28,160–28,164**	**8.4 (8.3–8.5)**	**72,936**	**21.8 (21.7–22.0)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
† Number/rate suppressed due to small cell size <5.
CI—confidence interval

TABLE G10.1 Rate of cesarean delivery and rates of primary cesarean delivery and repeat cesarean delivery

Canada, 1995–1996 to 2004–2005

Fiscal year	Number of cesarean deliveries	Number of hospital deliveries	Cesarean deliveries per 100 hospital deliveries	Number of primary cesarean deliveries	Number of hospital deliveries without a previous cesarean delivery
1995–1996	65,873	373,731	17.6	42,674	337,874
1996–1997	65,244	359,101	18.2	42,448	323,930
1997–1998	63,897	345,713	18.5	41,990	311,890
1998–1999	64,149	338,368	19.0	42,142	304,648
1999–2000	66,003	335,656	19.7	43,783	302,432
2000–2001	68,582	324,631	21.1	45,593	291,802
2001–2002	74,016	329,607	22.5	48,539	294,861
2002–2003	76,931	325,277	23.7	50,825	290,970
2003–2004	82,904	334,154	24.8	54,261	297,433
2004–2005	85,341	333,974	25.6	55,119	296,211

Fiscal year	Primary cesarean deliveries per 100 hospital deliveries without a previous cesarean delivery	Number of delivering women with previous cesarean delivery	Number of repeat cesarean deliveries	Repeat cesarean delivery rate (%)
1995–1996	12.6	35,857	23,198	64.7
1996–1997	13.1	35,171	22,796	64.8
1997–1998	13.5	33,823	21,907	64.8
1998–1999	13.8	33,720	22,007	65.3
1999–2000	14.5	33,224	22,220	66.9
2000–2001	15.6	32,829	22,989	70.0
2001–2002	16.5	34,746	25,477	73.3
2002–2003	17.5	34,307	26,106	76.1
2003–2004	18.2	36,712	28,643	78.0
2004–2005	18.6	37,763	30,222	80.0

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

TABLE G10.2 Rate of cesarean delivery, by indication
Canada, 1995–1996 and 2004–2005

Indication*	1995–1996		2004–2005		1995–1996 and 2004–2005
	Number of cesarean deliveries	Rate of cesarean delivery (%)	Number of cesarean deliveries	Rate of cesarean delivery (%)	Absolute change (%)
All cesareans					
Breech presentation	11,435	3.0	11,817	3.6	+0.6
Dystocia	28,071	7.5	32,914	9.9	+2.4
Fetal distress	6,275	1.7	8,483	2.5	+0.8
Miscellaneous	6,352	1.7	9,804	2.9	+1.2
Elective repeat/Other	13,740	3.7	22,323	6.7	+3.0
TOTAL	**65,873**	**17.6**	**85,341**	**25.6**	**+8.0**
Primary cesareans					
Breech presentation	9,968	3.0	10,264	3.5	+0.5
Dystocia	22,786	6.7	30,664	10.3	+3.6
Fetal distress	5,497	1.6	7,681	2.6	+1.0
Miscellaneous	3,318	1.0	4,348	1.5	+0.5
Other	1,106	0.3	2,162	0.7	+0.4
TOTAL	**42,675**	**12.6**	**55,119**	**18.6**	**+6.0**
Repeat cesareans					
Breech presentation	1,467	4.1	1,553	4.1	0
Dystocia	5,285	14.7	2,250	6.0	-8.7
Fetal distress	778	2.2	802	2.1	-0.1
Miscellaneous	3,034	8.5	5,456	14.4	+5.9
Elective repeat/Other	12,634	35.2	20,161	53.4	+18.2
TOTAL	**23,198**	**64.7**	**30,222**	**80.0**	**+15.3**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 and 2004–2005.
* Note:
1) Indications were defined based on an earlier publication by Henry et al. (page 81).[10]
2) "Miscellaneous" includes multiple gestations, antepartum hemorrhage, placental abruption, placenta previa, intrauterine growth retardation, macrosomia, genital herpes simplex virus, diabetes mellitus, abnormal glucose tolerance, hypertensive disorders, oligohydramnios, chorioamnionitis, fetal central nervous system malformation affecting management, other congenital or acquired anomaly, rupture of uterus, congenital or acquired abnormality of vagina, scarred uterus, Rhesus (anti-D) isoimmunization and cerebral hemorrhage or occlusion.
3) "Other" indicates that none of the above obstetrical/medical indications were coded in the database. It should be noted that primary cesarean delivery with no medical indication identified does not necessarily represent cesarean delivery on maternal request.

TABLE G10.3 Rate of cesarean delivery, by province/territory

Canada, 2004–2005

Province/Territory	Number of cesarean deliveries	Number of hospital deliveries	Cesarean deliveries (95% CI) per 100 hospital deliveries
Newfoundland and Labrador	1,257	4,364	28.8 (27.5–30.2)
Prince Edward Island	457	1,367	33.4 (30.9–36.0)
Nova Scotia	2,322	8,319	27.9 (26.9–28.9)
New Brunswick	1,856	6,548	28.3 (27.3–29.5)
Quebec	15,964	71,792	22.2 (21.9–22.5)
Ontario	35,344	132,145	26.7 (26.5–27.0)
Manitoba	2,788	13,525	20.6 (19.9–21.3)
Saskatchewan	2,372	11,737	20.2 (19.5–20.9)
Alberta	10,092	39,748	25.4 (25.0–25.8)
British Columbia	11,579	38,683	29.9 (29.5–30.4)
Yukon	90	330	27.3 (22.5–32.4)
Northwest Territories	152	675	22.5 (19.4–25.9)
Nunavut	74	751	9.9 (7.8–12.2)
Not available	994	3,990	24.9 (23.6–26.3)
CANADA	**85,341**	**333,974**	**25.6 (25.4–25.7)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

TABLE G11.1 Rate of operative vaginal delivery

Canada, 1995–1996 to 2004–2005

Fiscal year	Number of hospital vaginal deliveries	Number of operative vaginal deliveries	Operative vaginal deliveries per 100 hospital vaginal deliveries	Number of forceps deliveries	Forceps use per 100 hospital vaginal deliveries	Number of vacuum extractions	Vacuum extractions per 100 hospital vaginal deliveries	Vacuum: Forceps ratio
1995–1996	307,859	50,049	16.3	22,927	7.4	28,937	9.4	1.3
1996–1997	293,857	48,154	16.4	19,953	6.8	29,966	10.2	1.5
1997–1998	281,816	47,153	16.7	18,336	6.5	30,547	10.8	1.7
1998–1999	274,219	45,833	16.7	16,670	6.1	30,771	11.2	1.8
1999–2000	269,653	43,918	16.3	16,520	6.1	28,935	10.7	1.8
2000–2001	256,049	41,342	16.2	15,452	6.0	27,194	10.6	1.8
2001–2002	255,591	40,396	15.8	14,231	5.6	27,717	10.8	1.9
2002–2003	248,346	38,055	15.3	12,601	5.1	26,392	10.6	2.1
2003–2004	251,250	37,951	15.1	11,896	4.7	26,411	10.5	2.2
2004–2005	248,633	36,837	14.8	11,561	4.6	25,537	10.3	2.2

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

TABLE G11.2 Rate of operative vaginal delivery, by province/territory

*Canada, 2003–2004 and 2004–2005**

Province/Territory	Number of operative vaginal deliveries	Number of hospital vaginal deliveries	Operative vaginal deliveries (95% CI) per 100 hospital vaginal deliveries
Newfoundland and Labrador	1,144	6,388	17.9 (17.0–18.9)
Prince Edward Island	155	1,897	8.2 (7.0–9.5)
Nova Scotia	1,842	12,148	15.2 (14.5–15.8)
New Brunswick	1,513	9,656	15.6 (14.9–16.4)
Quebec	16,226	112,328	14.4 (14.2–14.7)
Ontario	29,150	194,049	15.0 (14.9–15.2)
Manitoba	1,841	21,829	8.4 (8.1–8.8)
Saskatchewan	3,141	18,782	16.7 (16.2–17.3)
Alberta	10,458	59,382	17.6 (17.3–17.9)
British Columbia	8,276	54,272	15.2 (14.9–15.6)
Yukon	56	494	11.3 (8.7–14.5)
Northwest Territories	71	1,070	6.6 (5.2–8.3)
Nunavut	29	1,140	2.5 (1.7–3.6)
Not available	886	6,448	13.7 (12.9–14.6)
CANADA	**74,788**	**499,883**	**15.0 (14.9–15.1)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2003–2004 and 2004–2005.
* Data for two years are combined because of small numbers.
CI—confidence interval

TABLE G11.3 Rate of vaginal delivery by forceps, by province/territory

*Canada, 2003–2004 and 2004–2005**

Province/Territory	Number of forceps deliveries	Number of hospital vaginal deliveries	Forceps use (95% CI) per 100 hospital vaginal deliveries
Newfoundland and Labrador	497	6,388	7.8 (7.1–8.5)
Prince Edward Island	74	1,897	3.9 (3.1–4.9)
Nova Scotia	732	12,148	6.0 (5.6–6.5)
New Brunswick	540	9,656	5.7 (5.1–6.1)
Quebec	4,112	112,328	3.7 (3.6–3.8)
Ontario	9,970	194,049	5.1 (5.0–5.2)
Manitoba	773	21,829	3.5 (3.3–3.8)
Saskatchewan	681	18,782	3.6 (3.4–3.9)
Alberta	2,836	59,382	4.8 (4.6–5.0)
British Columbia	2,939	54,272	5.4 (5.2–5.6)
Yukon	†	†	† (0.0–1.1)
Northwest Territories	19	1,070	1.8 (1.1–2.8)
Nunavut	11	1,140	1.0 (0.5–1.7)
Not available	272	6,448	4.2 (3.7–4.7)
CANADA	**23,456–23,460**	**499,883**	**4.7 (4.6–4.7)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2003–2004 and 2004–2005.
* Data for two years are combined because of small numbers.
† Number/rate suppressed due to small cell size <5.
CI—confidence interval

TABLE G11.4 Rate of vaginal delivery by vacuum extraction, by province/territory
*Canada, 2003–2004 and 2004–2005**

Province/Territory	Number of vacuum extractions	Number of hospital vaginal deliveries	Vacuum extractions (95% CI) per 100 hospital vaginal deliveries
Newfoundland and Labrador	648	6,388	10.1 (9.4–10.9)
Prince Edward Island	81	1,897	4.3 (3.4–5.3)
Nova Scotia	1,111	12,148	9.1 (8.6–9.7)
New Brunswick	976	9,656	10.1 (9.5–10.7)
Quebec	12,567	112,328	11.2 (11.0–11.4)
Ontario	19,247	194,049	9.9 (9.8–10.1)
Manitoba	1,117	21,829	5.1 (4.8–5.4)
Saskatchewan	2,461	18,782	13.1 (12.6–13.6)
Alberta	7,636	59,382	12.9 (12.6–13.1)
British Columbia	5,360	54,272	9.9 (9.6–10.1)
Yukon	55	494	11.1 (8.5–14.2)
Northwest Territories	52	1,070	4.9 (3.7–6.3)
Nunavut	18	1,140	1.6 (0.9–2.5)
Not available	619	6,448	9.6 (8.9–10.3)
CANADA	**51,948**	**499,883**	**10.4 (10.3–10.5)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2003–2004 and 2004–2005.
* Data for two years are combined because of small numbers.
CI—confidence interval

TABLE G12.1 Rate of trauma to the perineum by perineal laceration and episiotomy

Canada, 1995–1996 to 2004–2005

A. Rate of perineal laceration

Fiscal year	Number of first- and second-degree lacerations	First- and second-degree lacerations per 100 hospital vaginal deliveries	Number of hospital vaginal deliveries	Number of third-degree lacerations*	Number of fourth-degree lacerations*	Number of hospital vaginal deliveries*	Third-degree lacerations per 100 hospital vaginal deliveries*	Fourth-degree lacerations per 100 hospital vaginal deliveries*
1995–1996	137,845	44.8	307,859	7,225	1,660	237,712	3.0	0.7
1996–1997	135,482	46.1	293,857	7,174	1,553	225,851	3.2	0.7
1997–1998	131,607	46.7	281,816	6,827	1,460	218,231	3.1	0.7
1998–1999	128,748	47.0	274,219	6,844	1,497	214,145	3.2	0.7
1999–2000	127,868	47.4	269,653	6,752	1,502	210,530	3.2	0.7
2000–2001	126,895	49.6	256,049	6,744	1,294	199,555	3.4	0.6
2001–2002	127,933	50.1	255,591	6,340	1,204	198,484	3.2	0.6
2002–2003	125,980	50.7	248,346	6,107	1,127	193,175	3.2	0.6
2003–2004	128,304	51.1	251,250	6,330	1,126	194,750	3.3	0.6
2004–2005	127,726	51.4	248,633	6,410	1,122	192,805	3.3	0.6

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
* Data for Quebec were excluded because of data quality concerns.

B. Rate of episiotomy

Fiscal year	Number of episiotomies	Number of hospital vaginal deliveries	Episiotomies per 100 hospital vaginal deliveries
1995–1996	95,859	307,859	31.1
1996–1997	85,578	293,857	29.1
1997–1998	77,286	281,816	27.4
1998–1999	72,966	274,219	26.6
1999–2000	68,592	269,653	25.4
2000–2001	61,793	256,049	24.1
2001–2002	59,619	255,591	23.3
2002–2003	54,898	248,346	22.1
2003–2004	53,087	251,250	21.1
2004–2005	50,778	248,633	20.4

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

TABLE G12.2 Rate of episiotomy, by province/territory

Canada, 2004–2005

Province/Territory	Number of episiotomies	Number of hospital vaginal deliveries	Episiotomies (95% CI) per 100 hospital vaginal deliveries
Newfoundland and Labrador	661	3,107	21.3 (19.8–22.8)
Prince Edward Island	133	910	14.6 (12.4–17.1)
Nova Scotia	1,303	5,997	21.7 (20.7–22.8)
New Brunswick	925	4,692	19.7 (18.6–20.9)
Quebec	13,839	55,828	24.8 (24.4–25.1)
Ontario	20,874	96,801	21.6 (21.3–21.8)
Manitoba	1,840	10,737	17.1 (16.4–17.9)
Saskatchewan	1,463	9,365	15.6 (14.9–16.4)
Alberta	4,725	29,656	15.9 (15.5–16.4)
British Columbia	4,294	27,104	15.8 (15.4–16.3)
Yukon	30	240	12.5 (8.6–17.4)
Northwest Territories	39	523	7.5 (5.4–10.1)
Nunavut	24	677	3.5 (2.3–5.2)
Not available	628	2,996	21.0 (19.5–22.5)
CANADA	**50,778**	**248,633**	**20.4 (20.3–20.6)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

TABLE G12.3 Rate of third- and fourth-degree perineal laceration, by province/territory

Canada (excluding Quebec), 2002–2003 to 2004–2005***

Province/Territory	Number of third-degree lacerations	Number of hospital vaginal deliveries	Third-degree lacerations (95% CI) per 100 hospital vaginal deliveries		Number of fourth-degree lacerations	Fourth-degree lacerations (95% CI) per 100 hospital vaginal deliveries	
Newfoundland and Labrador	206	9,787	2.1	(1.8–2.4)	45	0.5	(0.3–0.6)
Prince Edward Island	77	2,863	2.7	(2.1–3.4)	14	0.5	(0.3–0.8)
Nova Scotia	580	18,258	3.2	(2.9–3.4)	93	0.5	(0.4–0.6)
New Brunswick	528	14,657	3.6	(3.3–3.9)	85	0.6	(0.5–0.7)
Ontario	8,094	290,905	2.8	(2.7–2.8)	1,712	0.6	(0.6–0.6)
Manitoba	1,126	32,866	3.4	(3.2–3.6)	168	0.5	(0.4–0.6)
Saskatchewan	1,037	27,875	3.7	(3.5–3.9)	282	1.0	(0.9–1.1)
Alberta	3,934	88,462	4.4	(4.3–4.6)	516	0.6	(0.5–0.6)
British Columbia	2,859	81,833	3.5	(3.4–3.6)	370	0.5	(0.4–0.5)
Yukon	19	731	2.6	(1.6–4.0)	†	†	(0.0–0.8)
Northwest Territories	31	1,570	2.0	(1.3–2.8)	18	1.1	(0.7–1.8)
Nunavut	20	1,295	1.5	(0.9–2.4)	6	0.5	(0.2–1.0)
Unknown	336	9,628	3.5	(3.1–3.9)	65	0.7	(0.5–0.9)
CANADA	**18,847**	**580,730**	**3.2**	**(3.2–3.3)**	**3,375–3,380**	**0.6**	**(0.6–0.6)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
* Data for Quebec were excluded because of data quality concerns.
** Data for three years are combined because of small numbers.
† Number/rate suppressed due to small cell size <5.
CI—confidence interval

TABLE G13.1 Rate of short maternal length of stay (LOS) in hospital for childbirth

Canada, 1995–1996 to 2004–2005

Fiscal year	Vaginal delivery			Cesarean delivery		
	Number of women with LOS <2 days	Number of hospital deliveries	Women with LOS <2 days per 100 hospital vaginal deliveries	Number of women with LOS <4 days	Number of hospital deliveries	Women with LOS <4 days per 100 hospital cesarean deliveries
1995–1996	53,300	307,859	17.3	12,317	65,872	18.7
1996–1997	52,519	293,857	17.9	14,177	65,244	21.7
1997–1998	56,066	281,816	19.9	16,920	63,897	26.5
1998–1999	58,731	274,219	21.4	19,394	64,149	30.2
1999–2000	55,309	269,653	20.5	21,517	66,003	32.6
2000–2001	50,736	256,049	19.8	24,437	68,582	35.6
2001–2002	53,384	255,591	20.9	29,584	74,016	40.0
2002–2003	55,112	248,346	22.2	34,117	76,931	44.3
2003–2004	61,934	251,250	24.7	40,950	82,904	49.4
2004–2005	63,364	248,633	25.5	44,807	85,341	52.5

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

TABLE G13.2 Average maternal length of stay (LOS) in hospital for childbirth

Canada, 1995–1996 to 2004–2005

Fiscal year	Vaginal delivery		Cesarean delivery	
	Number of hospital deliveries	Mean LOS in days (SD)	Number of hospital deliveries	Mean LOS in days (SD)
1995–1996	307,859	2.6 (1.6)	65,872	5.0 (2.6)
1996–1997	293,857	2.5 (1.5)	65,244	4.8 (2.5)
1997–1998	281,816	2.4 (1.5)	63,897	4.6 (2.5)
1998–1999	274,219	2.4 (1.5)	64,149	4.5 (2.5)
1999–2000	269,653	2.4 (1.5)	66,003	4.5 (2.5)
2000–2001	256,049	2.4 (1.5)	68,582	4.4 (2.4)
2001–2002	255,591	2.4 (1.4)	74,016	4.2 (2.4)
2002–2003	248,346	2.3 (1.4)	76,931	4.1 (2.4)
2003–2004	251,250	2.3 (1.4)	82,904	4.0 (2.3)
2004–2005	248,633	2.2 (1.4)	85,341	3.9 (2.2)

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
SD—standard deviation

TABLE G13.3 Rate of short maternal length of stay (LOS) in hospital for childbirth, by province/territory

Canada, 2004–2005

A. Vaginal delivery

Province/Territory	Number of women with LOS <2 days	Number of hospital vaginal deliveries	Hospital deliveries with LOS <2 days (95% CI) per 100 hospital vaginal deliveries
Newfoundland and Labrador	279	3,107	9.0 (8.0–10.0)
Prince Edward Island	17	910	1.9 (1.1–3.0)
Nova Scotia	823	5,997	13.7 (12.9–14.6)
New Brunswick	392	4,692	8.4 (7.6–9.2)
Quebec	3,461	55,828	6.2 (6.0–6.4)
Ontario	30,817	96,801	31.8 (31.5–32.1)
Manitoba	1,815	10,737	16.9 (16.2–17.6)
Saskatchewan	1,632	9,365	17.4 (16.7–18.2)
Alberta	13,256	29,656	44.7 (44.1–45.3)
British Columbia	8,941	27,104	33.0 (32.4–33.6)
Yukon	30	240	12.5 (8.6–17.4)
Northwest Territories	86	523	16.4 (13.4–19.9)
Nunavut	232	677	34.3 (30.7–38.0)
Not available	1,583	2,996	52.8 (51.0–54.6)
CANADA	**63,364**	**248,633**	**25.5 (25.3–25.7)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

B. Cesarean delivery

Province/Territory	Number of women with LOS <4 days	Number of hospital cesarean deliveries	Hospital deliveries with LOS <4 days (95% CI) per 100 hospital cesarean deliveries
Newfoundland and Labrador	433	1,257	34.4 (31.8–37.1)
Prince Edward Island	45	457	9.8 (7.3–13.0)
Nova Scotia	932	2,322	40.1 (38.1–42.2)
New Brunswick	786	1,856	42.3 (40.1–44.6)
Quebec	5,272	15,964	33.0 (32.3–33.8)
Ontario	21,385	35,344	60.5 (60.0–61.0)
Manitoba	1,244	2,788	44.6 (42.8–46.5)
Saskatchewan	1,093	2,372	46.1 (44.1–48.1)
Alberta	6,467	10,092	64.1 (63.1–65.0)
British Columbia	6,390	11,579	55.2 (54.3–56.1)
Yukon	40	90	44.4 (34.0–55.3)
Northwest Territories	46	152	30.3 (23.1–38.2)
Nunavut	36	74	48.6 (36.9–60.6)
Not available	638	994	64.2 (61.1–67.2)
CANADA	**44,807**	**85,341**	**52.5 (52.2–52.8)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
CI—confidence interval

TABLE G13.4 Average maternal length of stay (LOS) in hospital for childbirth, by province/territory

Canada, 2004–2005

Province/Territory	Number of hospital vaginal deliveries	Mean LOS in days (SD) for vaginal delivery	Number of hospital cesarean deliveries	Mean LOS in days (SD) for cesarean delivery
Newfoundland and Labrador	3,107	3.2 (2.0)	1,257	4.8 (3.1)
Prince Edward Island	910	3.1 (1.5)	457	5.0 (2.4)
Nova Scotia	5,997	2.9 (2.0)	2,322	4.4 (2.7)
New Brunswick	4,692	2.7 (1.5)	1,856	4.3 (2.5)
Quebec	55,828	2.6 (1.3)	15,964	4.3 (2.3)
Ontario	96,801	2.1 (1.3)	35,344	3.7 (2.0)
Manitoba	10,737	2.4 (1.3)	2,788	4.1 (2.4)
Saskatchewan	9,365	2.6 (1.5)	2,372	4.1 (2.2)
Alberta	29,656	1.8 (1.3)	10,092	3.6 (2.2)
British Columbia	27,104	2.2 (1.6)	11,579	3.9 (2.3)
Yukon	240	3.0 (1.5)	90	4.0 (1.8)
Northwest Territories	523	2.7 (1.8)	152	4.5 (2.1)
Nunavut	677	2.1 (1.4)	74	4.5 (2.9)
Not available	2,996	2.2 (1.4)	994	3.5 (2.6)
CANADA	**248,633**	**2.2 (1.4)**	**85,341**	**3.9 (2.2)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.
SD—standard deviation

TABLE G14.1 Rate of early neonatal discharge from hospital after birth for term newborns

Canada, 1995–1996 to 2004–2005

Fiscal year	Newborns with LOS <2 days	Number of hospital live births	Newborns with LOS <2 days per 100 hospital live births
1995–1996	71,311	355,452	20.1
1996–1997	70,275	341,108	20.6
1997–1998	75,376	328,507	22.9
1998–1999	78,995	320,043	24.7
1999–2000	74,770	316,780	23.6
2000–2001	68,883	305,702	22.5
2001–2002	73,296	310,741	23.6
2002–2003	75,729	305,906	24.8
2003–2004	85,216	313,658	27.2
2004–2005	86,130	310,551	27.7

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
LOS—length of stay

TABLE G14.2 Rate of early neonatal discharge from hospital after birth for term newborns, by province/territory

*Canada, 2002–2003 to 2004–2005 combined**

Province/Territory	Newborns with LOS <2 days	Number of hospital live births	Newborns (95% CI) with LOS <2 days per 100 hospital live births
Newfoundland and Labrador	1,251	12,771	9.8 (9.3–10.3)
Prince Edward Island	76	3,914	1.9 (1.5–2.4)
Nova Scotia	3,757	24,056	15.6 (15.2–16.1)
New Brunswick	1,724	19,159	9.0 (8.6–9.4)
Quebec	14,781	200,294	7.4 (7.3–7.5)
Ontario	118,899	369,884	32.1 (32.0–32.3)
Manitoba	7,761	38,050	20.4 (20.0–20.8)
Saskatchewan	6,830	32,702	20.9 (20.4–21.3)
Alberta	52,575	110,024	47.8 (47.5–48.1)
British Columbia	35,151	108,641	32.4 (32.1–32.6)
Yukon	135	917	14.7 (12.5–17.2)
Northwest Territories	353	1,849	19.1 (17.3–21.0)
Nunavut	559	1,280	43.7 (40.9–46.4)
Not available	3,223	6,574	49.0 (47.8–50.2)
CANADA	**247,075**	**930,115**	**26.6 (26.5–26.7)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
* Data for three years are combined because of small numbers.
CI—confidence interval
LOS—length of stay

TABLE G14.3 Average neonatal length of stay (LOS) in hospital after birth for term newborns

Canada, 1995–1996 to 2004–2005

Fiscal year	Number of hospital live births	Mean LOS in days (SD)
1995–1996	355,452	2.6 (1.7)
1996–1997	341,108	2.5 (1.6)
1997–1998	328,507	2.5 (1.6)
1998–1999	320,043	2.4 (1.6)
1999–2000	316,780	2.4 (1.6)
2000–2001	305,702	2.4 (1.5)
2001–2002	310,741	2.4 (1.5)
2002–2003	305,906	2.4 (1.5)
2003–2004	313,658	2.3 (1.5)
2004–2005	310,551	2.3 (1.5)

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
SD—standard deviation

TABLE G14.4 Average neonatal length of stay (LOS) in hospital after birth for term newborns, by province/territory

*Canada, 2002–2003 to 2004–2005 combined**

Province/Territory	Number of hospital live births	Mean LOS in days (SD)
Newfoundland and Labrador	12,771	2.9 (1.6)
Prince Edward Island	3,914	3.4 (1.7)
Nova Scotia	24,056	2.7 (1.7)
New Brunswick	19,159	2.8 (1.8)
Quebec	200,294	2.7 (1.5)
Ontario	369,884	2.2 (1.4)
Manitoba	38,050	2.4 (1.6)
Saskatchewan	32,702	2.5 (1.7)
Alberta	110,024	1.9 (1.3)
British Columbia	108,641	2.3 (1.6)
Yukon	917	2.9 (1.5)
Northwest Territories	1,849	2.7 (1.5)
Nunavut	1,280	2.0 (1.5)
Not available	6,574	2.0 (1.6)
CANADA	**930,115**	**2.3 (1.5)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
* Data for three years are combined because of small numbers.
SD—standard deviation

Section B: Maternal, Fetal and Infant Health Outcomes

TABLE G15.1 Maternal mortality ratio (MMR)

*Canada, 1981–2004**

Year	Number of live births	All maternal deaths		Direct maternal deaths	
		Deaths	Ratio (95% CI) per 100,000 live births	Deaths	Ratio (95% CI) per 100,000 live births
1981–1983	1,118,117	50	4.5 (3.3–5.9)	44	3.9 (2.9–5.3)
1984–1986	1,125,671	38	3.4 (2.4–4.7)	35	3.1 (2.2–4.3)
1987–1989	1,139,198	49	4.3 (3.2–5.7)	48	4.2 (3.1–5.6)
1990–1992	1,206,650	41	3.4 (2.4–4.6)	37	3.1 (2.2–4.3)
1993–1995	1,151,502	46	4.0 (2.9–5.3)	39	3.4 (2.4–4.7)
1996–1998	1,057,180	50	4.7 (3.5–6.2)	48	4.5 (3.4–6.0)
1999–2001**	998,826	42	4.2 (3.1–5.7)	32	3.1 (2.2–4.5)
2002–2004**	1,001,064	55	5.5 (4.2–7.2)	41	4.1 (2.9–5.6)

Sources: Years 1981–1983[5,6] (page 104). Years 1984–2004: Statistics Canada. Canadian Vital Statistics System, 1984–2004.
* 1981–1999 deaths classified according to ICD-9, 2000–2004 deaths classified according to ICD-10.
** For the years 2000–2004, deaths due to ICD-10 codes O96 and O97 (late maternal deaths) are excluded so as to more accurately present the temporal trend.
Note: Deaths due to cerebrovascular disorders of the puerperium are considered indirect in ICD-10; in ICD-9 these were considered direct causes of death.
CI—confidence interval

TABLE G16.1 Incidence of amniotic-fluid embolism, postpartum hemorrhage (PPH), atonic PPH and PPH requiring hysterectomy

Canada, 1995–1996 to 2004–2005

Fiscal year	Number of hospital deliveries	Amniotic-fluid embolism		PPH		Atonic PPH		PPH with hysterectomy	
		Number of cases	Incidence per 100,000 hospital deliveries	Number of cases	Incidence per 1,000 hospital deliveries	Number of cases	Incidence per 1,000 hospital deliveries	Number of cases	Incidence per 100,000 hospital deliveries
1995–1996	373,731	25	6.7	17,118	45.8	12,648	33.8	131	35.1
1996–1997	359,101	23	6.4	17,166	47.8	13,046	36.3	117	32.6
1997–1998	345,713	27	7.8	16,763	48.5	12,622	36.5	128	37.0
1998–1999	338,368	19	5.6	17,268	51.0	13,302	39.3	134	39.6
1999–2000	335,656	11	3.3	17,982	53.6	14,081	42.0	153	45.6
2000–2001	324,631	16	4.9	17,467	53.8	13,764	42.4	141	43.4
2001–2002	329,607	25	7.6	17,129	52.0	13,321	40.4	154	46.7
2002–2003	325,277	31	9.5	16,591	51.0	12,815	39.4	144	44.3
2003–2004	334,154	23	6.9	16,503	49.4	12,654	37.9	169	50.6
2004–2005	333,974	22	6.6	16,628	49.8	12,909	38.7	136	40.7
TOTAL	**3,400,212**	**222**	**6.5**	**170,615**	**50.2**	**131,162**	**38.6**	**1,407**	**41.4**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

TABLE G16.2 Incidence of postpartum hemorrhage (PPH) and atonic PPH, by province/territory

*Canada, 2002–2003 to 2004–2005**

Province/Territory	Number of hospital deliveries	PPH		Atonic PPH	
		Number of cases	Incidence (95% CI) per 1,000 hospital deliveries	Number of cases	Incidence (95% CI) per 1,000 hospital deliveries
Newfoundland and Labrador	13,453	429	31.9 (29.0–35.0)	344	25.6 (23.0–28.4)
Prince Edward Island	4,095	118	28.8 (23.9–34.4)	87	21.2 (17.1–26.1)
Nova Scotia	25,200	1,257	49.9 (47.2–52.6)	973	38.6 (36.3–41.1)
New Brunswick	20,427	635	31.1 (28.7–33.6)	471	23.1 (21.0–25.2)
Quebec	213,495	10,136	47.5 (46.6–48.4)	7,854	36.8 (36.0–37.6)
Ontario	391,648	14,418	36.8 (36.2–37.4)	10,605	27.1 (26.6–27.6)
Manitoba	40,983	1,837	44.8 (42.8–46.9)	1,395	34.0 (32.3–35.8)
Saskatchewan	34,859	3,743	107.4 (104.1–110.7)	3,247	93.1 (90.1–96.2)
Alberta	117,041	8,729	74.6 (73.1–76.1)	6,969	59.5 (58.2–60.9)
British Columbia	115,137	7,336	63.7 (62.3–65.1)	5,637	49.0 (47.7–50.2)
Yukon	967	135	139.6 (118.4–163.1)	116	120.0 (100.1–142.1)
Northwest Territories	2,039	170	83.4 (71.7–96.2)	94	46.1 (37.4–56.1)
Nunavut	1,436	137	95.4 (80.7–111.8)	86	59.9 (48.2–111.8)
Not available	12,625	642	50.9 (47.1–54.8)	500	39.6 (36.3–43.2)
CANADA	**993,405**	**49,722**	**50.1 (49.6–50.5)**	**38,378**	**38.6 (38.3–39.0)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2000–2001 to 2004–2005.
* Data for three years are combined because of small numbers.
CI—confidence interval

TABLE G17.1 Ratio and rate of induced abortion*

*Canada (excluding Ontario),** 1995–2004*

Year	Number of induced abortions	Number of live births	Number of females 15–44 years	Induced abortions per 100 live births	Induced abortions per 1,000 females 15–44 years
1995	62,153	231,753	4,229,099	26.8	14.7
1996	64,741	226,188	4,245,799	28.6	15.2
1997	67,663	215,594	4,247,987	31.4	15.9
1998	67,879	209,800	4,233,808	32.4	16.0
1999	65,685	206,169	4,216,383	31.9	15.6
2000	65,883	200,474	4,194,313	32.9	15.7
2001	67,591	202,035	4,178,561	33.5	16.2
2002	67,016	199,548	4,161,237	33.6	16.1
2003	67,102	203,517	4,145,495	33.0	16.2
2004	64,856	204,521	4,146,738	31.7	15.6

Sources: Statistics Canada, Pregnancy Outcomes 2004—Catalogue No. 82-224-XIE.
Statistics Canada, CANSIM II, table 051-0001—Canadian population estimates, 1995–2004.
* Includes abortions performed on Canadian residents in selected U.S. states (for years prior to 2004). Includes cases with age not specified as well as abortions to females ≤14 years of age and ≥45 years of age. Rate based on female population 15–44 years of age. May include some abortions performed in Canada on non-Canadian residents. For 2002 and 2003, data for Nunavut are excluded due to incomplete reporting.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G17.2 Ratio and rate of induced abortion,* by province/territory

*Canada (excluding Ontario, Yukon and Nunavut),** 2004*

Province/Territory	Number of induced abortions	Number of live births	Number of females 15–44 years	Induced abortions (95% CI) per 100 live births	Induced abortions (95% CI) per 1,000 females 15–44 years
Newfoundland and Labrador	902	4,488	110,973	20.1 (18.9–21.3)	8.1 (7.6–8.7)
Prince Edward Island	143	1,390	28,956	10.3 (8.7–12.0)	4.9 (4.2–5.8)
Nova Scotia	1,905	8,734	197,267	21.8 (20.9–22.7)	9.7 (9.2–10.1)
New Brunswick	920	6,959	157,517	13.2 (12.4–14.0)	5.8 (5.5–6.2)
Quebec	30,616	74,072	1,559,000	41.3 (41.0–41.7)	19.6 (19.4–19.9)
Manitoba	2,661	13,811	242,728	19.3 (18.6–19.9)	11.0 (10.6–11.4)
Saskatchewan	1,888	11,983	203,325	15.8 (15.1–16.4)	9.3 (8.9–9.7)
Alberta	11,098	40,779	719,968	27.2 (26.8–27.6)	15.4 (15.1–15.7)
British Columbia	14,145	40,489	902,252	34.9 (34.5–35.4)	15.7 (15.4–15.9)
Northwest Territories	261	698	10,536	37.4 (33.8–41.1)	24.8 (21.9–27.9)
CANADA	**64,539**	**203,403**	**4,132,522**	**31.7 (31.5–31.9)**	**15.6 (15.5–15.7)**

Sources: Statistics Canada, Pregnancy Outcomes 2004—Catalogue No. 82-224-XIE.
Statistics Canada, CANSIM II, table 051-0001—Canadian population estimates, 1995–2004.
* Includes cases with age not specified as well as abortions to females ≤14 years of age and ≥45 years of age. Rate based on female population 15–44 years of age. Province/territory of residence may be imputed because of missing information. May include some abortions performed in Canada on non-Canadian residents.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.* For 2004 the numbers were too small for reporting in Nunavut and Yukon territories.
CI—confidence interval

TABLE G17.3 Age-specific induced abortion rate and ratio

Canada (excluding Ontario), 2004*

Age (years)	Number of induced abortions	Number of females	Induced abortion rate (95% CI) per 1,000 females
<15**	253	129,642	2.0 (1.7–2.2)
15–19	11,451	632,334	18.1 (17.8–18.4)
20–24	20,705	671,750	30.8 (30.4–31.2)
25–29	14,185	651,910	21.8 (21.4–22.1)
30–34	9,438	653,406	14.4 (14.2–14.7)
35–39	6,162	709,169	8.7 (8.5–8.9)
40–44***	2,658	828,169	3.2 (3.1–3.3)

Age (years)	Number of induced abortions	Number of live births	Induced abortion ratio (95% CI) per 100 live births
<15**	253	90	281.1 (247.5–318.0)
15–19	11,451	9,754	117.4 (115.3–119.6)
20–24	20,705	37,573	55.1 (54.6–55.6)
25–29	14,185	65,471	21.7 (21.4–22.0)
30–34	9,438	60,057	15.7 (15.4–16.0)
35–39	6,162	26,335	23.4 (22.9–23.9)
40–44***	2,658	5,239	50.7 (49.4–52.1)

Sources: Statistics Canada, Pregnancy Outcomes 2004—Catalogue No. 82-224-XIE.
Statistics Canada, CANSIM II, table 051-0001—Canadian population estimates, 1995–2004.
* May include some abortions performed in Canada on non-Canadian residents. Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Rate based on female population aged 14 years.
*** Includes induced abortions to women ≥45 years of age. Rate based on female population aged 40–44 years.
CI—confidence interval

TABLE G18.1 Rate of ectopic pregnancy

Canada, 1995–1996 to 2004–2005

Fiscal year	Number of reported pregnancies*	Number of ectopic pregnancies	Ectopic pregnancies per 1,000 reported pregnancies
1995–1996	405,155	6,981	17.2
1996–1997	386,503	6,507	16.8
1997–1998	370,406	6,020	16.3
1998–1999	361,042	5,786	16.0
1999–2000	357,285	5,252	14.7
2000–2001	344,780	4,988	14.5
2001–2002	348,773	4,716	13.5
2002–2003	343,434	4,464	13.0
2003–2004	351,754	4,271	12.1
2004–2005	351,724	4,194	11.9

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

* Reported pregnancies include all hospital deliveries, inpatient hospital-based induced abortions and ectopic pregnancies managed in the inpatient setting, but not spontaneous abortions, hospital day surgery induced abortions, clinic-based induced abortions or ectopic pregnancies managed in the outpatient setting.

TABLE G18.2 Rate of ectopic pregnancy, by province/territory

Canada, 2004–2005

Province/Territory	Number of reported pregnancies*	Number of ectopic pregnancies	Ectopic pregnancies (95% CI) per 1,000 reported pregnancies
Newfoundland and Labrador	4,606	49	10.6 (7.9–14.0)
Prince Edward Island	1,419	8	5.6 (2.4–11.1)
Nova Scotia	8,553	63	7.4 (5.7–9.4)
New Brunswick	6,928	75	10.8 (8.5–13.6)
Quebec	75,660	873	11.5 (10.8–12.3)
Ontario	137,632	1,546	11.2 (10.7–11.8)
Manitoba	14,729	220	14.9 (13.0–17.0)
Saskatchewan	12,488	161	12.9 (11.0–15.0)
Alberta	42,580	552	13.0 (11.9–14.1)
British Columbia	40,949	519	12.7 (11.6–13.8)
Yukon	360	11	30.6 (15.4–54.0)
Northwest Territories	758	25	33.0 (21.5–48.3)
Nunavut	824	12	14.6 (7.5–25.3)
Not available	4,238	80	18.9 (15.0–23.4)
CANADA	**351,724**	**4,194**	**11.9 (11.6–12.3)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.

* Reported pregnancies include all hospital deliveries, inpatient hospital-based induced abortions and ectopic pregnancies managed in the inpatient setting, but not spontaneous abortions, hospital day surgery induced abortions, clinic-based induced abortions or ectopic pregnancies managed in the outpatient setting.

CI—confidence interval

TABLE G18.3 Rate of ectopic pregnancy, by maternal age*

Canada, 2004–2005

Age (years)	Number of reported pregnancies**	Number of ectopic pregnancies	Ectopic pregnancies (95% CI) per 1,000 reported pregnancies
15–19	15,746	215	13.7 (11.9–15.6)
20–24	58,708	659	11.2 (10.4–12.1)
25–29	107,417	1,038	9.7 (9.1–10.3)
30–34	108,351	1,211	11.2 (10.6–11.8)
35–39	50,467	811	16.1 (15.0–17.2)
40–44	10,413	249	23.9 (21.1–27.0)
45–49	457	9	19.7 (9.0–37.1)

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2004–2005.

* Excludes cases of unknown maternal age.

** Reported pregnancies include all hospital deliveries, inpatient hospital-based induced abortions and ectopic pregnancies managed in the inpatient setting, but not spontaneous abortions, hospital day surgery induced abortions, clinic-based induced abortions or ectopic pregnancies managed in the outpatient setting.

CI—confidence interval

TABLE G19.1 Rate of maternal readmission within 90 days of discharge from hospital following childbirth

Canada, 1995–1996 to 2004–2005

Fiscal year	Vaginal delivery*			Cesarean delivery*		
	Number of readmissions	Number of hospital deliveries	Readmissions per 100 hospital deliveries*	Number of readmissions	Number of hospital deliveries	Readmissions per 100 hospital deliveries*
1995–1996	4,776	319,320	1.5	1,728	61,661	2.8
1996–1997	4,718	303,547	1.6	1,742	61,449	2.8
1997–1998	4,843	294,655	1.6	1,852	60,991	3.0
1998–1999	5,267	289,571	1.8	2,010	62,088	3.2
1999–2000	5,780	285,177	2.0	2,348	64,105	3.7
2000–2001**	4,838	257,349	1.9	2,155	63,992	3.4
2001–2002**	4,059	256,325	1.6	1,987	69,387	2.9
2002–2003**	3,903	262,742	1.6	1,950	72,145	2.7
2003–2004	4,588	250,434	1.7	2,537	80,496	3.2
2004–2005***	3,553	198,652	1.8	1,936	62,947	3.1

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

* Only for women for whom a scrambled health card number is available.

** 2000–2001 to 2002–2003 data for Manitoba were excluded because complete health card numbers were not available for approximately 70% of its hospital records in the HMDB, so linkage to readmitted cases was not possible. See *Appendix A* for further details.

*** For 2004–2005, the denominator (i.e., number of hospital deliveries) only includes the nine-month period from April 1, 2004, to December 31, 2004, to allow a 90-day time window in which readmissions could be ascertained.

TABLE G19.2 Rate of maternal readmission within 90 days of discharge from hospital following childbirth,* by province/territory

*Canada,** 2002–2003 to 2004–2005 combined****

A. Vaginal delivery

Province/Territory	Number of readmissions	Number of hospital deliveries	Readmissions (95% CI) per 100 hospital deliveries
Newfoundland and Labrador	223	9,542	2.3 (2.0–2.7)
Prince Edward Island	84	2,820	3.0 (2.4–3.7)
Nova Scotia	298	17,355	1.7 (1.5–1.9)
New Brunswick	429	14,539	3.0 (2.7–3.2)
Quebec	2,830	163,353	1.7 (1.7–1.8)
Ontario	3,362	279,713	1.2 (1.2–1.2)
Manitoba**	560	20,929	2.7 (2.5–2.9)
Saskatchewan	646	27,454	2.4 (2.2–2.5)
Alberta	1,891	88,583	2.1 (2.0–2.2)
British Columbia	1,620	81,162	2.0 (1.9–2.1)
Yukon	19	738	2.6 (1.6–4.0)
Northwest Territories	45	1,578	2.9 (2.1–3.8)
Nunavut	33	1,214	2.7 (1.9–3.8)
Not available	4	618	0.6 (0.2–1.6)
CANADA	**12,044**	**709,638**	**1.7 (1.7–1.7)**

B. Cesarean delivery

Province/Territory	Number of readmissions	Number of hospital deliveries	Readmissions (95% CI) per 100 hospital deliveries
Newfoundland and Labrador	99	3,272	3.0 (2.5–3.7)
Prince Edward Island	72	1,098	6.6 (5.2–8.2)
Nova Scotia	196	6,310	3.1 (2.7–3.6)
New Brunswick	264	5,284	5.0 (4.4–5.6)
Quebec	1,202	41,284	2.9 (2.8–3.1)
Ontario	2,014	90,441	2.2 (2.1–2.3)
Manitoba**	250	4,686	5.3 (4.7–6.0)
Saskatchewan	294	6,334	4.6 (4.1–5.2)
Alberta	982	25,777	3.8 (3.6–4.1)
British Columbia	1,007	30,166	3.3 (3.1–3.5)
Yukon	9	215	4.2 (1.9–7.8)
Northwest Territories	21	416	5.0 (3.2–7.6)
Nunavut	9	113	8.0 (3.7–14.6)
Not available	4	192	2.1 (0.6–5.2)
CANADA	**6,423**	**215,588**	**3.0 (2.9–3.1)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.

* Only for women for whom a scrambled health card number is available.

** 2002–2003 data for Manitoba were excluded because complete health card numbers were not available for approximately 70% of its hospital records in the HMDB, so linkage to readmitted cases was not possible. See *Appendix A* for further details.

*** Data for three years are combined because of small numbers.

CI—confidence interval

TABLE G19.3 Primary diagnosis for maternal readmissions within 90 days of discharge from hospital following childbirth,* by delivery mode

*Canada,** 2002–2003 to 2004–2005 combined****

Primary diagnosis at readmission	Mode of delivery					
	Total maternal readmission		Cesarean maternal readmission		Vaginal maternal readmission	
	Number	Percent	Number	Percent	Number	Percent
1. Postpartum hemorrhage	2,542	13.8	412	6.4	2,130	17.7
2. Major puerperal infection	2,063	11.2	797	12.4	1,266	10.5
3. Cholelithiasis	1,862	10.1	544	8.5	1,318	10.9
4. Complications of pregnancy, not elsewhere classified	1,422	7.7	1,024	15.9	398	3.3
5. Other and unspecified complications of puerperium	927	5.0	676	10.5	251	2.1
6. Person seeking consultation without complaint of sickness, postpartum care and examination	749	4.1	187	2.9	562	4.7
7. Other current conditions in the mother classifiable elsewhere, but complicating pregnancy, childbirth or the puerperium	578	3.1	231	3.6	347	2.9
8. Depressive disorder and mood/affective psychoses	521	2.8	131	2.0	390	3.2
9. Infection of the breast and nipple associated with childbirth	463	2.5	115	1.8	348	2.9
10. Acute appendicitis	413	2.2	102	1.6	311	2.6
11. Hypertension complicating pregnancy, childbirth and puerperium	367	2.0	135	2.1	232	1.9
12. Symptoms involving abdomen and pelvis	257	1.4	90	1.4	167	1.4
13. Acute pancreatitis	244	1.3	71	1.1	173	1.4
14. Retained placenta	211	1.1	29	0.5	182	1.5
15. Complication of procedures, not elsewhere classified	205	1.1	94	1.5	111	0.9
16. Calculus of kidney and ureter	190	1.0	52	0.8	138	1.1
17. Other diagnoses	5,453	29.5	1,733	27.0	3,720	30.9
TOTAL	**18,467**	**100**	**6,423**	**100**	**12,044**	**100**

Source: Canadian Institute for Health Information. Hospital Morbidity Database (HMDB), 2002–2003 to 2004–2005.
* Only for women for whom a scrambled health card number is available.
** 2002–2003 data for Manitoba were excluded because complete health card numbers were not available for approximately 70% of its hospital records in the HMDB, so linkage to readmitted cases was not possible. See *Appendix A* for further details.
*** Data for three years are combined due to small numbers.

TABLE G20.1 Rate of preterm birth

Canada (excluding Ontario), 1995–2004*

Year	Number of live births**	Number of preterm births <32 weeks	Preterm births <32 weeks per 100 live births	Number of preterm births 32–36 weeks	Preterm births 32–36 weeks per 100 live births	Number of preterm births <37 weeks	Preterm births <37 weeks per 100 live births
1995	231,436	2,350	1.0	13,775	6.0	16,125	7.0
1996	224,520	2,333	1.0	13,559	6.1	15,892	7.1
1997	214,414	2,296	1.1	12,878	6.0	15,174	7.1
1998	209,629	2,178	1.1	12,831	6.1	15,009	7.2
1999	206,004	2,197	1.1	13,016	6.3	15,213	7.4
2000	200,358	2,203	1.1	13,088	6.5	15,291	7.6
2001	201,068	2,204	1.1	12,906	6.4	15,110	7.5
2002	199,435	2,211	1.1	12,929	6.5	15,140	7.6
2003	203,422	2,397	1.2	13,625	6.7	16,022	7.9
2004	203,565	2,446	1.2	14,235	7.0	16,681	8.2

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age are excluded from this table.

TABLE G20.2 Rate of preterm birth among singleton and multiple births

Canada (excluding Ontario), 2004*

Plurality	Number of live births**	Number of preterm births <32 weeks	Preterm births <32 weeks per 100 live births	Number of preterm births 32–36 weeks	Preterm births 32–36 weeks per 100 live births	Number of preterm births <37 weeks	Preterm births <37 weeks per 100 live births
Singletons	197,539	1,768	0.9	11,392	5.8	13,160	6.7
Twins	5,798	609	10.5	2,693	46.5	3,302	57.0
Triplets or higher	228	69	30.3	150	65.8	219	96.1
All live births	**203,565**	**2,446**	**1.2**	**14,235**	**7.0**	**16,681**	**8.2**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age are excluded from this table.

TABLE G20.3 Rate of preterm birth, by province/territory

Canada (excluding Ontario), 2004*

Province/Territory	Number of live births**	Number of preterm births <32 weeks	Preterm births <32 weeks (95% CI) per 100 live births	Number of preterm births 32–36 weeks	Preterm births 32–36 weeks (95% CI) per 100 live births	Number of preterm births <37 weeks	Preterm births <37 weeks (95% CI) per 100 live births
Newfoundland and Labrador	4,470	64	1.4 (1.1–1.8)	310	7.0 (6.2–7.7)	374	8.4 (7.6–9.2)
Prince Edward Island	1,390	20	1.4 (0.9–2.2)	91	6.6 (5.3–8.0)	111	8.0 (6.6–9.5)
Nova Scotia	8,732	109	1.3 (1.0–1.5)	571	6.5 (6.0–7.1)	680	7.8 (7.2–8.4)
New Brunswick	6,959	88	1.2 (1.0–1.6)	471	6.8 (6.2–7.4)	559	8.0 (7.4–8.7)
Quebec	73,310	806	1.1 (1.0–1.2)	5,107	7.0 (6.8–7.2)	5,913	8.1 (7.9–8.3)
Manitoba	13,777	168	1.2 (1.0–1.4)	974	7.1 (6.6–7.5)	1,142	8.3 (7.8–8.8)
Saskatchewan	11,981	153	1.3 (1.1–1.5)	733	6.1 (5.7–6.6)	886	7.4 (6.9–7.9)
Alberta	40,777	559	1.4 (1.3–1.5)	3,159	7.7 (7.5–8.0)	3,718	9.1 (8.8–9.4)
British Columbia	40,420	456	1.1 (1.0–1.2)	2,657	6.6 (6.3–6.8)	3,113	7.7 (7.4–8.0)
Yukon	365	5	1.4 (0.4–3.2)	29	7.9 (5.4–11.2)	34	9.3 (6.5–12.8)
Northwest Territories	644	11	1.7 (0.9–3.0)	50	7.8 (5.8–10.1)	61	9.5 (7.3–12.0)
Nunavut	740	7	1.0 (0.4–1.9)	83	11.2 (9.0–13.7)	90	12.2 (9.9–14.7)
CANADA	**203,565**	**2,446**	**1.2 (1.2–1.2)**	**14,235**	**7.0 (6.9–7.1)**	**16,681**	**8.2 (8.1–8.3)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.

* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

** Live births with unknown gestational age are excluded from this table.

CI—confidence interval

TABLE G21.1 Rate of postterm birth

Canada (excluding Ontario), 1995–2004*

Year	Number of postterm births	Number of live births**	Postterm births per 100 live births
1995	5,751	231,436	2.5
1996	4,353	224,520	1.9
1997	3,928	214,414	1.8
1998	3,439	209,629	1.6
1999	2,999	206,004	1.5
2000	2,397	200,358	1.2
2001	2,301	201,068	1.1
2002	2,085	199,435	1.0
2003	1,875	203,422	0.9
2004	1,540	203,565	0.8

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age are excluded from this table.

TABLE G21.2 Rate of postterm birth, by province/territory

Canada (excluding Ontario), 2004*

Province/Territory	Number of postterm births	Number of live births**	Postterm births (95% CI) per 100 live births
Newfoundland and Labrador	27	4,470	0.6 (0.4–0.9)
Prince Edward Island	12	1,390	0.9 (0.4–1.5)
Nova Scotia	115	8,732	1.3 (1.1–1.6)
New Brunswick	49	6,959	0.7 (0.5–0.9)
Quebec	225	73,310	0.3 (0.3–0.3)
Manitoba	329	13,777	2.4 (2.1–2.7)
Saskatchewan	125	11,981	1.0 (0.9–1.2)
Alberta	339	40,777	0.8 (0.7–0.9)
British Columbia	296	40,420	0.7 (0.7–0.8)
Yukon	14	365	3.8 (2.1–6.4)
Northwest Territories	9	644	1.4 (0.6–2.6)
Nunavut	0	740	0.0 (0.0–0.5)
CANADA	**1,540**	**203,565**	**0.8 (0.7–0.8)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Live births with unknown gestational age are excluded from this table.
CI—confidence interval

TABLE G22.1 Rate of small-for-gestational-age (SGA)

Canada (excluding Ontario), 1995–2004*

Year	Number of SGA singleton live births	Number of singleton live births**	SGA live births per 100 singleton live births**
1995	22,704	224,864	10.1
1996	20,726	218,246	9.5
1997	19,783	207,926	9.5
1998	18,649	204,004	9.1
1999	16,904	200,486	8.4
2000	15,354	194,919	7.9
2001	15,634	194,524	8.0
2002	15,521	193,071	8.0
2003	15,471	196,624	7.9
2004	15,283	196,472	7.8

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. SGA cut-off is based on the 10th percentile of the sex-specific birth weight for gestational age.

TABLE G22.2 Rate of small-for-gestational-age (SGA), by province/territory

Canada (excluding Ontario), 2004*

Province/Territory	Number of SGA singleton live births	Number of singleton live births**	SGA live births (95% CI) per 100 singleton live births**
Newfoundland and Labrador	312	4,341	7.2 (6.4–8.0)
Prince Edward Island	102	1,351	7.5 (6.2–9.1)
Nova Scotia	656	8,437	7.8 (7.2–8.4)
New Brunswick	482	6,743	7.1 (6.5–7.8)
Quebec	5,512	70,278	7.8 (7.6–8.0)
Manitoba	1,010	13,382	7.5 (7.1–8.0)
Saskatchewan	816	11,688	7.0 (6.5–7.5)
Alberta	3,318	39,362	8.4 (8.2–8.7)
British Columbia	2,976	39,202	7.6 (7.3–7.9)
Yukon	23	351	6.6 (4.2–9.7)
Northwest Territories	31	612	5.1 (3.5–7.1)
Nunavut	45	725	6.2 (4.6–8.2)
CANADA	**15,283**	**196,472**	**7.8 (7.7–7.9)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. SGA cut-off is based on the 10th percentile of the sex-specific birth weight for gestational age.
CI—confidence interval

TABLE G23.1 Rate of large-for-gestational-age (LGA)

Canada (excluding Ontario), 1995–2004*

Year	Number of LGA singleton live births	Number of singleton live births**	LGA live births per 100 singleton live births**
1995	22,137	224,864	9.8
1996	22,966	218,246	10.5
1997	21,111	207,926	10.2
1998	22,015	204,004	10.8
1999	22,310	200,486	11.1
2000	23,351	194,919	12.0
2001	22,926	194,524	11.8
2002	22,473	193,071	11.6
2003	22,711	196,624	11.6
2004	22,758	196,472	11.6

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. LGA cut-off is based on the 90th percentile of the sex-specific birth weight for gestational age.

TABLE G23.2 Rate of large-for-gestational-age (LGA), by province/territory

Canada (excluding Ontario), 2004*

Province/Territory	Number of LGA singleton live births	Number of singleton live births**	LGA live births (95% CI) per 100 singleton live births**
Newfoundland and Labrador	623	4,341	14.4 (13.3–15.4)
Prince Edward Island	211	1,351	15.6 (13.7–17.7)
Nova Scotia	1,153	8,437	13.7 (12.9–14.4)
New Brunswick	911	6,743	13.5 (12.7–14.3)
Quebec	7,182	70,278	10.2 (10.0–10.4)
Manitoba	1,987	13,382	14.8 (14.2–15.5)
Saskatchewan	1,619	11,688	13.9 (13.2–14.5)
Alberta	4,229	39,362	10.7 (10.4–11.1)
British Columbia	4,559	39,202	11.6 (11.3–12.0)
Yukon	51	351	14.5 (11.0–18.7)
Northwest Territories	125	612	20.4 (17.3–23.8)
Nunavut	108	725	14.9 (12.4–17.7)
CANADA	**22,758**	**196,472**	**11.6 (11.4–11.7)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. LGA cut-off is based on the 90th percentile of the sex-specific birth weight for gestational age.
CI—confidence interval

TABLE G24.1 Rate of fetal death

Canada (excluding Ontario), 1995–2004*

Year	Fetal deaths (crude)**			Fetal deaths ≥500 g***		
	Number of fetal deaths	Number of total births	Deaths per 1,000 total births	Number of fetal deaths	Number of total births	Deaths per 1,000 total births
1995	1,380	233,127	5.9	1,082	232,636	4.7
1996	1,220	227,408	5.4	972	226,967	4.3
1997	1,263	216,853	5.8	983	216,373	4.5
1998	1,141	210,935	5.4	866	210,493	4.1
1999	1,229	207,387	5.9	933	206,903	4.5
2000	1,175	201,633	5.8	903	201,183	4.5
2001	1,199	203,231	5.9	945	202,773	4.7
2002	1,191	201,461	5.9	854	200,894	4.3
2003	1,197	205,470	5.8	841	204,863	4.1
2004	1,231	205,746	6.0	872	205,111	4.3

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age of <20 weeks.
*** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.

TABLE G24.2 Rate of fetal death, by province/region

Canada (excluding Ontario), 2004*

Province/Region	Fetal deaths (crude)**			Fetal deaths ≥500 g***		
	Number of fetal deaths	Number of total births	Deaths (95% CI) per 1,000 total births**	Number of fetal deaths	Number of total births	Deaths (95% CI) per 1,000 total births**
Newfoundland and Labrador	20	4,508	4.4 (2.7–6.8)	16	4,497	3.6 (2.0–5.8)
Prince Edward Island§	5	1,395	3.6 (1.2–8.3)	6	1,383	4.3 (1.6–9.4)
Nova Scotia	77	8,811	8.7 (6.9–10.9)	40	8,760	4.6 (3.3–6.2)
New Brunswick	38	6,997	5.4 (3.8–7.4)	28	6,986	4.0 (2.7–5.8)
Quebec§	297	74,369	4.0 (3.6–4.5)	281	73,682	3.8 (3.4–4.3)
Manitoba	118	13,929	8.5 (7.0–10.1)	77	13,866	5.6 (4.4–6.9)
Saskatchewan	90	12,073	7.5 (6.0–9.2)	62	12,032	5.2 (4.0–6.6)
Alberta	288	41,067	7.0 (6.2–7.9)	186	40,888	4.5 (3.9–5.3)
British Columbia	285	40,774	7.0 (6.2–7.8)	156	40,600	3.8 (3.3–4.5)
Territories§	13	1,823	7.1 (3.8–12.2)	12	1,776	6.6 (3.5–11.8)

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age of <20 weeks.
*** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.
§ Numbers of fetal deaths ≥500 g in Prince Edward Island, Quebec and the three territories represent an average of 2002–2004 deaths due to small numbers and concern about residual disclosure.
CI—confidence interval

TABLE G24.3 Rate of fetal death, by singleton and multiple births

Canada (excluding Ontario), 2004*

Plurality	Fetal deaths (crude)**			Fetal deaths ≥500 g***		
	Number of fetal deaths	Number of total births	Deaths (95% CI) per 1,000 total births	Number of fetal deaths	Number of total births	Deaths (95% CI) per 1,000 total births
All	1,231	205,746	6.0 (5.7–6.3)	872	205,111	4.3 (4.0–4.5)
Singletons	1,124	199,613	5.6 (5.3–6.0)	815	199,095	4.1 (3.8–4.4)
Multiples	107	6,133	17.4 (14.3–21.0)	57	6,016	9.5 (7.2–12.3)

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age of <20 weeks.
*** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.
CI—confidence interval

TABLE G24.4 Cause-specific rates of fetal death ≥500 g*

*Canada (excluding Ontario),** 1995–1996 to 2003–2004*

Cause	1995–1996		1997–1998		1999–2000	
	Number of fetal deaths	Deaths per 1,000 total births	Number of fetal deaths	Deaths per 1,000 total births	Number of fetal deaths	Deaths per 1,000 total births
Congenital anomalies	228	0.50	218	0.51	208	0.51
Maternal complications of pregnancy	109	0.24	126	0.30	127	0.31
Complications of placenta/cord/membranes	765	1.66	599	1.40	599	1.47
Intrauterine hypoxia and birth asphyxia	151	0.33	115	0.27	89	0.22
Unspecified	471	1.02	427	1.00	412	1.01
Number of total births	**459,603**		**426,866**		**408,086**	

Cause	2001–2002		2003–2004	
	Number of fetal deaths	Deaths per 1,000 total births	Number of fetal deaths	Deaths per 1,000 total births
Congenital anomalies	181	0.45	177	0.43
Maternal complications of pregnancy	99	0.25	87	0.21
Complications of placenta/cord/membranes	620	1.54	563	1.37
Intrauterine hypoxia and birth asphyxia	86	0.21	65	0.16
Unspecified	440	1.09	398	0.97
Number of total births	**403,667**		**409,974**	

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.
** Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G25.1A Rate of neonatal death (0–27 days)

Canada (excluding Ontario), 1995–2004*

Year	Birth period calculation			Birth cohort calculation		
	Number of neonatal deaths	Number of live births	All neonatal deaths (95% CI) per 1,000 live births**	Number of neonatal deaths ≥500 g	Number of births (cohort)	Rate of neonatal deaths ≥500 g (95% CI) per 1,000 live births***
1995	976	231,747	4.2 (4.0–4.5)	793	231,623	3.4 (3.2–3.7)
1996	857	226,188	3.8 (3.5–4.1)	691	225,987	3.1 (2.8–3.3)
1997	840	215,590	3.9 (3.6–4.2)	655	215,389	3.0 (2.8–3.3)
1998	762	209,789	3.6 (3.4–3.9)	635	209,633	3.0 (2.8–3.3)
1999	712	206,157	3.5 (3.2–3.7)	550	205,982	2.7 (2.5–2.9)
2000	688	200,458	3.4 (3.2–3.7)	514	200,298	2.6 (2.3–2.8)
2001	739	202,033	3.7 (3.4–3.9)	553	201,832	2.7 (2.5–3.0)
2002	757	200,270	3.8 (3.5–4.1)	542	200,057	2.7 (2.5–2.9)
2003	781	204,273	3.8 (3.6–4.1)	503	204,024	2.5 (2.3–2.7)
2004	766	204,515	3.7 (3.5–4.0)	–	–	–

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1995–2003 (cohort calculation) and Unlinked File, 1995–2004 (period calculation).
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Includes deaths for the specified calendar year (period calculation).
*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.
CI—confidence interval

TABLE G25.1B Rate of postneonatal death (28–364 days)

Canada (excluding Ontario), 1995–2004*

Year	Birth period calculation			Birth cohort calculation		
	Number of postneonatal deaths	Number of neonatal survivors	Postneonatal deaths (95% CI) per 1,000 neonatal survivors**	Number of postneonatal deaths ≥500 g	Number of neonatal survivors	Postneonatal deaths ≥500 g (95% CI) per 1,000 neonatal survivors***
1995	475	230,771	2.1 (1.9–2.3)	445	230,830	1.9 (1.8–2.1)
1996	392	225,331	1.7 (1.6–1.9)	358	225,296	1.6 (1.4–1.8)
1997	359	214,750	1.7 (1.5–1.9)	351	214,734	1.6 (1.5–1.8)
1998	382	209,027	1.8 (1.6–2.0)	379	208,998	1.8 (1.6–2.0)
1999	359	205,445	1.7 (1.6–1.9)	354	205,432	1.7 (1.5–1.9)
2000	336	199,770	1.7 (1.5–1.9)	317	199,784	1.6 (1.4–1.8)
2001	286	201,294	1.4 (1.3–1.6)	296	201,279	1.5 (1.3–1.6)
2002	324	199,513	1.6 (1.5–1.8)	299	199,515	1.5 (1.3–1.7)
2003	292	203,492	1.4 (1.3–1.6)	255	203,521	1.3 (1.1–1.4)
2004	273	203,749	1.3 (1.2–1.5)	–	–	–

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1995–2003 (cohort calculation) and Unlinked File, 1995–2004 (period calculation).
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Includes deaths for the specified calendar year (period calculation).
*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.
CI—confidence interval

TABLE G25.1C Rate of infant death (0–364 days)

Canada (excluding Ontario), 1995–2004*

Year	Birth period calculation			Birth cohort calculation		
	Number of infant deaths	Number of live births	All infant deaths (95% CI) per 1,000 live births**	Number of infant deaths ≥500 g	Number of live births	Infant deaths ≥500 g (95% CI) per 1,000 live births***
1995	1,451	231,747	6.3 (5.9–6.6)	1,238	231,623	5.3 (5.1–5.7)
1996	1,249	226,188	5.5 (5.2–5.8)	1,049	225,987	4.6 (4.4–4.9)
1997	1,199	215,590	5.6 (5.3–5.9)	1,006	215,389	4.7 (4.4–5.0)
1998	1,144	209,789	5.5 (5.1–5.8)	1,014	209,633	4.8 (4.5–5.1)
1999	1,071	206,157	5.2 (4.9–5.4)	904	205,982	4.4 (4.1–4.7)
2000	1,024	200,458	5.1 (4.8–5.4)	831	200,298	4.1 (3.9–4.4)
2001	1,025	202,033	5.1 (4.8–5.4)	849	201,832	4.2 (3.9–4.5)
2002	1,081	200,270	5.4 (5.1–5.7)	841	200,057	4.2 (3.9–4.5)
2003	1,073	204,273	5.3 (4.9–5.6)	758	204,024	3.7 (3.5–4.0)
2004	1,039	204,515	5.1 (4.8–5.4)	–	–	–

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1995–2003 (cohort calculation) and Unlinked File, 1995–2004 (period calculation).
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Includes deaths for the specified calendar year (period calculation).
*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.
CI—confidence interval

TABLE G25.2 Rate of neonatal death (0–27 days), by province/territory

Canada (excluding Ontario), 2003 and 2004*

Province/Territory	Birth period calculation			Birth cohort calculation		
	Number of neonatal deaths	Number of live births	All neonatal deaths (95% CI) per 1,000 live births**	Number of neonatal deaths ≥500 g	Number of births (cohort)	Neonatal deaths ≥500 g (95% CI) per 1,000 live births***
Newfoundland and Labrador	16	4,488	3.6 (2.0–5.8)	13	4,625	2.8 (1.5–4.8)
Prince Edward Island	5	1,390	3.6 (1.2–8.4)	†	1,413	† (0.0–3.9)
Nova Scotia	28	8,734	3.2 (2.1–4.6)	22	8,637	2.5 (1.6–3.9)
New Brunswick	17	6,959	2.4 (1.4–3.9)	16	7,115	2.2 (1.3–3.6)
Quebec	275	74,072	3.7 (3.3–4.2)	151	73,832	2.0 (1.7–2.4)
Manitoba	68	13,811	4.9 (3.8–6.2)	49	13,910	3.5 (2.6–4.7)
Saskatchewan	40	11,983	3.3 (2.4–4.5)	38	12,030	3.2 (2.2–4.3)
Alberta	182	40,779	4.5 (3.8–5.2)	124	40,222	3.1 (2.6–3.7)
British Columbia	125	40,489	3.1 (2.6–3.7)	83	40,451	2.1 (1.6–2.5)
Yukon	3	365	8.2 (1.7–23.8)	†	332	† (0.0–11.0)
Northwest Territories	0	698	0.0 (0.0–5.3)	†	697	† (0.0–8.0)
Nunavut	7	747	9.4 (3.8–19.2)	5	758	6.6 (2.1–15.3)
Unknown	–	–	–	†	†	–
CANADA	**766**	**204,515**	**3.7 (3.5–4.0)**	**501–509**	**204,022–204,025**	**2.5 (2.3–2.7)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2003 (cohort calculation) and Unlinked File, 2004 (period calculation).
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Includes deaths for the specified calendar year (period calculation).
*** Includes deaths occurring to births weighing ≥500g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.
† Number/rate suppressed due small size.
CI—confidence interval

TABLE G25.3 Rate of postneonatal death (28–364 days), by province/territory

Canada (excluding Ontario), 2003 and 2004*

Province/Territory	Birth period calculation			Birth cohort calculation		
	Number of postneonatal deaths	Number of neonatal survivors	Postneonatal deaths (95% CI) per 1,000 neonatal survivors**	Number of postneonatal deaths ≥500 g	Number of neonatal survivors	Postneonatal deaths ≥500 g (95% CI) per 1,000 neonatal survivors***
Newfoundland and Labrador	7	4,472	1.6 (0.6–3.2)	9	4,612	2.0 (0.9–3.7)
Prince Edward Island	†	1,385	† (0.0–4.0)	†	1,412	† (0.0–5.1)
Nova Scotia	12	8,706	1.4 (0.7–2.4)	12	8,615	1.4 (0.7–2.4)
New Brunswick	13	6,942	1.9 (1.0–3.2)	9	7,099	1.3 (0.6–2.4)
Quebec	67	73,797	0.9 (0.7–1.2)	54	73,681	0.7 (0.6–1.0)
Manitoba	29	13,743	2.1 (1.4–3.0)	34	13,861	2.5 (1.7–3.4)
Saskatchewan	34	11,943	2.8 (2.0–4.0)	29	11,992	2.4 (1.6–3.5)
Alberta	54	40,597	1.3 (1.0–1.7)	52	40,098	1.3 (1.0–1.7)
British Columbia	50	40,364	1.2 (0.9–1.6)	48	40,368	1.2 (0.9–1.6)
Yukon	†	362	† (0.0–15.3)	†	332	† (0.0–11.0)
Northwest Territories	†	698	† (0.0–5.3)	†	696	† (0.0–8.0)
Nunavut	5	740	6.8 (2.2–15.7)	5	753	6.6 (2.2–15.4)
Unknown	–	–	–	†	†	–
CANADA	**271–277**	**203,749**	**1.3 (1.2–1.5)**	**255**	**203,519–203,522**	**1.3 (1.1–1.4)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2003 (cohort calculation) and Unlinked File, 2004 (period calculation).

* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

** Includes deaths for the specified calendar year (period calculation).

*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.

† Number/rate suppressed due to small cell size.

CI—confidence interval

TABLE G25.4 Rate of infant death (0–364 days), by province/territory

Canada (excluding Ontario), 2003 and 2004*

Province/Territory	Birth period calculation			Birth cohort calculation		
	Number of infant deaths	Number of live births	Infant deaths (95% CI) per 1,000 live births**	Number of infant deaths ≥500 g	Number of live births	Infant deaths ≥500 g (95% CI) per 1,000 live births***
Newfoundland and Labrador	23	4,488	5.1 (3.3–7.7)	22	4,625	4.8 (3.0–7.2)
Prince Edward Island	6	1,390	4.3 (1.6–9.4)	3	1,413	2.1 (0.4–6.2)
Nova Scotia	40	8,734	4.6 (3.3–6.2)	34	8,637	3.9 (2.7–5.5)
New Brunswick	30	6,959	4.3 (2.9–6.1)	25	7,115	3.5 (2.3–5.2)
Quebec	342	74,072	4.6 (4.1–5.1)	205	73,832	2.8 (2.4–3.2)
Manitoba	97	13,811	7.0 (5.7–8.6)	83	13,910	6.0 (4.8–7.4)
Saskatchewan	74	11,983	6.2 (4.9–7.7)	67	12,030	5.6 (4.3–7.1)
Alberta	236	40,779	5.8 (5.1–6.6)	176	40,222	4.4 (3.8–5.1)
British Columbia	175	40,489	4.3 (3.7–5.0)	131	40,451	3.2 (2.7–3.8)
Yukon	4	365	11.0 (3.0–27.8)	0	332	0.0 (0.0–11.0)
Northwest Territories	0	698	0.0 (0.0–5.3)	2	697	2.9 (0.3–10.3)
Nunavut	12	747	16.1 (8.3–27.9)	10	758	13.2 (6.3–24.1)
Unknown	–	–	–	–	2	–
CANADA	**1,039**	**204,515**	**5.1 (4.8–5.4)**	**758**	**204,024**	**3.7 (3.5–4.0)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2003 (cohort calculation) and Unlinked File, 2004 (period calculation).

* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

** Includes deaths for the specified calendar year (period calculation).

*** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.

CI—confidence interval

TABLE G25.5 Causes of infant death

Canada (excluding Ontario), 2004*

Cause	Number of infant deaths	Proportion (%) of deaths among all infant deaths**	Number of neonatal deaths	Proportion (%) of deaths among all neonatal deaths**	Number of postneonatal deaths	Proportion (%) of deaths among all postneonatal deaths**
Congenital anomalies	245	23.6	184	24.0	61	22.3
Asphyxia	107	10.3	102	13.3	5	1.8
Immaturity	331	31.9	307	40.1	24	8.8
Infection	50	4.8	22	2.9	28	10.3
Sudden infant death syndrome (SIDS)	52	5.0	5	0.7	47	17.2
Other unexplained infant death	35	3.4	7	0.9	28	10.3
External causes	29	2.8	5	0.7	24	8.8
Other	190	18.3	134	17.5	56	20.5
TOTAL	**1,039**	**100**	**766**	**100**	**273**	**100**

Source: Statistics Canada. Canadian Vital Statistics System Unlinked File, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Includes deaths for the specified calendar year (period calculation).

TABLE G25.6 Cause-specific rates of infant death

Canada (excluding Ontario), 1999 and 2004*

Cause according to modified ICE classification	1999		2004	
	Number of infant deaths	Rate of infant deaths per 1,000 live births**	Number of infant deaths	Rate of infant deaths per 1,000 live births**
Congenital anomalies	284	1.4	245	1.2
Asphyxia	108	0.5	107	0.5
Immaturity	251	1.2	331	1.6
Infection	72	0.3	50	0.2
Sudden infant death syndrome (SIDS)	120	0.6	52	0.3
Other unexplained infant death	28	0.1	35	0.2
External causes	30	0.1	29	0.1
Other	178	0.9	190	0.9
TOTAL	**1,071**	**5.2**	**1,039**	**5.1**
Live births	**206,157**		**204,515**	

Source: Statistics Canada. Canadian Vital Statistics System Unlinked File, 1999 and 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
** Includes deaths for the specified calendar year (period calculation).
ICE—International Collaborative Effort (on perinatal and infant mortality).

TABLE G25.7 Birth cohort-based infant death rate, by gestational age

Canada (excluding Ontario), 2001–2003 combined*

Gestational age (weeks)	Number of infant deaths	Number of live births	Infant deaths (95% CI) per 1,000 live births
<22	457	467	978.6 (961.0–989.7)
22–23	503	572	879.4 (849.8–904.9)
24–25	331	740	447.3 (411.1–483.9)
26–27	176	1,022	172.2 (149.5–196.8)
28–31	192	4,019	47.8 (41.4-54.8)
32–33	96	5,346	18.0 (14.6–21.9)
34–36	275	34,159	8.1 (7.1–9.1)
37–41	999	552,222	1.8 (1.7–1.9)
≥42	14	6,262	2.2 (1.2–3.7)
Unknown gestational age	17	1,796	9.5 (5.5–15.1)
Unlinked	37	–	–
All gestational ages	**3,097**	**606,605**	**5.1 (4.9–5.3)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2001–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
CI—confidence interval

TABLE G25.8 Birth cohort-based infant death rate, by birth weight

Canada (excluding Ontario), 2001–2003 combined*

Birth weight (grams)	Number of infant deaths	Number of live births	Infant deaths (95% CI) per 1,000 live births
<500	638	681	936.9 (915.9–953.9)
500–749	587	1,043	562.8 (532.1–593.2)
750–999	210	1,107	189.7 (167.0–214.1)
1,000–1,249	107	1,308	81.8 (67.5–98.0)
1,250–1,499	75	1,716	43.7 (34.5–54.5)
1,500–1,999	171	6,628	25.8 (22.1–29.9)
2,000–2,499	229	21,459	10.7 (9.3–12.1)
2,500–3,999	917	491,087	1.9 (1.7–2.0)
≥4,000	95	79,795	1.2 (1.0–1.5)
Unknown birth weight	31	1,781	17.4 (11.9–24.6)
Unlinked	37	–	–
All birth weights	**3,097**	**606,605**	**5.1 (4.9–5.3)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2001–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
CI—confidence interval

TABLE G25.9 Birth cohort-based number of infant deaths, by gestational age and province/territory

Canada (excluding Ontario), 1999–2003 combined*

<table>
<tr><th>Gestational age (weeks)</th><th>NL</th><th>PE</th><th>NS</th><th>NB</th><th>QC</th><th>MB</th><th>SK</th><th>AB</th><th>BC</th><th>YK</th><th>NT</th><th>NU</th></tr>
<tr><td><22</td><td>8</td><td>7</td><td>40</td><td>10</td><td>250</td><td>62</td><td>21</td><td>177</td><td>115</td><td rowspan="4">4</td><td rowspan="4">16</td><td rowspan="4">18</td></tr>
<tr><td>22–23</td><td>11</td><td>6</td><td>39</td><td>23</td><td>275</td><td>70</td><td>49</td><td>195</td><td>118</td></tr>
<tr><td>24–25</td><td>16</td><td>4</td><td>18</td><td>20</td><td>201</td><td>50</td><td>40</td><td>101</td><td>79</td></tr>
<tr><td>26–27</td><td>5</td><td rowspan="3">5</td><td>12</td><td>9</td><td>86</td><td>20</td><td>23</td><td>59</td><td>54</td></tr>
<tr><td>28–31</td><td>10</td><td>15</td><td>18</td><td>94</td><td>29</td><td>28</td><td>79</td><td>56</td><td rowspan="3">3</td><td rowspan="3">5</td><td rowspan="3">11</td></tr>
<tr><td>32–33</td><td>3</td><td>5</td><td>4</td><td>56</td><td>15</td><td>15</td><td>42</td><td>29</td></tr>
<tr><td>34–36</td><td>14</td><td>4</td><td>20</td><td>13</td><td>137</td><td>62</td><td>37</td><td>115</td><td>55</td></tr>
<tr><td>37–41</td><td>42</td><td>6</td><td>63</td><td>46</td><td>527</td><td>189</td><td>152</td><td>428</td><td>307</td><td>3</td><td>6</td><td>28</td></tr>
<tr><td>≥42</td><td>†</td><td>†</td><td>†</td><td>†</td><td rowspan="3">18</td><td>4</td><td>5</td><td rowspan="3">10</td><td>6</td><td>†</td><td>†</td><td>†</td></tr>
<tr><td>Unknown gestational age</td><td>†</td><td>†</td><td>†</td><td>†</td><td>6</td><td>0</td><td>9</td><td>†</td><td>†</td><td>†</td></tr>
<tr><td>Unlinked</td><td>9</td><td>†</td><td>†</td><td>†</td><td>3</td><td>10</td><td>12</td><td>†</td><td>†</td><td>†</td></tr>
<tr><td>All gestational ages</td><td>118–122</td><td>27–33</td><td>212–218</td><td>143–149</td><td>1,644</td><td>510</td><td>380</td><td>1,206</td><td>840</td><td>10–16</td><td>28–34</td><td>48–54</td></tr>
</table>

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1999–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
† Number suppressed due to small cell size.

TABLE G25.10 Birth cohort-based number of live births, by gestational age and province/territory

Canada (excluding Ontario), 1999–2003 combined*

Gestational age (weeks)	NL	PE	NS	NB	QC	MB	SK	AB	BC	YK	NT	NU
<22	9	7	43	10	255	62	22	178	116	0	7	1
22–23	15	7	41	25	299	75	56	218	154	2	8	1
24–25	30	9	44	43	427	92	74	243	236	5	3	9
26–27	32	13	84	53	569	101	118	404	342	6	6	4
28–31	186	40	307	246	2,226	455	405	1,453	1,264	13	25	42
32–33	237	66	405	299	3,062	614	550	1,946	1,650	10	26	54
34–36	1,285	298	2,436	1,902	21,027	4,036	3,074	11,656	10,413	74	217	276
37–41	21,841	6,500	40,448	33,262	334,621	62,753	55,428	173,123	187,050	1,570	3,070	3,017
≥42	162	135	1,096	480	1,815	1,870	1,094	2,539	2,304	91	53	19
Unknown gestational age	123	6	16	0	1,388	177	1	14	219	0	36	67
All gestational ages	**23,920**	**7,081**	**44,920**	**36,320**	**365,689**	**70,235**	**60,822**	**191,774**	**203,748**	**1,771**	**3,451**	**3,490**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1999–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G25.11 Birth cohort-based infant mortality rate, by gestational age and province/territory
Canada (excluding Ontario), 1999–2003 combined*

Gestational age (weeks)	Rate (95% CI) per 1,000 live births					
	NL	PE	NS	NB	QC	MB
<22	888.9 (517.5–997.2)	1,000.0 (590.4–1,000.0)	930.2 (809.4–985.4)	1,000.0 (691.5–1,000.0)	980.4 (954.8–993.6)	1,000.0 (942.2–1,000.0)
22–23	733.3 (449.0–922.1)	857.1 (421.3–996.4)	951.2 (834.7–994.0)	920.0 (739.7–990.2)	919.7 (882.9–947.9)	933.3 (851.2–978.0)
24–25	533.3 (343.3–716.6)	444.4 (137.0–788.0)	409.1 (263.4–567.5)	465.1 (311.8–623.5)	470.7 (422.6–519.3)	543.5 (436.3–647.8)
26–27	156.3 (52.8–327.9)	0.0 (0.0–247.1)	142.9 (76.1–236.2)	169.8 (80.7–298.0)	151.1 (122.7–183.3)	198.0 (125.4–289.1)
28–31	53.8 (26.1–96.6)	75.0 (15.7–203.9)	48.9 (27.6–79.3)	73.2 (43.9–113.2)	42.2 (34.3–51.4)	63.7 (43.1–90.3)
32–33	12.7 (2.6–36.5)	30.3 (3.7–105.2)	12.3 (4.0–28.6)	13.4 (3.7–33.9)	18.3 (13.8–23.7)	24.4 (13.7–40.0)
34–36	10.9 (6.0–18.2)	13.4 (3.7–34.0)	8.2 (5.0–12.7)	6.8 (3.6–11.7)	6.5 (5.5–7.7)	15.4 (11.8–19.7)
37–41	1.9 (1.4–2.6)	0.9 (0.3–2.0)	1.6 (1.2–2.0)	1.4 (1.0–1.8)	1.6 (1.4–1.7)	3.0 (2.6–3.5)
≥42	6.2 (0.2–33.9)	0.0 (0.0–27.0)	0.9 (0.0–5.1)	4.2 (0.5–15.0)	0.6 (0.0–3.1)	2.1 (0.6–5.5)
Unknown gestational age	0.0 (0.0–29.5)	0.0 (0.0–459.3)	0.0 (0.0–205.9)	– (–)	6.5 (3.0–12.3)	33.9 (12.5–72.3)
All gestational ages	**5.0 (4.1–5.9)**	**4.5 (3.1–6.4)**	**4.7 (4.1–5.4)**	**4.0 (3.4–4.7)**	**4.5 (4.3–4.7)**	**7.3 (6.6–7.9)**

Gestational age (weeks)	Rate (95% CI) per 1,000 live births					
	SK	AB	BC	YK	NT	NU
<22	954.5 (771.6–998.8)	994.4 (969.1–999.9)	991.4 (952.9–999.8)	– (–)	857.1 (421.3–996.4)	1,000.0 (25.0–1,000.0)
22–23	875.0 (759.3–948.2)	894.5 (845.9–931.9)	766.2 (691.4–830.6)	1,000.0 (158.1–1,000.0)	875.0 (473.5–996.8)	1,000.0 (25.0–1,000.0)
24–25	540.5 (420.7–657.1)	415.6 (353.0–480.4)	334.7 (274.8–398.9)	400.0 (52.7–853.4)	666.7 (94.3–991.6)	333.3 (74.9–700.7)
26–27	194.9 (127.8–278.0)	146.0 (113.1–184.3)	157.9 (120.9–200.9)	0.0 (0.0–459.3)	166.7 (4.2–641.2)	1,000.0 (397.6–1,000.0)
28–31	69.1 (46.4–98.4)	54.4 (43.3–67.3)	44.3 (33.6–57.1)	153.8 (19.2–454.5)	80.0 (9.8–260.3)	23.8 (0.6–125.7)
32–33	27.3 (15.3–44.6)	21.6 (15.6–29.1)	17.6 (11.8–25.1)	0.0 (0.0–308.5)	38.5 (1.0–196.4)	74.1 (20.6–178.9)
34–36	12.0 (8.5–16.6)	9.9 (8.2–11.8)	5.3 (4.0–6.9)	13.5 (0.3–73.0)	9.2 (1.1–32.9)	21.7 (8.0–46.7)
37–41	2.7 (2.3–3.2)	2.5 (2.2–2.7)	1.6 (1.5–1.8)	1.9 (0.4–5.6)	2.0 (0.7–4.2)	9.3 (6.2–13.4)
≥42	4.6 (1.5–10.6)	2.4 (0.9–5.1)	2.6 (1.0–5.7)	0.0 (0.0–39.7)	0.0 (0.0–67.2)	0.0 (0.0–176.5)
Unknown gestational age	0.0 (0.0–975.0)	214.3 (46.6–508.0)	41.1 (19.0–76.6)	– (–)	27.8 (0.7–145.3)	0.0 (0.0–53.6)
All gestational ages	**6.2 (5.6–6.9)**	**6.3 (5.9–6.7)**	**4.1 (3.8–4.4)**	**5.6 (2.7–10.4)**	**9.6 (6.6–13.4)**	**14.3 (10.7–18.8)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1999–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
CI—confidence interval

TABLE G25.12 Birth cohort-based number of infant deaths, by birth weight and province/territory
Canada (excluding Ontario), 1999–2003 combined*

Birth weight (grams)	NL	PE	NS	NB	QC	MB	SK	AB	BC	YK	NT	NU
<500	14	11	58	21	355	88	32	243	154	2	9	1
500–749	17	6	39	30	343	85	72	213	140	1	5	1
750–999	7	0	11	14	109	29	29	85	51	1	1	3
1,000–1,249	7	1	5	10	57	16	14	37	36	0	1	4
1,250–1,499	2	1	5	2	36	15	5	25	24	2	1	2
1,500–1,999	8	3	10	10	88	30	22	74	48	0	1	3
2,000–2,499	6	4	22	10	106	35	32	99	54	0	1	5
2,500–3,999	39	6	52	44	484	178	144	388	261	4	7	22
≥4,000	6	0	9	4	46	27	20	38	40	0	2	6
Unknown birth weight	4	0	2	0	12	4	0	3	20	0	0	1
Unlinked	9	0	0	0	8	3	10	1	12	0	5	2
All birth weights	**119**	**32**	**213**	**145**	**1,644**	**510**	**380**	**1,206**	**840**	**10**	**33**	**50**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1999–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G25.13 Birth cohort-based number of live births, by birth weight and province/territory
Canada (excluding Ontario), 1999–2003 combined*

Birth weight (grams)	NL	PE	NS	NB	QC	MB	SK	AB	BC	YK	NT	NU
<500	17	11	60	22	370	93	37	251	170	4	9	2
500–749	35	10	72	55	600	130	122	374	288	2	6	3
750–999	40	10	84	68	651	120	98	415	368	6	2	10
1,000–1,249	68	22	90	90	717	134	134	482	394	5	13	12
1,250–1,499	65	14	141	107	1,012	196	176	596	527	4	8	11
1,500–1,999	281	73	496	376	3,959	760	645	2,337	2,023	10	31	66
2,000–2,499	758	187	1,545	1,184	13,178	2,280	1,987	7,411	6,724	49	111	160
2,500–3,999	18,518	5,418	35,436	28,595	303,498	54,912	47,945	155,758	164,184	1,366	2,596	2,796
≥4,000	4,074	1,323	6,974	5,820	40,110	11,599	9,670	24,144	28,839	325	662	415
Unknown birth weight	64	13	22	3	1,594	11	8	6	231	0	13	15
All birth weights	**23,920**	**7,081**	**44,920**	**36,320**	**365,689**	**70,235**	**60,822**	**191,774**	**203,748**	**1,771**	**3,451**	**3,490**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1999–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G25.14 Birth cohort-based infant mortality rate, by birth weight and province/territory
Canada (excluding Ontario), 1999–2003 combined*

Birth weight (grams)	Rate (95% CI) per 1,000 live births					
	NL	PE	NS	NB	QC	MB
<500	823.5 (565.7–962.0)	1,000.0 (715.1–1,000.0)	966.7 (884.7–995.9)	954.5 (771.6–998.8)	959.5 (934.0–977.1)	946.2 (879.0–982.3)
500–749	485.7 (313.8–660.1)	600.0 (262.4–878.4)	541.7 (420.0–659.8)	545.5 (405.5–680.3)	571.7 (531.0–611.7)	653.8 (565.4–735.1)
750–999	175.0 (73.4–327.8)	0.0 (0.0–308.5)	131.0 (67.2–222.2)	205.9 (117.4–321.2)	167.4 (139.5–198.4)	241.7 (168.2–328.3)
1,000–1,249	102.9 (42.4–200.7)	45.5 (1.2–228.4)	55.6 (18.3–124.9)	111.1 (54.6–194.9)	79.5 (60.8–101.8)	119.4 (69.8–186.7)
1,250–1,499	30.8 (3.7–106.8)	71.4 (1.8–338.7)	35.5 (11.6–80.8)	18.7 (2.3–65.9)	35.6 (25.0–48.9)	76.5 (43.5–123.1)
1,500–1,999	28.5 (12.4–55.3)	41.1 (8.6–115.4)	20.2 (9.7–36.8)	26.6 (12.8–48.4)	22.2 (17.9–27.3)	39.5 (26.8–55.9)
2,000–2,499	7.9 (2.9–17.1)	21.4 (5.9–53.9)	14.2 (8.9–21.5)	8.4 (4.1–15.5)	8.0 (6.6–9.7)	15.4 (10.7–21.3)
2,500–3,999	2.1 (1.5–2.9)	1.1 (0.4–2.4)	1.5 (1.1–1.9)	1.5 (1.1–2.1)	1.6 (1.5–1.7)	3.2 (2.8–3.8)
≥4,000	1.5 (0.5–3.2)	0.0 (0.0–2.8)	1.3 (0.6–2.4)	0.7 (0.2–1.8)	1.1 (0.8–1.5)	2.3 (1.5–3.4)
Unknown birth weight	62.5 (17.3–152.4)	0.0 (0.0–247.1)	90.9 (11.2–291.6)	0.0 (0.0–707.6)	7.5 (3.9–13.1)	363.6 (109.3–692.1)
All birth weights	**5.0 (4.1–5.9)**	**4.5 (3.1–6.4)**	**4.7 (4.1–5.4)**	**4.0 (3.4–4.7)**	**4.5 (4.3–4.7)**	**7.3 (6.6–7.9)**

Birth weight (grams)	Rate (95% CI) per 1,000 live births					
	SK	AB	BC	YK	NT	NU
<500	864.9 (712.3–954.6)	968.1 (938.2–986.1)	905.9 (851.7–945.2)	500.0 (67.6–945.2)	1,000.0 (663.7–1,000.0)	500.0 (12.6–987.4)
500–749	590.2 (497.5–678.3)	569.5 (517.6–620.3)	486.1 (427.1–545.5)	500.0 (12.6–545.5)	833.3 (358.8–995.8)	333.3 (8.4–905.7)
750–999	295.9 (207.9–396.6)	204.8 (167.0–246.9)	138.6 (105.0–178.2)	166.7 (4.2–178.2)	500.0 (12.6–987.4)	300.0 (66.7–652.5)
1,000–1,249	104.5 (58.3–169.1)	76.8 (54.6–104.3)	91.4 (64.8–124.2)	0.0 (0.0–124.2)	76.9 (1.9–360.3)	333.3 (99.2–651.1)
1,250–1,499	28.4 (9.3–65.0)	41.9 (27.3–61.3)	45.5 (29.4–67.0)	500.0 (67.6–67.0)	125.0 (3.2–526.5)	181.8 (22.8–517.8)
1,500–1,999	34.1 (21.5–51.2)	31.7 (24.9–39.6)	23.7 (17.5–31.3)	0.0 (0.0–31.3)	32.3 (0.8–167.0)	45.5 (9.5–127.1)
2,000–2,499	16.1 (11.0–22.7)	13.4 (10.9–16.2)	8.0 (6.0–10.5)	0.0 (0.0–10.5)	9.0 (0.2–49.2)	31.3 (10.2–71.4)
2,500–3,999	3.0 (2.5–3.5)	2.5 (2.2–2.8)	1.6 (1.4–1.8)	2.9 (0.8–1.8)	2.7 (1.1–5.5)	7.9 (4.9–11.9)
≥4,000	2.1 (1.3–3.2)	1.6 (1.1–2.2)	1.4 (1.0–1.9)	0.0 (0.0–1.9)	3.0 (0.4–10.9)	14.5 (5.3–31.2)
Unknown birth weight	0.0 (0.0–369.4)	500.0 (118.1–881.9)	86.6 (53.7–130.5)	– (–)	0.0 (0.0–247.1)	66.7 (1.7–319.5)
All birth weights	**6.2 (5.6–6.9)**	**6.3 (5.9–6.7)**	**4.1 (3.8–4.4)**	**5.6 (2.7–130.5)**	**9.6 (6.6–13.4)**	**14.3 (10.7–18.8)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1999–2003.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
CI—confidence interval

TABLE G26.1 Rates of intubation, neonatal sepsis and average length of stay (LOS), by birth weight category

Canada, 1995–1996 to 2004–2005

Fiscal year	Birth weight <1,000 g			Birth weight 1,000–2,499 g			Birth weight ≥2,500 g		
	Intubations per 100 hospital live births	Neonatal sepsis per 100 hospital live births	Mean LOS in days (SD)	Intubations per 100 hospital live births	Neonatal sepsis per 100 hospital live births	Mean LOS in days (SD)	Intubations per 100 hospital live births	Neonatal sepsis per 100 hospital live births	Mean LOS in days (SD)
1995–1996	41.4	26.2	25.9 (30.1)	7.9	10.7	10.2 (10.8)	0.5	1.4	2.6 (1.7)
1996–1997	41.9	24.9	26.2 (29.9)	9.0	11.2	10.0 (10.6)	0.5	1.5	2.5 (1.6)
1997–1998	45.5	27.9	26.8 (29.8)	9.8	12.2	10.4 (10.8)	0.6	1.5	2.5 (1.6)
1998–1999	43.8	26.3	25.5 (29.4)	10.8	12.0	10.1 (10.6)	0.7	1.5	2.4 (1.6)
1999–2000	47.1	24.8	25.5 (29.5)	11.2	11.2	9.9 (10.4)	0.8	1.5	2.4 (1.6)
2000–2001	51.2	28.0	26.9 (29.9)	13.4	12.5	10.2 (10.4)	0.9	1.6	2.4 (1.5)
2001–2002	36.8	29.4	25.2 (29.3)	12.0	13.1	10.0 (10.5)	1.1	1.8	2.4 (1.5)
2002–2003	51.2	21.9	26.2 (29.4)	13.2	8.4	9.6 (10.1)	1.1	1.1	2.4 (1.5)
2003–2004	51.6	21.7	24.0 (28.7)	14.5	7.0	9.8 (10.3)	1.3	0.8	2.3 (1.5)
2004–2005	55.0	22.4	26.5 (29.3)	13.1	4.8	9.1 (9.9)	1.1	0.6	2.3 (1.5)

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.
SD—standard deviation

TABLE G26.1A Numbers of intubation and neonatal sepsis, by birth weight category

Canada, 1995–1996 to 2004–2005

Fiscal year	Birth weight <1,000 g			Birth weight 1,000–2,499 g			Birth weight ≥2,500 g		
	Number of hospital live births	Number intubated	Number with neonatal sepsis	Number of hospital live births	Number intubated	Number with neonatal sepsis	Number of hospital live births	Number intubated	Number with neonatal sepsis
1995–1996	1,617	669	423	19,261	1,525	2,058	355,452	1,758	4,891
1996–1997	1,680	703	418	19,357	1,738	2,161	341,108	1,819	5,225
1997–1998	1,607	731	448	18,548	1,825	2,263	328,507	2,066	5,002
1998–1999	1,613	707	424	19,253	2,071	2,310	320,043	2,253	4,862
1999–2000	1,685	794	417	19,833	2,214	2,222	316,780	2,367	4,823
2000–2001	1,627	833	456	19,947	2,667	2,496	305,702	2,691	4,982
2001–2002	1,688	622	497	20,229	2,433	2,644	310,741	3,373	5,541
2002–2003	1,826	934	399	21,550	2,833	1,817	305,906	3,502	3,294
2003–2004	1,929	996	419	22,791	3,310	1,597	313,658	4,114	2,564
2004–2005	1,856	1,020	416	25,236	3,312	1,219	310,551	3,448	1,996

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 1995–1996 to 2004–2005.

TABLE G26.2 Rates of intubation, by birth weight category and province/territory

Canada, 2002–2003 to 2004–2005 combined

Province/Territory	Intubations (95% CI) per 100 hospital live births		
	Birth weight <1,000 g	Birth weight 1,000–2,499 g	Birth weight ≥2,500 g
Newfoundland and Labrador	54.3 (41.9–66.3)	12.0 (9.7–14.5)	0.3 (0.2–0.4)
Prince Edward Island	58.8 (32.9–81.6)	13.5 (9.3–18.6)	0.3 (0.2–0.6)
Nova Scotia	66.9 (57.9–75.1)	13.6 (11.9–15.5)	1.5 (1.4–1.7)
New Brunswick	51.6 (40.9–62.3)	9.4 (7.8–11.9)	0.6 (0.5–0.7)
Quebec	45.6 (42.5–48.6)	8.0 (7.6–8.5)	0.4 (0.4–0.4)
Ontario	52.7 (50.7–54.6)	16.5 (16.1–17.0)	1.6 (1.5–1.6)
Manitoba	21.4 (16.1–27.4)	11.2 (10.1–12.4)	0.4 (0.3–0.4)
Saskatchewan	61.8 (54.0–69.1)	17.6 (16.0–19.3)	1.1 (1.0–1.2)
Alberta	60.8 (57.2–64.4)	17.6 (16.8–18.4)	2.4 (2.3–2.5)
British Columbia	62.5 (58.5–66.4)	10.5 (9.8–11.2)	0.7 (0.6–0.7)
Yukon	55.6 (21.2–86.3)	† (2.3–19.6)	† (0.1–1.0)
Northwest Territories	† (2.5–55.6)	9.9 (5.2–16.7)	† (0.0–0.4)
Nunavut	† (3.2–65.1)	7.8 (3.8–13.8)	† (0.0–0.7)
Not available	39.7 (27.6–52.8)	9.8 (7.4–12.7)	0.8 (0.6–1.1)
CANADA	**52.6 (51.3–53.9)**	**13.6 (13.3–13.8)**	**1.2 (1.2–1.2)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
† Rate suppressed due to small numbers.
CI—confidence interval

TABLE G26.3 Rates of neonatal sepsis, by birth weight category and province/territory

Canada, 2002–2003 to 2004–2005 combined

Province/Territory	Neonatal sepsis (95% CI) per 100 hospital live births		
	Birth weight <1,000 g	Birth weight 1,000–2,499 g	Birth weight ≥2,500 g
Newfoundland and Labrador	24.3 (14.8–36.0)	5.9 (4.3–7.9)	0.3 (0.2–0.4)
Prince Edward Island	23.5 (6.8–49.9)	4.9 (2.5–8.7)	0.7 (0.4–1.0)
Nova Scotia	29.6 (18.4–34.4)	5.0 (3.9–6.2)	0.7 (0.6–0.8)
New Brunswick	33.0 (23.5–43.6)	8.1 (6.7–9.7)	1.2 (1.1–1.4)
Quebec	20.3 (17.9–22.8)	6.5 (6.2–6.9)	0.9 (0.8–0.9)
Ontario	23.9 (22.2–25.6)	9.1 (8.8–9.5)	1.2 (1.2–1.2)
Manitoba	29.5 (23.6–36.0)	3.7 (3.0–4.4)	0.2 (0.2–0.3)
Saskatchewan	12.9 (8.3–18.9)	3.3 (2.6–4.2)	0.5 (0.4–0.5)
Alberta	14.0 (11.5–16.7)	2.6 (2.3–3.0)	0.3 (0.3–0.3)
British Columbia	24.2 (20.8–27.8)	4.7 (4.3–5.2)	0.5 (0.5–0.6)
Yukon	† (2.8–60.0)	0.0 (0.0–7.3)	† (0.1–1.0)
Northwest Territories	† (0.3–44.5)	† (0.5–7.1)	0.5 (0.2–0.9)
Nunavut	† (0.3–52.7)	7.0 (3.2–12.8)	† (0.0–0.6)
Not available	20.6 (11.5–32.7)	6.0 (4.1–8.4)	0.6 (0.4–0.8)
CANADA	**22.0 (20.9–23.1)**	**6.7 (6.5–6.8)**	**0.8 (0.8–0.9)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
† Rate suppressed due to small numbers.
CI—confidence interval

TABLE G26.4 Average length of stay (LOS), by birth weight category and province/territory

Canada, 2002–2003 to 2004–2005 combined

Province/Territory	Mean LOS in days (SD)		
	Birth weight <1,000 g	Birth weight 1,000–2,499 g	Birth weight ≥2,500 g
Newfoundland and Labrador	38.2 (32.7)	13.5 (12.6)	2.9 (1.6)
Prince Edward Island	39.3 (31.0)	15.2 (11.0)	3.4 (1.7)
Nova Scotia	45.0 (30.8)	13.7 (11.9)	2.7 (1.7)
New Brunswick	39.1 (28.7)	13.6 (11.7)	2.8 (1.8)
Quebec	26.3 (30.1)	9.6 (0.5)	2.7 (1.5)
Ontario	23.2 (28.0)	8.6 (9.1)	2.2 (1.4)
Manitoba	26.6 (31.5)	11.7 (11.3)	2.4 (1.5)
Saskatchewan	35.3 (32.9)	11.7 (11.3)	2.5 (1.7)
Alberta	23.2 (27.1)	8.7 (9.2)	1.9 (1.3)
British Columbia	26.7 (29.4)	9.4 (9.4)	2.3 (1.6)
Yukon	29.4 (34.3)	8.3 (9.0)	2.9 (1.5)
Northwest Territories	7.8 (13.4)	6.7 (8.2)	2.7 (1.5)
Nunavut	20.4 (31.2)	8.8 (9.9)	2.0 (1.5)
Not available	13.5 (22.2)	9.4 (10.8)	2.0 (1.6)
CANADA	**25.5 (29.1)**	**9.4 (9.9)**	**2.3 (1.5)**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
SD—standard deviation

TABLE G26.5 Numbers of intubation and neonatal sepsis, by birth weight category and province/territory

Canada, 2002–2003 to 2004–2005 combined

Province/Territory	Birth weight <1,000 g			Birth weight 1,000–2,499 g			Birth weight ≥2,500 g		
	Number of hospital live births	Number intubated	Number with neonatal sepsis	Number of hospital live births	Number intubated	Number with neonatal sepsis	Number of hospital live births	Number intubated	Number with neonatal sepsis
Newfoundland and Labrador	70	38	17	744	89	44	12,771	32	32
Prince Edward Island	17	10	†	223	30	11	3,914	13	26
Nova Scotia	124	83	32	1,446	197	72	24,056	370	164
New Brunswick	91	47	30	1,326	124	107	19,159	107	236
Quebec	1,036	472	210	15,060	1,208	985	200,294	825	1,762
Ontario	2,486	1,309	594	28,335	4,681	2,586	369,884	5,777	4,428
Manitoba	220	47	65	2,910	326	107	38,050	138	87
Saskatchewan	170	105	22	2,121	373	71	32,702	368	148
Alberta	715	435	100	8,605	1,513	228	110,024	2,652	343
British Columbia	592	370	143	7,988	837	379	108,641	720	576
Yukon	9	5	†	49	†	†	917	†	†
Northwest Territories	10	†	†	121	12	†	1,849	†	9
Nunavut	8	†	†	129	10	9	1,280	†	†
Not available	63	25	13	520	51	31	6,574	54	38
CANADA	**5,611**	**2,946–2,954**	**1,226–1,246**	**69,577**	**9,451–9,455**	**4,630–4,634**	**930,115**	**11,056–11,068**	**7,849–7,857**

Source: Canadian Institute for Health Information. Hospital Morbidity Database, 2002–2003 to 2004–2005.
† Number suppressed due to small cell size <5.

TABLE G27.1 Rate of multiple birth

Canada (excluding Ontario), 1995–2004*

Year	Number of multiple births	Total births (live births and stillbirths)	Multiple births per 100 total births
1995	5,230	233,127	2.2
1996	5,235	227,408	2.3
1997	5,304	216,853	2.4
1998	5,423	210,935	2.6
1999	5,448	207,387	2.6
2000	5,384	201,633	2.7
2001	5,639	203,231	2.8
2002	5,626	201,461	2.8
2003	6,096	205,470	3.0
2004	6,133	205,746	3.0

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*

TABLE G27.2 Rate of multiple birth, by province/territory

Canada (excluding Ontario), 2004*

Province/Territory	Number of multiple births	Total births (live births and stillbirths)	Multiple births (95% CI) per 100 total births
Newfoundland and Labrador	120	4,508	2.7 (2.2–3.2)
Prince Edward Island	38	1,395	2.7 (1.9–3.7)
Nova Scotia	300	8,811	3.4 (3.0–3.8)
New Brunswick	220	6,997	3.1 (2.7–3.6)
Quebec	2,110	74,369	2.8 (2.7–3.0)
Manitoba	392	13,929	2.8 (2.5–3.1)
Saskatchewan	291	12,073	2.4 (2.1–2.7)
Alberta	1,395	41,067	3.4 (3.2–3.6)
British Columbia	1,216	40,774	3.0 (2.8–3.2)
Yukon	15	367	4.1 (2.3–6.7)
Northwest Territories	28	704	4.0 (2.7–5.7)
Nunavut	8	752	1.1 (0.5–2.1)
CANADA	**6,133**	**205,746**	**3.0 (2.9–3.1)**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data for Ontario are excluded because of data quality concerns; they are presented in *Appendix H.*
CI—confidence interval

TABLE G28 Rate of congenital anomalies (CAs)

Canada, 1995–2004*

Year	Number of cases	Total births	Cases per 10,000 total births
1995*	16,666	368,100	452.8
1996	17,838	366,811	486.3
1997	17,736	351,139	505.1
1998	17,212	343,823	500.6
1999	16,905	338,407	499.5
2000	16,556	330,398	501.1
2001	17,610	336,835	522.8
2002	16,616	331,527	501.2
2003	16,768	338,417	495.5
2004	16,298	339,662	479.8

Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System (CCASS), 1995–2004.
* Nova Scotia data were not available to CCASS before 1996.

TABLE G28.1 Rate of Down syndrome (DS)

Canada, 1995–2004*

Year	Number of DS cases	Total births	DS cases per 10,000 total births
1995*	493	368,100	13.4
1996	450	366,811	12.3
1997	478	351,139	13.6
1998	490	343,823	14.3
1999	498	338,407	14.7
2000	515	330,398	15.6
2001	462	336,835	13.7
2002	484	331,527	14.6
2003	524	338,417	15.5
2004	460	339,662	13.5

Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System (CCASS), 1995–2004.
* Nova Scotia data were not available to CCASS before 1996.

TABLE G28.2 Rate of Down syndrome (DS), by province/territory

Canada, 2001–2004 combined

Province/Territory	Number of DS cases	Total births	DS cases (95% CI) per 10,000 total births
Newfoundland and Labrador	20	18,148	11.0 (6.7–17.0)
Prince Edward Island	12	5,528	21.7 (11.2–37.9)
Nova Scotia	58	34,949	16.6 (12.6–21.5)
New Brunswick	36	28,035	12.8 (9.0–17.8)
Quebec	300	287,409	10.4 (9.3–11.7)
Ontario	801	536,754	14.9 (13.9–16.0)
Manitoba	78	54,869	14.2 (11.2–17.7)
Saskatchewan	66	47,282	14.0 (10.8–17.8)
Alberta	224	161,951	13.8 (12.1–15.8)
British Columbia	317	157,801	20.1 (17.9–22.4)
Yukon	†	1,826	† (0.0–30.5)
Northwest Territories	†	2,611	† (0.0–27.7)
Nunavut	†	1,362	† (0.0–40.9)
Unknown	14	7,916	17.7 (9.7–29.7)
CANADA	**1,926–1,938**	**1,346,441**	**14.3 (13.7–15.0)**

Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System, 2001–2004.
† Number/rate suppressed due to small cell size <5.
CI—confidence interval

TABLE G28.3 Rate of neural tube defects (NTDs), spina bifida (SB), and anencephaly and similar anomalies*

*Canada,** 1995–2004*

Year	Total births	Number of NTD cases	NTD cases per 10,000 total births	Number of SB cases	SB cases per 10,000 total births	Number of cases of anencephaly and similar anomalies*	Cases per 10,000 total births
1995**	368,100	340	9.2	238	6.5	65	1.8
1996	366,811	278	7.6	200	5.5	42	1.1
1997	351,139	267	7.6	188	5.4	54	1.5
1998	343,823	196	5.7	144	4.2	31	0.9
1999	338,407	203	6.0	143	4.2	31	0.9
2000	330,398	176	5.3	115	3.5	38	1.2
2001	336,835	171	5.1	109	3.2	39	1.2
2002	331,527	152	4.6	105	3.2	29	0.9
2003	338,417	160	4.7	108	3.2	33	1.0
2004	339,662	136	4.0	90	2.6	36	1.1

Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System (CCASS), 1995–2004.
* Similar anomalies include craniorachischisis, iniencephaly, encephalocele and microcephaly.
** Nova Scotia data were not available to CCASS before 1996.

TABLE G28.4 Rate of neural tube defects (NTDs), spina bifida (SB), and anencephaly and similar anomalies,* by province/territory

Canada, 2001–2004 combined

Province/Territory	Total births	Number of NTD cases	NTD cases (95% CI) per 10,000 total births
Newfoundland and Labrador	18,148	7	3.9 (1.5–7.9)
Prince Edward Island	5,528	†	† (0.0–10.1)
Nova Scotia	34,949	20	5.7 (3.5–8.8)
New Brunswick	28,035	10	3.6 (1.7–6.6)
Quebec	287,409	101	3.5 (2.9–4.3)
Ontario	536,754	230	4.3 (3.7–4.9)
Manitoba	54,869	35	6.4 (4.4–8.9)
Saskatchewan	47,282	24	5.1 (3.3–7.6)
Alberta	161,951	59	3.6 (2.8–4.7)
British Columbia	157,801	122	7.7 (6.4–9.2)
Yukon	1,826	†	† (0.0–30.5)
Northwest Territories	2,611	†	† (0.0–21.3)
Nunavut	1,362	0	0.0 (0.0–26.9)
Not available	7,916	8	10.1 (4.4–19.9)
CANADA	**1,346,441**	**616–628**	**4.6 (4.2–5.0)**

Province/Territory	Number of SB cases	SB cases (95% CI) per 10,000 total births	Number of cases of anencephaly and similar anomalies*	Cases of anencephaly and similar anomalies* (95% CI) per 10,000 total births
Newfoundland and Labrador	†	† (0.6–5.6)	†	† (0.0–4.8)
Prince Edward Island	†	† (0.0–10.1)	0	0.0 (0.0–6.6)
Nova Scotia	10	2.9 (1.4–5.3)	9	2.6 (1.2–4.9)
New Brunswick	9	3.2 (1.5–6.1)	†	† (0.0–2.0)
Quebec	79	2.7 (2.2–3.4)	11	0.4 (0.2–0.7)
Ontario	153	2.9 (2.4–3.3)	45	0.8 (0.6–1.1)
Manitoba	19	3.5 (2.1–5.4)	13	2.4 (1.3–4.1)
Saskatchewan	18	3.8 (2.3–6.0)	†	† (0.0–2.2)
Alberta	31	1.9 (1.3–2.7)	16	1.0 (0.6–1.6)
British Columbia	79	5.0 (4.0–6.2)	35	2.2 (1.5–3.1)
Yukon	†	† (0.0–30.5)	0	0.0 (0.0–20.1)
Northwest Territories	†	† (0.0–21.3)	0	0.0 (0.0–14.0)
Nunavut	0	0.0 (0.0–26.9)	0	0.0 (0.0–26.9)
Not available	7	8.8 (3.5–18.2)	0	0.0 (0.0–4.6)
CANADA	**405–421**	**3.1 (2.8–3.4)**	**129–141**	**1.0 (0.9–1.2)**

Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System, 2001–2004.
* Similar anomalies include craniorachischisis, iniencephaly, encephalocele and microcephaly.
† Number/rate suppressed due to small cell size <5.
CI—confidence interval

TABLE G28.5 Rate of cleft palate (CP) and cleft lip with or without cleft palate (CL/P)

Canada, 1995–2004*

Year	Total births	Number of CP cases	CP cases per 10,000 total births	Number of CL/P cases	CL/P cases per 10,000 total births
1995*	368,100	230	6.2	411	11.2
1996	366,811	280	7.6	411	11.2
1997	351,139	282	8.0	374	10.7
1998	343,823	251	7.3	370	10.8
1999	338,407	278	8.2	376	11.1
2000	330,398	229	6.9	359	10.9
2001	336,835	232	6.9	324	9.6
2002	331,527	245	7.4	324	9.8
2003	338,417	238	7.0	294	8.7
2004	339,662	221	6.5	328	9.7

Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System (CCASS), 1995–2004.
* Nova Scotia data were not available to CCASS before 1996.

TABLE G28.6 Rate of cleft palate (CP) and cleft lip with or without cleft palate (CL/P), by province/territory

Canada, 2001–2004 combined

Province/Territory	Total births	Number of CP cases	CP cases (95% CI) per 10,000 total births	Number of CL/P cases	CL/P cases (95% CI) per 10,000 total births
Newfoundland and Labrador	18,148	10	5.5 (2.6–10.1)	20	11.0 (6.7–17.0)
Prince Edward Island	5,528	5	9.0 (2.9–21.1)	2	3.6 (0.4–13.1)
Nova Scotia	34,949	25	7.2 (4.6–10.6)	38	10.9 (7.7–14.9)
New Brunswick	28,035	12	4.3 (2.2–7.5)	20	7.1 (4.4–11.0)
Quebec	287,409	191	6.6 (5.7–7.7)	187	6.5 (5.6–7.5)
Ontario	536,754	375	7.0 (6.3–7.7)	450	8.4 (7.6–9.2)
Manitoba	54,869	41	7.5 (5.4–10.1)	71	12.9 (10.1–16.3)
Saskatchewan	47,282	49	10.4 (7.7–13.7)	64	13.5 (10.4–17.3)
Alberta	161,951	114	7.0 (5.8–8.5)	175	10.8 (9.3–12.5)
British Columbia	157,801	112	7.1 (5.8–8.5)	225	14.3 (12.5–16.2)
Yukon	1,826	0	0.0 (0.0–20.1)	1	5.5 (0.1–30.5)
Northwest Territories	2,611	0	0.0 (0.0–14.0)	2	7.7 (0.9–27.7)
Nunavut	1,362	1	7.3 (0.1–40.9)	4	29.4 (7.9–75.2)
Not available	7,916	1	1.3 (0.0–7.0)	11	13.9 (6.9–24.9)
CANADA	**1,346,441**	**936**	**7.0 (6.5–7.4)**	**1,270**	**9.4 (8.9–10.0)**

Source: Public Health Agency of Canada. Canadian Congenital Anomalies Surveillance System, 2001–2004.

TABLE G29.1 Rate of neonatal hospital readmission after discharge following birth

Canada (excluding Quebec and Manitoba), 1995–1996 to 2004–2005*

Fiscal year	Number of readmissions of newborns (≤28 days)	Number of hospital live births	Readmissions per 100 hospital live births**
1995–1996	9,932	271,340	3.7
1996–1997	9,930	260,011	3.8
1997–1998	9,453	253,018	3.7
1998–1999	9,480	249,265	3.8
1999–2000	8,579	247,560	3.5
2000–2001	8,198	239,289	3.4
2001–2002	8,143	243,039	3.4
2002–2003	8,366	241,542	3.5
2003–2004	8,217	247,719	3.3
2004–2005	8,531	247,599	3.4

Source: Canadian Institute for Health Information. Discharge Abstract Database (DAD), 1995–1996 to 2004–2005.
* Complete data for Quebec and Manitoba were not available in the DAD.
** Newborns who weighed <1,000 g and newborns with initial length of stay >20 days were excluded from this analysis. Cases of neonatal readmission were included up to 28 days after birth. Hospitalizations for newborns who were directly transferred to another hospital after birth were not included in neonatal readmission counts, and day surgery after discharge from birth hospitalization was not considered as a readmission.

TABLE G29.2 Rate of neonatal hospital readmission after discharge following birth, by province/territory

Canada (excluding Quebec and Manitoba), 2002–2003 to 2004–2005*

Province/Territory	Number of readmissions of newborns (≤28 days)	Number of hospital live births	Readmissions (95% CI) per 100 hospital live births***
Newfoundland and Labrador	283	13,277	2.1 (1.9–2.4)
Prince Edward Island	97	4,069	2.4 (1.9–2.9)
Nova Scotia	525	25,091	2.1 (1.9–2.3)
New Brunswick	727	20,096	3.6 (3.4–3.9)
Ontario	12,241	394,479	3.1 (3.0–3.2)
Saskatchewan	1,448	34,162	4.2 (4.0–4.5)
Alberta	5,498	117,524	4.7 (4.6–4.8)
British Columbia	3,874	115,428	3.4 (3.3–3.5)
Yukon	27	957	2.8 (1.9–4.1)
Northwest Territories	79	1,957	4.0 (3.2–5.0)
Nunavut	64	1,172	5.5 (4.2–6.9)
Not available/Other**	251	8,648	2.9 (2.6–3.3)
CANADA	**25,114**	**736,860**	**3.4 (3.4–3.4)**

Source: Canadian Institute for Health Information. Discharge Abstract Database (DAD), 2002–2003 to 2004–2005.
* Complete data for Quebec and Manitoba were not available in the DAD; data for three years are combined because of small numbers.
** "Other" includes residents of Quebec and Manitoba who were hospitalized in other provinces/territories.
*** Newborns who weighed <1,000 g and newborns with initial length of stay >20 days were excluded from this analysis. Cases of neonatal readmission were included up to 28 days after birth. Hospitalizations for newborns who were directly transferred to another hospital after birth were not included in neonatal readmission counts, and day surgery after discharge from birth hospitalization was not considered as a readmission.
CI—confidence interval

TABLE G29.3 Principal diagnosis for readmitted newborns

Canada (excluding Quebec and Manitoba), 1995–1996 and 2004–2005*

Principal diagnosis	1995–1996			2004–2005		
	Number of readmissions of newborns (≤28 days)	Percentage of readmissions**	Principal diagnosis-specific readmission rate (95% CI) per 1,000 hospital live births**	Number of readmissions of newborns (≤28 days)	Percentage of readmissions**	Principal diagnosis-specific readmission rate (95% CI) per 1,000 hospital live births**
Jaundice	3,883	39.1	14.3 (13.9–14.8)	4,003	46.9	16.2 (15.7–16.7)
Respiratory conditions	679	6.8	2.5 (2.0–2.4)	695	8.1	2.8 (2.6–3.0)
Healthy infant accompanying sick person	597	6.0	2.2 (2.0–2.4)	245	2.9	1.0 (0.9–1.1)
Feeding problems	516	5.2	1.9 (1.7–2.1)	440	5.2	1.8 (1.6–2.0)
Congenital anomalies	373	3.8	1.4 (1.2–1.5)	300	3.5	1.2 (1.1–1.4)
Sepsis	347	3.5	1.3 (1.1–1.4)	344	4.0	1.4 (1.2–1.5)
Dehydration	246	2.5	0.9 (0.8–1.0)	280	3.3	1.1 (1.0–1.3)
Urinary tract infections	179	1.8	0.7 (0.6–0.8)	112	1.3	0.5 (0.4–0.5)
Inadequate weight gain	157	1.6	0.6 (0.5–0.7)	98	1.2	0.4 (0.3–0.5)
Others	2,955	29.7	10.8 (10.4–11.2)	2,014	23.6	8.1 (7.8–8.5)
TOTAL	**9,932**	**100**	**36.6 (35.9–37.3)**	**8,531**	**100**	**34.5 (33.7–35.2)**

Source: Canadian Institute for Health Information. Discharge Abstract Database (DAD), 1995–1996 and 2004–2005.

* Complete data for Quebec and Manitoba were not available in the DAD.

** Newborns who weighed <1,000 g and newborns with initial length of stay >20 days were excluded from this analysis. Cases of neonatal readmission were included up to 28 days after birth. Hospitalizations for newborns who were directly transferred to another hospital after birth were not included in neonatal readmission counts, and day surgery after discharge from birth hospitalization was not considered as a readmission.

CI—confidence interval

Appendix H

Ontario Vital Statistics Data

Previous studies have identified problems with the quality of vital statistics data from the province of Ontario.[1-4] Errors in birth weight and gestational age led to large artifactual increases in rates of low birth weight and preterm birth in Ontario during the early and mid-1990s. These errors have been corrected, and recent data on birth weight and gestational age appear to be free from the previously identified concerns. However, other concerns persist including those related to increases in the under-registration of live births and the under-registration of live births among vulnerable populations, such as teenage mothers.[3,4] In particular, the Canadian Perinatal Surveillance System's project, which links information from live birth registrations with information from infant death registrations, has been successful in all provinces and territories except Ontario, where it has consistently resulted in a substantial rate of unlinked infant deaths, i.e., infant deaths for which a birth registration could not be located. Over 40% of infant deaths in Ontario in 2003 resulted in such non-links as compared with 1% of unlinked infant deaths in all other provinces and territories combined (see *Overview*, page 23, for a detailed discussion on unlinked infant deaths in Ontario).

Such concerns about data quality and completeness were responsible for excluding Ontario Vital Statistics data from the calculation of indicator values in the *Canadian Perinatal Health Report, 2008 Edition.* The Maternal Mortality Ratio was the only indicator based on vital statistics data for which Ontario data were included. Ontario data are included in this Appendix, along with this cautionary note, as some of the information may be useful in specific contexts.

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Ontario Vital Statistics Data Tables

Live Births and Female Population Estimates

Section A: Determinants of Maternal, Fetal and Infant Health

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Maternal Health Outcomes

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Ontario Vital Statistics Data Tables

Live Births and Female Population Estimates

TABLE H1 **Number of live births, by maternal age***
Ontario, 1995–2004

Year	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years	Total
1995	2,781	5,035	23,134	46,172	48,272	17,784	2,731	145,909
1996	2,434	4,584	21,327	43,290	46,683	18,745	2,879	139,942
1997	2,053	4,061	19,760	40,623	44,370	19,040	3,078	132,985
1998	2,149	4,108	20,083	39,814	43,265	19,679	3,229	132,327
1999	1,942	3,928	19,462	39,202	42,815	20,241	3,494	131,084
2000	1,750	3,608	18,899	37,357	41,511	20,538	3,654	127,317
2001	1,510	3,587	18,418	38,437	44,365	21,474	3,904	131,695
2002	1,469	3,306	17,744	37,256	43,383	21,337	4,022	128,517
2003	1,377	3,344	17,722	37,817	44,506	21,821	4,284	130,871
2004	1,324	3,018	17,810	38,272	45,648	21,795	4,563	132,430

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Excludes live births to mothers ≥50 years and those with unknown maternal age.

TABLE H2 **Number of females, by age**
Ontario, 1995–2004

Year	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years
1995	558,516	139,884	374,229	420,273	499,976	475,301	811,133
1996	570,649	139,195	368,092	413,212	493,202	487,944	837,607
1997	582,026	140,315	365,519	408,533	482,923	498,440	855,038
1998	592,179	143,798	364,418	404,127	468,203	508,491	874,507
1999	601,937	147,854	367,394	399,874	454,141	516,506	896,254
2000	615,204	151,726	373,767	399,119	446,169	521,284	921,642
2001	627,551	156,372	383,799	399,452	447,535	518,767	949,803
2002	637,725	160,171	394,620	405,150	450,617	513,240	977,134
2003	642,472	163,286	405,827	408,306	451,108	501,926	1,003,342
2004	646,787	165,027	415,722	414,081	450,166	490,931	1,026,476

Source: Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls

TABLE H3 Proportion (%) of live births, by maternal age*

Ontario, 1995–2004

Year	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years	10–19 years	35–49 years
1995	1.91	3.45	15.86	31.64	33.08	12.19	1.87	5.36	14.06
1996	1.74	3.28	15.24	30.93	33.36	13.39	2.06	5.01	15.45
1997	1.54	3.05	14.86	30.55	33.36	14.32	2.31	4.60	16.63
1998	1.62	3.10	15.18	30.09	32.70	14.87	2.44	4.73	17.31
1999	1.48	3.00	14.85	29.91	32.66	15.44	2.67	4.48	18.11
2000	1.37	2.83	14.84	29.34	32.60	16.13	2.87	4.21	19.00
2001	1.15	2.72	13.99	29.19	33.69	16.31	2.96	3.87	19.27
2002	1.14	2.57	13.81	28.99	33.76	16.60	3.13	3.72	19.73
2003	1.05	2.56	13.54	28.90	34.01	16.67	3.27	3.61	19.95
2004	1.00	2.28	13.45	28.90	34.47	16.46	3.45	3.28	19.90

Source: Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls

* Excludes live births to mothers ≥50 years and those with unknown maternal age.

TABLE H4 Maternal age-specific live birth rate per 1,000 females*

Ontario, 1995–2004

Year	10–17 years	18–19 years	20–24 years	25–29 years	30–34 years	35–39 years	40–49 years	10–19 years	35–49 years
1995	4.98	35.99	61.82	109.86	96.55	37.42	3.37	11.19	15.95
1996	4.27	32.93	57.94	104.76	94.65	38.42	3.44	9.89	16.31
1997	3.53	28.94	54.06	99.44	91.88	38.20	3.60	8.46	16.34
1998	3.63	28.57	55.11	98.52	92.41	38.70	3.69	8.50	16.56
1999	3.23	26.57	52.97	98.04	94.28	39.19	3.90	7.83	16.80
2000	2.84	23.78	50.56	93.60	93.04	39.40	3.96	6.99	16.77
2001	2.41	22.94	47.99	96.22	99.13	41.39	4.11	6.50	17.28
2002	2.30	20.64	44.96	91.96	96.27	41.57	4.12	5.98	17.02
2003	2.14	20.48	43.67	92.62	98.66	43.47	4.27	5.86	17.34
2004	2.05	18.29	42.84	92.43	101.40	44.40	4.45	5.35	17.37

Sources: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Population estimates 0–90+ July Canada—Provinces 1971–2005(29Jan07).xls

* Excludes live births to mothers ≥50 years and those with unknown maternal age.

Section A: Determinants of Maternal, Fetal and Infant Health

TABLE H7.1 Age-specific live birth rates, females 10–14, 15–17 and 18–19 years

Ontario, 1995–2004

Year	10–14 years			15–17 years			18–19 years		
	Number of females	Number of live births	Live births per 1,000 females	Number of females	Number of live births	Live births per 1,000 females	Number of females	Number of live births	Live births per 1,000 females
1995	353,270	59	0.17	205,246	2,722	13.26	139,884	5,035	35.99
1996	360,053	51	0.14	210,596	2,383	11.32	139,195	4,584	32.93
1997	367,279	48	0.13	214,747	2,005	9.34	140,315	4,061	28.94
1998	372,813	39	0.10	219,366	2,110	9.62	143,798	4,108	28.57
1999	377,920	35	0.09	224,017	1,907	8.51	147,854	3,928	26.57
2000	384,734	42	0.11	230,470	1,708	7.41	151,726	3,608	23.78
2001	391,661	26	0.07	235,890	1,484	6.29	156,372	3,587	22.94
2002	399,490	20	0.05	238,235	1,449	6.08	160,171	3,306	20.64
2003	404,896	15	0.04	237,576	1,362	5.73	163,286	3,344	20.48
2004	407,453	21	0.05	239,334	1,303	5.44	165,027	3,018	18.29

Sources: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.

TABLE H7.2 Proportion (%) of live births to teenage mothers 10–19 years

Ontario, 1995–2004

Year	Number of live births*	Live births to mothers 10–14 years		Live births to mothers 15–17 years		Live births to mothers 18–19 years	
		Number	Percent	Number	Percent	Number	Percent
1995	145,909	59	0.04	2,722	1.87	5,035	3.45
1996	139,942	51	0.04	2,383	1.70	4,584	3.28
1997	132,985	48	0.04	2,005	1.51	4,061	3.05
1998	132,327	39	0.03	2,110	1.59	4,108	3.10
1999	131,084	35	0.03	1,907	1.45	3,928	3.00
2000	127,317	42	0.03	1,708	1.34	3,608	2.83
2001	131,695	26	0.02	1,484	1.13	3,587	2.72
2002	128,517	20	0.02	1,449	1.13	3,306	2.57
2003	130,871	15	0.01	1,362	1.04	3,344	2.56
2004	132,430	21	0.02	1,303	0.98	3,018	2.28

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Excludes live births to mothers ≥50 years and those with unknown maternal age.

TABLE H8.1 Age-specific live birth rates, females 35–49 years*

Ontario, 1995–2004

Year	35–39 years			40–49 years		
	Number of females	Number of live births	Live births per 1,000 females	Number of females	Number of live births	Live births per 1,000 females
1995	475,301	17,784	37.42	811,133	2,731	3.37
1996	487,944	18,745	38.42	837,607	2,879	3.44
1997	498,440	19,040	38.20	855,038	3,078	3.60
1998	508,491	19,679	38.70	874,507	3,229	3.69
1999	516,506	20,241	39.19	896,254	3,494	3.90
2000	521,284	20,538	39.40	921,642	3,654	3.96
2001	518,767	21,474	41.39	949,803	3,904	4.11
2002	513,240	21,337	41.57	977,134	4,022	4.12
2003	501,926	21,821	43.47	1,003,342	4,284	4.27
2004	490,931	21,795	44.40	1,026,476	4,563	4.45

Sources: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
Statistics Canada. *Annual Demographics Statistics, 2005.* Demography Division, Catalogue No. 91-213-XPB, Annual, Ottawa, 2006.
* Excludes live births to mothers ≥50 years and those with unknown maternal age.

TABLE H8.2 Proportion (%) of live births to older mothers 35–49 years

Ontario, 1995–2004

Year	Number of live births*	Live births to mothers 35–39 years		Live births to mothers 40–49 years	
		Number	Percent	Number	Percent
1995	145,909	17,784	12.19	2,731	1.87
1996	139,942	18,745	13.39	2,879	2.06
1997	132,985	19,040	14.32	3,078	2.31
1998	132,327	19,679	14.87	3,229	2.44
1999	131,084	20,241	15.44	3,494	2.67
2000	127,317	20,538	16.13	3,654	2.87
2001	131,695	21,474	16.31	3,904	2.96
2002	128,517	21,337	16.60	4,022	3.13
2003	130,871	21,821	16.67	4,284	3.27
2004	132,430	21,795	16.46	4,563	3.45

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Excludes live births to mothers ≥50 years and those with unknown maternal age.

■ Section B: Maternal, Fetal and Infant Health Outcomes

TABLE H17.1 Ratio and rate of induced abortion*

Ontario, 1995–2004

Year	Number of induced abortions	Number of live births	Number of females 15–44 years	Induced abortions per 100 live births	Induced abortions per 1,000 females 15–44 years
1995	46,095	146,263	2,541,740	31.5	18.1
1996	46,918	140,012	2,551,559	33.5	18.4
1997	44,046	133,004	2,564,362	33.1	17.2
1998	42,452	132,618	2,574,722	32.0	16.5
1999	39,981	131,080	2,586,561	30.5	15.5
2000	39,544	127,408	2,611,129	31.0	15.1
2001	38,827	131,709	2,645,215	29.5	14.7
2002	38,138	128,528	2,678,089	29.7	14.2
2003	36,666	130,927	2,696,303	28.0	13.6
2004	35,183	132,551	2,714,731	26.5	13.0

Sources: Statistics Canada. *Pregnancy Outcomes 2004.* Catalogue No. 82-224-XIE.
Statistics Canada. CANSIM II, table 051-0001—Canadian population estimates, 1995–2004.
* Includes abortions performed on Canadian residents in selected U.S. states (for years prior to 2004). Includes cases with age not specified as well as abortions to females ≤14 years of age and ≥45 years of age. Rate based on female population 15–44 years of age. May include some abortions performed in Canada on non-Canadian residents.

TABLE H17.3 Age-specific induced abortion rate and ratio*

Ontario, 2004

Age (years)	Number of induced abortions	Number of females	Induced abortion rate (95% CI) per 1,000 females
<15**	51	82,804	0.6 (0.5–0.8)
15–19	5,487	404,361	13.5 (13.2–13.9)
20–24	10,762	415,722	25.9 (25.4–26.4)
25–29	7,477	414,081	18.1 (17.7–18.5)
30–34	5,651	450,166	12.6 (12.2–12.9)
35–39	4,044	490,931	8.2 (8.0–8.5)
40–44***	1,710	539,470	3.2 (3.0–3.3)

Age (years)	Number of induced abortions	Number of live births	Induced abortion ratio (95% CI) per 100 live births
<15**	51	21	242.9 (180.8–319.3)
15–19	5,487	4,321	127.0 (123.6–130.4)
20–24	10,762	17,810	60.4 (59.7–61.1)
25–29	7,477	38,272	19.5 (19.1–19.9)
30–34	5,651	45,648	12.4 (12.1–12.7)
35–39	4,044	21,795	18.6 (18.0–19.1)
40–44***	1,710	4,563	37.5 (36.1–38.9)

Sources: Statistics Canada. *Pregnancy Outcomes 2004.* Catalogue No. 82-224-XIE.
Statistics Canada. CANSIM II, table 051-0001—Canadian population estimates, 1995–2004.
* May include some abortions performed in Canada on non-Canadian residents.
** Rate based on female population aged 14 years.
*** Includes induced abortions to women ≥45 years of age. Rate based on female population aged 40–44 years.
CI—confidence interval

TABLE H20.1 Rate of preterm birth*

Ontario, 1995–2004

Year	Number of live births*	Number of preterm births <32 weeks	Preterm births <32 weeks per 100 live births	Number of preterm births 32–36 weeks	Preterm births 32–36 weeks per 100 live births	Number of preterm births <37 weeks	Preterm births <37 weeks per 100 live births
1995	145,474	1,716	1.2	11,738	8.1	13,454	9.3
1996	139,482	1,603	1.2	11,767	8.4	13,370	9.6
1997	132,848	1,389	1.0	9,295	7.0	10,684	8.0
1998	132,380	1,395	1.1	8,114	6.1	9,509	7.2
1999	130,961	1,471	1.1	7,888	6.0	9,359	7.1
2000	127,318	1,392	1.1	7,932	6.2	9,324	7.3
2001	131,649	1,408	1.1	7,903	6.0	9,311	7.1
2002	128,486	1,406	1.1	7,968	6.2	9,374	7.3
2003	130,885	1,506	1.1	8,180	6.3	9,686	7.4
2004	132,454	1,347	1.0	8,704	6.6	10,051	7.6

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Live births with unknown gestational age are excluded from this table.

TABLE H20.2 Rate of preterm birth among singleton and multiple births*

Ontario, 2004

Plurality	Number of live births*	Number of preterm births <32 weeks	Preterm births <32 weeks per 100 live births	Number of preterm births 32–36 weeks	Preterm births 32–36 weeks per 100 live births	Number of preterm births <37 weeks	Preterm births <37 weeks per 100 live births
Singletons	128,250	976	0.8	6,780	5.3	7,756	6.1
Twins	4,032	335	8.3	1,810	44.9	2,145	53.2
Triplets or higher	172	36	20.9	114	66.3	150	87.2
All live births	**132,454**	**1,347**	**1.0**	**8,704**	**6.6**	**10,051**	**7.6**

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Live births with unknown gestational age are excluded from this table.

TABLE H21.1 Rate of postterm birth

Ontario, 1995–2004

Year	Number of postterm births	Number of live births*	Postterm births per 100 live births
1995	5,251	145,474	3.6
1996	3,816	139,492	2.7
1997	3,717	132,848	2.8
1998	2,445	132,380	1.8
1999	1,602	130,961	1.2
2000	1,211	127,333	1.0
2001	1,315	131,649	1.0
2002	902	128,486	0.7
2003	764	130,885	0.6
2004	580	132,454	0.4

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Live births with unknown gestational age are excluded from this table.

TABLE H22.1 Rate of small for gestational age (SGA)*

Ontario, 1995–2004

Year	Number of SGA singleton live births	Number of singleton live births	SGA live births per 100 singleton live births	SGA live births (95% CI) per 100 singleton live births
1995	–	141,799	–	–
1996	13,872	135,747	10.2	(10.1–10.4)
1997	13,423	129,261	10.4	(10.2–10.6)
1998	12,315	128,648	9.6	(9.4–9.7)
1999	11,359	127,170	8.9	(8.8–9.1)
2000	10,480	123,609	8.5	(8.3–8.6)
2001	11,091	127,750	8.7	(8.5–8.8)
2002	10,783	124,422	8.7	(8.5–8.8)
2003	11,025	126,695	8.7	(8.5–8.9)
2004	10,887	128,220	8.5	(8.3–8.6)

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. SGA cut-off is based on the 10th percentile of the sex-specific birth weight for gestational age.
CI—confidence interval

TABLE H23.1 Rate of large for gestational age (LGA)*

Ontario, 1995–2004

Year	Number of LGA singleton live births	Number of singleton live births	LGA live births per 100 singleton live births	LGA live births (95% CI) per 100 singleton live births
1995	–	141,799	–	–
1996	16,303	135,747	12.0	(11.8–12.2)
1997	14,351	129,261	11.1	(10.9–11.3)
1998	14,550	128,648	11.3	(11.1–11.5)
1999	15,083	127,170	11.9	(11.7–12.0)
2000	15,753	123,609	12.7	(12.6–12.9)
2001	15,753	127,750	12.3	(12.2–12.5)
2002	14,837	124,422	11.9	(11.7–12.1)
2003	14,715	126,695	11.6	(11.4–11.8)
2004	14,595	128,220	11.4	(11.2–11.6)

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Excludes live births with unknown gestational age or birth weight, live births with gestational age <22 weeks or >43 weeks, and multiple births. LGA cut-off is based on the 90th percentile of the sex-specific birth weight for gestational age.
CI—confidence interval

TABLE H24.1 Rate of fetal death

Ontario, 1995–2004

Year	Fetal deaths (crude)*			Fetal deaths ≥500 g**		
	Number of fetal deaths	Number of total births	Deaths per 1,000 total births	Number of fetal deaths	Number of total births	Deaths per 1,000 total births
1995	977	147,238	6.6	738	146,947	5.0
1996	905	140,913	6.4	678	140,585	4.8
1997	881	133,878	6.6	651	133,577	4.9
1998	849	133,455	6.4	611	133,115	4.6
1999	837	131,896	6.3	599	131,559	4.6
2000	815	128,223	6.4	564	127,889	4.4
2001	841	132,550	6.3	576	132,218	4.4
2002	821	129,349	6.3	561	128,989	4.3
2003	966	131,893	7.3	615	131,466	4.7
2004	835	133,386	6.3	525	133,006	3.9

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age <20 weeks.
** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.

TABLE H24.3 Rate of fetal death, by singleton and multiple births

Ontario, 2004

Plurality	Fetal deaths (crude)*			Fetal deaths ≥500 g**		
	Number of fetal deaths	Number of total births	Deaths (95% CI) per 1,000 total births	Number of fetal deaths	Number of total births	Deaths (95% CI) per 1,000 total births
All	835	133,386	6.3 (5.8–6.7)	525	133,006	3.9 (3.6–4.3)
Singletons	769	129,114	6.0 (5.5–6.4)	503	128,801	3.9 (3.6–4.3)
Multiples	66	4,272	15.4 (12.0–19.6)	22	4,205	5.2 (3.3–7.9)

Source: Statistics Canada. Canadian Vital Statistics System, 2004.
* Data exclude all stillbirths and live births with a birth weight of <500 g **and** a gestational age <20 weeks.
** Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.
CI—confidence interval

TABLE H24.4 Cause-specific rates of fetal death ≥500 g*

Ontario, 1995–1996 to 2003–2004

Cause	1995–1996		1997–1998		1999–2000	
	Number of fetal deaths	Deaths per 1,000 total births	Number of fetal deaths	Deaths per 1,000 total births	Number of fetal deaths	Deaths per 1,000 total births
Congenital anomalies	136	0.47	145	0.54	144	0.56
Maternal complications of pregnancy	80	0.28	60	0.22	51	0.20
Complications of placenta/cord/membranes	567	1.97	471	1.77	417	1.61
Intrauterine hypoxia and birth asphyxia	75	0.26	70	0.26	71	0.27
Unspecified	289	1.01	278	1.04	285	1.10
Number of total births	**287,532**		**266,692**		**259,433**	

Cause	2001–2002		2003–2004	
	Number of fetal deaths	Deaths per 1,000 total births	Number of fetal deaths	Deaths per 1,000 total births
Congenital anomalies	146	0.56	134	0.51
Maternal complications of pregnancy	53	0.20	52	0.20
Complications of placenta/cord/membranes	382	1.46	354	1.34
Intrauterine hypoxia and birth asphyxia	51	0.20	47	0.18
Unspecified	260	1.00	295	1.12
Number of total births	**261,207**		**264,472**	

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.
* Based on WHO recommendation, which includes fetal deaths with a gestational age ≥22 weeks if birth weight is unknown.

TABLE H25.1A Rate of neonatal death (0–27 days)

Ontario, 1995–2004

Year	Birth period calculation				Birth cohort calculation			
	Number of neonatal deaths	Number of live births	Neonatal deaths per 1,000 live births*	95% CI	Number of neonatal deaths ≥500 g	Number of births (cohort)	Neonatal deaths ≥500 g per 1,000 live births**	95% CI
1995	608	146,261	4.2	(3.8–4.5)	548	146,304	3.8	(3.5–4.1)
1996	584	140,010	4.2	(3.8–4.5)	528	140,092	3.7	(3.4–4.1)
1997	518	132,997	3.9	(3.6–4.2)	462	132,932	3.8	(3.5–4.1)
1998	501	132,606	3.8	(3.5–4.1)	431	132,512	3.5	(3.2–3.8)
1999	510	131,061	3.9	(3.6–4.2)	433	130,979	3.3	(3.0–3.6)
2000	505	127,408	4.0	(3.6–4.3)	440	127,325	3.3	(3.0–3.6)
2001	521	131,709	4.0	(3.6–4.3)	455	131,642	3.5	(3.1–3.8)
2002	520	128,528	4.0	(3.7–4.4)	435	128,500	3.5	(3.1–3.8)
2003	542	130,927	4.1	(3.8–4.5)	474	130,851	3.4	(3.1–3.7)
2004	577	132,551	4.4	(4.0–4.7)	–	–	–	–

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1995–2003 (cohort calculation) and Unlinked File, 1995–2004 (period calculation).
* Includes deaths for the specified calendar year (period calculation).
** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.
CI—confidence interval

TABLE H25.1B Rate of postneonatal death (28–364 days)

Ontario, 1995–2004

Year	Birth period calculation				Birth cohort calculation			
	Number of postneonatal deaths	Number of neonatal survivors	Postneonatal deaths per 1,000 neonatal survivors*	95% CI	Number of postneonatal deaths ≥500 g	Number of neonatal survivors	Postneonatal deaths ≥500 g per 1,000 neonatal survivors**	95% CI
1995	262	145,653	1.8	(1.6–2.0)	255	145,756	1.7	(1.5–2.0)
1996	218	139,426	1.6	(1.4–1.8)	206	139,564	1.5	(1.3–1.7)
1997	210	132,479	1.6	(1.4–1.8)	188	132,470	1.4	(1.2–1.6)
1998	165	132,105	1.2	(1.1–1.5)	178	132,081	1.3	(1.2–1.6)
1999	195	130,551	1.5	(1.3–1.7)	195	130,546	1.5	(1.3–1.7)
2000	208	126,903	1.6	(1.4–1.9)	182	126,885	1.4	(1.2–1.7)
2001	192	131,188	1.5	(1.3–1.7)	185	131,187	1.4	(1.2–1.6)
2002	161	128,008	1.3	(1.1–1.5)	157	128,065	1.2	(1.0–1.4)
2003	150	130,385	1.2	(1.0–1.4)	153	130,377	1.2	(1.0–1.4)
2004	158	131,974	1.2	(1.0–1.4)	–	–	–	–

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1995–2003 (cohort calculation) and Unlinked File, 1995–2004 (period calculation).
* Includes deaths for the specified calendar year (period calculation).
** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.
CI—confidence interval

TABLE H25.1C Rate of infant death (0–364 days)

Ontario, 1995–2004

Year	Birth period calculation				Birth cohort calculation			
	Number of infant deaths	Number of live births	Infant deaths per 1,000 live births*	95% CI	Number of infant deaths ≥500 g	Number of live births	Infant deaths ≥500 g per 1,000 live births**	95% CI
1995	870	146,261	5.9	(5.6–6.4)	805	146,304	5.5	(5.1–5.9)
1996	802	140,010	5.7	(5.3–6.1)	735	140,092	5.2	(4.9–5.6)
1997	728	132,997	5.5	(5.1–5.9)	651	132,932	4.9	(4.5–5.3)
1998	666	132,606	5.0	(4.6–5.4)	614	132,512	4.6	(4.3–5.0)
1999	705	131,061	5.4	(5.0–5.8)	629	130,979	4.8	(4.4–5.2)
2000	713	127,408	5.6	(5.2–6.0)	622	127,325	4.9	(4.5–5.3)
2001	713	131,709	5.4	(5.0–5.8)	640	131,642	4.9	(4.5–5.3)
2002	681	128,528	5.3	(4.9–5.7)	592	128,500	4.6	(4.2–5.0)
2003	692	130,927	5.3	(4.9–5.7)	627	130,851	4.8	(4.4–5.2)
2004	735	132,551	5.5	(5.2–6.0)	–	–	–	–

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 1995–2003 (cohort calculation) and Unlinked File, 1995–2004 (period calculation).
* Includes deaths for the specified calendar year (period calculation).
** Includes deaths occurring to births weighing ≥500 g for the specified calendar year (cohort calculation). Unlinked infant deaths (i.e., infants whose death registration could not be linked to their birth registration) and live births/infant deaths with missing birth weight were also included, but live births/infant deaths with a missing birth weight and a gestational age <22 weeks were excluded.
CI—confidence interval

TABLE H25.5 Causes of infant death*

Ontario, 2004

Cause	Number of infant deaths	Proportion (%) of deaths among all infant deaths	Number of neonatal deaths	Proportion (%) of deaths among all neonatal deaths	Number of postneonatal deaths	Proportion (%) of deaths among all postneonatal deaths
Congenital anomalies	166	22.6	127	22.0	39	24.7
Asphyxia	112	15.2	107	18.5	5	3.2
Immaturity	223	30.3	203	35.2	20	12.7
Infection	47	6.4	26	4.5	21	13.3
Sudden infant death syndrome (SIDS)	32	4.4	3	0.5	29	18.4
Other unexplained infant death	20	2.7	11	1.9	9	5.7
External causes	4	0.5	0	0.0	4	2.5
Other	131	17.8	100	17.3	31	19.6
TOTAL	**735**	**100**	**577**	**100**	**158**	**100**

Source: Statistics Canada. Canadian Vital Statistics System Unlinked File 2004.
* Includes deaths for the specified calendar year (period calculation).

TABLE H25.6 Cause-specific rates of infant death*

Ontario, 1999 and 2004

Cause according to modified ICE classification	1999		2004	
	Number of infant deaths	Rate of infant deaths per 1,000 live births	Number of infant deaths	Rate of infant deaths per 1,000 live births
Congenital anomalies	206	1.6	166	1.3
Asphyxia	58	0.4	112	0.8
Immaturity	209	1.6	223	1.7
Infection	60	0.5	47	0.4
Sudden infant death syndrome (SIDS)	46	0.4	32	0.2
Other unexplained infant death	19	0.1	20	0.2
External causes	10	0.1	4	0.0
Other	97	0.7	131	1.0
TOTAL	**705**	**5.4**	**735**	**5.5**
Live births	**131,061**		**132,551**	

Source: Statistics Canada. Canadian Vital Statistics System Unlinked File 1999 and 2004.
* Includes deaths for the specified calendar year (period calculation).
ICE—International Collaborative Effort (on perinatal and infant mortality)

TABLE H25.7 Birth cohort-based infant death rate, by gestational age

Ontario, 2001–2003 combined

Gestational age (weeks)	Number of infant deaths	Number of live births	Infant deaths (95% CI) per 1,000 live births
<22	126	126	1,000.0 (971.1–1,000.0)
22–23	239	266	898.5 (855.8–932.0)
24–25	157	463	339.1 (296.0–384.2)
26–27	76	668	113.8 (90.7–140.3)
28–31	120	2,799	42.9 (35.7–51.0)
32–33	46	3,644	12.6 (9.3–16.8)
34–36	103	20,414	5.0 (4.1–6.1)
37–41	460	359,729	1.3 (1.2–1.4)
≥42	5	2,982	1.7 (0.5–3.9)
Unknown gestational age	2	145	13.8 (1.7–48.9)
Unlinked	749	–	–
All gestational ages	**2,083**	**391,236**	**5.3 (5.1–5.6)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2001–2003.
CI—confidence interval

TABLE H25.8 Birth cohort-based infant death rate, by birth weight

Ontario, 2001–2003 combined

Birth weight (grams)	Number of infant deaths	Number of live births	Infant deaths (95% CI) per 1,000 live births
<500	223	242	921.5 (880.1–952.1)
500–749	281	590	476.3 (435.3–517.5)
750–999	109	729	149.5 (124.4–177.5)
1,000–1,249	52	921	56.5 (42.5–73.4)
1,250–1,499	36	1,207	29.8 (21.0–41.1)
1,500–1,999	81	4,617	17.5 (14.0–21.8)
2,000–2,499	83	14,638	5.7 (4.5–7.0)
2,500–3,999	415	316,364	1.3 (1.2–1.4)
≥4,000	53	51,799	1.0 (0.8–1.3)
Unknown birth weight	1	129	7.8 (0.2–42.4)
Unlinked	749	–	–
All birth weights	**2,083**	**391,236**	**5.3 (5.8–6.3)**

Source: Statistics Canada. Canadian Vital Statistics System Birth-Death Linked File, 2001–2003.
CI—confidence interval

TABLE H27.1 Rate of multiple birth

Ontario, 1995–2004

Year	Number of multiple births	Total births (live births and stillbirths)	Multiple births per 100 total births
1995	3,592	147,239	2.4
1996	3,711	140,915	2.6
1997	3,583	133,878	2.7
1998	3,764	133,456	2.8
1999	3,829	131,898	2.9
2000	3,734	128,223	2.9
2001	3,955	132,550	3.0
2002	4,087	129,349	3.2
2003	4,240	131,892	3.2
2004	4,272	133,386	3.2

Source: Statistics Canada. Canadian Vital Statistics System, 1995–2004.

Appendix I

Canadian Perinatal Surveillance System (CPSS) Publications (as of January 2008)

Papers Published or in Press in Peer-Reviewed Journals

2007

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Published Fact Sheets

Cesarean Delivery on Maternal Request —Information for Women*	February 2007	(English and French)
Physical Abuse During Pregnancy	February 2004	(English and French)
Preterm Birth	October 1999	(English and French)
Sudden Infant Death Syndrome	September 1999	(English and French)
Alcohol and Pregnancy	November 1998	(English and French)
Breastfeeding	November 1998	(English and French)
Induced Abortion	April 1998	(English and French)
Report on Maternal Mortality in Canada	April 1998	(Bilingual)
Infant Mortality	March 1998	(English and French)

* Available through CPSS website: http://www.phac-aspc.gc.ca/rhs-ssg/index.html