



Perinatal HIV Transmission in Canada

At a Glance

- The number of infants perinatally exposed to HIV is on the rise, although the mother-to-child transmission rate has declined significantly.
- Available data indicate high rates of HIV screening of pregnant women in Canada.
- Antiretroviral therapy is effective in reducing mother-to-child transmission of HIV, and research continues to identify new developments.
- Pregnant women of Aboriginal and black descent as well as female immigrants from HIV-endemic countries are overrepresented in the Canadian perinatal HIV data.

Introduction

Mother-to-child transmission of HIV can occur during gestation (*in utero* transmission) or during delivery when the newborn comes into contact with maternal blood and cervical-vaginal secretions. In the absence of any intervention, it is estimated that 25.0% of pregnant women who are HIV positive will transmit the virus to their infant either during pregnancy or at birth. If a seropositive mother breastfeeds her baby, the risk of transmission increases to an estimated 35.0%.¹

In 2008, it was estimated that 15.7 million women worldwide were living with HIV.² For this same year, approximately 1.4 million HIV-positive women gave birth to a child; 91.0% of these births occurred in sub-Saharan Africa.³

This *Epi Update* presents a profile of perinatal HIV transmission in Canada and discusses existing screening approaches for pregnant women in the provinces and territories.

Routine Surveillance of HIV

Data sources

The data presented in this section are derived from several provincial government sources. However, the majority of surveillance data were provided by the Canadian Pediatric AIDS Research Group (CPARG), a body that collects national data on the HIV status of newborns perinatally exposed to HIV. Support for the development of the Canadian Perinatal HIV Database has been provided by the Canadian HIV Trials Network and the Surveillance and Risk Assessment Division of the Public Health Agency of Canada (PHAC). Data on infants born to women known to be HIV positive during pregnancy are accessible in the annual publication *HIV and AIDS in Canada, Surveillance Report to December 31, 2008*.

The figures presented here relate to all newborns known to have been perinatally exposed to HIV in Canada. However, not all women know their HIV status, which means that not all HIV-positive pregnant women in Canada are included in the data; therefore, it would not be valid to calculate vertical transmission rates from the data.

National profile

Between 1985 and December 31, 2008, a total of 67,442 positive HIV tests were reported to PHAC. Of the 61,949 adult cases for which information on sex was available, 10,799 or 17.4%, were women. Of the positive HIV tests reported among adult women, 74.5% involved women who were 15 to 39 years of age.⁴

In the early 1990s, according to CPARG, between 50 and 80 newborns in Canada were known to have been perinatally exposed to HIV each year. In 2008 that figure had risen to 238 per year. Of the 2,851 newborns known to have been exposed to HIV between 1984 and 2008, 523 confirmed cases of infection and 2,291 cases confirmed not to be infected were reported. The infection status of the remaining 37 newborns has not been confirmed (and may include some infants who have been lost to follow-up). Of the 93 infants confirmed to be HIV infected since 2000, none died of AIDS-related causes, 11 died of causes other than AIDS, and 1 was lost to follow-up.⁴

Mother-to-Child Transmission Trends

International trends

Available data indicate that the rate of mother-to-child transmission in high-income countries has improved significantly since the introduction of antiretroviral therapies. In 2008 it was estimated that, since 2002, fewer than 250 infants had been born with HIV infection each year in the United States, representing a perinatal rate of less than 2.0%.⁵ In 1991, by contrast, the Centers for Disease Control and Prevention estimated that 1,650 infants had acquired HIV perinatally.⁶ In England in 2007, the rate of mother-to-child transmission was 2.0%, a significant decrease compared with the 12.0% national rate observed in 1999.⁷

National trends

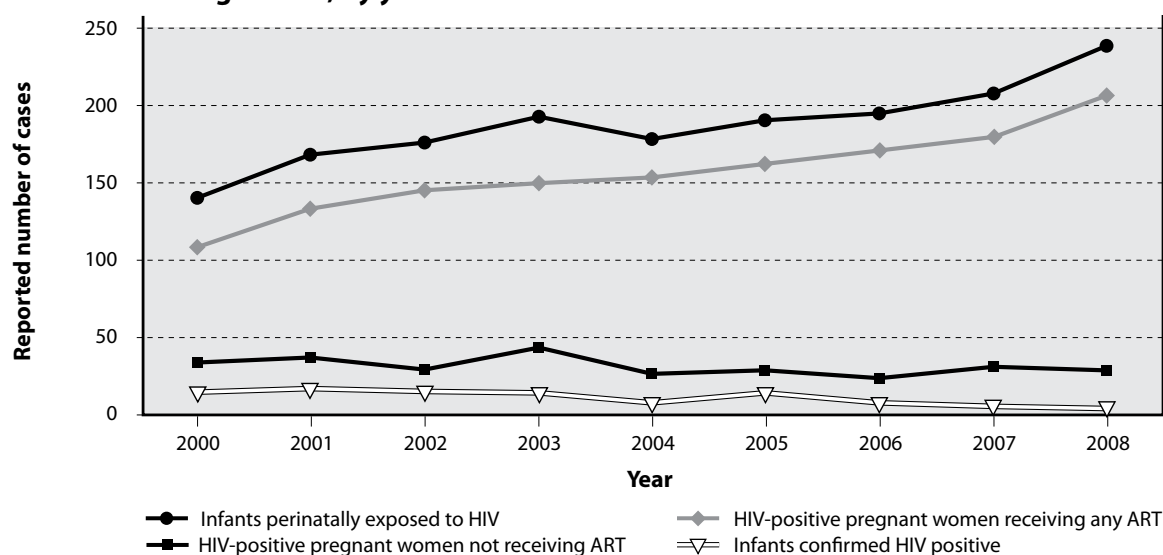
Overall, the situation of infants perinatally exposed to HIV has greatly improved during the past decade. As the number of persons living with HIV in Canada has increased, so too has the number of infants perinatally

exposed to HIV. However, the number of these infants who are subsequently confirmed to be infected has declined dramatically in recent years, both as a percentage and in absolute numbers. In 2001, for example, a total of 168 infants were perinatally exposed to HIV. Out of these, 17 (10.1%) were confirmed to be infected. In 2008, by contrast, 4 out of a total of 238 exposed infants (1.7%) were confirmed as infected. The more widespread administration of effective antiretroviral therapies (ART) has played a large role in this outcome: in 2008, 87.8% of HIV-positive pregnant women had benefited from these therapies. The average percentage of infants who were perinatally infected during the 1984-2000 period (33.9%) was approximately 6 times greater than the average percentage infected between 2001 and 2008 (5.2%).⁴

Perinatal exposure antiretroviral therapy, and seroconversion of infants in Canada

Between 1984 and 2008, 80.4% of the 2,851 infants known to have been perinatally exposed to HIV were confirmed not infected. Since the World Health Organization first issued recommendations for the use of ARV drugs to prevent mother-to-child transmission in 2000, both the number and proportion of HIV-positive pregnant women receiving ART in Canada has increased (Figure 1). In 2000, 77.9% of known HIV-positive pregnant women were receiving any ART. By 2008, the rate was 87.8%. Moreover, between 1984 and 2008, the proportion of HIV-positive pregnant women who received ART during the perinatal period and whose infants were confirmed to be infected (1.6%) was significantly lower than of those who did not receive ART (47.9%).⁴

Figure 1. Perinatal exposure to HIV, antiretroviral therapy, and confirmed HIV infections among infants, by year

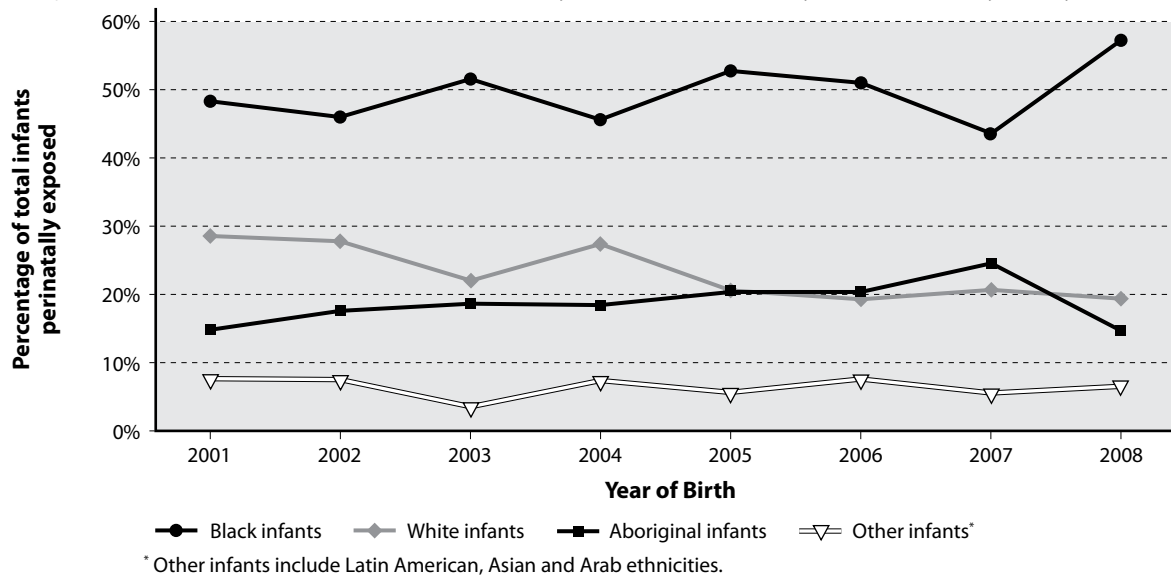


Perinatal HIV Transmission Trends

Race/ethnicity

Between 1984 and 2008, 2,851 births were reported in which an infant was perinatally exposed to HIV; 97.5% of these cases included information on ethnicity/race.⁴

Figure 2. Proportion of infants perinatally exposed to HIV, by race/ethnicity and year



Key points:

- The average proportion of white infants perinatally exposed to HIV between 2001 and 2008 (22.9%) was less than during the period 1984-2000 (35.9%) and has generally shown a downward proportional trend since 2001 (Figure 2).
- Between 1984 and 2008, black infants accounted for the largest proportion of infants perinatally exposed to HIV: 1,333 cases out of a total of 2,851 (46.8%). This proportion has increased over time, from 43.2% in 1984-2000 to 49.8% in 2001-2008 (Figure 2).
- While Black infants were the largest group of perinatally infected infants from 1984 to 2008 (286 confirmed HIV infections), the seroconversion rate among Black infants perinatally exposed to HIV has decreased dramatically, from 15% in 2001, to 0% in 2007 and 1.5% in 2008 (Figure 3).
- Between 1984 and 2008, Aboriginal infants were overrepresented among all infants perinatally exposed to HIV (16.2%), as well as among infants confirmed infected (9.5%); according to the 2006 census Aboriginals make up 3.8% of the total Canadian population.[‡]

HIV Screening of Pregnant Women in Canada

Each province and territory determines which approach it will use to screen pregnant women for HIV (Table 1). The two systems currently in use are voluntary screen-

ing (opt-in) or routine screening with right of refusal (opt-out). The Canadian Medical Association recommends voluntary screening since a positive result can have an impact on many different aspects of a person's life.⁸ However, routine screening with right of refusal reaches a larger proportion of pregnant women.

Table 1. Approach to HIV screening of pregnant women by province/territory

Province/territory	Testing approach*	Year
British Columbia	Opt-in	1994
Yukon	Opt-in	1994
Northwest Territories	Opt-out	1993, revised in 1998
Nunavut	Opt-out	1999
Alberta	Opt-out	1998
Saskatchewan	Opt-out	1999, revised in 2004-2005
Manitoba	Opt-out	2002, revised in 2006
Ontario	Opt-in	1999
Quebec	Opt-out	2002
New Brunswick	Opt-out	1999, revised in 2005
Nova Scotia	Opt-in	1998
Prince Edward Island	Opt-in	1999
Newfoundland and Labrador	Opt-out	1992, revised in 1994

*According to data submitted by provincial/territorial HIV/AIDS data coordinators.

According to prevalence studies among pregnant women in several provinces, the HIV prevalence rates between 1998 and 2008 in this group ranged from 2 to 9 per 10,000, but rates are not available for

all provinces and territories. Table 2 presents the percentage of pregnant women screened for HIV virus in several provinces.

Table 2. Available data on HIV screening rates among pregnant women, by province

Province/territory	Percentage of pregnant women screened for HIV
British Columbia	83.4% in 2003 ⁹
Alberta	97.0% in 2006 ¹⁰
Ontario	97.6% in 2009 ¹¹

Overview of Recent Research

Antiretroviral therapy research and adherence

Despite significant progress made in ART to prevent perinatal HIV transmission, research efforts to improve these therapies and treatment adherence continue. Research efforts prevent perinatal HIV transmission, as well as study factors that contribute to treatment adherence.

- A study investigating the superiority of Kaletra-based highly active ART (HAART) over regimens that use nevirapine and nelfinavir was conducted in 2009.¹³ To perform their comparison, the researchers collected data on all pregnant women who had received three-drug HAART between 1994 and 2007. The authors concluded that there was no link between the HAART regimen selected and the level of viral suppression achieved in patients. They also determined that other variables, such as CD4 cell counts and viral loads before the start of therapy, as well as adherence to and duration of treatment, have a greater influence over the success of HAART than the product selected.
- Data were collected on 195 HIV-positive mothers and their babies from 21 different pediatric centres in Canada in 2007.¹⁴ Analysis revealed that 82.6% of the mothers had received HAART, 4.1% had received some form of ART, and 13.3% had received no treatment. Only one infant in the group, born of a mother who had received no treatment, was confirmed to be infected.

- Researchers studied the records of 193 British Columbia women who were given HAART between 1993 and 2006, in order to determine their level of adherence before and after giving birth.¹⁵ The study participants were significantly more likely to adhere to their treatment regimens during pregnancy relative to postpartum. Adherence was also positively associated with a low CD4 cell count before treatment and residence in the Vancouver Coastal Health Authority area.

Intention of HIV-positive women to have children

- The roll-out of highly effective treatments has increased the odds that a woman living with HIV can deliver a healthy baby by reducing the risk of mother-to-child transmission. This advance has resulted in more HIV-infected women intending and/or choosing to have children. Adherence to ART plays an extremely important role in reducing viral count in pregnant women, an important factor in treatment outcome.
- In a survey of 182 HIV-positive women of reproductive age conducted in British Columbia between November 2003 and December 2004, 25.0% of the women indicated that they wanted to have children.¹⁶ Younger women, respondents in a stable relationship, and women of non-Aboriginal descent were more likely to report intention to have children. Overall, respondents' reported intention to have children that approached the same levels observed among women in the general population.

- A study of HIV-positive women of reproductive age (18-52 years) living in Ontario was carried out between October 2007 and April 2009.¹⁷ The median age of the 490 women in the study was 38, and 74.0% of the women were receiving ART at the time of the study. The study found that 69.0% of the women wanted to have children, and 57.0% fully expected to conceive one day.

Pregnant women of Aboriginal descent and immigrants from HIV-endemic countries disproportionately affected

Geographic origin, poverty, and social marginalization are some of the major factors influencing one's risk of contracting a communicable disease. The increased immigration to Canada from HIV-endemic regions of the world contributes to Canada's growing number of people living with HIV/AIDS, including pregnant women, children and infants.

Between 1984 and 2008, 205 infants confirmed to be infected with HIV were born in Ontario. Of this number, 133 (68.6%) were born to mothers from countries where HIV is endemic.¹⁹

The rising number of HIV cases among Aboriginals also translates into rising numbers of Aboriginal women of reproductive age who are living with HIV.

Blood specimens were taken from 5,232 pregnant Aboriginal women in British Columbia during the years 2000 to 2003.¹⁸ Testing of these samples revealed an HIV prevalence rate among these women that was 7 times higher than the estimated rate of the general population during that same time period.

Comment

Although there has been a decline in the rate of mother-to-child transmission of HIV, the absolute number of infants exposed to HIV *in-utero* or during birth is on the rise. It is thus important that all pregnant women, as well as women considering pregnancy, continue to have access to prenatal care that includes the offer of HIV testing, HAART, and appropriate counselling and care.

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Mission

To promote and protect the health of Canadians through leadership, partnership, innovation and action in public health.

Public Health Agency of Canada

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