



# MAKE EVERY MOTHER AND CHILD *Count*

## REPORT ON MATERNAL AND CHILD HEALTH IN CANADA



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## Introduction

On April 7 each year the international community celebrates World Health Day, marking the anniversary of the establishment of the World Health Organization (WHO) on April 7, 1948. The theme of World Health Day 2005 is **healthy mothers and children** and the slogan, **Make every mother and child count**. The objective is to raise awareness and promote action on a set of tragic facts: more than half a million women die from pregnancy-related causes every year; 10.6 million children under 5 also die each year, 40% of them in the first month after birth. Many of these deaths could be prevented with available interventions. It is necessary for us to work together to address this critical situation to save lives and reduce the burden of suffering. Such action will also strengthen societies since healthy mothers and children are the foundation of healthy and prosperous communities and nations.<sup>1</sup>

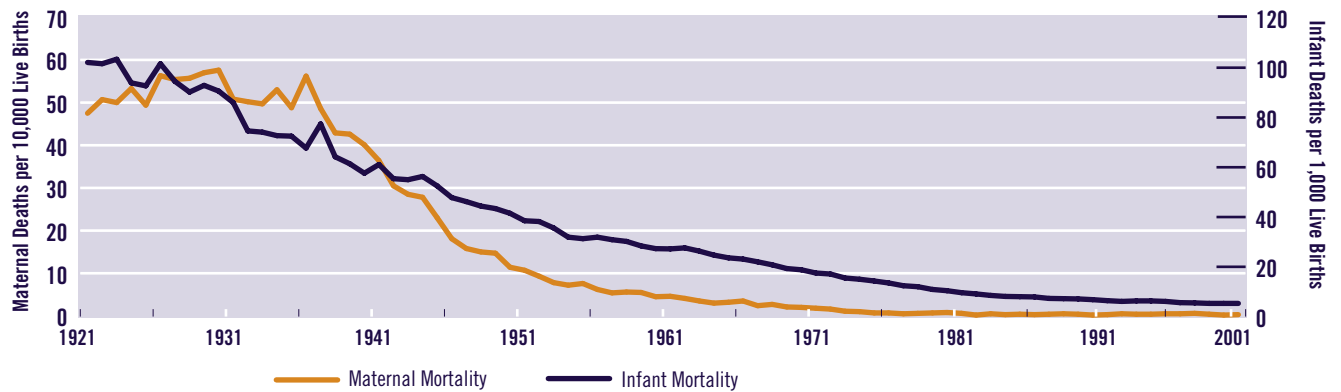
Many other international initiatives recognize the importance of healthy mothers and children. For example, the Millennium Development Goals, which have been ratified by more than 189 nations, have among their targets the reduction of maternal deaths by 75% and child deaths by two-thirds by the year 2015.<sup>2</sup> The Convention on the Rights of the Child and the report of the 4<sup>th</sup> World Conference on Women (Beijing Summit) reaffirm the rights of children to health and of women to have access to appropriate health care services throughout pregnancy and childbirth.<sup>3,4</sup>

This epidemiologic update, prepared by the Public Health Agency of Canada, provides information about maternal and child health in Canada in the context of the global situation and the issues of concern to WHO.

In Canada there has been a major decline in maternal and infant death rates since the early 20<sup>th</sup> century (see Figure 1). As in other developed countries, this reduction started with improved sanitation, nutrition, standard of living and level of education. Later,

Figure 1

Maternal and Infant Death Rates, Canada, 1921–2000

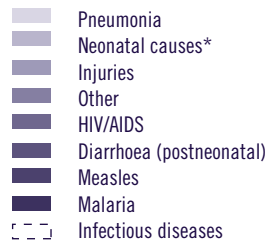


Sources: Statistics Canada. Selected Mortality Statistics, Canada 1921–1990. 1994 — Catalogue 82-548. Statistics Canada. Canadian Vital Statistics System, 1991–2000.

advances in clinical medicine, improved access to health care, and better surveillance and monitoring of disease also contributed to this remarkable decline.<sup>5,6</sup> Today the health of mothers and children in Canada is among the best in the world. But we should not be complacent since these outcomes are not shared by all Canadians. Furthermore, we need to pay attention to growing risks and future needs.

Figure 2

Causes of Death, Children < 5 Years, Worldwide, 2000–2003



Source: World Health Day Toolkit, World Health Organization 2005. \*One-third of neonatal causes are infectious diseases.

## Key issues

### MATERNAL DEATHS

Worldwide, more than half a million women die from the complications of pregnancy and childbirth each year and 15 million women suffer injuries, infections and disabilities in pregnancy or childbirth.<sup>1</sup>

The world maternal mortality ratio (MMR) for 2000 was estimated to be 400 maternal deaths per 100,000 live births.<sup>7</sup> The MMR was highest in the region of Africa (830), followed by Asia (330), Oceania (240), Latin America and the Caribbean (190), and the developed countries (20). In comparison, Canada's MMR for the period from 1997 to 2000 (excluding Quebec) was 6.1,<sup>8</sup> one of the lowest rates in the world.

#### Direct maternal death:

death while pregnant or within 42 days of the end of the pregnancy and caused by obstetric complications of the pregnancy.

#### Indirect maternal death:

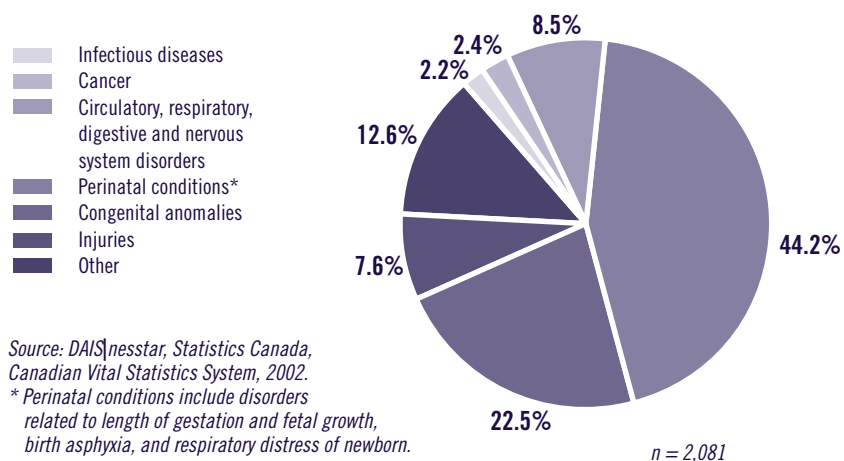
death while pregnant or within 42 days of the end of the pregnancy and resulting from disease that was aggravated by the pregnancy but not caused by being pregnant.

In Canada, the leading causes of direct maternal death are pulmonary embolism and pre-eclampsia/pregnancy-induced hypertension, amniotic fluid embolism, and intracranial hemorrhage.<sup>8</sup> The leading cause of indirect maternal death is cardiovascular disease. These causes differ markedly from the causes of maternal death worldwide. In 1997 the leading causes of direct maternal death globally were hemorrhage, infection and unsafe abortion; the leading causes of indirect maternal death were anemia, malaria and cardiovascular disease.<sup>1</sup>

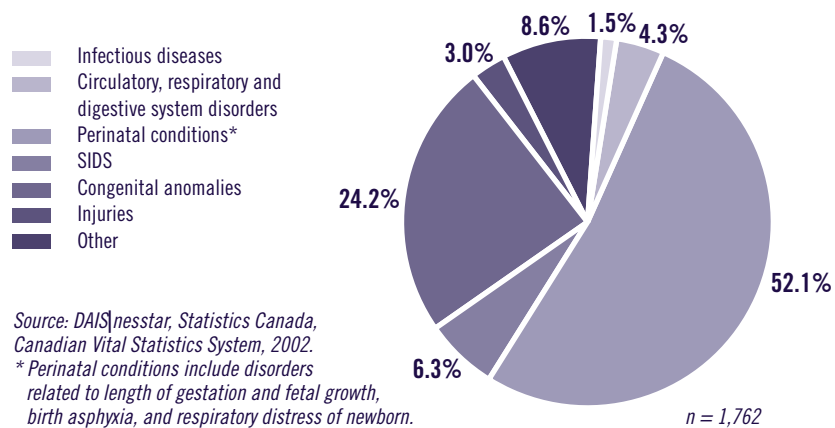
## SEVERE MATERNAL ILLNESS

In developed countries, where maternal death has become increasingly rare, experts have proposed a supplementary indicator — the rate of severe maternal illness (or severe maternal morbidity) — for monitoring maternal health and the quality of maternity care. Severe maternal illness is an illness that places a woman at serious risk of death but is not fatal. Between 1991–92 and 2000–01 the rate of severe maternal illness was 4.62 women per 1,000 deliveries in Canada (excluding Manitoba, Quebec and Nova Scotia).<sup>8</sup> The top three causes of severe maternal illness in Canada are severe postpartum hemorrhage (requiring hysterectomy or blood transfusion), cardiac arrest/failure or cerebral anoxia following obstetrical surgery, and uterine rupture.

**Figure 3**  
Causes of Death, Children < 5 Years, Canada, 2002



**Figure 4**  
Causes of Death, Infants (<1 year of age), Canada, 2002



## CHILD DEATHS

Worldwide, almost 30,000 children under 5 die every day from largely preventable diseases. That is 10.6 million deaths each year.<sup>1</sup> In Canada 2,081 children under 5 died in 2002, giving Canada one of the lowest child mortality rates in the world — 6.6 deaths per 1,000 live births.<sup>9</sup>

As Figure 2 indicates, most of the deaths among children under 5 worldwide are due to infection. This contrasts with the situation in Canada, where conditions of the perinatal period (such as disorders related to length of gestation and fetal growth) predominate as causes of death (see Figure 3).

In Canada 85% of deaths among children under 5 occur in infancy (in the first year after birth).

Therefore, it is important to consider infant deaths separately from deaths among 1- to 4-year-olds.

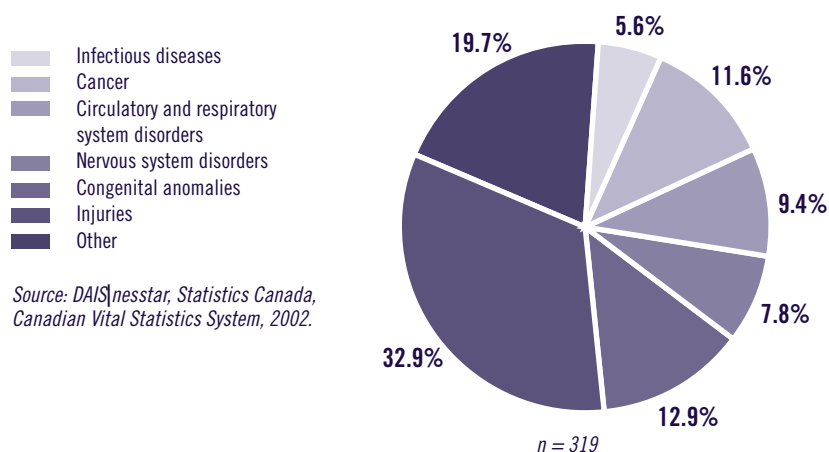
In 2002 the Canadian infant mortality rate was 5.4 infant deaths per 1,000 live births.<sup>9</sup> Neonatal deaths (deaths in the first month after birth) account for approximately two-thirds of infant deaths. The leading cause of infant death in Canada is perinatal conditions, followed by congenital anomalies and Sudden Infant Death Syndrome (SIDS) (see Figure 4). In contrast, the leading cause of death for Canadian children 1 to 4 years old is injury, followed by congenital anomalies and cancer (see Figure 5). The most frequent cause of injury death in this age group is transport injuries, followed by drowning and homicide.<sup>10</sup>

## COMPARISONS AMONG COUNTRIES

Care should be taken with inter-jurisdictional comparisons of health indicators, especially among countries with similar levels of development. For example, cross-country comparisons of maternal mortality ratios require caution because different strategies are used to derive estimates for different

countries.<sup>7</sup> While infant and under-5 mortality rates are important indicators of population health, international rankings, such as those done by UNICEF and the Organisation for Economic Co-operation and Development, are not always straightforward. These comparisons serve to highlight the great disparities in health across the world. But they are also flawed because they ignore the considerable regional differences and changes over time in approaches to registering very preterm babies born at the edge of viability.<sup>11</sup> International comparisons, particularly among developed countries, should follow the WHO recommendation to exclude live births weighing less than 1,000 grams.<sup>12</sup>

**Figure 5**  
Causes of Death, Children 1–4 Years, Canada, 2002



Source: DAIS|nesstar, Statistics Canada, Canadian Vital Statistics System, 2002.

## Analysis of the Canadian situation

For Canada as a whole, maternal and early childhood survival are among the best in the world. Relatively high levels of education and economic well-being and an effective health care system contribute to this fortunate situation. With universal access to health services, most women in Canada receive high-quality care during pregnancy. Also, an increasing number of women are engaging in healthy behaviours during pregnancy, and successful public health interventions, such as immunization and the folic acid fortification of foods, have been implemented.

Ninety-seven percent of new mothers report receiving prenatal care and virtually 100% had their births attended by a skilled attendant.<sup>13</sup> Prenatal HIV screening, a component of prenatal care, is offered to all women. Data from several provinces indicate that the number of pregnant women undergoing prenatal HIV screening is increasing, as is the proportion of HIV-infected pregnant women receiving antiretroviral therapy.<sup>14</sup>

Maternal smoking and alcohol consumption rates have been decreasing but remain a public health concern.<sup>11</sup> In 2003, 14% of recent mothers reported smoking daily during pregnancy and roughly 14% reported drinking alcohol (any amount) during pregnancy.<sup>15</sup>

Mandatory food fortification with folic acid was introduced in 1998 to reduce the risk of neural tube defects (NTDs). Studies in Newfoundland and other provinces

have found that this public health measure has been accompanied by significant reductions in NTD rates.<sup>16</sup> In addition, increased use of prenatal diagnosis and subsequent termination of the affected pregnancy has resulted in a decrease in infant deaths due to congenital anomalies.<sup>17</sup>

The stillbirth rate has also declined considerably. The increase in prenatal diagnosis and increased obstetric intervention (labour induction, cesarean delivery) when the fetus is at risk have had an important role in reducing stillbirths.<sup>11</sup>

Breastfeeding rates are increasing. In 2003, 85% of recent mothers reported breastfeeding for some period of time,<sup>18</sup> compared with 75% in 1994–95.<sup>11</sup> Many health organizations recommend exclusive breastfeeding for the first six months after birth.<sup>19</sup> In 2003, 19% of recent mothers reported breastfeeding exclusively for at least six months.<sup>18</sup>

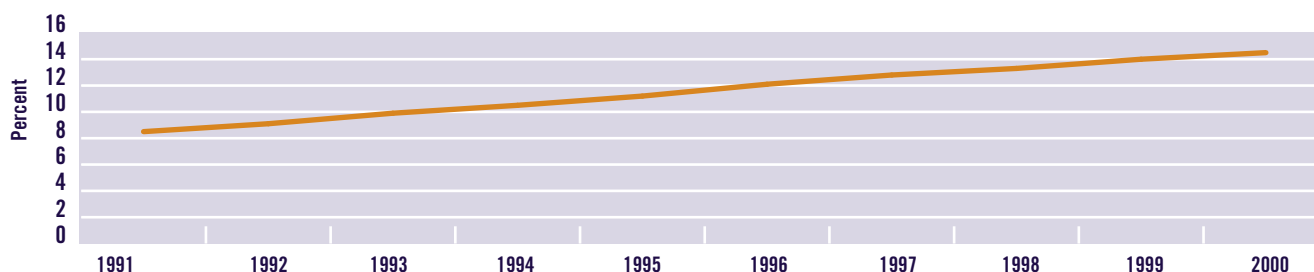
In a 2002 national telephone survey of parents of 2- and 7-year-olds, 98% reported that their child had been immunized. Immunization coverage rates were quite high (greater than 90%) for first doses of diphtheria, pertussis, tetanus, poliomyelitis, measles, mumps and rubella, although coverage was lower for subsequent doses (65% to 75%).<sup>20</sup>

## VULNERABLE POPULATIONS

Although maternal and child health outcomes (and their determinants) are generally good or improving, it is important to acknowledge existing disparities. Socio-economic status, including income, is a key factor in health.<sup>21</sup> In 2002 the percentage of children (people under 18) living in low-income families was 10.2% — the lowest rate recorded since 1980. However, the rate varied considerably depending on the type of family. The low-income rate of children in female lone-parent

**Figure 6**

**Proportion of Live Births to Women  $\geq$  35 Years of Age, Canada (excluding Ontario\*), 1991–2000**

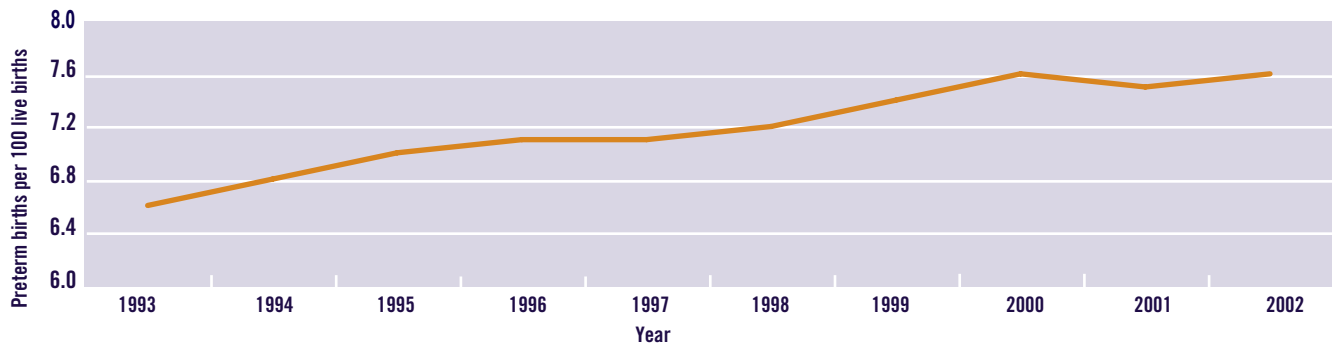


Source: Health Canada, *Canadian Perinatal Health Report, 2003*.

\*Ontario excluded because of data quality concerns.

Figure 7

Rate of Preterm Birth, Canada (excluding Ontario\*), 1993–2002



Sources: Statistics Canada, Canadian Vital Statistics System, unlinked file, 1993–2000. DAIS|nesstar, Statistics Canada, Canadian Vital Statistics System, 2001–2002.

\*Ontario excluded because of data quality concerns.

families was much higher than that of children living in two-parent families (39% vs. 6%).<sup>22</sup>

A **low-income family** is defined as one whose income falls below Statistics Canada's low-income cutoff (LICO). The LICO is an income level at which a family has to spend significantly more of its income on food, shelter and clothing than the average family.<sup>22</sup>

During pregnancy, women with low socio-economic status are more likely to face stressful life events and chronic stressors and experience low gestational weight gain. They are also less likely to initiate early prenatal care.<sup>23</sup> This translates into poor pregnancy outcomes. Disadvantaged groups face a higher risk of maternal death.<sup>8</sup> Rates of adverse pregnancy outcomes, including preterm birth and especially intrauterine growth restriction, generally rise with

increasing socio-economic disadvantage.<sup>23</sup> Socio-economic gradients also exist for occurrence of childhood injuries.<sup>24</sup>

Aboriginal Canadians face higher risks of adverse pregnancy and infant health outcomes, as demonstrated by recent studies in Quebec<sup>25</sup> and British Columbia.<sup>26</sup> In the latter study, the increased infant death, preterm birth and large-for-gestational-age rates among First Nations infants compared with non-First Nations infants were found to be independent of neighbourhood socio-economic status.<sup>26</sup> Among First Nations, the infant death rate is about twice that of the general Canadian population.<sup>26,27</sup> In a study of Alberta children aged 1 to 5, Aboriginal children or children who had received social assistance at some time were more likely to have been injured.<sup>28</sup>

## GROWING RISKS AND FUTURE NEEDS

The proportion of births to older mothers is steadily increasing (see Figure 6). Older women are at increased risk for complications of pregnancy and adverse birth outcomes such as preterm birth and small-for-gestational-age birth.<sup>11</sup> The upward trend in the number of older mothers and use of assisted conception have resulted in an increase in multiple births. Multiple births carry higher risks for preterm birth, intrauterine growth restriction and accompanying infant health problems.<sup>11</sup>

**Preterm birth:** live birth with a gestational age at birth of less than 37 completed weeks (259 days).

In Canada, as in other developed countries, preterm birth is the most important cause of infant death, illness and disability.



Advances in neonatal and infant health care have greatly improved survival rates for very preterm infants. However, these infants are at increased risk for neurological and developmental problems.<sup>11</sup> Over the long term, preterm birth can impose a substantial burden on special education, health and social services and on the families and caregivers of the children.<sup>29</sup> As Figure 7 shows, the preterm birth rate has been increasing in recent years. This trend is due in part to the increase in multiple births and increased obstetric intervention (early delivery when the fetus is at risk).<sup>11</sup> At the same time, much of the occurrence of preterm birth remains unexplained.

The prevalence of obesity has reached epidemic proportions.<sup>30</sup> Pre-pregnancy obesity has been associated with an increased risk of pregnancy-induced hypertension, gestational diabetes, certain congenital anomalies, cesarean delivery, preterm birth and late fetal death.<sup>31,32,33</sup> Also, there is an increase in the number of women with pre-existing chronic diseases (such as hypertension and diabetes) who are entering pregnancy.<sup>34</sup> Medical advances have enabled women with relatively serious chronic conditions to become pregnant and give birth.<sup>35</sup> Such pregnancies require specialized health care because of the increased risk of pregnancy complications and adverse birth outcomes.<sup>36</sup>

Although the use of prenatal HIV screening and antiretroviral therapy is increasing, it is nevertheless of concern that women account for a growing proportion of positive HIV tests, a figure that has risen from 12% in the years between 1985 and 1997 to 25% in 2002.<sup>14</sup>

The overall rate of new cases of childhood cancer in Canada is relatively stable, yet child deaths due to cancer have decreased considerably due to advances in treatment. For the increasing number of childhood cancer survivors, it is important to address long-term effects of cancer treatment.<sup>37</sup>

Among Canadian children under 5, the death rate due to unintentional injury has fallen by 73% in the past two decades. The largest decreases were in deaths due to fire and motor vehicle traffic crashes. Unfortunately, the homicide rate in this age group has not changed; 26 children under 5 were victims of homicide in 2002.<sup>10</sup>

While access to high-quality health services has contributed to our overall good maternal and child health outcomes, there are concerns about the future availability of maternal and child health care providers.<sup>13,38,39</sup> The Commission on the Future of Health Care in Canada called for action to ensure that we have the health workforce that we need for the future.<sup>40</sup>

## Future directions

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### PREVENTION

Several public health strategies targeting women of childbearing age, children and the general population were implemented in the 1990s and have had a positive impact on the health of Canadian mothers and children. Consider tobacco control efforts, the promotion of expanded childhood immunization programs, universal HIV testing of pregnant women, the “Back to Sleep” public education campaigns for SIDS and mandatory food fortification with folic acid. We should build on these successes and continue to strengthen prevention and promotion policies and programs with particular attention to high-risk (or vulnerable) populations.

The role of health care providers is also critical to further improving the health of women of childbearing age and their children. The period around conception and during pregnancy is an opportune time for health professionals to offer health education, screening and counselling to women.

While prenatal care has been implemented for many decades, the effectiveness of the current content, frequency and timing of prenatal visits for routine prenatal care has recently been

Table 1

Ten effective interventions to improve maternal, infant and child health	
Preconception/ prenatal care	<ol style="list-style-type: none"> <li>1. Smoking during pregnancy and exposure of a child to environmental tobacco smoke are known risks to health. <b>Smoking cessation programs during pregnancy</b> are effective in increasing quit rates and decreasing intrauterine growth restriction and preterm birth.<sup>46,47</sup></li> <li>2. <b>Screening and counselling women who drink alcohol during pregnancy</b> has been shown to reduce consumption of alcohol and reduce adverse effects on the child.<sup>48</sup></li> <li>3. <b>Use of vitamin supplements containing folic acid</b> prior to pregnancy and during the first trimester could prevent up to 70% of cases of neural tube defects such as spina bifida and anencephaly.<sup>49,50</sup></li> </ol>
Prenatal care	<ol style="list-style-type: none"> <li>4. <b>Maternal serum screening or Triple Test</b> can detect up to 50% of Down Syndrome cases and 90% of fetuses with neural tube defects.<sup>50,51</sup></li> <li>5. <b>HIV testing</b> and appropriate antiretroviral treatment for the pregnant woman and her infant can reduce the likelihood of transmission of HIV from mother to newborn by two-thirds or more.<sup>14,52</sup></li> <li>6. <b>Group B streptococcus (GBS) screening</b> with intrapartum antibiotic (when recommended) has been shown to be effective in preventing early-onset infection in newborns.<sup>53,54</sup></li> </ol>
Postpartum and childhood care	<ol style="list-style-type: none"> <li>7. <b>Breastfeeding</b> protects against gastrointestinal and respiratory infections in infants.<sup>55</sup> It has been associated with improved cognitive development, particularly in preterm and low birth weight babies,<sup>56,57</sup> and may help prevent childhood and adolescent obesity.<sup>58</sup> Prenatal education and postpartum support improve both initiation and duration of breastfeeding.<sup>59,60</sup></li> <li>8. The decline in the rate of Sudden Infant Death Syndrome (SIDS) in the last 10 years has been largely attributed to <b>parents' education on proper infant sleeping position</b>.<sup>61</sup> New recommendations on the sleeping environment will possibly further decrease the SIDS rate.<sup>62</sup></li> <li>9. Childhood <b>immunization</b> is one of the most cost-effective public health interventions. Dramatic declines in the rates of vaccine-preventable diseases occurred from the pre-vaccine to the post-vaccine era.<sup>63</sup> More recently, there has been a 99% reduction in reported invasive disease due to <i>Haemophilus influenzae</i> type B since the introduction of this vaccine in the late 1980s.<sup>64</sup></li> <li>10. Although legislation and regulation have made a major contribution to the reduction in fatal child injuries, there is also a role for <b>public health education and counselling of parents in reducing death from unintentional injuries</b> among young children. Examples are measures to reduce drowning in bathtubs and pools (never leave children younger than 3 alone in the bathtub, and put fences around pools); burns and death by fire (smoke detectors, non-inflammable sleepwear and hot water thermostat settings); and severe head injuries (use of bicycle helmets) and motor vehicle traffic deaths and injuries (appropriate use of car seats and other child restraints).<sup>65,66,67</sup></li> </ol>



questioned.<sup>41,42</sup> A recent international, randomized controlled trial commissioned by WHO showed that fewer clinic visits (involving only interventions proven to be effective) did not adversely affect maternal and perinatal outcomes for low-risk women.<sup>43</sup> However, it has been shown that women with late entry/no entry into prenatal care have worse outcomes,<sup>44</sup> whether due to unintended pregnancy, lower socio-economic status or other reasons.<sup>45</sup>

At the same time, the concept of “pregnancy-readiness” for all women of reproductive age is getting more attention by the public health and clinical care sectors. It is now recognized that some interventions would be more effective if provided before pregnancy. For issues affecting maternal and child health, such as maternal nutrition, weight, smoking, alcohol and drug use, and maternal health conditions such as diabetes and hypertension, preconception health care is an opportunity to assess and mitigate those risk factors.<sup>45</sup>

Effective clinical preventive interventions exist and should be universally accessible and used by all. Table 1 lists 10 effective interventions to improve maternal, infant and child health.

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## HEALTH INFORMATION, SURVEILLANCE AND RESEARCH

Effective policies and programs for maternal and child health require information as a basis for

decision-making. The Public Health Agency of Canada, which carries out national surveillance in collaboration with governments, health care providers, universities and non-governmental organizations, is working to strengthen this core function. For example:

- Careful statistical and in-depth review of maternal deaths guide prevention efforts. The recent “Special Report on Maternal Mortality and Severe Morbidity in Canada” has drawn attention to the need for maternal death (and possibly severe maternal morbidity) review committees across Canada, and developments in that regard are highly promising.<sup>8,68</sup>
- The Agency is working with the chief coroners and chief medical examiners of the provinces and territories, Statistics Canada, and the Canadian Institute for Health Information to establish a national database of coroners’ and medical examiners’ cases. This database will improve national surveillance of child deaths.
- Through its perinatal surveillance program,<sup>69</sup> the Agency is working with representatives of Aboriginal communities and with Health Canada to improve surveillance of the perinatal health of First Nations, Inuit and Métis.
- The Agency is also undertaking a national Maternity Experiences Survey that will gather information from women about their

perspectives on and experiences of pregnancy, birth and new motherhood. This survey will contribute to the evidence base for public health and clinical services for women at this important stage in their lives.

- An important component of the Federal Initiative to Address HIV/AIDS in Canada is surveillance, including HIV/AIDS surveillance among women and surveillance of perinatal transmission of the virus.<sup>70</sup>
- Canada’s National Immunization Strategy, a cornerstone of our collaborative public health efforts, includes ongoing surveillance of vaccine-preventable diseases, development of a national immunization registry network and monitoring of vaccine safety.<sup>71</sup>

In Canada we must continue to strive for good quality, timely data on maternal and child health and for expert, meaningful analysis and interpretation of the data.<sup>11,72</sup> We must also maintain and strengthen the links between public health surveillance and research. There are many research questions relevant to Canadian maternal and child health, one of the top priorities being research on prevention of preterm birth. Among the other priorities are research on multiple births and on obesity and maintenance of healthy body weights.

# Conclusion

It is important to reiterate that we are fortunate in Canada to have such good maternal and child health overall. At the same time, there are women and children in this country who don't share these good outcomes and who face health risks and considerable challenges. We must continue to work together as governments, health care providers, researchers and non-governmental organizations on their behalf and on behalf of all mothers and children, to **make every mother and child count**.

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