

# Infant Health— the First Year of Life



## INTRODUCTION

Health in the first year of life is a vital precursor to health in later childhood and adulthood. This chapter includes information on several aspects of infant health, including birth weight, stillbirths, congenital anomalies, infant and perinatal deaths, and breastfeeding practices. Peel data are compared with Ontario data in each instance.

## LOW BIRTH WEIGHT

Birth weight is an important predictor of maternal and infant health. Infants born with low birth weight (weight less than 2,500 grams) tend to have an increased risk of dying and experience more developmental and physical health problems than babies born with normal birth weight.<sup>7,8</sup> This finding is even more dramatic among pre-term low birth weight children.<sup>7</sup>

Maternal factors that may contribute to the risk of low birth weight babies include: having a lower socioeconomic status,<sup>9,10</sup> being of non-European origin,<sup>11</sup> being a teenage mother<sup>10</sup> and being single or in a common-law relationship.<sup>10,12</sup> Behaviours such as smoking and alcohol use during pregnancy have also been found to result in lower birth weight babies.<sup>13</sup>

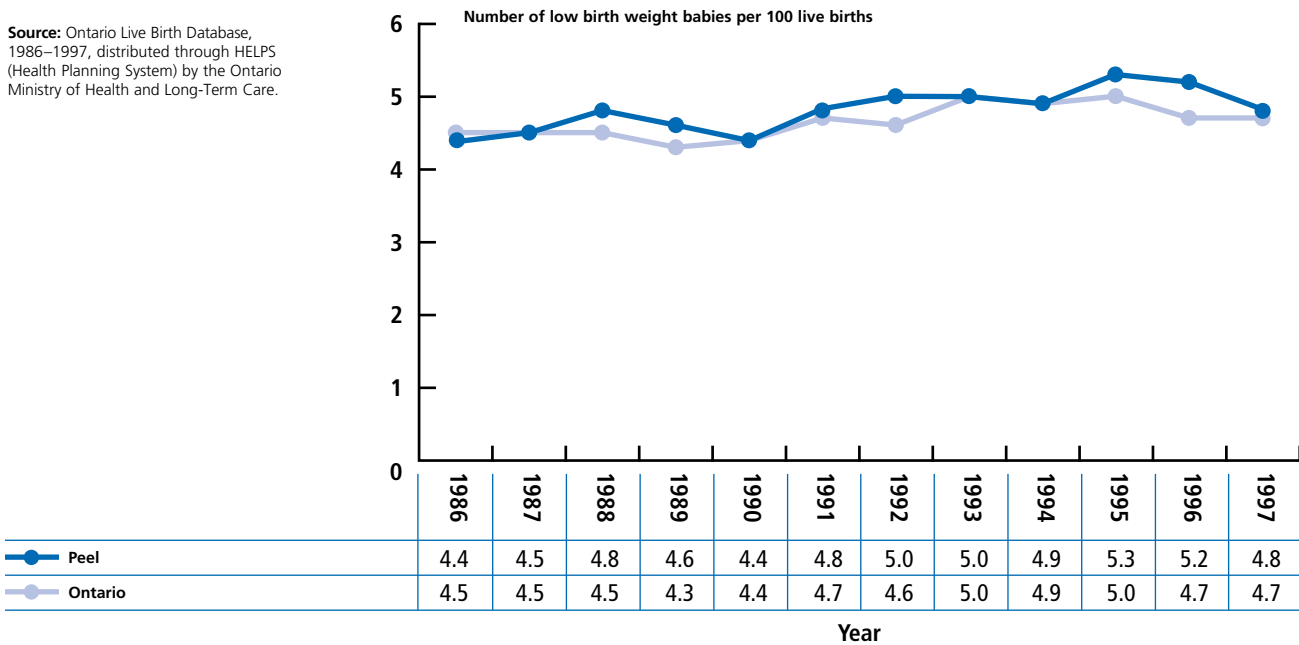
Results of several Canadian studies have shown that the increasing proportion of low birth weight babies is a function of an increase in the proportion of pre-term births.<sup>14,15,16</sup> In these studies, potential reasons for the increases seen in low birth weight and pre-term births were given. These included: increased registration of extremely early births (20–27 weeks), increased use of ultrasound-based estimates of gestational age,<sup>16</sup> increased obstetrical intervention,<sup>15</sup> increased multiple birth rates,<sup>15</sup> and increased use of reproductive technologies such as in-vitro fertilization and hormone induction of pregnancy.<sup>17</sup> These increases in low birth weight and pre-term births could also be explained by decreased availability of obstetrical care providers, economic changes, or lack of access to comprehensive prenatal programs.<sup>14</sup>

Currently in Ontario, problems with recording the duration of pregnancies have been identified<sup>18</sup> and until such time as they are resolved, analyses of gestational age cannot be conducted. Babies born in multiple births (twins, triplets, etc.) have lower birth weights than singleton births. In Peel, the number of multiple births varies from year to year, influencing rates of low birth weight. For this reason, low birth weight rates in this report are reported separately for singleton and total births.

As shown in Figure 3.1, low birth weight rates\* among singleton births increased gradually between 1986 and 1997 in both Peel and Ontario. Peel's singleton low birth weight rates were either the same or slightly higher than rates in Ontario. Although not shown in the figure, this finding was similar for total births.

**Figure 3.1—Singleton Low Birth Weight, Region of Peel and Ontario, 1986–1997**

Source: Ontario Live Birth Database, 1986–1997, distributed through HELPS (Health Planning System) by the Ontario Ministry of Health and Long-Term Care.



An examination of low birth weight births by the kind of birth in Peel (single, twin, triplet, etc.) between 1986 and 1997 revealed that less than 5% of single births were born with a weight of less than 2,500 grams. Almost half of all twins were born with a weight of less than 2,500 grams. Approximately 90% of all triplets and 100% of all quadruplets were born with a weight less than 2,500 grams.

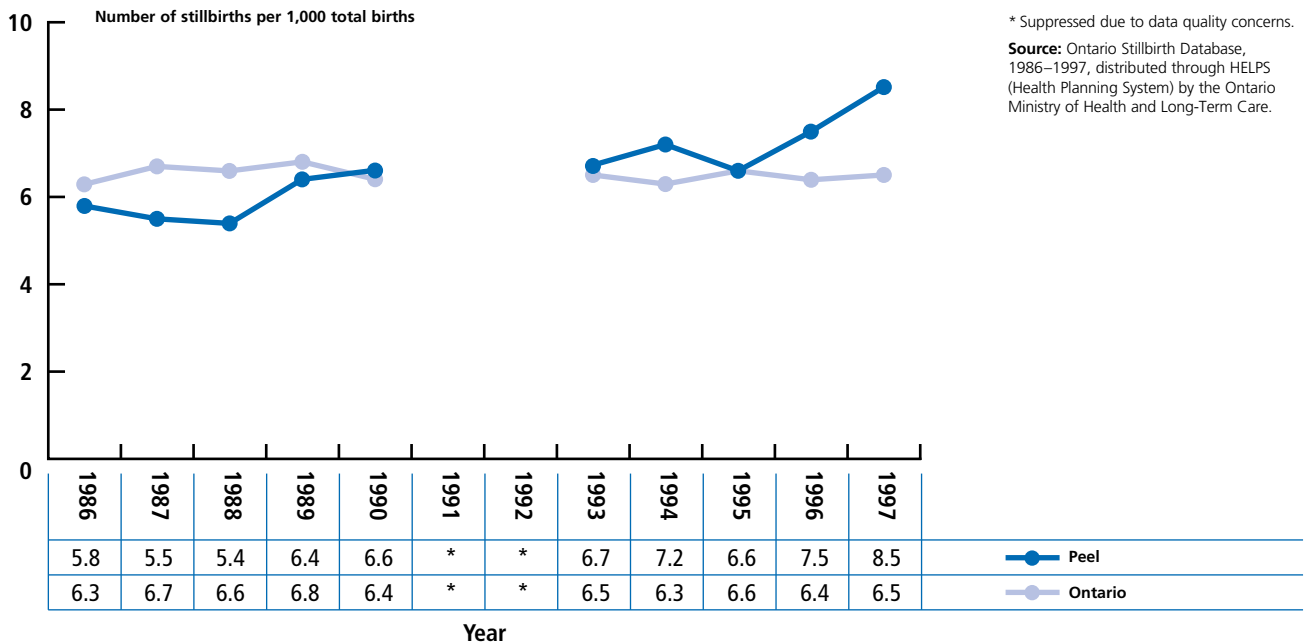
In Peel during 1997, most low birth weight infants were born to mothers aged 25–34 years; however, the highest rates of low birth weight were to mothers aged 15–19 years and 40 years and older, who had fewer births overall. This was true for both total live births and singleton live births.

\* The low birth weight rate is defined as the number of live births under 2,500 grams per 100 live births.

## STILLBIRTHS

With the exception of 1991 and 1992 data, which were excluded from this analysis due to data quality concerns, stillbirth rates<sup>†</sup> in the Region of Peel gradually increased between 1986 and 1997.

**Figure 3.2—Stillbirths,  
Region of Peel and Ontario, 1986–1997**



The rate of 8.5 stillbirths per 1,000 total births in Peel in 1997 represented a 12-year high (see Figure 3.2). Since Peel’s rates of stillbirth might be expected to fluctuate more than rates in Ontario due to smaller numbers, the data for years following 1997 will need to be examined when available to determine whether a rising trend exists.

In Ontario, stillbirth rates remained stable at around 6.5 stillbirths per 1,000 total births.

<sup>†</sup> Stillbirth rates are defined as the number of stillbirths per 1,000 total births (stillbirths plus live births).

## CONGENITAL ANOMALIES

### Congenital Anomalies

Data about congenital anomalies were collected from the Canadian Congenital Anomalies Surveillance System (CCASS). The CCASS obtains information on congenital anomalies detected at birth and up to one year of age from hospital records and through other provincial systems.<sup>19</sup> Limitations of the system include lack of reporting from some hospitals, lack of outpatient data, exclusion of data on affected infants admitted to hospital for other reasons, and exclusion of fetuses with anomalies that result in termination of the pregnancy.<sup>19</sup>

Rates of congenital anomalies in Peel tended to be slightly higher than rates for the province between 1993 and 1997 (see Figure 3.3). Congenital anomaly rates in Peel and Ontario increased slightly between 1995 and 1997.

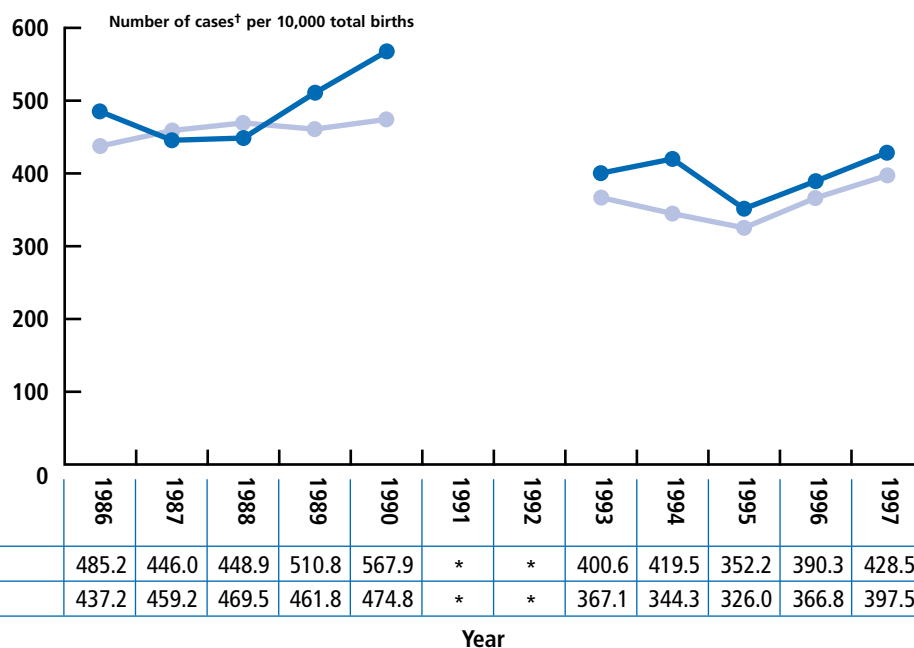
**Figure 3.3—Congenital Anomalies, Region of Peel and Ontario, 1986–1997**

\* Suppressed due to quality concerns regarding stillbirth data.

† Cases might include more than one defect.

**Sources:** Canadian Congenital Anomaly Surveillance System (CCASS), Laboratory Centre for Disease Control, Health Canada.

Ontario Live Birth and Stillbirth Databases 1986–1997, distributed through HELPS (Health Planning System) by the Ontario Ministry of Health and Long-Term Care.



### Neural Tube Defects

Neural tube defects (NTD) are birth defects associated with malformation of the embryonic spinal cord and certain parts of the brain.<sup>20</sup> These defects include anencephalus, spina bifida and encephalocele. Spina bifida results when the lower portion of the neural tube fails to close properly, and may lead to paralysis and hydrocephalus. In anencephaly, the cranial vault and cerebral hemispheres are missing. Encephalocele is a condition in which a cranial defect results in protrusion of the brain outside the skull.<sup>20</sup>

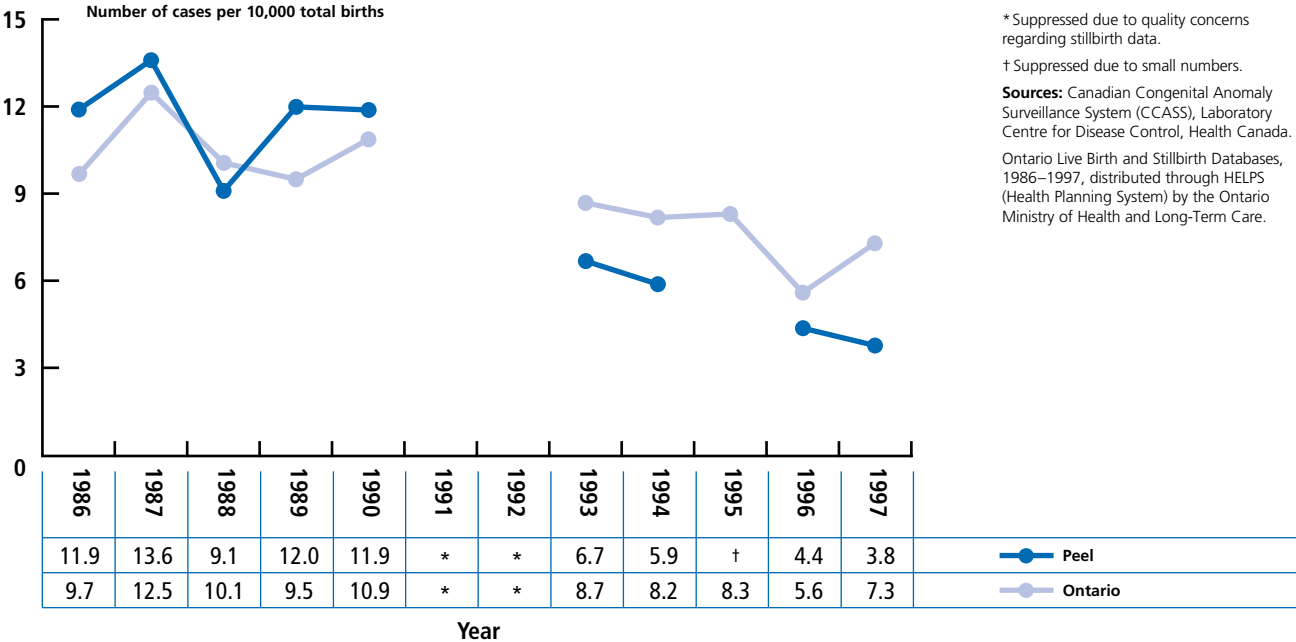
Health Canada estimates that approximately 400 infants are born each year in Canada with a neural tube defect (equal to a rate of approximately one per 1,000 total births).<sup>21</sup> Unfortunately, there are no data on the number of pregnancies terminated after screening detected a NTD or after the fetus spontaneously aborted as a result of a NTD.<sup>20</sup>

Closure of the neural tube is complete 26–28 days after conception, when many women do not even know they are pregnant.<sup>22</sup> Current recommendations therefore suggest that all women of child-bearing age consume a minimum of 0.6 mg of folic acid per day, from diet and vitamin supplements, to reduce the risk of having a baby with a NTD.<sup>21</sup>

In Canada, an analysis of birth defects found that between 1979–1981 and 1991–1993, rates of anencephalus, spina bifida and congenital hydrocephalus decreased by 53%, 28% and 21% respectively.<sup>23</sup> The availability and use of prenatal screening techniques and selective pregnancy terminations were cited as important contributors to the reported prevalence rates.

Data on encephalocele were unavailable for the Region of Peel for the period being examined, so for the purpose of this analysis, neural tube defects include only anencephalus and similar anomalies, and spina bifida for both Peel and Ontario comparisons. Data for 1991 and 1992 were omitted because of data quality concerns regarding stillbirths. As shown in Figure 3.4, rates of neural tube defects in both Peel and Ontario decreased between 1986 and 1996; however, the rate for Ontario rose slightly in 1997 to 7.3 neural tube defects per 10,000 births.

**Figure 3.4—Neural Tube Defects, Region of Peel and Ontario, 1986–1997**



## PERINATAL AND INFANT MORTALITY

### Perinatal Mortality

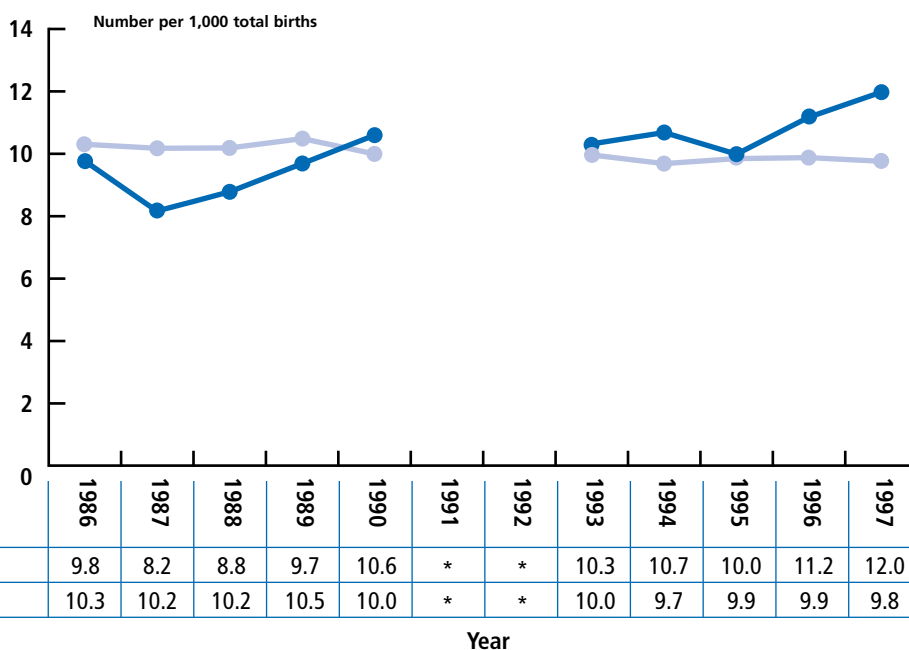
The perinatal period is defined as the time period between 20 weeks gestation or 500 grams in weight, and seven days after delivery. Rates of perinatal mortality include stillbirths and infant deaths up to seven days of age, expressed per 1,000 total births (live births plus stillbirths).

Between 1986 and 1989, Peel's perinatal mortality rates were below those of the province. Peel's rate started to rise in 1988. This upward trend continued, with slight fluctuations, right up to 1997 when the rate for Peel reached a 12-year high of 12.0 deaths per 1,000 births (*see Figure 3.5*). Meanwhile, rates of perinatal mortality across the province were fairly stable, at an average of 10.0 deaths per 1,000 total births, over the same period.

**Figure 3.5—Perinatal Mortality, Region of Peel and Ontario, 1986–1997**

\*Suppressed due to quality concerns regarding stillbirth data.

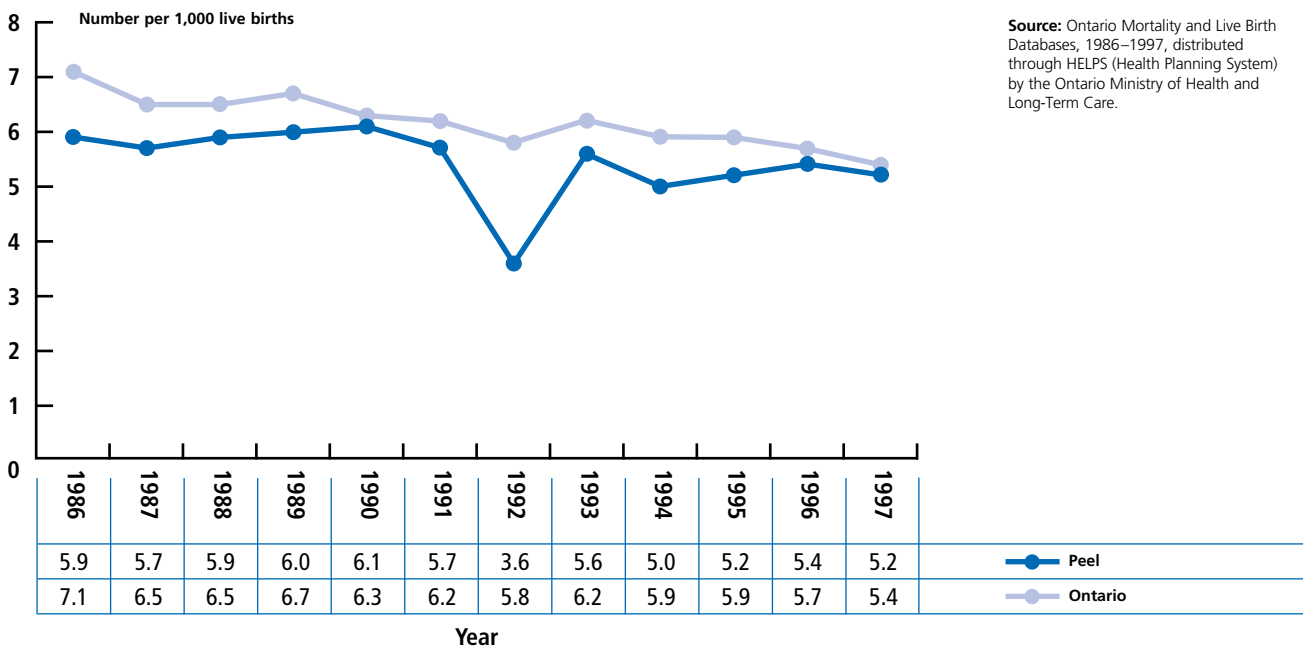
Source: Ontario Mortality Database, Ontario Live Birth Database and Stillbirth Databases, 1986–1997, distributed through HELPS (Health Planning System) by the Ontario Ministry of Health and Long-Term Care.



## Infant Mortality

Infant mortality includes all deaths that occur to live-born infants and children under one year of age, and is expressed per 1,000 live births. Infant mortality rates gradually decreased in Ontario over the 12-year period between 1986 and 1997, from 7.1 to 5.4 deaths per 1,000 live births. In Peel, rates started at a lower point in 1986, at 5.9 deaths per 1,000 live births, and declined to their lowest point in 1992 (3.6 deaths per 1,000 live births). Rates have continued to fluctuate around 5.2 deaths per 1,000 live births since that time (see Figure 3.6).

**Figure 3.6—Infant Mortality, Region of Peel and Ontario, 1986–1997**



In Canada in 1996, the infant mortality rate was 5.6 deaths per 1,000 live births.<sup>8</sup> While the decline in these rates over time has been substantial, international experience indicates there is still room for improvement. For example, Japan, Finland and Sweden boast rates of 3.8, 4.0 and 4.0 deaths per 1,000 live births respectively, although these rates might not be directly comparable due to differences in definitions.<sup>8</sup>

The decline in infant mortality and increase in perinatal mortality might be linked to the increased registration of very premature infants. Extremely premature infants—births that previously may have been registered as spontaneous abortions, if at all—are now surviving and being registered as births due to advances in obstetric and neonatal care.<sup>24</sup>

Selected causes of infant death are shown in Table 3.1. Peel data for the years 1986–1996 were combined to provide adequate numbers for analysis. The most frequent cause of infant death in both Peel and Ontario was related to conditions occurring in the perinatal period. These included maternal conditions that affect the fetus, complications of pregnancy and birth, and conditions related to birth trauma, birth weight, length of gestation and infection.

**Table 3.1—Selected Causes of Death in Infants (Children Less than One Year), Region of Peel and Ontario, 1986–1996 Combined**

Cause of Death	Region of Peel			Ontario		
	Number	Per Cent	AAR*	Number	Per Cent	AAR*
Perinatal Conditions	355	48.6	264.2	4,309	43.5	276.0
Congenital Anomalies	220	30.1	163.7	3,020	30.5	189.9
Ill-Defined Conditions	87	11.9	64.7	1,451	14.6	91.3
Injuries and Poisonings	18	2.5	13.4	228	2.3	14.3
Nervous System and Sense Organ Disorders	18	2.5	13.4	203	2.0	12.8
Respiratory Diseases	8	1.1	6.0	185	1.9	11.6
Infectious Diseases	5	0.7	3.7	118	1.2	7.4
All Others	19	2.6	14.1	391	3.9	24.6
<b>Total</b>	<b>730</b>	<b>100.0</b>	<b>543.3</b>	<b>9,905</b>	<b>100.0</b>	<b>622.9</b>

\*Average annual rate per 100,000.

Source: Ontario Mortality Databases, 1986–1996, distributed through HELPS (Health Planning System) by the Ontario Ministry of Health and Long-Term Care.

In Peel, nearly half (49%) of all infant deaths were caused by perinatal conditions, while another 30% were caused by birth defects. Similar proportions were found for Ontario. The next largest category of cause of death among infants was ill-defined conditions, which includes Sudden Infant Death Syndrome (SIDS). This ill-defined conditions category accounted for 12% and 15% of infant deaths in Peel and Ontario, respectively.

As with infant mortality rates, Peel’s average annual rates of infant death by selected causes were generally lower than the corresponding rates in Ontario.



## BREASTFEEDING

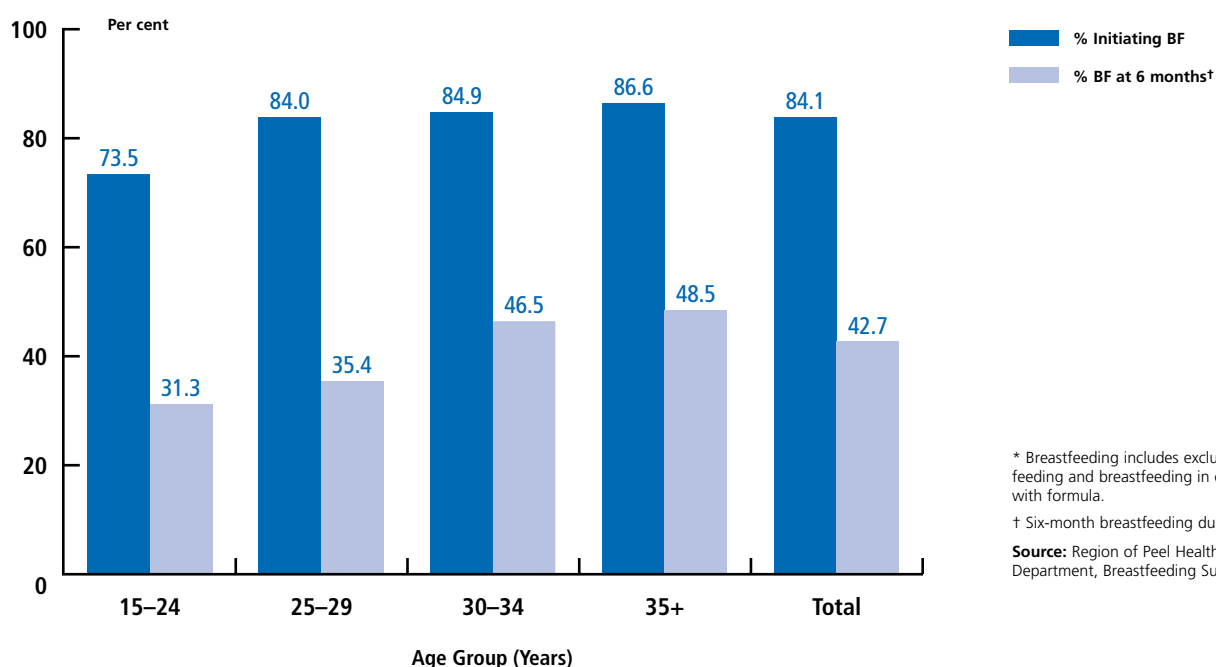
Breastfeeding of infants during the first six months of life is widely recognized to be the optimal method of feeding and provides benefits to both the mother and infant.<sup>25</sup> Breastfeeding reduces maternal anxiety, develops maternal self-esteem, promotes contraction of the uterus, improves bone remineralization and possibly reduces the risk of ovarian cancer.<sup>26</sup> Benefits to the infant include protection against gastrointestinal and respiratory infections, otitis media and the possible enhancement of cognitive function.<sup>27</sup>

In 2000, the Region of Peel Health Department completed a telephone survey with 541 mothers who had a live born infant in April, May or June of 1999. The primary purpose of the study was to determine the breastfeeding initiation and duration rates in Peel. Other factors, such as awareness of breastfeeding and other infant feeding supports and services in the community and reasons for cessation, were also examined. Details about the study methodology have been previously published.<sup>25</sup>

Eighty-four per cent of mothers who participated in the survey initially fed their babies breast milk at birth. Of these mothers, 79.5% breastfed exclusively and 4.6% fed their babies a combination of breast milk and formula.

The six month breastfeeding duration rate from this study was 42.7% (using all women in the study as the denominator). Breastfeeding initiation rates and duration rates varied by the age of the mother as shown in Figure 3.7.

**Figure 3.7—Proportion of Mothers Initiating Breastfeeding\* and Breastfeeding to Six Months by Age of Mother, Region of Peel, 2000**



In this study, the following factors were associated with breastfeeding:

- Age—younger mothers (aged 15–24 years) were less likely to initiate and continue breastfeeding than older mothers
- Education—higher levels of education were found to be associated with higher rates of breastfeeding duration and initiation

There were no associations between:

- Parity and breastfeeding initiation—comparing the initiation rates of breastfeeding of first-time mothers to mothers of more than one child
- Cultural factors (born in Canada) and breastfeeding initiation—comparing the initiation rates of breastfeeding between mothers born in Canada and those born outside of Canada

In the breastfeeding study, reasons for discontinuation of breastfeeding included:

- Concerns the baby was not getting enough to eat/breast milk supply (41%)
- Return to work (35%)
- Social reasons (15%)

## SUMMARY

### Low Birth Weight

The rising rates of low birth weight (LBW) seen in Peel and Ontario are of concern. In 1997, the singleton LBW for Peel was 4.8 per 100 live births and 4.7 for Ontario. In Peel, the highest rates of singleton LBW were seen in mothers aged 15–19 years and 40 years and older.

### Stillbirths

Stillbirth rates in Peel have increased slowly since 1986. The stillbirth rate of 8.5 stillbirths per 1,000 total births in Peel represents a 12-year high. Stillbirth rates for Ontario have remained relatively stable at around 6.5 stillbirths per 1,000 total births.

### Congenital Anomalies

Rates of congenital anomalies in Peel and Ontario increased slightly between 1995 and 1997, and are higher in Peel than those in the province. In contrast, neural tube defects in Peel and Ontario have declined over time. By 1997, Peel had reached an all-time low of 3.8 neural tube defects per 10,000 births. With the exception of 1996, Ontario rates have remained relatively constant between 1993 and 1997.

### **Infant and Perinatal Mortality**

In 1997, the perinatal mortality rate reached a high of 12.0 per 1,000 total births. Rates in Peel over the last few years (1994–1997) have been higher than Ontario. In contrast, infant mortality has declined in Ontario and declined less dramatically in Peel. By 1997, infant mortality rates in Peel were 5.2 per 1,000 live births compared to 5.4 per 1,000 live births in Ontario. In Peel, almost half of infant deaths (49%) were due to perinatal conditions, one-third (30%) to congenital anomalies and an additional 12% to ill-defined conditions such as SIDS.

### **Breastfeeding**

Breastfeeding initiation rates of 84% were calculated using data from a Region of Peel survey conducted in 2000. The six-month duration rate from this same study was 43%.

Both breastfeeding initiation and duration varied by the age of the mother. Breastfeeding initiation rates increased with each increasing age group, as did the six-month duration rates.

The most common reasons for discontinuation of breastfeeding were concerns that the baby was not getting enough to eat and concerns about the breast milk supply (41%). Just over one-third (35%) of women discontinued because they returned to work and an additional 15% mentioned social reasons.