

# Infant Mortality in Alberta: First Nations and Non-First Nations

## Purpose

Infant mortality is an important indicator of population health. First Nations infants have a higher risk of mortality than Non-First Nations infants. While the risk of mortality among Non-First Nations infants appears to be decreasing or stable over time, the risk of mortality among First Nations infants appears to be increasing over time.

The purpose of this bulletin is to identify risk factors that may contribute to the difference in the risk of mortality between First Nations and Non-First Nations infants.

## Key Findings

In the neonatal period (within 28 days after birth), risk of mortality among First Nations infants is typically around 1.5 times that of Non-First Nations infants and in the post-neonatal period (29 days to one year after birth), risk of mortality among First Nations infants is typically around 4 times that of Non-First Nations infants.

While the risk of mortality among Non-First Nations infants appears to be slightly decreasing or stable over time, the risk of mortality among First Nations infants appears to be increasing over time, with the increasing trend beginning around 2006. The increasing risk of mortality among First Nations infants from 2006 to 2010 appears to be primarily in the neonatal period among those infants on the lower edge of viability (less than 30 weeks gestation or 1500 grams).

First Nations infants have a higher risk of mortality than Non-First Nations infants but generally have a similar overall risk of mortality compared to Non-First Nations infants whose family received Alberta Health Care Insurance Plan (AHCIP) premium subsidies. In Non-First Nations mothers, greater maternal age is associated with improved social environment; however, this relationship is not seen in First Nations mothers.

## Applications

Based on the risk factors examined, much of the increased risk of mortality in First Nations infants appears to be related to poorer social environments, rather than distance to care, environmental risk factors or biological risk factors. The largest relative difference in the risk of mortality between First Nations and Non-First Nations infants is in the post-neonatal period; mostly in causes of death that are thought to be preventable with appropriate postnatal care and healthy social environments. Further, the largest relative difference in the risk of mortality between First Nations and Non-First Nations infants occurs in urban geographies where distance to care is less of a barrier to natal care than in rural or remote geographies.

While social environment is difficult to improve in the short term, an immediate action might be for public health nurses to make a larger focus on communicating Sudden Infant Death Syndrome (SIDS) preventive strategies to parents when doing post-natal follow-up. If risk of mortality due to SIDS in First Nations infants were to become the same as in Non-First Nations infants, then – all else being equal – the overall risk of mortality in First Nations infants would be reduced from approximately 12 per 1000 to approximately 9 per 1000.

## Methods

Alberta Vital Statistics birth and death records were examined for the period 2000 to 2010 and were linked to AHCIP records to identify infants and mothers that were Registered First Nations. Statistics Canada 2006 Census data were also used as a proxy for social environment.

Risk factors for infant mortality, including birth weight, gestational age, small for gestational age, large for gestational age, maternal age, geographic location, congenital anomalies, social environment proxies were examined. For the sake of brevity, only those risk factors that appeared to contribute to the difference in the risk of mortality between First Nations and Non-First Nations infants will be described in this bulletin.

Neonatal infant mortality (within 28 days after birth) and post-neonatal infant mortality (29 days to one year after birth) have similar but differing risk factors; with neonatal risk factors tending to be more prenatal and post-neonatal infant mortality risk factors tending to be more postnatal. Although risk factors were examined by neonatal and post-neonatal mortality throughout, comparisons may not be described in this bulletin for the sake of brevity.

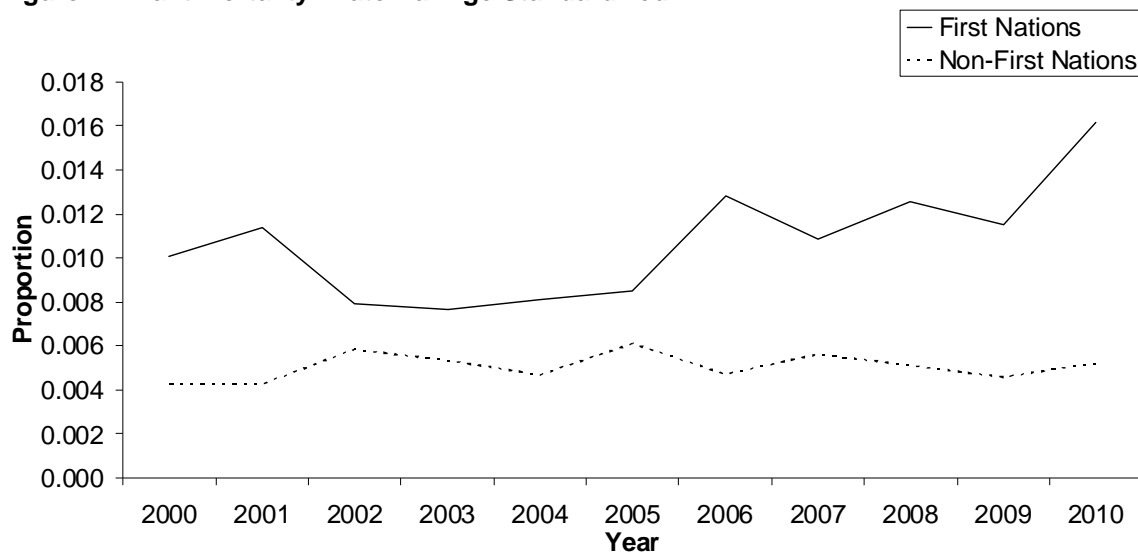
In general, univariate or maternal age-standardized univariate results are described in this bulletin. Several logistic regression models using SAS proc GAM were used to determine the independent effect of risk factors on infant mortality. Although there were slight variations, the adjusted risk factors appeared to be quite similar to the univariate risk factors, and so will not be described in this bulletin.

## Results

### Infant Mortality

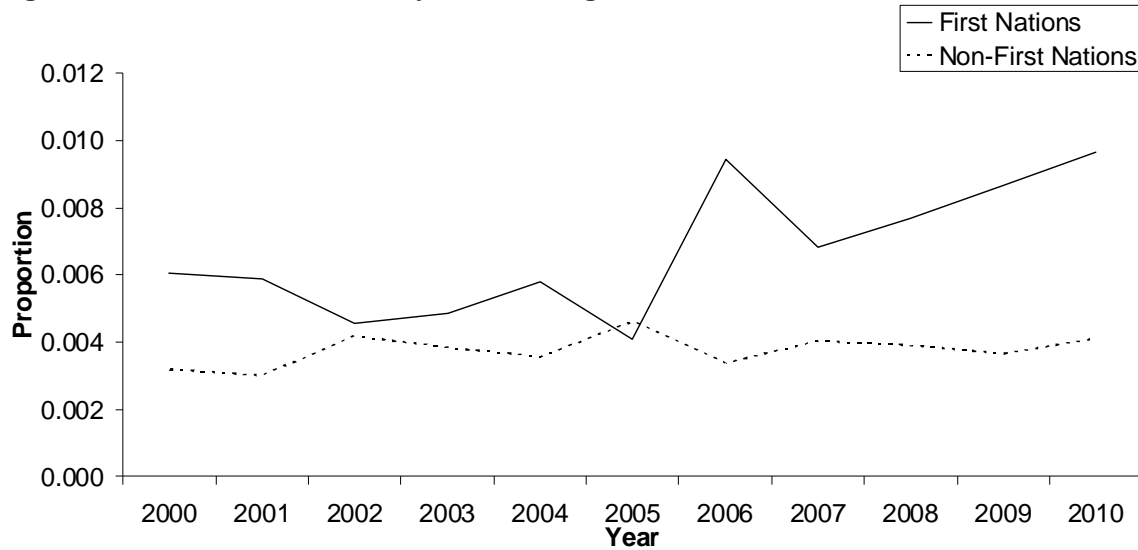
First Nations infants have a higher risk of mortality than Non-First Nations infants. While the risk of mortality among Non-First Nations infants appears to be slightly decreasing or stable over time, the risk of mortality among First Nations infants appears to be increasing over time, with the increasing trend beginning around 2006.

**Figure 1: Infant Mortality: Maternal Age Standardized**

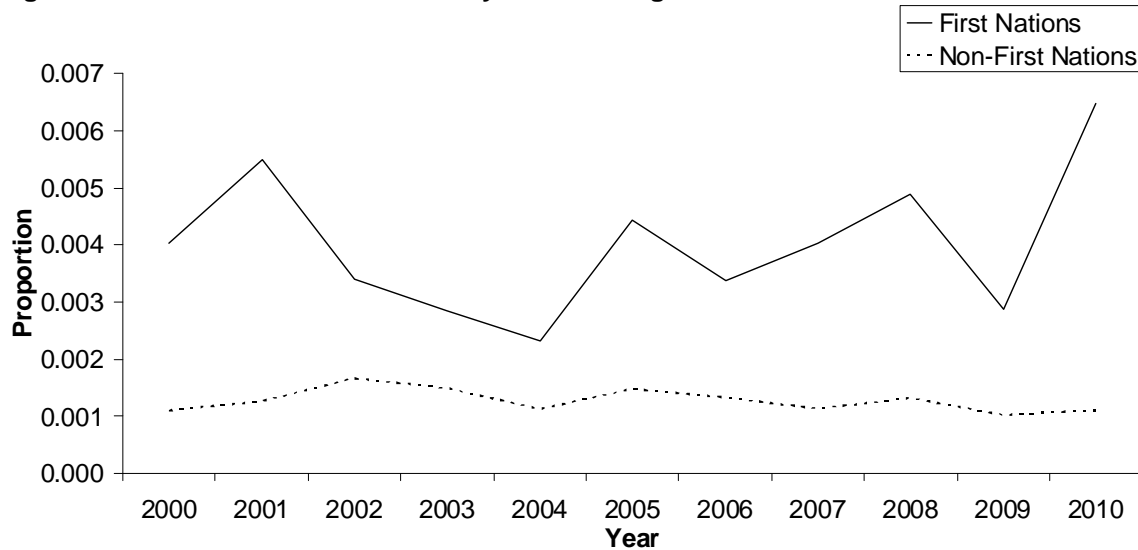


In the neonatal period, risk of mortality among First Nations infants is typically around 1.5 times higher than Non-First Nations infants (aside from the increase beginning in 2006) and in the post-neonatal period, risk of mortality among First Nations infants is typically around 4 times higher than Non-First Nations infants.

**Figure 2: Neonatal Infant Mortality: Maternal Age Standardized**



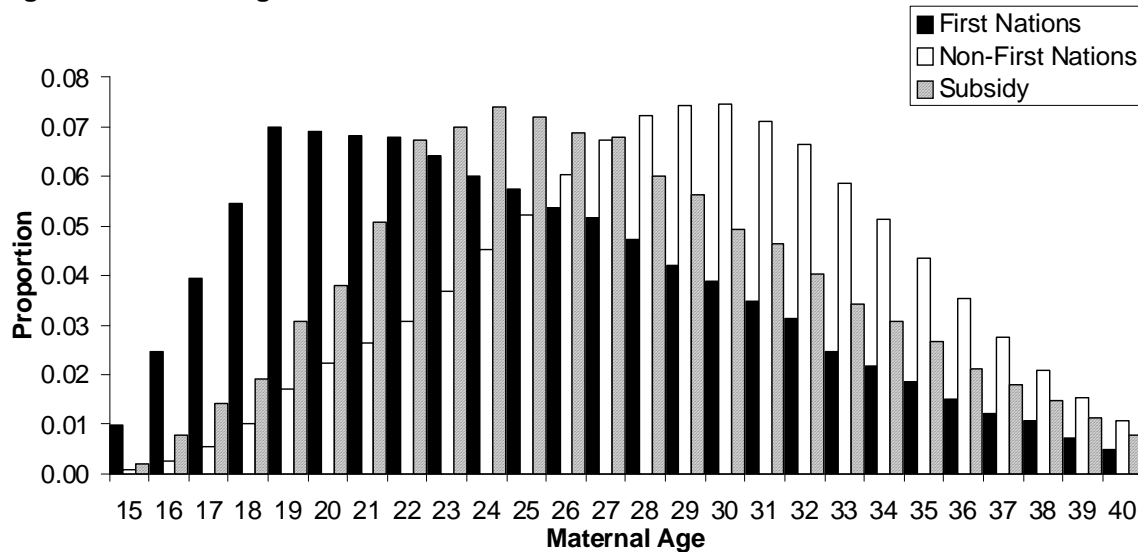
**Figure 3: Post-Neonatal Infant Mortality: Maternal Age Standardized**



## Maternal Age

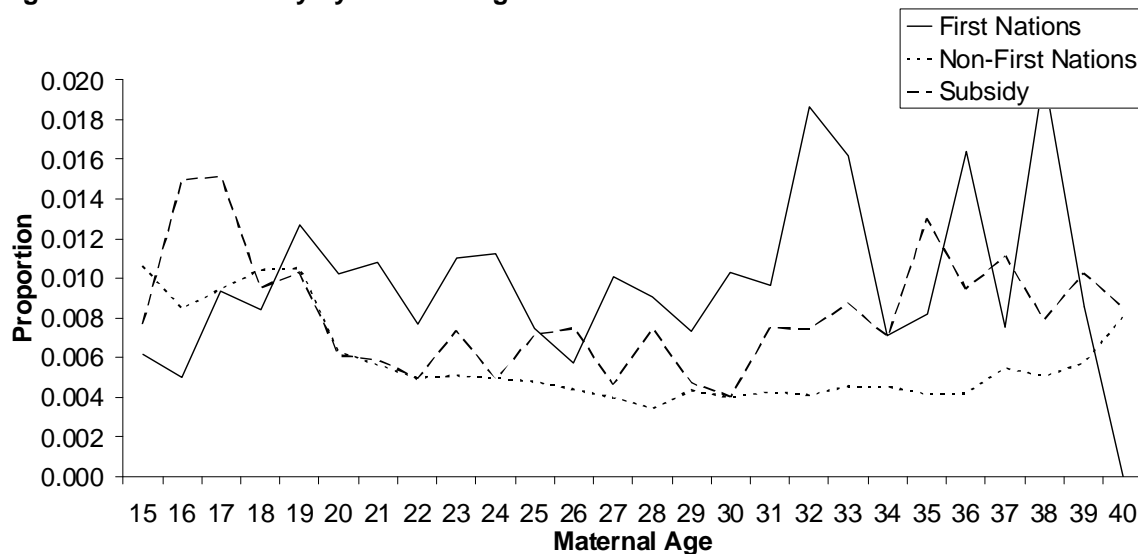
First Nations infants tend to be born to younger mothers than Non-First Nations infants and Non-First Nations infants whose family received Alberta Health Care Insurance Plan (AHCIP) premium subsidies.

**Figure 4: Maternal Age Distribution**



The risk of mortality by maternal age differs for First Nations and Non-First Nations infants. For First Nations infants, the risk of mortality is generally constant – although somewhat higher in maternal ages over 30 – regardless of maternal age. For Non-First Nations infants, the risk of mortality is highest for maternal ages under 18, then steadily decreasing until 28, remaining constant until 35, then slightly increasing thereafter. There is a similar pattern for Non-First Nations infants whose family received Alberta Health Care Insurance Plan (AHCIP) premium subsidies, with a higher risk overall in maternal ages over 22.

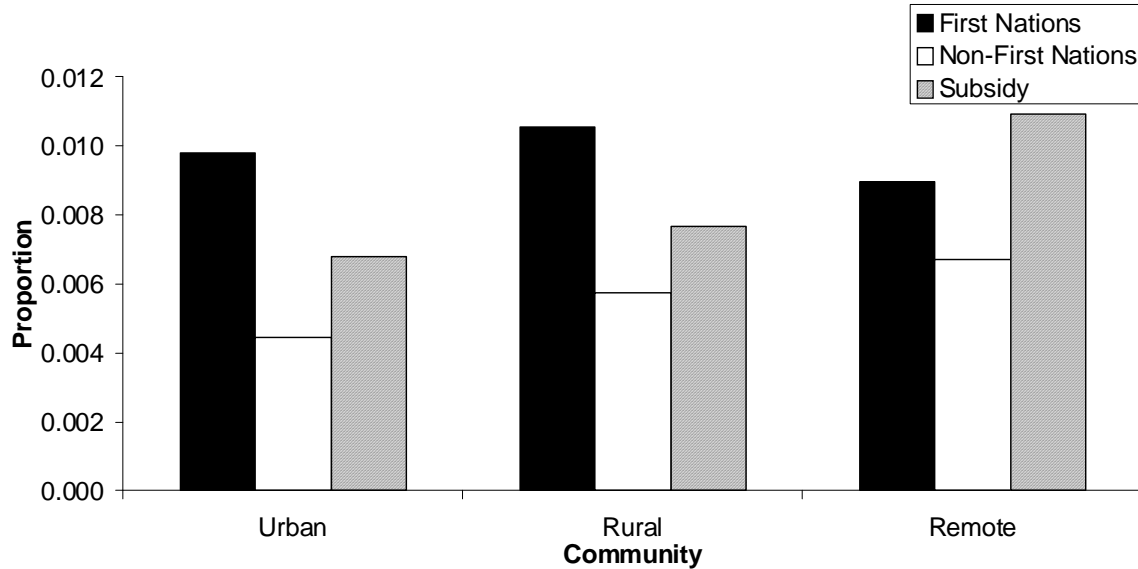
**Figure 5: Infant Mortality by Maternal Age**



## Geography

First Nations infants have a similar risk of mortality in urban, rural and remote communities. Non-First Nations infants have the highest risk of mortality in remote communities and the lowest in urban communities. The large difference in risk of mortality between First Nations and Non-First Nations infants in urban areas suggests that distance to care is likely not related to the overall difference in risk of mortality between First Nations and Non-First Nations infants.

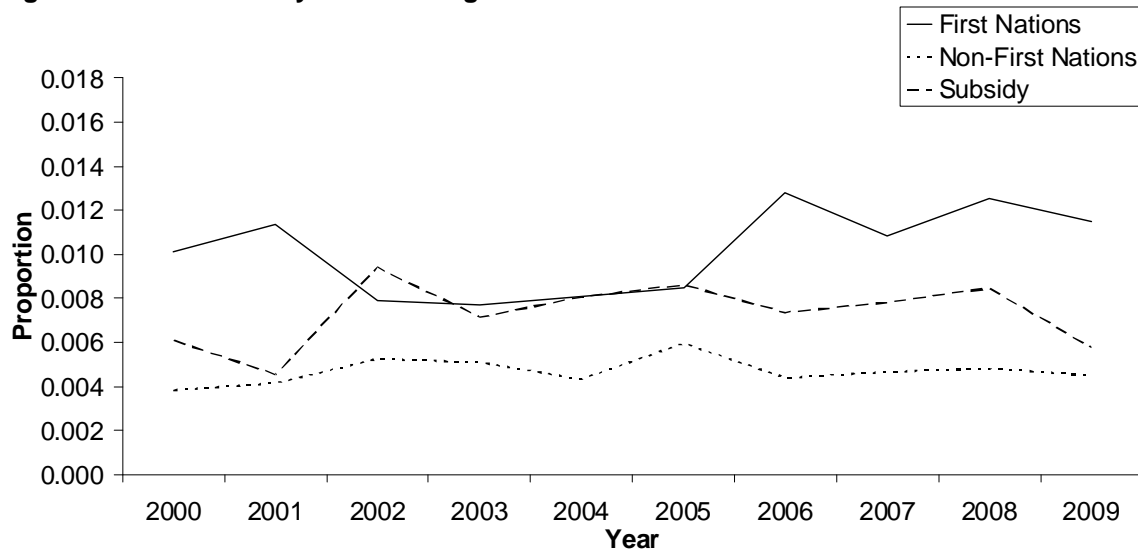
**Figure 6: Infant Mortality by Geographic Category**



## Social Environment Proxies

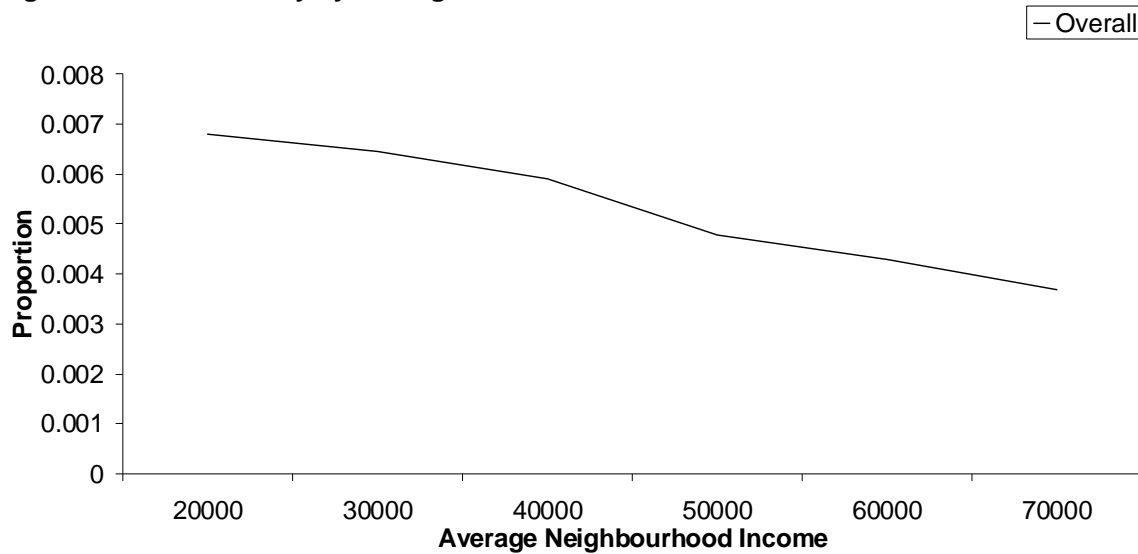
First Nations have a higher risk of mortality than Non-First Nations infants overall but a similar risk of mortality (aside from the increase beginning in 2006) compared to Non-First Nations infants whose family received AHCIP premium subsidies.

**Figure 7: Infant Mortality: Maternal Age Standardized**



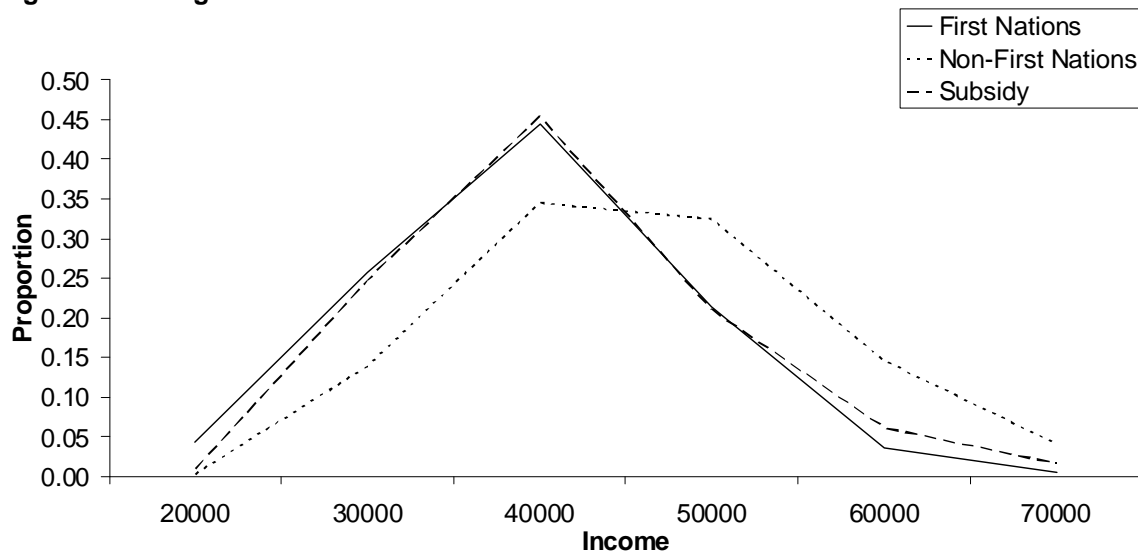
Alberta Vital Statistics birth and death records were assigned to Local Zone boundaries (132 areas) based on the mother's usual postal code of residence and the average income for each Local Zone was calculated from the Statistics Canada 2006 Census. Overall, infants that are born to mothers that live in Local Zones with lower average incomes tend to have a higher risk of mortality than infants born to mothers that live in Local Zones with higher average incomes.

**Figure 8: Infant Mortality by Average Income of Local Zone**



First Nations infants and Non-First Nations infants whose family received AHCIP premium subsidies tend to be born to mothers that live in Local Zones with lower average incomes than Non-First Nations infants.

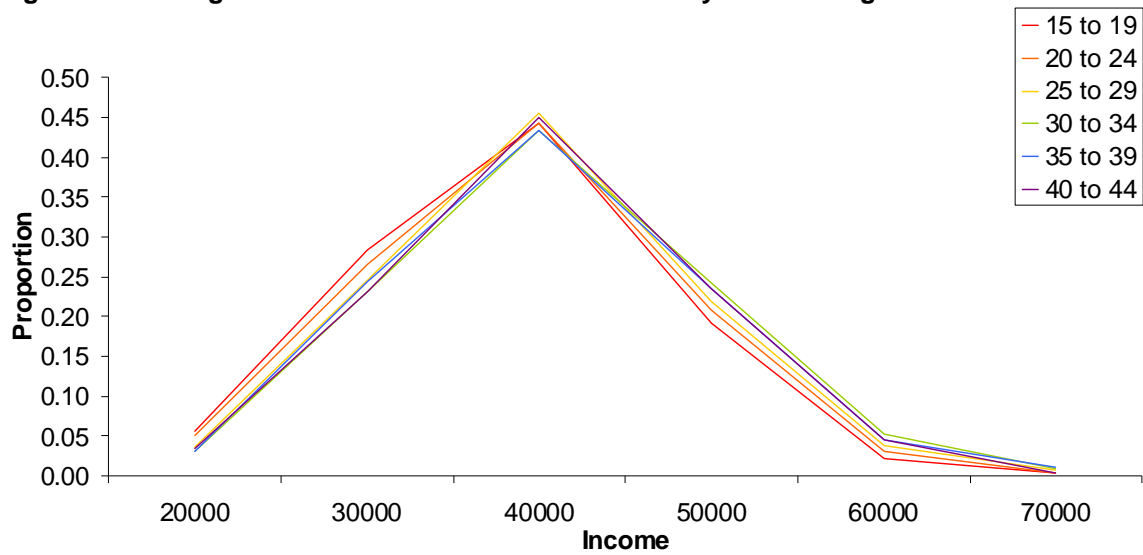
**Figure 9: Average Income of Local Zone Distribution**



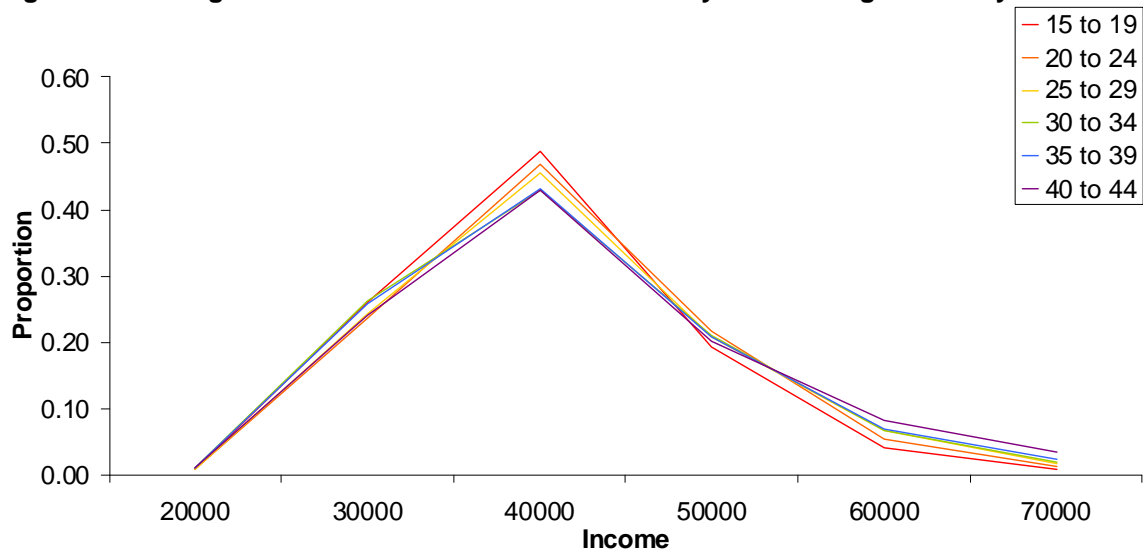
Maternal age and Local Zone average income are positively correlated but the relationship differs for First Nations mothers, Non-First Nations mothers and Non-First Nations mothers whose family received AHCIP premium subsidies. For First Nations mothers the relationship is relatively weak, it is slightly stronger for Non-First Nations mothers whose family received AHCIP premium subsidies and quite strong for Non-First Nations mothers. These differing relationships may

suggest why the risk of mortality for First Nations infants appears to be generally constant regardless of maternal age (see Figure 5).

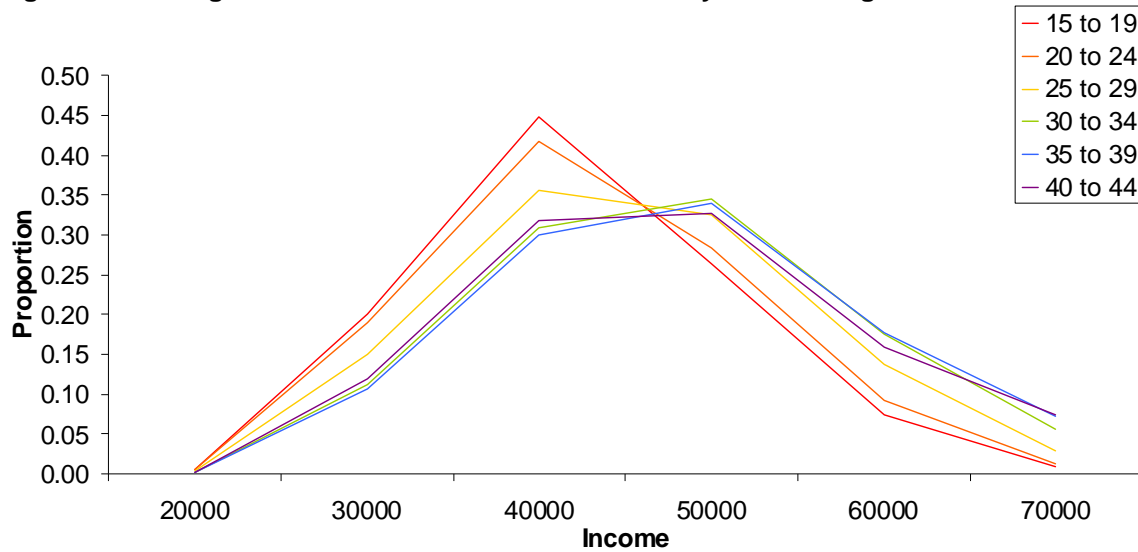
**Figure 10: Average Income of Local Zone Distribution by Maternal Age: First Nations**



**Figure 11: Average Income of Local Zone Distribution by Maternal Age: Subsidy**

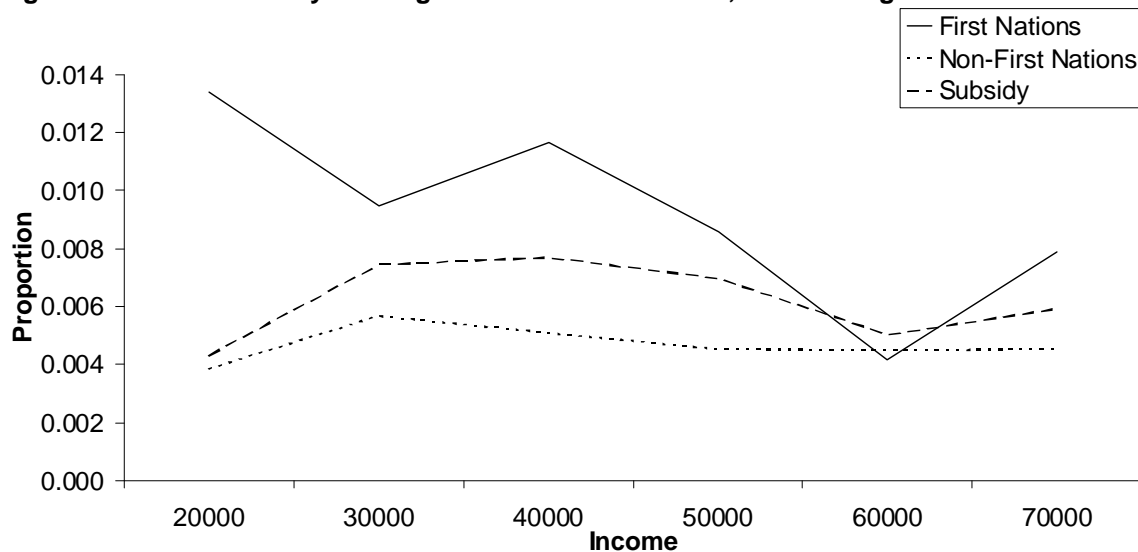


**Figure 12: Average Income of Local Zone Distribution by Maternal Age: Non-First Nations**



After standardizing by maternal age, First Nations infants that are born to mothers that live in Local Zones with lower average incomes tend to have a higher risk of mortality than infants born to mothers that live in Local Zones with higher average incomes. The relationship appears similar but weaker for Non-First Nations infants whose family received AHCIP premium subsidies. For Non-First Nations infants, the risk of mortality appears to be constant regardless of the average income of the Local Zone. Assuming that Local Zone average income is a reasonable proxy for social environment, these relationships perhaps suggests that (as mentioned above) the risk of mortality in First Nations infants is essentially constant regardless of maternal age (see Figure 5) largely because the social environment of First Nations mothers does not improve with maternal age as it does for Non-First Nations mothers.

**Figure 13: Infant Mortality: Average Income of Local Zone, Maternal Age Standardized**

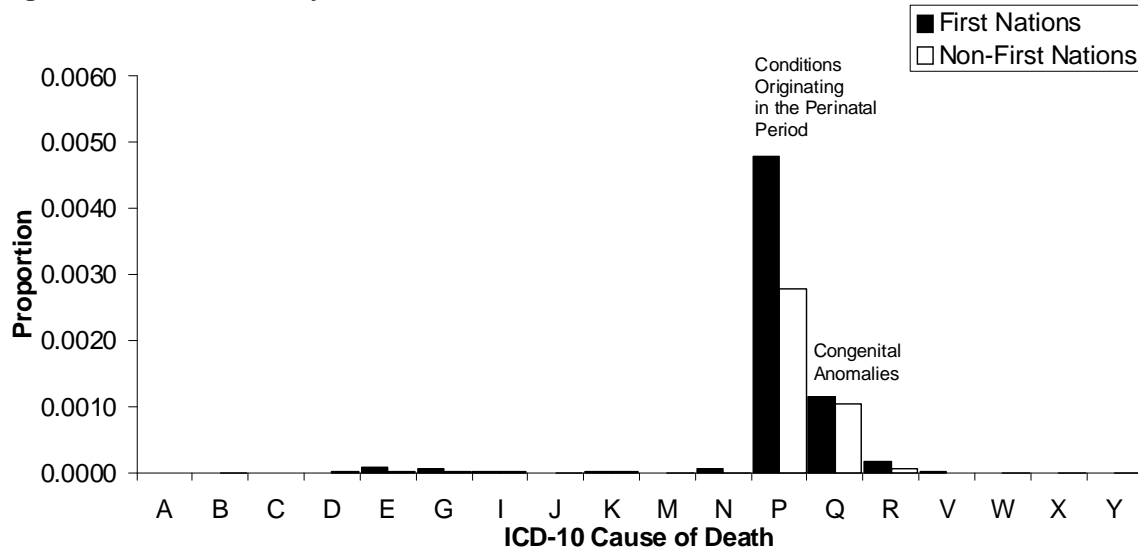




## Cause of Death

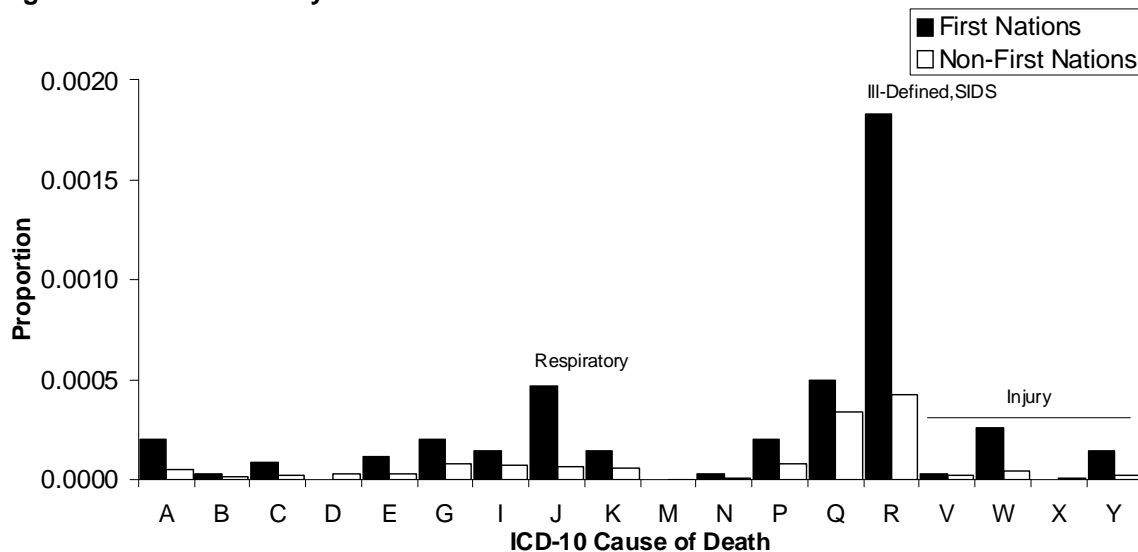
In the neonatal period, First Nations and Non-First Nations infants had similar risks of mortality for each cause of death, except for ‘conditions originating in the perinatal period’ (e.g. extreme immaturity, fetus and newborn affected by premature rupture of membranes, fetus and newborn affected by other forms of placental separation and haemorrhage, respiratory distress syndrome of newborn, birth asphyxia).

**Figure 14: Infant Mortality: Neonatal Cause of Death**



In the post-neonatal period, First Nations and Non-First Nations infants had differing risks of mortality for each cause of death, particularly in ‘ill-defined / SIDS’, ‘respiratory’ (primarily pneumonia) and ‘injury’. These causes of death with the largest differing risks are presumably preventable through appropriate postnatal care and healthy social environments.

**Figure 15: Infant Mortality: Post-neonatal Cause of Death**

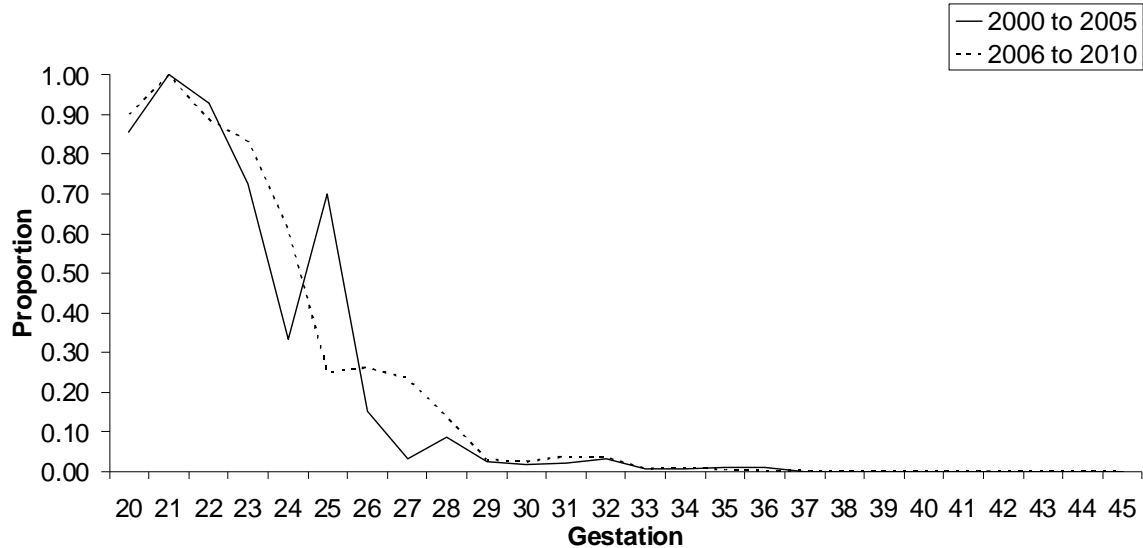


## Increasing Risk of Mortality in First Nations Infants

The increasing risk of mortality among First Nations infants from 2006 to 2010 appears to be primarily in the neonatal period (see Figures 2 and 3) among those infants on the lower edge of viability (less than 30 weeks gestation or less than 1500 grams at birth).

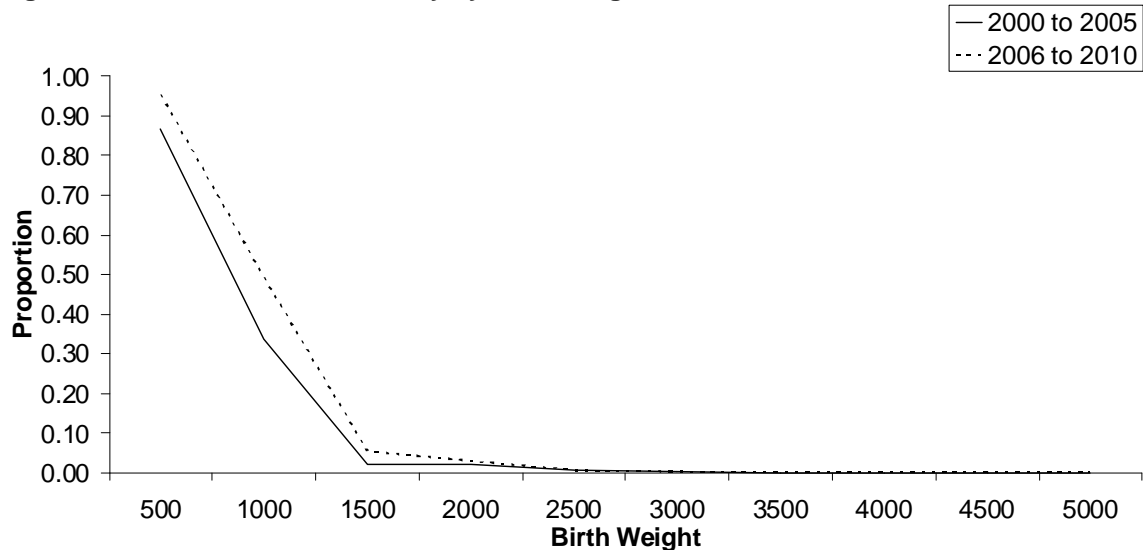
Aside from an unusually high risk at 25 weeks gestation in 2000 to 2005, the largest difference in the risk of mortality for First Nations infants between 2000 to 2005 and 2006 to 2010 is in gestational ages under 30 weeks.

**Figure 16: Neonatal Infant Mortality by Gestation: First Nations**



The largest difference in the risk of mortality for First Nations infants between 2000 to 2005 and 2006 to 2010 is in birth weights less than 1500 grams.

**Figure 17: Neonatal Infant Mortality by Birth Weight: First Nations**



**For further information or to suggest a topic for a Public Health Surveillance Bulletin:**

Surveillance and Assessment Branch, Alberta Health

[health.surveillance@gov.ab.ca](mailto:health.surveillance@gov.ab.ca)

Looking for Health Information? Check out the Interactive Health Data Application:

[www.health.alberta.ca/health-info/IHDA.html](http://www.health.alberta.ca/health-info/IHDA.html)

ISSN: 2291-7462