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Mortality among children and youth in high-percentage First Nations identity areas, 2000-2002 and 2005-2007

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ABSTRACT

Introduction: Many First Nations children live in communities that face diverse social and health challenges compared with their non-Aboriginal peers, including some of the most socio-economically challenging situations in Canada. These differences can be seen in broad indicators of the social determinants of health. Studies of mortality in Aboriginal populations across Canada are often restricted by the lack of Aboriginal identifiers on national death records. While some studies have utilised a record-linkage approach, this is often not possible for the entire country or for recent data. Some researchers have adopted a geographic approach and examined mortality and morbidity in areas that have a high percentage of Aboriginal identity residents, and have uniformly reported elevated rates of mortality and morbidity compared with other areas. The purpose of this article was to examine child and youth mortality (aged 1 to 19 years) in areas where a high percentage of the population identified as First Nations in comparison with areas where there is a low percentage of Aboriginal identity residents.

Methods: Using a geographic threshold table approach, areas with a high percentage of Aboriginal identity peoples were classified as either First Nations, Métis, or Inuit communities based on the predominant identity group. The upper one-third of the total Aboriginal population distribution was used as a cut-off for high percentage First Nations areas, where 97.7% of the population aged 1-19 were of First Nations identity in 2006 (N=140 779). Mortality rates were then calculated for high-percentage First Nations identity areas and compared with low-percentage Aboriginal identity areas, excluding high-percentage Métis or Inuit identity areas. Deaths were aggregated for the 3 years surrounding the 2001 and 2006 census periods, and a total of 473 deaths were recorded for

2000-2002 and 493 deaths for 2005-2007. Analysis was facilitated via the correspondence of six-digit residential postal codes on vital statistics records to census geographical areas using automated geo-coding software (Statistics Canada; PCCF+).

Results: Age-standardized mortality rates for children and youth in high-percentage First Nations identity areas were significantly higher than in low-percentage Aboriginal identity areas. The rate ratio for all-cause mortality for boys was 3.2 (CI: 2.9-3.6) for 2005-2007 and 3.6 (CI: 3.2-4.2) for girls. Mortality rates for injuries had the largest difference, with rate ratios of 4.7 (CI: 4.0-5.5) and 5.3 (CI:4.5-6.3) for boys in 2000-2002 and 2005-2007 and 5.5 (CI: 4.4-6.8) and 8.3 (CI: 6.8-10.1) for girls in the same period.

Conclusion: A strength of this study is that it is the first to use national-level vital statistics registration data across two time periods to report mortality by cause for children and youth living in high-percentage First Nations areas. Vital events were geographically coded to high-percentage First Nations identity areas and compared with low-percentage Aboriginal identity areas at the Dissemination Areas level. This area-based methodology allows for mortality to be calculated for children and youth by sex and by detailed cause of death for multiple time periods. The results provide key evidence for the persistent differences in the causes of death for children and youth living in high-percentage First Nations identity areas.

Key words: Canada, child mortality, Indigenous population, rural communities, wounds and injuries.

Introduction

Studies of mortality in Aboriginal populations across Canada are often restricted by the lack of Aboriginal identifiers on national death records[1-3]. While some studies have utilised a record-linkage approach, this is often not possible for the entire country or for recent data[4-6]. Therefore, some researchers have adopted a geographic approach and examined mortality and morbidity in areas that have a high percent of Aboriginal identity residents[7-13]. These studies have uniformly reported elevated rates of mortality and morbidity for residents in areas with a high percent of Aboriginal identity residents compared with other areas.

Many First Nations children live in communities that face diverse social and health challenges compared with their non-Aboriginal peers, including some of the most socio-economically challenging situations in Canada[14,15]. These differences can be seen in broad indicators of the social determinants of health[16]. The First Nations population of Canada is significantly younger than the non-Aboriginal population, with a median age of 25 years compared with 40 years for the non-Aboriginal population. Compared with non-Aboriginal children, First Nations children were more likely to live with a lone parent, grandparent, or other relative[17]. From the 2006 Census, First Nations people were five-times more likely to live in crowded homes than non-Aboriginal people (15% vs 3%), although this has decreased by 5% since 1996. In addition, in 2006 approximately half the Aboriginal children in urban areas and one-quarter in rural areas were from low-income families[18].

Mortality from intentional and unintentional injuries as well as injury hospitalization have been shown to be particularly prevalent for children and youth in areas with high percentage of Aboriginal or First Nations identity residents[9,10,19]. To date, numerous studies have examined infant mortality and perinatal deaths, demonstrating higher rates for First Nations children and youth, and for areas with a high percent of First Nations identity residents, with mortality rates decreasing over time[2,14,20,21]. However, a national picture of mortality rates by cause, sex, and age group does not exist for Canadian children and youth living in high-percentage First Nations identity areas.

This article examines child and youth (aged 1 to 19 years) mortality in areas where a high percentage of the population

identified as First Nations as compared with low-percentage Aboriginal identity areas. The focus of this study was to develop measures specific to high-percentage First Nations areas, with those calculated for Inuit presented elsewhere[13]. The results of this analysis demonstrate not only persistent disparities in mortality for children and youth living in high-percentage First Nations identity areas, but also show this to be a valuable methodology for calculating area-based measures of population health[11].

Methods

A threshold table approach was used to classify geographic areas where a high percentage of residents were of First Nations identity[8,11]. This methodology examined the distribution of all Aboriginal identity peoples in Canada aggregated by small geographic areas, classified as high or low-percent Aboriginal by a specific threshold value. Dissemination Areas (DA) were selected as the geographic unit of aggregation. DAs are the smallest standard geographic unit that provide continuous coverage of the country and have a population of between 400 and 700 people[22]. To calculate threshold tables, DAs were grouped in ascending order by the number of Aboriginal-identity people indicated on the 2006 Census. The top one-third of the distribution (33.3%) was coded as high-percentage Aboriginal identity areas and classified by the predominant Aboriginal identity group: First Nations, Métis, or Inuit. Taken together, 97% of the population residing in these 1233 DAs identified as Aboriginal. Only the 1133 DAs classified as high-percentage First Nations identity areas were used for analysis in the present study, with 90% of the combined population identifying as First Nations, representing 45% of the total First Nations identity population enumerated by the 2006 census. DAs meeting the threshold criteria in 2006 were used to analyse mortality in 2001 and 2006 so as to maintain a consistent geography.

Mortality data were extracted from the 2000-2002 and 2005-2007 vital statistics database at Statistics Canada[23], which contains vital events for all deaths occurring to usual residents of Canada and some deaths occurring to Canadians outside the country. For each death, information on the decedent's age, sex, residential postal code, and primary cause of death was available. Cause of death was coded to the International Classification of Diseases, vol 10 (ICD-10) and classified according to selected causes in the Global Burden of Disease framework[24]. Deaths occurring to those from age 1 through 19 years were grouped for the 3 year period surrounding the 2001 and 2006 census years.

Residential postal codes for deaths were linked to 2006 DAs via the Postal Code Conversion File[25]. Linkage of death records to place of residence was improved via additional manual resolution of postal codes on death records for the years studied. Manual resolution was performed on death records where the postal code was missing by reviewing digital scans of death certificates to obtain missing values. After manual resolution, 99% of registered deaths had a valid postal code for all years combined. As many postal codes in rural areas span multiple DA boundaries, a population-weighted algorithm was employed using PCCF+ v5K software (Statistics Canada; http://www5.statcan.gc.ca/bsolc/olc-cel/olc-cel?lang=eng&catno=82F0086X) to assign death records to the most likely DA[26]. The 2006 DA boundaries were used for both periods analysed in order to maintain consistent geographic areas between periods.

The denominator for mortality rates was derived from the 2001 and 2006 censuses, with a correspondence file used to link 2001 DA identifiers with those in 2006. The denominator was the sum of the interpolated populations (aged 1-19) for each of the 3 year periods of mortality data (2000-2002 and 2005-2007), based on the mid-point of the census year. Because of incompletely enumerated Indian Reserves, a small number of DAs lacked detailed age and sex data needed to provide a complete denominator[12]. To retain these DAs in the sample, age and sex were estimated from the total population counts or population estimates of incompletely enumerated Indian Reserves and the population age-sex structure of the broader First Nations population[11,27]. As these DAs were all on Indian Reserves, they were considered to be high-percentage First Nations identity areas.

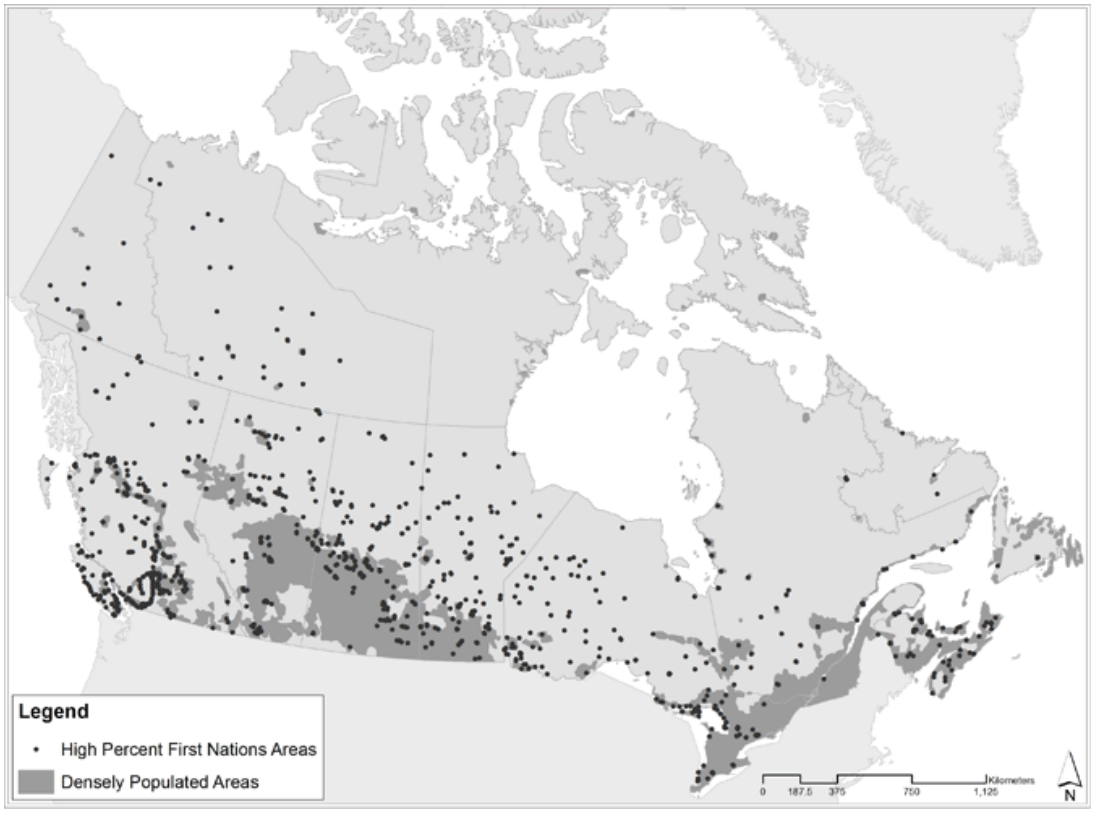

Figure 1: High-percentage First Nations identity areas, 2006.

Several contextual socio-economic variables were calculated for high-percentage First Nations identity areas and for low-percentage Aboriginal identity areas: the percent of the population aged 1-19 who were of Aboriginal identity, percent of the population in weak or non-Metropolitan Influenced Zone, percent of the population in the lowest and highest income quintiles, the mean household income per person in the household, percent of the population aged 15 years and over without a high school diploma and those with a university degree, percent of the population aged 15 and over who were unemployed, and the percent of the population living in dwellings in need of major repair. These measures were calculated from the 2006 census using census microdata from Statistics Canada[28].

Age-standardised mortality per 100 000 persons was calculated separately for males and females and for both sexes combined using the adjusted Chiang method[29]. Mortality was age-standardised to the 2001 population age structure of all Aboriginal identity persons. This standardisation method allows for more relevant interpretation of results for the Aboriginal population given the different population age-structure of this population[27].

All analysis was conducted using Science Analysis Software (SAS) v9.2 (http://www.sas.com).

Results

There were several significant socioeconomic and demographic differences between high-percentage First Nations identity areas and low-percentage Aboriginal identity areas. The population age-structure varied significantly

between areas, with 27% of the population in low-percentage Aboriginal identity areas aged 1-19 years, compared with 43.7% in high-percentage First Nations identity areas, 94.7% of whom were of First Nations identity. The majority of the population in high-percentage First Nations identity areas (72%) lived in rural areas (weak or non-Metropolitan influenced zones). The percentage of population in either the lowest or highest income quintile varied considerably, reflected also in the difference between average household income per person. In low-percentage Aboriginal identity areas, 21.1% of the population was without a secondary certificate compared with 54.5% in high-percentage First Nations identity areas. There was also a large difference in the percentage of dwellings in need of major repair, with 7.2% of people in low-percentage Aboriginal identity areas living in dwellings in need of major repair compared with 38.7% in high-percentage First Nations identity areas.

Age-standardised mortality rates (ASMR) for children and youth in high-percentage First Nations identity areas were significantly higher than low-percentage Aboriginal identity areas. The ASMR for low-percentage Aboriginal identity areas was 45.6 per 100 000 for males and 27.4 per 100 000 for females in 2000-2002, decreasing to 42.9 per 100 000 for males and 25.9 per 100 000 for females in 2005-2007. In comparison, high-percentage First Nations identity areas had an ASMR of 139.5 per 100 000 for males and 82.6 per 100 000 for females in 2000-2002 and 138.0 per 100 000 for males and 94.5 per 100 000 for females in 2005-2007. The differences between low percentage Aboriginal and high-percentage First Nations identity areas were significant for both sexes in both time periods, and there was a statistically significant increase in the ASMR for females in these areas between the two periods.

The ASMR by cause illustrates specific categories and causes of death that contributed significantly to overall differences in the ASMR. Of the three Global Burden of Disease groupings, non-communicable diseases and injuries had the largest differences between low-percentage Aboriginal and high-percentage First Nations identity areas for both males and females. Of non-communicable disease, the largest differences were for congenital anomalies, particularly congenital heart anomalies. There were also slightly higher rates for endocrine disorders and neuropsychiatric conditions in high-percentage First Nations identity areas.

Injuries remained the most significant contributor to overall differences in mortality for both males and females. Rates of unintentional injury were significantly higher in high-percentage First Nations identity areas, with road traffic accidents and drowning the major causes. Additionally, intentional injuries, particularly self-inflicted injury, were much higher in high-percentage First Nations identity areas.

Rate ratios of the ASMR between low percent Aboriginal and high-percentage First Nations identity areas further highlight the calculated mortality differentials. Overall, rate ratios for males were 3.1 for 2000-2002 and 3.2 for 2005-2007 and for females were 3.0 for 2000-2002 and 3.6 for 2005-2007. Grouped according to WHO Global Burden of Disease classification[24], within Group I - infectious and parasitic diseases, the largest differences were for respiratory infections, particularly lower respiratory infections. For Group II causes - non-communicable diseases, the rate ratios were not as great, with congenital anomalies for males and endocrine disorders for females showing the largest rate ratios for 2005-2007.

The highest rate ratios were for Group III causes - injuries, with rate ratios of 4.7 and 5.3 for males in 2000-2002 and 2005-2007 and rate ratios of 5.5 and 8.3 for females in the same periods. For males, drowning mortality was significantly greater in high-percentage First Nations identity areas compared with low-percentage Aboriginal identity areas, with a rate ratio of 7.0 for both 2000-2002 and 2005-2007. However, the largest differences between high-percentage First Nations identity areas and low-percentage Aboriginal identity areas were for intentional injuries. For males, the rate ratios for self-inflicted injuries were 7.2 and 10.7 for 2000-2002 and 2005-2007, and 5.4 and 7.6 for deaths from intentional violence in 2000-2002 and 2005-2007. For females, the rate ratios for self-inflicted injuries were 15.7 and 21.9 for 2000-2002 and 2005-2007 and 3.8 and 5.3 for 2000-2002 and 2005-2007.

Table 1: Demographic and socio-economic measures for high-percentage First Nations identity areas and low-percentage Aboriginal identity areas, Canada, 2006

Characteristics	Low % Aboriginal identity areas	High % First Nations identity areas
Total population	26 370 008	322 321
Non-Aboriginal identity (%)	97.4	5.2
Aboriginal identity (%)	2.6	94.8
First Nations identity (%)	1.3	91.4
Total population aged 1-19 years	7 112 250	140 779
Non-Aboriginal identity (%)	96.1	2.3
Aboriginal identity (%)	3.9	97.7
First Nations identity (%)	2.0	94.7
Population in lowest income quintile (%)	18.3	49.8
Population in highest income quintile (%)	20.7	4.9
Average household income per person (CAD$)	30 945	13 018
Population aged ≥15 years currently employed (%)	63.9	40.3
Population aged ≥15 years without high school (%)	21.1	54.5
Population aged ≥15 years with a university degree (%)	22.0	6.2
Dwellings in need of major repair (%)	7.2	38.7
Population in weak or non-Metropolitan-Influenced Zone (%)	6.7	72.1

Source: Census 2006, Statistics Canada.

Discussion

Strengths and limitations

A strength of this study is that it uses national-level vital statistics registration data across two time periods. Vital events were geographically coded to small geographic units classified as high-percentage First Nations identity areas and compared against low-percentage Aboriginal identity areas. This area-based geozones methodology allows for mortality to be calculated for children and youth by sex and by detailed cause of death for multiple time periods. However, some limitations warrant discussion.

As Aboriginal identifiers are not uniformly available for vital events, a geographical proxy was used for all census DAs with a high percentage of persons identifying as First Nations. As such, this is an ecological study and reports results for geographical areas; the observed differences do not necessarily apply at the individual level. The upper one-third of the total Aboriginal population distribution was used as a cut-off for high First Nations areas, where 97.7% of the population aged 1-19 were of First Nations identity in 2006. As such, some of the population considered in high-percentage First Nations areas are not of First Nations identity, and many First Nations peoples reside in areas classified as low-percentage Aboriginal identity areas.

The potential contributions of social determinants of health or health service delivery were not considered in this article but as is shown, these areas differ by several socioeconomic characteristics and not just by the proportion of First Nations or non-Aboriginal residents. The objective of this article was to describe mortality differences between children and youth living in high-percentage First Nations identity areas and those in low-percentage Aboriginal identity areas. Given the differences in key socioeconomic and demographic characteristics, the relationship of health determinants to causes of mortality warrants further investigation.

Table 2: Age-standardised mortality rates for children and youth in high-percentage First Nations identity areas and low-percentage Aboriginal identity areas, Canada, 2000-2002 and 2005-2007, by cause

	Non-Aboriginal								First Nations							
	2000-2002				2005-2007				2000-2002				2005-2007			
			Interval				Interval				Interval				Interval	
	Deaths	ASMR	from	to	Deaths	ASMR	from	to	Deaths	ASMR	from	to	Deaths	ASMR	from	to
Males - All Causes	**4,847**	**45.6**	**44.3**	**46.9**	**4,558**	**42.9**	**41.6**	**44.1**	**289**	**139.5**	**124.3**	**156.5**	**286**	**138.0**	**122.9**	**155.0**
Group I: Communicable, maternal, perinatal, etc.	1,005	10.2	9.6	10.8	1,077	10.9	10.3	11.6	30	14.4	10.1	20.6	38	18.3	13.3	25.1
Infectious and Parasitic	95	1.0	0.8	1.2	86	0.8	0.7	1.0	5	2.4	1.0	5.8	5	2.4	1.0	5.8
Respiratory infections	43	0.4	0.3	0.6	52	0.5	0.4	0.7	9	4.3	2.3	8.3	..	..	..	..
Lower respiratory infections	40	0.4	0.3	0.5	47	0.5	0.3	0.6	9	4.3	2.3	8.3	..	..	..	..
Conditions arising during the perinatal period	865	8.8	8.2	9.4	937	9.6	9.0	10.2	16	7.7	4.7	12.6	29	13.9	9.7	20.1
Birth asphyxia and birth trauma	283	2.9	2.6	3.2	269	2.8	2.4	3.1	6	2.9	1.3	6.4	6	2.9	1.3	6.4
Group II: Noncommunicable diseases	1,486	14.4	13.7	15.2	1,415	13.6	12.9	14.4	60	28.9	22.4	37.2	57	27.5	21.2	35.6
Malignant neoplasms	338	3.2	2.9	3.6	303	2.8	2.5	3.2	7	3.4	1.6	7.1	8	3.9	1.9	7.7
Endocrine disorders	116	1.1	0.9	1.4	135	1.3	1.1	1.6	..	..	..	..	5	2.4	1.0	5.8
Neurophsychiatric conditions	194	1.8	1.6	2.1	186	1.7	1.5	2.0	10	4.8	2.6	9.0	6	2.9	1.3	6.4
Cardiovascular diseases	125	1.2	1.0	1.4	138	1.3	1.1	1.5	6	2.9	1.3	6.4	5	2.4	1.0	5.8
Congenital anomolies	569	5.7	5.3	6.2	484	4.9	4.5	5.4	27	13.0	8.9	18.9	24	11.5	7.7	17.2
Congenital heart anomolies	233	2.3	2.0	2.7	185	1.9	1.6	2.1	9	4.3	2.3	8.3	9	4.3	2.3	8.3
Group III: Injuries	2,053	18.0	17.2	18.8	1,769	15.4	14.7	16.1	174	84.1	72.5	97.6	168	81.3	69.9	94.5
Unintentional injuries	1,492	13.2	12.6	13.9	1,280	11.2	10.6	11.8	107	51.7	42.7	62.4	85	41.1	33.2	50.8
Road traffic accidents	864	7.5	7.0	8.0	771	6.6	6.2	7.1	39	18.8	13.8	25.8	25	12.1	8.2	17.9
Drownings	133	1.2	1.0	1.5	110	1.0	0.9	1.2	18	8.7	5.5	13.8	15	7.2	4.4	12.0
Intentional injuries	561	4.8	4.4	5.2	489	4.2	3.8	4.5	67	32.4	25.5	41.2	83	40.2	32.4	49.8
Self-inflicted injuries	442	3.7	3.4	4.1	335	2.8	2.5	3.1	55	26.6	20.5	34.7	62	30.0	23.4	38.5
Violence	119	1.1	0.9	1.3	152	1.3	1.1	1.6	12	5.8	3.3	10.2	21	10.2	6.6	15.6
Females - All Causes	**3,018**	**27.4**	**26.5**	**28.5**	**2,845**	**25.9**	**24.9**	**26.9**	**181**	**82.6**	**71.4**	**95.5**	**207**	**94.5**	**82.4**	**108.3**
Group I: Communicable, maternal, perinatal, etc.	710	6.9	6.4	7.4	816	7.8	7.3	8.4	33	15.1	10.7	21.2	33	15.1	10.7	21.2
Infectious and Parasitic	80	0.8	0.6	0.9	72	0.7	0.5	0.8		..	..	..	6	2.7	1.2	6.1
Respiratory infections	29	0.3	0.2	0.4	31	0.3	0.2	0.4	5	2.3	1.0	5.5	6	2.7	1.2	6.1
Lower respiratory infections	27	0.2	0.2	0.4	28	0.3	0.2	0.4	5	2.3	1.0	5.5	6	2.7	1.2	6.1
Conditions arising during the perinatal period	599	5.8	5.4	6.3	708	6.8	6.3	7.4	24	11.0	7.4	16.4	21	9.6	6.3	14.7
Birth asphyxia and birth trauma	211	2.0	1.8	2.3	209	2.0	1.8	2.3	11	5.0	2.8	9.1	5	2.3	1.0	5.5
Group II: Noncommunicable diseases	1,200	11.0	10.4	11.7	1,081	9.9	9.4	10.6	43	19.6	14.6	26.5	35	16.0	11.5	22.3
Malignant neoplasms	253	2.2	2.0	2.5	221	2.0	1.7	2.3	..	..	..	..	7	3.2	1.5	6.7
Endocrine disorders	102	0.9	0.8	1.2	86	0.8	0.6	1.0	6	2.7	1.2	6.1	5	2.3	1.0	5.5
Neurophsychiatric conditions	149	1.3	1.1	1.6	145	1.3	1.1	1.5	6	2.7	1.2	6.1	5	2.3	1.0	5.5
Cardiovascular diseases	101	0.9	0.7	1.1	92	0.8	0.7	1.0	..	..	..	..	..	..	..	..
Congenital anomolies	450	4.3	3.9	4.7	414	4.0	3.6	4.4	18	8.2	5.2	13.1	12	5.5	3.1	9.7
Congenital heart anomolies	156	1.5	1.3	1.7	136	1.3	1.1	1.5	7	3.2	1.5	6.7	..	..	..	..
Group III: Injuries	883	7.5	7.0	8.0	774	6.5	6.0	7.0	90	41.0	33.4	50.5	118	53.8	44.9	64.4
Unintentional injuries	672	5.7	5.3	6.2	575	4.9	4.5	5.3	47	21.5	16.1	28.6	56	25.6	19.7	33.2
Road traffic accidents	440	3.7	3.3	4.0	398	3.3	3.0	3.6	26	11.9	8.1	17.4	28	12.8	8.8	18.5
Drownings	38	0.3	0.2	0.5	29	0.3	0.2	0.4	..	..	..	..	..	..	..	..
Intentional injuries	211	1.7	1.5	2.0	199	1.6	1.4	1.9	43	19.6	14.5	26.4	62	28.2	22.0	36.2
Self-inflicted injuries	142	1.1	1.0	1.3	145	1.2	1.0	1.4	39	17.8	13.0	24.3	56	25.5	19.6	33.1
Violence	69	0.6	0.5	0.8	54	0.5	0.4	0.6	..	..	..	..	6	2.7	1.2	6.1

Source: 2001 and 2006 Census of Canada; Vital Statistics, Deaths Database, 2000-2002 and 2005-2007

Notes: Some values have been masked to meet the confidentiality requirements of the Statistics Act

This study confirms the persistent and substantial disparities in mortality between children living in high-percentage First Nations areas. The differences found here are similar to those found in other countries, including Australia, New Zealand, and the USA[30]. The causes of death for Indigenous children in Australia are very similar to those found in Canada, with external causes the most prevalent at a rate three times that of non-Indigenous children, and suicide for Indigenous girls five times the rate their non-Indigenous counterparts[31]. For Maori children aged 5-14 years, injuries and suicide are among the most common causes of death[32].

Table 3: Age-standardised mortality rate ratios for children and youth in high-percentage First Nations identity areas and low-percentage Aboriginal identity areas, Canada, 2000-2002 and 2005-2007, by cause

	2000-2002			2005-2007		
		Interval			Interval	
	RR	from	to	RR	from	to
Males - All Causes	**3.1**	**2.7**	**3.4**	**3.2**	**2.9**	**3.6**
Group I: Communicable, maternal, perinatal, etc.	1.4	1.0	2.0	1.7	1.2	2.3
Infectious and Parasitic	2.5	1.0	6.2	2.9	1.2	7.1
Respiratory infections	10.2	5.0	20.9	..	..	..
Lower respiratory infections	10.9	5.3	22.6	..	..	..
Conditions arising during the perinatal period	0.9	0.5	1.4	1.5	1.0	2.1
Birth asphyxia and birth trauma	1.0	0.4	2.3	1.0	0.5	2.4
Group II: Noncommunicable diseases	2.0	1.5	2.6	2.0	1.5	2.6
Malignant neoplasms	1.1	0.5	2.2	1.4	0.7	2.8
Endocrine disorders	..	..	..	1.8	0.7	4.5
Neurophsychiatric conditions	2.6	1.4	5.0	1.7	0.7	3.8
Cardiovascular diseases	2.5	1.1	5.6	1.9	0.8	4.7
Congenital anomolies	2.3	1.5	3.3	2.4	1.6	3.5
Congenital heart anomolies	1.9	1.0	3.6	2.3	1.2	4.6
Group III: Injuries	4.7	4.0	5.5	5.3	4.5	6.2
Unintentional injuries	3.9	3.2	4.8	3.7	2.9	4.6
Road traffic accidents	2.5	1.8	3.5	1.8	1.2	2.7
Drownings	7.0	4.3	11.4	7.0	4.1	12.1
Intentional injuries	6.8	5.3	8.7	9.7	7.7	12.2
Self-inflicted injuries	7.2	5.4	9.5	10.7	8.1	14.0
Violence	5.4	3.0	9.9	7.6	4.8	12.1
Females - All Causes	**3.0**	**2.6**	**3.5**	**3.6**	**3.2**	**4.2**
Group I: Communicable, maternal, perinatal, etc.	2.2	1.6	3.1	1.9	1.4	2.7
Infectious and Parasitic	..	..	..	4.1	1.8	9.5
Respiratory infections	8.5	3.3	22.0	9.4	3.9	22.6
Lower respiratory infections	9.2	3.5	23.8	10.4	4.3	25.2
Conditions arising during the perinatal period	1.9	1.3	2.8	1.4	0.9	2.2
Birth asphyxia and birth trauma	2.5	1.3	4.5	1.1	0.5	2.8
Group II: Noncommunicable diseases	1.8	1.3	2.4	1.6	1.1	2.3
Malignant neoplasms	..	..	..	1.6	0.8	3.4
Endocrine disorders	2.9	1.3	6.6	2.9	1.2	7.2
Neurophsychiatric conditions	2.0	0.9	4.6	1.7	0.7	4.3
Cardiovascular diseases	..	..	..	..	..	..
Congenital anomolies	1.9	1.2	3.1	1.4	0.8	2.5
Congenital heart anomolies	2.2	1.0	4.6	..	..	..
Group III: Injuries	5.5	4.4	6.8	8.3	6.8	10.1
Unintentional injuries	3.8	2.8	5.0	5.3	4.0	6.9
Road traffic accidents	3.2	2.2	4.8	3.9	2.7	5.7
Drownings	..	..	..	..	..	..
Intentional injuries	11.2	8.1	15.5	17.3	13.0	23.0
Self-inflicted injuries	15.7	11.0	22.4	21.9	16.1	29.8
Violence	..	..	..	5.8	2.5	13.5

Source: 2001 and 2006 Census of Canada; Vital Statistics, Deaths Database, 2000-2002 and 2005-2007

Notes: Some values have been masked to meet the confidentiality requirements of the Statistics Act

Conclusion

This study is the first to use national vital statistics data to report on causes of mortality for children aged 1-19 living in high-percentage First Nations identity areas compared with low-percentage Aboriginal identity areas. An area based approach was used in the absence of individual Aboriginal identity identifiers. The results presented here show significant difference in mortality outcomes for children and youth in high-percentage First Nations identity areas compared with those in low-percentage Aboriginal identity areas.

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