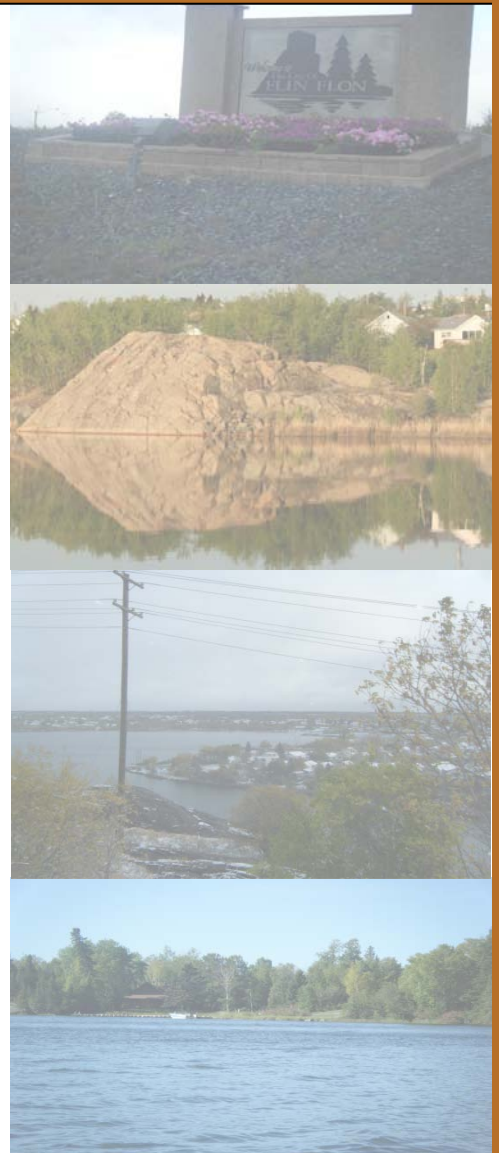


APPENDIX B

POPULATION SAMPLING PROTOCOL



SUMMARY OF SAMPLING STRATEGY

Samples of urine and blood from children living in Flin Flon and Creighton are being collected to determine their average level of exposure to lead, mercury and arsenic and to compare their exposure with other children. The research questions relevant to biological sampling are “What are the current levels of lead in blood, arsenic and inorganic mercury in urine of children in Flin Flon?”, and “What personal factors are associated with the level of measured internal exposure of children in Flin Flon Area (e.g., place of residence, place of work, level of COC in soil, age, gender, diet, personal habits, etc.)?”

The samples that will be collected, the sampling method, the chemical of concern and the age groups being sampled are listed in Table 1.

Table 1: COC, Sample Medium, Collection Method and Age Group

COC	Medium	Collection Method	Age Groups
Lead	Blood	Capillary draw	0 months to 83 months (under 7)
Total Arsenic	Urine	First morning void at home	Continent (approx 30 months) to 179 months (under 15)
Inorganic Mercury	Urine	First morning void at home	Continent (approx 30 months) to 179 months (under 15)

Note: children between approximately 30 months to 83 months will be asked to provide both blood and urine samples.

Approach to sampling

- 1) 200 children in West Flin Flon (or areas with highest soil levels) who are between 0 and 179 months.
- 2) Remainder of sample to selected across other areas of towns to obtain goal of:
 - a. 250 blood samples from children 0 to 83 months old
 - b. 300 urine samples from children 30 to 179 months old¹.
- 3) This approach assumes that there will be approximately 150 children who provide both urine and blood samples (30 months to 83 months).

¹ Rationale for sampling 50 more children for urine is that the standard error of the geometric mean for inorganic mercury in urine is not well established. This provides us with a bit more data.

- 4) This will require 400 unique children participate in the study.

Table 2 has the details of the sampling plan.

Table 2: Number of Children Sampled by Age Group and Area

Area	Blood Only	Blood and Urine	Urine Only	Total
	Under 30 months	30 to 83 months	84 to 179 months	
West Flin Flon	50	100	50	200
East Flin Flon	25	25	50	100
Creighton and Channing	25	25	50	100
Total	100	150	150	400

Because the proposed sample will be representative of all children living in Flin Flon and Creighton, analysis of the biological sampling data will answer the first research question. For the same reason, analysis of the biological sampling data, the questionnaire data and environmental sampling data will answer the second research question listed above.

SAMPLING OVERVIEW

Ideally, all residents of Flin Flon and Creighton who are under the age of 15 years should be recruited to the study and interviewed to determine behaviours, exposures and health outcomes that may be associated with observed levels of CoCs. However, the cost of data collection and laboratory analysis of these samples for all eligible study participants would be prohibitive. A representative sample of the source population is often used to infer population parameters. A sample chosen at random from the whole population will have, on average, the same characteristics as the source population in which it is sampled. Hence, the results of the survey could be generalized to the general population. In addition, we will also consider various sampling designs to ensure that the sample is sufficiently large to detect exposure levels that are greater than acceptable with a reasonable level of confidence. The following sections describe these aspects in detail.

Selection of Study Area

The city of Flin Flon is located in west-central Manitoba on the border with Saskatchewan. According to the 2006 census, it has a population of approximately 5,590. The neighbouring town of Creighton, located just southwest of Flin Flon, in Saskatchewan, has a population of approximately 1,500. Both Flin Flon and Creighton were established in the 1930's in response to demand for employment at the Hudson Bay Mining and Smelting (HBMS) complex.

According to results from the HHRA, the location of different communities within the Flin Flon-Creighton area relative to the HBMS complex has a significant influence on the potential exposure of its residents. The proximity of the community to the smelter as well as the location relative to predominant wind direction will determine the level of particulate in ambient air and the amount that is available for deposition. In the HHRA, Flin Flon and Creighton was subdivided into 4 sub-communities:

1. East Flin Flon (designated as the area east and northeast of Ross Lake);
2. West Flin Flon (designated as the area west of Ross Lake);
3. Channing; and,
4. Creighton.

Table 3 summarises the average soil concentration of CoCs found in the soil for these 4 communities. The results indicate that the highest levels of lead and mercury were observed in West Flin Flon while elevated levels of arsenic were found in West Flin Flon and Creighton. East Flin Flon and Channing have relatively lower soil concentration of the CoCs.

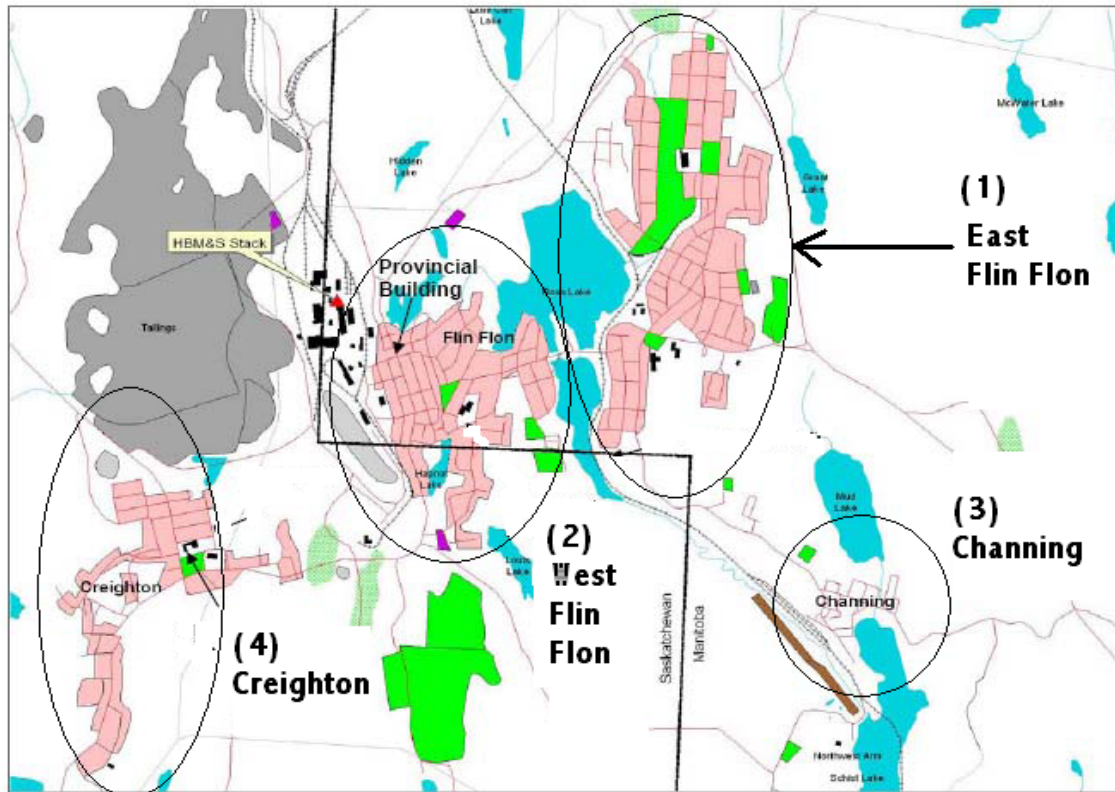
Channing is a relatively small community and, for the analysis, it will probably be combined with another similar sub-community. In this section, we assume that Creighton and Channing will be combined for the analysis.

For the exposure survey, the 3 sub-communities will form the groups to be sampled. Maintaining these strata offers a number of advantages; it allows for direct comparison with HHRA estimates and internal comparison can be conducted with the lowest sub-community used as the referent group. The relative geographical locations of the strata are shown in Figure 1.

Table 3: Soil concentrations of Chemicals of Concern in East and West Flin Flon, Creighton and Channing

Chemical of Concern	East Flin Flon	West Flin Flon	Creighton	Channing
Arsenic	16	67	64	17
Lead	141	332	164	112
Mercury	6.0	106	6	2.8

Figure 1: Relative geographical locations of East Flin Flon, West Flin Flon, Channing, and Creighton.



Selection of Age Groups

The study population consists of residents living in private dwellings in Flin Flon and Creighton census subdivisions who are under the age of 15 years. This age group was selected in order to match with the age groupings used in the HHRA. Consistent age groupings will facilitate comparison of HHRA predicted environmental exposures for this population to lead, arsenic, and mercury to internal exposure measured by biomonitoring and exclude occupational exposures. In addition, these age groupings are similar to those used in other biomonitoring studies such as the Canadian Health Measures Study² and hence will facilitate external comparison. As shown in Table 4, data from the most recent census (2006) indicates approximately 1,040 children under the age of 15 living in Flin Flon and another 315 live in Creighton.

² Wong S. and Lye E. *Lead, mercury and cadmium levels in Canadians*, Statistics Canada, Catalogue no. 82-003-XPE • Health Reports, Vol. 19, no. 4, December 2008.

Table 4 Age and sex distribution of residents of Flin Flon and Creighton aged 14 and under (Census 2006)

Age Groups (Years)	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	Total	Male	Female	Total	Male	Female
0 to 4	305	165	140	90	55	35
5 to 9	325	165	160	110	55	55
10 to 14	410	205	210	115	55	60
Total	1,040	535	510	315	165	150

Development of a Sampling Frame

According to Statistics Canada, there are 2,612 households in Flin Flon and 625 households in Creighton. The registries of residential tax properties in Flin Flon and Creighton could be used as sampling frames. Each of these households will be assigned an identification number to be used for random selection.

Sampling Strategy

The primary sampling unit will be the household and sampling will be stratified by the geographical areas used in the HHRA, namely, East Flin Flon, West Flin Flon, and the combined community of Creighton and Channing. Using the sampling frame developed in the previous section, a stratified random sampling approach will be used to recruit study participants. Households will be sampled at random until the required number of children in each age group and geographic area are sampled.

With 0.4 children under the age of 15 per household in Flin Flon and 100% participation rates, 750 households in Flin Flon will need to be contacted to obtain a sample of 300 children. In Creighton, with 0.5 children per household and a 100% participation rate, we will need to contact 200 households to obtain a sample of 100 children. Unless the participation rate is greater than 30%, all the households in Flin Flon and Creighton would be contacted to achieve the required sample size. If the participation rate is less than 30%, we will not achieve the planned sample size.

Sample size

When choosing the sample size, the desired level of accuracy, the cost of processing the samples and variability of the levels are taken into consideration. The precision of the simple random sample (i.e. no stratification) when sampling with no replacement (i.e. the same individual cannot be selected more than once) is measured by its standard error:

$$2 \text{ S.E}_{it} = 2(\ln \text{ GSD}) \sqrt{(1-f/n)}, \text{ with } \text{S.E}_{it} \text{ the standard error on a log scale}$$

or

$$2 \text{ S.E}_{it} = [\ln \text{GSD}]^{2\sqrt{(1-f/n)}} - 1$$

Where:

n= number of samples,
f= proportion of population that is sampled
 σ = standard deviation of the measurement.

In the case of environmental and biological concentrations, the logarithm of the concentration follows a normal distribution so the value of σ will be log of the geometric standard deviation (gsd) for the sample measurements.

Blood Lead Levels

The HHRA used a GSD of 1.6 for blood lead levels. The HHRA has predicted that the Geometric Mean Blood Lead Level in children under 84 months (See table 5-23 in the draft report, “Human Health Risk Assessment of Flin Flon, Manitoba, and Creighton, Saskatchewan, Chapter 5, Results and Discussion”, Intrinsic Environmental) is 4.6 $\mu\text{g/dL}$ in West Flin Flon, 2.6 $\mu\text{g/dL}$ in East Flin Flon, 3.2 $\mu\text{g/dL}$ in Creighton and 2.6 $\mu\text{g/dL}$ in Channing. The critical population for exposure to lead is children in East Flin Flon under the age of 7 years (less than 84 months) with children in the age group under 36 months having the highest blood lead levels. It is estimated that as many as 150 children in the age group less than 84 months could reside in that area of West Flin Flon with the highest exposure to lead and that, in total, 570 children under the age of 84 months live in Flin Flon and Creighton.

For Blood Lead Levels, it is proposed to sample 100% of the children under 84 months in West Flin Flon (approximately 150 children under the age of 84 months) and another 100 children under the age of 84 months in other areas of Flin Flon, Creighton and Channing. Without adjusting for the sampling fraction, the Blood Lead Levels in children under the age of 84 months should be measured with a precision (2 standard errors of the geometric mean) of $1.6^{2/\sqrt{150}} - 1 = 8\%$ in West Flin Flon and a precision of $1.6^{2/\sqrt{50}} - 1 = 14\%$ in East Flin Flon and in Creighton and Channing. The geometric mean blood lead level in children under the age of 83 months in Flin Flon and Creighton should be estimated with a precision of 0.85% (2 standard errors) for a sample of 350 children (See table 5).

Table 5: Sample size for Blood Lead Levels and Precision of Geometric Mean

Number of children in Sample	Size of Population Being Sampled	Sampling Fraction	Precision of Estimate of Geometric Mean (2 standard errors)
50	570	0.09	5.41%
100	570	0.18	3.42%
150	570	0.26	2.49%
200	570	0.35	1.89%
250	570	0.44	1.46%
300	570	0.53	1.12%
350	570	0.61	0.85%
400	570	0.70	0.61%

Inorganic Mercury

The HHRA predicts that Toddlers (ages 7 months to 4 years) in West Flin Flon are likely to have exposures to inorganic mercury above the allowable level and that the average exposures for other children in Flin Flon and Creighton are likely to be at most 68% of the allowable levels. Because of the difficulties of collecting urine samples from incontinent children who are generally under the age of 30 months, toddlers between the age of 30 months and 83 months will be sampled for mercury. We used two US studies^{3,4} to derive the Geometric Standard Deviation of inorganic mercury levels in urine; in one study, the Geometric Standard Deviation was found to be 1.8 and, in the other, 2. To be conservative, we used a value of 2. We estimate that urine samples will be collected from 50 toddlers (ages 30 months to 59 months) in West Flin Flon, the most highly exposed group of children, with a precision of $2^{2/\sqrt{50}} - 1 = 22\%$ (2 standard errors) without taking the sampling fraction into account.

³ Rogers HS, McCullough J, Kieszak S, Caldwell KL, Jones RL, Rubin C. Exposure assessment of young children living in Chicago communities with historic reports of ritualistic use of mercury. *Clin Toxicol (Phila)*. 2007;45(3):240-7.

⁴ Maserejian NN, Trachtenberg FL, Assmann SF, Barregard L. Dental amalgam exposure and urinary mercury levels in children: the New England Children's Amalgam Trial. *Environ Health Perspect*. 2008 Feb;116(2):256-62.

Table 6. Estimated Hazard Quotients for Inorganic Mercury

Age	East Flin Flon	West Flin Flon	Creighton	Channing	Background
Infant	0.26	0.60	0.27	0.25	0.23
Toddler	0.67	1.3	0.68	0.65	0.20
Child	0.55	0.65	0.55	0.55	0.14
Teen	0.50	0.55	0.50	0.49	0.08
Adult	0.48	0.53	0.48	0.48	0.06

Infant: 0 to 6 months, Toddler: 7 months to 4 years, Child: 5 to 11 years, Teen: 12 to 19 years, Adult: 20 years and older.

Table 7 shows that a sample of 300 children from a population of 785 children would provide an estimate of the geometric mean inorganic mercury level that is within 2.17% of the true mean 19 times out of 20.

Table 7: Sample size and precision of estimate of inorganic mercury levels

Number of children in Sample	Size of Population Being Sampled	Sampling Fraction	Precision of Estimate of Geometric Mean (2 standard errors)
50	785	0.06	8.30%
100	785	0.13	5.39%
150	785	0.19	4.06%
200	785	0.25	3.22%
250	785	0.32	2.63%
300	785	0.38	2.17%
350	785	0.45	1.80%
400	785	0.51	1.49%

Arsenic

The HHRA predicted that the hazard quotients for arsenic intake would be at or above 1.5 for infants and toddlers (children under the age of 5 years – 59 months) in all regions of Flin Flon and Creighton. The distribution of arsenic levels in urine in children in the US indicates that the Geometric Standard Deviation is approximately 1.5. Because it is difficult to collect urine from children before they are continent, we expect to be able to sample arsenic in urine only from children aged 30 months or more.

We expect to collect 50 urine samples from toddlers in West Flin Flon and about 25 urine samples from toddlers in East Flin Flon and Creighton. The precision of the

arsenic levels in urine in toddlers in Flin Flon and Creighton should be $1.5^{2/\sqrt{75}} - 1 = 10\%$ (2 standard errors). The overall geometric mean arsenic level should be estimated with a precision of 1.26% (2 standard errors) in children between the age of 30 months and 15 years.

Table 8 Predicted Hazard Quotients from Exposure to Arsenic Receptor East Flin Flon, West Flin Flon, Creighton and Channing Compared to Typical Background

Age*	East Flin Flon	West Flin Flon	Creighton	Channing	Background
Infant	1.5	1.6	2.4	1.5	1.0
Toddler	1.5	1.8	2.5	1.5	0.93
Child	0.90	1.0	1.5	0.90	0.60
Teen	0.56	0.62	0.94	0.56	0.36
Adult	0.49	0.54	1.0	0.49	0.26

*Infant: 0 to 6 months, Toddler: 7 months to 4 years, Child: 5 to 11 years, Teen: 12 to 19 years, Adult: 20 years and older.

Table 9. Precision of Estimate of Geometric Mean Arsenic Level

Number of children in Sample	Size of Population Being Sampled	Sampling Fraction	Precision of Estimate of Geometric Mean (2 standard errors)
50	785	0.06	4.77%
100	785	0.13	3.12%
150	785	0.19	2.35%
200	785	0.25	1.87%
250	785	0.32	1.53%
300	785	0.38	1.26%
350	785	0.45	1.05%
400	785	0.51	0.87%

SE: Standard Error

COMMUNITY PROFILES OF FLIN FLON AND CREIGHTON, MANITOBA, CANADA (CENSUS 2006).

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Population in 2006	5,594			1,502		
Population in 2001	6,000			1,556		
2001 to 2006 population change (%)	- 7			- 4		
Total private dwellings	2,612			625		
Private dwellings occupied by usual residents	2,361			586		
Population density per square kilometre	403			104		
Land area (square km)	14			14		
Total population	5,590	2,785	2,815	1,500	750	750
0 to 4 years	305	165	140	90	55	35
5 to 9 years	325	165	160	110	55	60
10 to 14 years	410	205	210	115	55	60
15 to 19 years	435	215	225	130	75	55
20 to 24 years	335	170	165	95	50	45
25 to 29 years	300	140	165	90	45	40
30 to 34 years	315	160	160	75	30	35
35 to 39 years	305	150	160	100	50	50
40 to 44 years	450	215	230	120	55	65
45 to 49 years	630	335	295	155	85	70
50 to 54 years	495	270	225	115	60	60
55 to 59 years	325	190	130	95	50	40
60 to 64 years	210	110	105	40	25	20



Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
65 to 69 years	180	90	90	40	15	20
70 to 74 years	160	70	90	35	15	20
75 to 79 years	145	65	80	45	15	30
80 to 84 years	140	55	85	40	15	25
85 years and over	135	30	105	15	5	5
Median age of the population	41	41	41	38	36	39
% of the population aged 15 and over	81	81	82	79	78	79
Total population 15 years and over	4,550	2,245	2,305	1,185	590	595
Not in a common-law relationship	4,110	2,025	2,080	1,075	535	540
In a common-law relationship	445	220	220	110	55	55
Total population 15 years and over	4,550	2,245	2,305	1,185	590	595
Never legally married (single)	1,450	790	655	365	205	160
Legally married (and not separated)	2,260	1,130	1,130	655	325	330
Separated; but still legally married	160	80	80	20	15	10
Divorced	360	180	180	45	25	25
Widowed	325	65	260	95	15	80
Total private dwellings occupied by usual residents	2,360			585		
Single-detached houses - as a % of total occupied private dwellings	76			75		
Semi-detached houses - as a % of total occupied private dwellings	0			10		

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Row houses - as a % of total occupied private dwellings	2			3		
Apartments; duplex - as a % of total occupied private dwellings	4			2		
Apartments in buildings with fewer than five storeys - as a % of total occupied private dwellings	14			4		
Apartments in buildings with five or more storeys - as a % of total occupied private dwellings	-			-		
Other dwellings - as a % of total occupied private dwellings	3			9		
Number of owned dwellings	1,685			455		
Number of rented dwellings	675			130		
Number of dwellings constructed before 1986	2,200			475		
Number of dwellings constructed between 1986 and 2006	160			105		
Dwellings requiring major repair - as a % of total occupied private dwellings	15			11		
Average number of rooms per dwelling	6			6		
Dwellings with more than one person per room - as a % of total occupied private dwellings	-			2		
Average value of owned dwelling (\$)	78,409			84,274		



Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Total number of census families	1,610			450		
Number of married-couple families	1,110			325		
Number of common-law-couple families	225			55		
Number of lone-parent families	270			70		
Number of female lone-parent families	220			50		
Number of male lone-parent families	55			20		
Average number of persons in all census families	3			3		
Average number of persons in married-couple families	3			3		
Average number of persons in common-law-couple families	3			3		
Average number of persons in lone-parent families	3			3		
Average number of persons in female lone-parent families	3			3		
Average number of persons in male lone-parent families	2			3		
Median income in 2005 - All census families (\$)	69,894			75,684		
Median income in 2005 - Married-couple families (\$)	81,516			87,364		
Median income in 2005 - Common-law-couple families (\$)	55,648			52,810		
Median income in 2005 - Lone-parent families (\$)	25,613			39,890		



Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Median income in 2005 - Female lone-parent families (\$)	24,305			28,351		
Median income in 2005 - Male lone-parent families (\$)	26,686			71,885		
Median after-tax income in 2005 - All census families (\$)	56,478			62,055		
Median after-tax income in 2005 - Married-couple families (\$)	66,153			71,050		
Median after-tax income in 2005 - Common-law-couple families (\$)	48,855			45,642		
Median after-tax income in 2005 - Lone-parent families (\$)	24,619			37,842		
Median after-tax income in 2005 - Female lone-parent families (\$)	24,305			28,095		
Median after-tax income in 2005 - Male lone-parent families (\$)	25,662			58,983		
Total private households	2,360			585		
Households containing a couple (married or common-law) with children	640			195		
Households containing a couple (married or common-law) without children	695			180		
One-person households	705			135		
Other household types	320			75		
Average household size	2			3		
Median income in 2005 - All private households (\$)	55,618			62,179		

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Median income in 2005 - Couple households with children (\$)	92,565			92,232		
Median income in 2005 - Couple households without children (\$)	62,200			69,169		
Median income in 2005 - One-person households (\$)	30,546			23,578		
Median income in 2005 - Other household types (\$)	35,757			44,680		
Median after-tax income in 2005 - All private households (\$)	46,131			52,470		
Median after-tax income in 2005 - Couple households with children (\$)	72,906			75,080		
Median after-tax income in 2005 - Couple households without children (\$)	52,469			56,917		
Median after-tax income in 2005 - One-person households (\$)	27,877			21,718		
Median after-tax income in 2005 - Other household types (\$)	33,759			40,971		
Median monthly payments for rented dwellings (\$)	501			601		
Median monthly payments for owner-occupied dwellings (\$)	455			531		
Total population	5,525	2,765	2,760	1,500	750	750
English only	5,055	2,530	2,525	1,330	685	645
French only	95	55	35	25	10	15
English and French	20	10	10	-	-	-

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Other language(s)	360	170	190	135	55	80
Total population	5,525	2,760	2,760	1,500	750	750
English only	5,185	2,580	2,605	1,435	725	715
French only	-	-	-	-	-	-
English and French	340	185	160	60	25	35
Neither English nor French	-	-	-	-	-	-
Total population	5,530	2,765	2,765	1,500	750	750
English	5,390	2,695	2,690	1,420	720	700
French	15	20	-	-	-	-
Non-official language	85	35	45	75	30	45
English and French	15	-	10	-	-	-
English and non-official language	20	-	10	10	-	-
French and non-official language	-	-	-	-	-	-
English; French and non-official language	-	-	-	-	-	-
Total population	5,525	2,765	2,765	1,500	750	750
Non-immigrants	5,255	2,635	2,625	1,460	730	725
Immigrants	270	135	135	45	15	25
Before 1991	235	125	110	30	10	20
1991 to 2000	30	10	25	10	10	-
2001 to 2006	10	-	-	-	-	-
Non-permanent residents	-	-	-	-	-	-
Total population	5,530	2,765	2,760	1,500	750	750
Canadian citizens	5,465	2,740	2,725	1,495	750	745
Canadian citizens under age 18	1,340	710	625	400	205	195
Canadian citizens age 18 and over	4,125	2,025	2,095	1,090	540	550

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Not Canadian citizens	65	25	40	10	-	10
Total population 15 years and over	4,490	2,230	2,255	1,180	585	595
1st generation	260	125	135	40	15	25
2nd generation	720	340	375	195	85	110
3rd generation or more	3,505	1,755	1,750	940	490	455
Total population 1 year and over	5,470	2,740	2,725	1,480	740	745
Lived at the same address 1 year ago	4,660	2,360	2,300	1,280	630	645
Proportion living at same residence one year ago	85%			86%		
Lived within the same province or territory 1 year ago; but changed addresses within the same census subdivision (municipality)	490	215	270	75	40	35
Lived within the same province or territory 1 year ago; but changed addresses from another census subdivision (municipality) within the same province or territory	65	35	35	65	35	30
Lived in a different province or territory 1 year ago	230	115	120	60	35	25
Lived in a different country 1 year ago	15	10	-	-	-	-
Total population 5 years and over	5,225	2,600	2,620	1,410	690	715
Lived at the same address 5 years ago	3,150	1,640	1,510	950	460	485

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Proportion living at same residence five years ago	60%			67%		
Lived within the same province or territory 5 years ago; but changed addresses within the same census subdivision (municipality)	1,010	435	580	165	80	80
Lived within the same province or territory 5 years ago; but changed addresses from another census subdivision (municipality) within the same province or territory	440	210	230	125	60	65
Lived in a different province or territory 5 years ago	610	315	290	175	95	85
Lived in a different country 5 years ago	10	-	10	-	-	10
Total Aboriginal and non-Aboriginal identity population	5,525	2,760	2,760	1,500	750	750
Aboriginal identity population	910	425	480	245	115	125
Non-Aboriginal identity population	4,615	2,335	2,285	1,260	630	625
Total population 15 years and over	4,490	2,230	2,255	1,180	585	595
No certificate; diploma or degree	1,490	775	710	410	235	180
High school certificate or equivalent	1,235	575	660	300	145	155
Apprenticeship or trades certificate or diploma	600	425	175	130	85	45

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
College; CEGEP or other non-university certificate or diploma	715	255	460	240	90	150
University certificate or diploma below the bachelor level	115	35	85	25	10	20
University certificate; diploma or degree	330	160	165	70	20	45
Total population aged 15 to 24	780	410	365	215	115	100
No certificate; diploma or degree	430	240	185	120	65	55
High school certificate or equivalent	290	130	155	80	45	35
Apprenticeship or trades certificate or diploma	30	25	-	10	-	-
College; CEGEP or other non-university certificate or diploma	20	10	10	10	-	10
University certificate or diploma below the bachelor level	-	-	-	-	-	-
University certificate; diploma or degree	10	-	10	-	-	-
Total population aged 25 to 34	620	270	350	165	80	80
No certificate; diploma or degree	130	55	75	35	25	10
High school certificate or equivalent	225	95	130	60	25	30
Apprenticeship or trades certificate or diploma	90	70	20	15	-	-
College; CEGEP or other non-university certificate or diploma	90	20	65	40	15	30
University certificate or diploma below the bachelor level	-	-	-	-	10	-

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
University certificate; diploma or degree	85	25	60	15	-	-
Total population aged 35 to 64	2,400	1,240	1,160	620	315	305
No certificate; diploma or degree	580	350	225	155	105	50
High school certificate or equivalent	620	305	315	145	70	75
Apprenticeship or trades certificate or diploma	390	240	145	90	55	30
College; CEGEP or other non-university certificate or diploma	525	205	320	170	70	100
University certificate or diploma below the bachelor level	90	20	70	15	-	15
University certificate; diploma or degree	195	110	80	45	10	35
Total population 15 years and over	4,485	2,230	2,260	1,180	590	590
No postsecondary certificate; diploma or degree	2,720	1,355	1,365	715	385	335
Education	165	60	110	50	10	40
Visual and performing arts; and communications technologies	25	-	20	-	-	-
Humanities	20	15	-	15	-	10
Social and behavioural sciences and law	115	35	75	20	-	15
Business; management and public administration	320	60	255	100	15	85
Physical and life sciences and technologies	35	15	25	-	10	-

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Mathematics; computer and information sciences	25	10	15	10	10	10
Architecture; engineering; and related technologies	590	565	20	135	130	10
Agriculture; natural resources and conservation	40	30	10	10	10	-
Health; parks; recreation and fitness	295	25	270	70	10	60
Personal; protective and transportation services	130	50	80	40	20	25
Other	-	-	-	-	-	-
Total population 15 years and over	4,490	2,230	2,255	1,180	585	595
No postsecondary certificate; diploma or degree	2,725	1,355	1,370	715	380	335
Postsecondary certificate; diploma or degree	1,765	875	890	465	205	260
Inside Canada	1,645	800	840	445	200	250
Outside Canada	120	70	45	15	-	10
Total population 15 years and over	4,490	2,230	2,260	1,180	585	595
In the labour force	3,175	1,705	1,475	830	445	380
Employed	3,030	1,630	1,400	770	425	345
Unemployed	145	70	75	55	25	35
Not in the labour force	1,310	525	785	350	140	215
Participation rate	71	77	65	70	76	64
Employment rate	68	73	62	65	73	58
Unemployment rate	5	4	5	7	6	9
Total experienced labour force 15 years and over	3,135	1,680	1,450	810	440	370

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
A Management occupations	210	110	100	65	25	35
B Business; finance and administration occupations	315	55	260	100	15	85
C Natural and applied sciences and related occupations	105	100	10	25	20	10
D Health occupations	205	25	175	30	-	25
E Occupations in social science; education; government service and religion	190	40	155	55	10	50
F Occupations in art; culture; recreation and sport	30	-	30	10	-	10
G Sales and service occupations	910	255	660	220	70	155
H Trades; transport and equipment operators and related occupations	620	595	30	160	160	10
I Occupations unique to primary industry	340	330	15	90	90	-
J Occupations unique to processing; manufacturing and utilities	195	175	15	50	45	10
Total experienced labour force 15 years and over	3,130	1,680	1,450	810	440	370
Agriculture and other resource-based industries	390	360	30	100	90	15
Construction	165	150	15	25	20	10
Manufacturing	655	550	105	165	145	20
Wholesale trade	75	35	40	20	10	-
Retail trade	440	190	245	135	50	80
Finance and real estate	65	15	50	15	-	20

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Health care and social services	350	45	310	80	10	75
Educational services	145	25	120	55	10	45
Business services	245	145	100	55	35	20
Other services	600	165	435	165	75	95
Population 15 years and over reporting hours of unpaid work	4,225	2,030	2,195	1,110	540	570
Population 15 years and over reporting hours of unpaid housework	4,185	2,010	2,180	1,090	525	565
Population 15 years and over reporting hours looking after children without pay	1,755	770	985	475	220	250
Population 15 years and over reporting hours of unpaid care or assistance to seniors	830	350	485	280	125	155
Total population 15 years and over who worked since 2005	3,415	1,810	1,600	870	470	405
English	3,395	1,805	1,590	870	465	405
French	10	10	-	-	-	-
Non-official language	-	-	10	-	10	-
English and French	-	-	-	-	-	-
English and non-official language	-	-	-	-	-	-
French and non-official language	-	-	-	-	-	-
English; French and non-official language	-	-	-	-	-	-
Total employed labour force 15 years and over	3,030	1,630	1,400	765	420	345
Worked at home	90	25	65	20	10	10

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Worked outside Canada	-	-	-	-	-	-
No fixed workplace address	285	235	45	55	40	10
Worked at usual place	2,655	1,375	1,285	695	365	325
Worked in census subdivision (municipality) of residence	1,700	635	1,060	145	55	85
Worked in a different census subdivision (municipality) within the census division (county) of residence	695	605	95	50	30	15
Worked in a different census division (county)	25	10	20	10	10	-
Worked in a different province	230	120	105	490	275	215
Total employed labour force 15 years and over with a usual place of work or no fixed workplace address	2,940	1,605	1,330	750	415	335
Car; truck; van; as driver	2,010	1,130	880	585	335	250
Car; truck; van; as passenger	250	125	120	40	25	20
Public transit	75	35	40	10	-	-
Walked or bicycled	505	250	255	95	40	55
All other modes	100	70	35	15	15	-
Total population	5,530	2,765	2,765	1,500	750	750
Total visible minority population	65	30	30	15	10	10
Chinese	-	-	-	10	10	-
South Asian	15	15	-	-	-	10
Black	10	-	-	-	-	-
Filipino	30	10	20	-	-	-
Latin American	-	-	-	-	-	-
Southeast Asian	-	-	-	-	-	-



Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Arab	-	-	-	-	-	-
West Asian	-	-	-	-	-	-
Korean	-	-	-	-	-	-
Japanese	10	10	-	-	-	-
Visible minority; n.i.e.	-	-	-	-	10	-
Multiple visible minority	-	-	-	-	-	-
Not a visible minority	5,460	2,730	2,730	1,485	745	740
Persons 15 years and over with earnings (counts)	3,285	1,755	1,535	880	475	405
Median earnings - Persons 15 years and over (\$)	30,903	51,139	17,224	29,480	50,485	18,998
Persons 15 years and over with earnings who worked full year; full time (counts)	1,935	1,195	735	455	275	180
Median earnings - Persons 15 years and over who worked full year; full time (\$)	48,262	57,676	29,324	50,343	60,276	31,540
Persons 15 years and over with income (counts)	4,280	2,130	2,145	1,140	570	570
Median income - Persons 15 years and over (\$)	26,245	43,735	18,188	27,389	44,369	19,931
Median income after tax - Persons 15 years and over (\$)	23,828	36,626	16,869	24,513	37,301	18,633
Composition of total income (100%)	100	100	100	100	100	100
Earnings - As a % of total income	82	87	73	81	87	71
Government transfers - As a % of total income	11	7	20	10	6	19

Characteristics	Flin Flon (Part) - City (Census subdivision)			Creighton - Town (Census subdivision)		
	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>
Other money - As a % of total income	7	6	8	8	8	10
Income status of all persons in private households (counts)	5,520	2,755	2,760	1,500	745	750
% in low income before tax - All persons	14	13	14	8	7	10
% in low income after tax - All persons	10	11	9	6	5	7
% in low income before tax - Persons less than 18 years of age	24	27	21	12	12	13
% in low income after tax - Persons less than 18 years of age	19	25	14	10	7	10

Source: Statistics Canada. 2007. 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13 2007. <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> as of April 8, 2009