

# Prevalence of Low and High Birthweight Among the James Bay Cree of Northern Quebec

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Infant birthweight is an important indicator of neonatal health.<sup>1</sup> Aboriginal women tend to give birth to a greater percentage of high birthweight babies than non-Aboriginal women.<sup>2-6</sup> However, the birthweight distribution among the Canadian native population and particularly among the Cree has not been well documented.

The aim of this study was to document the birthweight distribution, determine the prevalence of low and high birthweight, and examine the secular trends of these indicators among the northern Quebec James Bay Cree.

## METHODS

A complete census of all infants born in the nine Cree communities in the James Bay Cree Region of northern Quebec between 1985 and 1995 was obtained from the Public Health Module - Cree Region of James Bay. Over the 11-year period, 3,098 births were recorded. The study sample was limited to Cree, singleton, live births (n=2,881). The prevalence of high birthweight was calculated using the commonly used definition of 4000 g or more.<sup>7</sup> Student's t-tests were performed to

determine if there were significant differences in mean birthweight between the first three years (1985-87) and the last three years (1993-95) of data collection and, between the five coastal (Great Whale, Chisasibi, Wemindji, Eastmain, and Waskaganish) and the four inland communities (Ouje Bougoumou, Waswanipi, Misstissini, and Nemaska). The relationship of infant birthweight with parity and mother's age was examined by analysis of variance. All analyses were conducted using the SAS statistical package (SAS Version 6.0, SAS Institute, Cary NC). P values <0.05 (two-sided) were considered to be statistically significant.

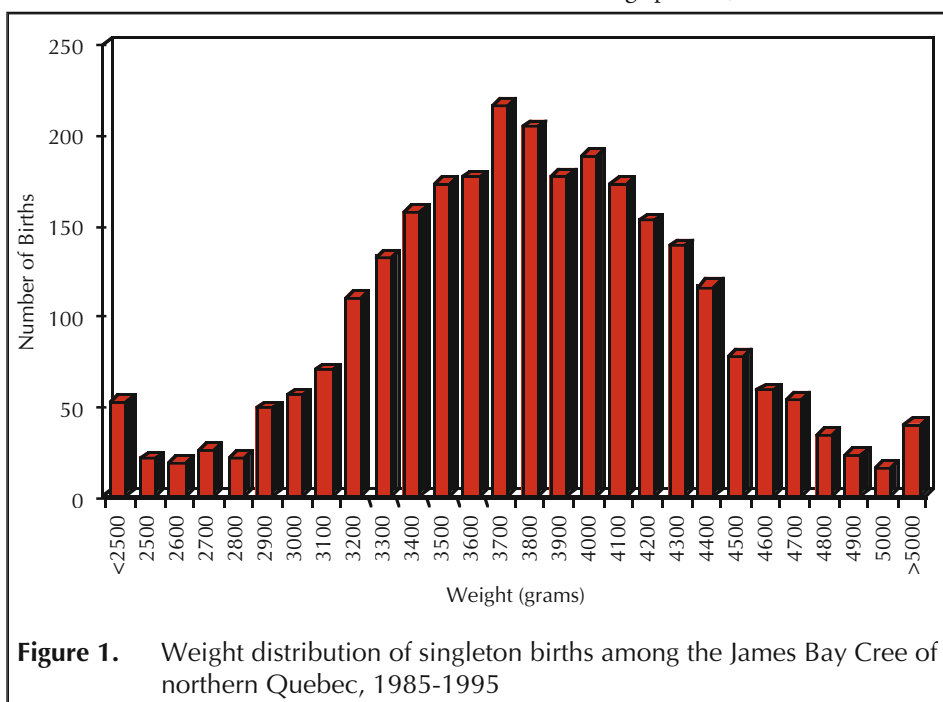
## RESULTS

The mean age of the Cree mothers and fathers at the time of birth was 23.7±5.6

years (range 12-45) and 26.5±6.4 years (range 14-64), respectively. Thirty-five percent of the mothers were pregnant for the first time, 42% for the second or third time, and 23% for at least the fourth time. The mean gestational age was 39.2±1.9. Approximately 5% of the deliveries were preterm (<37 weeks), 91% were at term, and 4% were post-term (≥42 weeks).

The overall mean birthweight was 3777±601 g, with males significantly heavier than females (3841±610 g versus 3709±583 g; p<0.001). The birthweights were normally distributed with the mean, median, and mode between 3777 g and 3900 g (see Figure 1).

Analysis revealed no difference between birthweights in the first three years (1985-87) and the last three years (1993-95) of data collection (3747±611 g versus 3744±616 g; p=0.39). There was also no



**Figure 1.** Weight distribution of singleton births among the James Bay Cree of northern Quebec, 1985-1995

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difference in birthweight between the Cree living in coastal versus inland communities (3799±621 g versus 3764±585 g;  $p=0.15$ ).

An analysis of predictors of birthweight was limited to parity and age which appear in the birth record. With increasing parity, mean birthweight increased as follows: first borns averaged 3693 g, second borns 3780 g, third and fourth borns 3833 g, and fifth borns and above 3923 g ( $p<0.001$ ). Similarly, mother's age was positively associated with infant birthweight ( $p<0.05$ ), however, when age and parity were put into the same regression model, only parity remained significantly related to birthweight ( $p<0.001$ ).

While the percentage of newborns weighing 4000 g or more increased steadily by increasing age of the mother (due in large part to increasing parity), the rate of low birthweight infants remained remarkably similar across different age groupings (see Table I). Of the 714 teenagers who gave birth during the period, the low birthweight rate was similar to the other age groupings. This was true even among the very young women (12-16 years).

## DISCUSSION

This census of birthweights from 1985 to 1995 in these nine communities indicates that Cree women give birth to high birthweight babies. The overall mean birthweight of 3777±601 g was higher than that reported for other native groups in Canada.<sup>3,4</sup> Furthermore, it is considerably higher than that of non-native Canadian averages of 3464±556 g for males and 3335±522 g for females.<sup>8</sup> The distribution of birthweights indicates that the mean birthweight is higher and that the total curve is pushed towards the right. There is a very low rate of low birthweight, even among young mothers. The variability in birthweight was very similar to that of non-native women with a coefficient of variation in birthweight of 16% among the Cree and 17% among Caucasian Montreal women.<sup>9</sup>

There is some evidence that birthweights are increasing among the Canadian Aboriginal population. For example, Dyck and Tan<sup>2</sup> found that the prevalence of infants weighing 4000 g or more increased

**TABLE I**  
**Percentage of Low Birthweight and Macrosomic Infants by Age Group Among Cree Women of the James Bay Region, 1985-1995**

Age Group (years)	n	< 2500 g (%)	≥ 4000 g (%)
12 - 16	159	2.5	28.3
17 - 19	555	2.0	31.6
20 - 34	1891	2.5	37.9
≥ 35	113	1.8	41.6
All Ages	2718	2.3	36.1

by 7% between 1975 and 1988 among northern, predominantly Aboriginal Saskatchewan women. Similarly, Thomson<sup>4</sup> cites a 1985 Health and Welfare Study reporting that in 1962, 12% of Canadian Aboriginal newborns weighed 4000 g or more compared to 22% in 1983. However, no significant increase was found over the 11 years of data collection for the James Bay Cree. In addition, Rich and Robinson<sup>10</sup> compiled live birthweight data on all Quebec James Bay Cree between 1982 and 1984 and reported similar mean birthweights (3800 g) to those of 1993-95. Moffatt<sup>6</sup> calculated birthweights for 213 James Bay Cree born 12 to 30 months prior to July 1978 and reported similar mean birthweights. Using earlier data for a similar population, Partington and Roberts<sup>5</sup> reported that the mean birthweight of 768 James Bay Cree from 1959 to 1965 was 3780 g, indicating no long-term secular trend.

Diabetes and obesity, two risk factors for high birthweight, have already been identified as important health problems among Canadian Aboriginal people and specifically among the Cree of northern Quebec.<sup>11</sup> The risk of developing gestational diabetes mellitus among Cree women is elevated as well.<sup>12</sup>

In conclusion, the distribution of birthweights of Cree infants is shifted to the right when compared to non-native women and hence there is an enviable low rate of low birthweight. The consequences of high birthweights in this population, however, need to be explored.

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## REFERENCES

1. Kramer MS. Determinants of low birth weight: Methodological assessment and meta-analysis. *Bull WHO* 1987;65:663-737.
2. Dyck RF, Tan L. Differences in high birth rates between northern and southern Saskatchewan: Implications for Aboriginal peoples. *Chron Dis Can* 1995;16:107-10.
3. Munroe M, Shah CP, Badgley R, Bain HW. Birth weight, length, head circumference and bilirubin level in Indian newborns in the Sioux Lookout Zone, northwestern Ontario. *Can Med Assoc J* 1984;131:45-46.
4. Thomson M. Heavy birthweights in native Indians of British Columbia. *Can J Public Health* 1990;81:443-46.
5. Partington MW, Roberts N. The heights and weights of Indian and Eskimo school children on James Bay and Hudson Bay. *Can Med Assoc J* 1969;100:502-9.
6. Moffatt MEK, Kato C, Watters GV. Length, weight, and head circumference in Quebec Cree children. Proceedings of the 6th International Symposium on Circumpolar Health. Anchorage, Alaska, 1985:170-72.
7. Boyd ME, Usher RH, McLean FH. Fetal macrosomia: Predictions, risks, proposed management. *Obstet Gynecol* 1983;61:715-22.
8. Arbuckle TE, Wilkins R, Sherman GJ. Birth weight percentiles by gestational age in Canada. *Obstet Gynecol* 1993;81:39-48.
9. Wen SW, Kramer MS, Usher RH. Comparison of birth weight distributions between Chinese and Caucasian infants. *Am J Epidemiol* 1995;141:1177-87.
10. Rich H, Robinson EJ. The heaviest babies in the world. *Arctic Med J* 1987;87:63.
11. Brassard P, Robinson E, Lavallée C. Prevalence of diabetes mellitus among James Bay Cree of northern Quebec. *Can Med Assoc J* 1993;149:303-7.
12. Rodrigues S, Robinson E, Gray-Donald K. Estimated prevalence of gestational diabetes among the James Bay Cree. *Can J Diabetes Care* 1997;21(3):64.

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