



Maternal Health

Birth Outcomes Among First Nations Birthing Parents Incarcerated While Pregnant: A Linked Administrative Data Study From Manitoba, Canada



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ABSTRACT

Background: In Canada, colonial policies have resulted in health inequities between First Nations and other Canadians. These policies contribute to overrepresentation of First Nations in the criminal legal system, where incarcerated people and their infants face elevated health risks. We investigated the association between prenatal incarceration and adverse birth outcomes among First Nations and other birthing parents in Manitoba, Canada.

Methods: Using linked whole-population administrative data, we identified all live births (2004–2017) in which the birthing parent (First Nations $n = 1,449$; other Manitoban $n = 278$) was prenatally incarcerated and compared them to birthing parents who were postnatally incarcerated (First Nations $n = 5,290$; other Manitoban $n = 790$) or not incarcerated (First Nations $n = 19,950$; other Manitoban $n = 3,203$). We used generalized linear models adjusted for measured confounders with propensity score weighting to calculate risk differences and 95% confidence intervals for adverse birth outcomes among those prenatally versus postnatally incarcerated in each group.

Results: Low birthweight births were more likely among First Nations birthing parents who were prenatally (vs. postnatally) incarcerated (risk difference 1.59, 95% CI [.79, 2.38]) but less likely among other Manitoban birthing parents (risk difference -2.33 , 95% CI $[-4.50, -.16]$) who were prenatally (vs. postnatally) incarcerated. Among First Nations, prenatal incarceration was also associated with large-for-gestational-age births, low Apgar scores, and no breastfeeding (vs. postnatal incarceration), as well as preterm births (vs. no incarceration). Among other Manitobans, prenatal incarceration was also associated with small-for-gestational-age births, low Apgar scores, and no breastfeeding (vs. postnatal incarceration), as well as preterm births (vs. no incarceration).

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Conclusions: The findings suggest that incarceration may contribute to intergenerational systems of oppression by compromising birth outcomes among First Nations and other birthing parents in Canada and underscore the need to both improve care for pregnant people who are incarcerated and invest in alternatives to incarceration.

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Children whose parents are incarcerated are set on a trajectory of systematic disadvantage that influences their long-term well-being (Nesmith & Ruhland, 2008; Quilty et al., 2004; Wildeman & Wang, 2017). Parental incarceration has been shown to be associated with poor child and family outcomes, including psychological impacts on the child (traumatic separation, loneliness), unstable childcare arrangements, and reduced family income (Murray et al., 2012). The negative influences on parents' psychological and social well-being from physical and mental health stressors in carceral environments can translate into health, educational, and socioeconomic challenges for their children as they grow older, and these negative influences can increase the likelihood the child also experiences incarceration, perpetuating a multigenerational cycle of disadvantage (Hardy, 2018). People who are incarcerated while pregnant and their infants may also experience greater health risks; there is growing evidence of epigenetic influences on infants' well-being, with emphasis on the prenatal period as a critical time for determining health trajectories (Van den Bergh et al., 2020). Epigenetic changes occurring as a result of high-stress pregnancies (such as those that can be experienced by people who are incarcerated) have been proposed as a mechanism by which physical health concerns and life-long susceptibility to illness manifest (Van den Bergh et al., 2020). Thus, accumulating effects of physical and mental stress from incarceration can be passed from parents to children through multiple generations, affecting the well-being of entire communities.

Incarceration during pregnancy has been shown to be associated with adverse birth outcomes such as low birthweight, preterm birth, and readmission into neonatal intensive care (Van den Bergh et al., 2020). Although many other factors (including smoking, substance use, and mental health) are associated with birth-related complications among incarcerated people, there is evidence that incarceration is an additional antagonist independent of these factors (Van den Bergh et al., 2020; Virk et al., 2010). In Canada, high rates of incarceration of birthing parents are recognized as a major contributor to child poverty and ill health (Singh et al., 2019), particularly among First Nations, one of three Indigenous Peoples in Canada. Generations of colonial policies, systems, and structures have resulted in substantial health and social disparities between First Nations and others in Canada. This includes disparities in parent/infant health outcomes (Allen et al., 2023; Enns et al., 2021; Silver et al., 2022; Vélez et al., 2020) and the overrepresentation of First Nations in the carceral system (Government of Canada's Department of Justice, 2019; Truth and Reconciliation Commission of Canada, 2015). In 2015, the Truth and Reconciliation Commission of Canada, which was formed to shed light on the harmful outcomes of colonial policies for Indigenous People and begin to facilitate reconciliation, issued two specific Calls to Action to address this injustice (Truth and Reconciliation Commission of Canada, 2015). The Calls to Action urge governments to commit to eliminating the overrepresentation of Indigenous People in

the carceral system and emphasize the need for annual reports on progress toward this goal.

To date, much of the research on prenatal incarceration has been conducted with relatively small, homogeneous populations and/or has been from the United States, where race- and ethnicity-related findings may have limited transferability to Canada's unique colonial history, health and criminal legal systems, and population demographics (Hardy, 2018; Lofstrom & Raphael, 2016). Understanding how incarceration impacts First Nations parental health and pregnancy outcomes addresses not only the Calls to Action, but also the need for more research on the sociodemographic characteristics that influence the quality of care offered to people who are incarcerated and therefore the trajectory of their children's health and well-being (Knittel & Sufrin, 2020). This retrospective population-based cohort study examines the association of prenatal incarceration with adverse birth outcomes among First Nations and among other people living in the province of Manitoba, Canada. We hypothesized that an infant born to a parent who was incarcerated while pregnant would have poorer birth outcomes than an infant born to either a parent who was incarcerated after giving birth or a parent who had never been incarcerated.

Methods

Study Setting and Approach

Manitoba has a population of 1.37 million residents and the highest proportion of First Nations residents (12%) among the Canadian provinces. Manitoba is representative of the national population on many indicators of health, education, and well-being (O'Grady et al., 2016; Oreopoulos et al., 2008); however, it has the second highest incarceration rate among Canadian provinces (Malakieh, 2020). Due to ongoing colonialist policies, which uphold institutionalized and structural racism, a high proportion of pregnant and birthing people incarcerated in Manitoba are First Nations (Singh et al., 2019). As recommended by the Indigenous Services Branch of the Government of Canada, we adopted a distinctions-based approach in which incarcerated First Nations are compared with other First Nations (but not with other groups of Manitobans) (Government of Canada, 2021); this was done in recognition of First Nations' data sovereignty and to avoid perpetuating and reinforcing deficit-based narratives (United Nations, 2007).

Ethics

Ethics approval was granted by the University of Manitoba Health Research Ethics Board (File No. H2019:370) and the Health Information Research Governance Committee of the First Nations Health and Social Secretariat of Manitoba. The Government of Manitoba's Health Information Privacy Committee also

reviewed and approved the use of the specific databases (HIPC #2019/2020–31).

Data Sources

The administrative data used in this study are from the Manitoba Population Research Data Repository at the Manitoba Centre for Health Policy (MCHP), University of Manitoba. The Repository comprises more than 90 databases of population-based administrative, registry, and survey data describing virtually all contacts Manitoba residents make with the health system, social services, and the criminal legal system. Many of the datasets, including the key health datasets used in this study, extend back as far as the 1970s. The data are de-identified (names and addresses are removed) but can be linked across databases and over time using encrypted individual-level identifiers. MCHP adheres to strict privacy protocols to protect Manitobans' personal information when using the Repository data for research (Katz et al., 2019).

Databases used in this study include the Manitoba Health Insurance Registry (includes variables for biological sex, birth dates, residential postal codes); hospital abstracts (clinical data collected at hospital discharge, such as birth dates and birth outcomes); medical claims for physician and nurse practitioner visits (diagnoses related to physical and mental health conditions); prescription drug claims from community pharmacies; data on the provincial employment and income assistance program; data on child protection/welfare services; and data from the provincial criminal legal system (court appearances, criminal charges, and incarceration in all types of provincial facilities). First Nations residents of Manitoba were differentiated from other Manitobans using the Manitoba First Nations Research File, which contains federally collected information on registered First Nations (Indian Act, 1985).

Cohort Construction

We identified all live births between January 1, 2004, and December 31, 2017 (121,074 birthing parents and 213,425 infants) using the hospital abstracts database. Then, through linkage to the Manitoba Health Insurance Registry, we limited the cohort to parent-infant pairings with continuous health care coverage throughout the pregnancy (i.e., they lived in Manitoba for the entirety of their pregnancy) (Figure 1). In Manitoba, health care coverage does not change when a person is incarcerated. Birthing parents were linked with their infants using a parent-child link algorithm previously developed at MCHP (Hamad et al., 2021). We used the Manitoba First Nations Research File to identify registered First Nations birthing parent-infant dyads and separated them from the other study group, All Other Manitobans. Information on adult incarceration derived from the criminal legal system databases was used to stratify First Nations and All Other Manitoban birthing parents by whether they had been incarcerated for at least 1 day between April 1, 2003, and May 1, 2019, and whether the incarceration occurred during the prenatal or postnatal period.

Exposure and Comparison Groups

In accordance with our distinctions-based approach, the exposure and comparison groups were created separately for First Nations and All Other Manitobans. The exposure groups comprised the infants of pregnant and birthing people who were

residents of Manitoba and who spent at least 1 day incarcerated in Manitoba during their pregnancy between April 1, 2003, and May 1, 2019 (*prenatal incarceration*). The comparison groups comprised infants born to parents who did not experience incarceration while pregnant but were incarcerated between the child's birth and their fifth birthday (*postnatal incarceration*), and to infants born to parents who did not experience incarceration at any point during the study period (*no incarceration*).

The *postnatal incarceration* group served as the main counterfactual to the exposure group; we hypothesized that they would share many measured and unmeasured characteristics while any differences in birth outcomes we detected could be attributed at least in part to experiencing incarceration during pregnancy. The *no incarceration* group was created by matching to infants in the prenatal incarceration group on the following characteristics: infant's sex, parental age at initial incarceration (within 3 years), infant's age at initial incarceration (within 1 year), parental urban/rural residence, and birthing parent's neighborhood income quintile during pregnancy.

Whether the birthing parent was incarcerated at the time of the birth was an important additional consideration for the study. However, the Manitoba criminal legal system data could only provide clear information on the date a person was incarcerated, and were not reliable with regard to whether the person was incarcerated at the time of their infant's birth. Thus, we limited the analysis to the three study groups above.

Variables

We calculated means and standard deviations or counts and proportions to describe the sociodemographic characteristics (parents' age at birth, urban/rural residence, income quintile, mental health and diabetes diagnoses, receipt of income assistance, and involvement of child welfare services) for each of the study groups. As outcome variables, we selected measures likely to be impacted by incarceration; these included markers of fetal development (birthweight, 5-minute Apgar scores, preterm birth, small- and large-for-gestational-age births, infant hospital readmission in the first 28 days of life) and indicators of the birthing parent/infant health care experience at the birth (cesarean section and breastfeeding initiation).

Our research team chose not to examine stillbirth and infant mortality outcomes in this study. Decades of oppressive and discriminatory colonial policies and practices have caused immense harm to generations of First Nations people, and we did not want to perpetuate negative stereotypes about First Nations parents. Thus, out of respect for our First Nations partners and their communities, and in recognition of the sovereignty these communities have over their own data, the research team chose to omit these outcomes from the study.

Adjustment Strategy

We constructed two generalized propensity scores to minimize observed differences in measured characteristics between the exposure and comparison groups (Imbens, 2000). The first propensity score was the basis for a minimally adjusted model that included only the birthing parent's age at first birth, their age at the birth of the infant included in the analyses, and the socioeconomic factor index (SEFI-2) for the neighborhood where they lived during pregnancy (Model 1) (Chateau et al., 2012). The second propensity score was the basis for a fully adjusted model that included all variables in the first generalized propensity

score as well as variables describing whether the birthing parent received income assistance while pregnant, had previously had a child taken into care, was diagnosed with a mental disorder, and was diagnosed with diabetes (Model 2). The two generalized propensity scores were used to create inverse probability of treatment weights (IPTWs) that were applied to the outcome

models. We calculated weighted and unweighted standardized differences to assess whether our adjustment strategy reduced differences among the three groups using an a priori cutoff of 10% (Austin, 2009). Appendix 1 presents a list of the variables we used in the propensity score models to adjust for confounding.

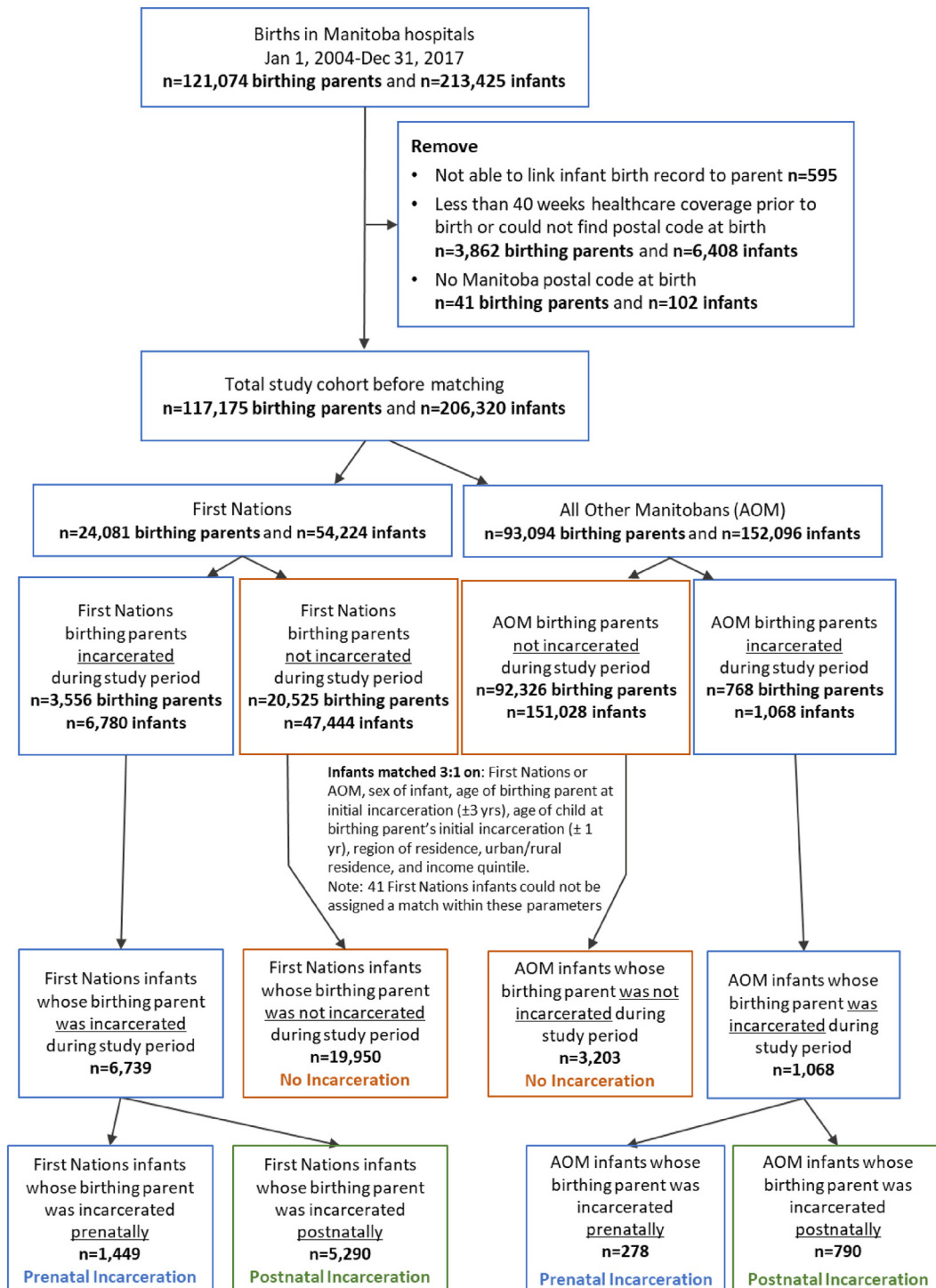


Figure 1. Study cohort development. AOM, All Other Manitobans.

Statistical Analyses

For the descriptive analyses, we tested for differences among the *prenatal*, *postnatal*, and *no incarceration* groups using linear regression for age at first birth and binomial regression for the counts/proportions. Income quintiles were compared using three separate χ^2 tests. Because there were three pairwise tests, the *p* values were adjusted for multiple comparisons using the Tukey-Kramer method. The tests were carried out separately for First Nations and All Other Manitobans. For the birth outcomes, we ran three sets of generalized linear models with binomial distributions to generate risk differences and risk ratios: a crude model with only the parent-infant exposure status; then Model 1, the minimally adjusted model using the IPTWs constructed using the first generalized propensity score; and Model 2, the fully adjusted model using the IPTWs created from the second generalized propensity score. For First Nations and All Other Manitobans separately, we compared the *prenatal incarceration* group to the *postnatal incarceration* group and to the *no incarceration* group. All analyses were conducted using SAS Version 9.4.

Results

Table 1 presents descriptive statistics for First Nations and All Other Manitoban exposure and comparison groups, and the distribution of outcomes for the cohort is shown in Table 2. Given that there were some differences across groups (despite matching for the *no incarceration* group), we adjusted for potential confounders using the IPTWs we developed from the propensity scores. After this adjustment (Figure 2), the study groups were comparable across all measured characteristics with standardized differences of less than .1.

Figure 3A presents the crude, minimally adjusted, and fully adjusted risk differences in birth outcomes between the *prenatal incarceration* group and the *postnatal incarceration* group. First

Nations are shown in blue and All Other Manitobans in orange. In the fully adjusted models, First Nations infants in the *prenatal incarceration* group were more likely than First Nations infants in the *postnatal incarceration* group to have low birthweight, be large for gestational age, and have a 5-minute Apgar score less than 7; they were also less likely to initiate breastfeeding. In the fully adjusted models, All Other Manitoban infants in the *prenatal incarceration* group were more likely than All Other Manitoban infants in the *postnatal incarceration* group to have a 5-minute Apgar score less than 8, and they were less likely to have low birthweight, have a planned preterm birth, be small for gestational age, and to initiate breastfeeding.

Figure 3B presents risk differences between the *prenatal incarceration* group and the *no incarceration* group. After fully adjusting for confounders, we observed a pattern of birth outcomes for both First Nations and All Other Manitoban infants similar to the comparison in Figure 3A; however, most of the adjusted risk differences were more pronounced and there were a few additional outcomes that were significantly different between the groups. For First Nations, these outcomes included preterm births (both planned and unplanned), small-for-gestational-age births, and births by cesarean section. For All Other Manitobans, outcomes that were not significantly different or were less likely when comparing prenatal and postnatal incarceration became more likely in this comparison (e.g., low birthweight, preterm birth). Risk differences for the three continuous outcome measures (birthweight, gestational age, and 5-minute Apgar scores) align with these findings and are presented in Appendix 2.

Discussion

This study found that prenatal incarceration of both First Nations and other birthing parents in Manitoba is associated with adverse birth outcomes for their infants. First Nations infants of birthing parents who were prenatally incarcerated were

Table 1
Study Cohort Descriptive Characteristics

Descriptive Characteristic	First Nations			All Other Manitobans		
	Prenatal Incarceration	Postnatal Incarceration	No Incarceration	Prenatal Incarceration	Postnatal Incarceration	No Incarceration
Count	<i>n</i> = 1,449	<i>n</i> = 5,290	<i>n</i> = 19,950	<i>n</i> = 278	<i>n</i> = 790	<i>n</i> = 3,203
Mean age of birthing parent at first birth	Mean (SD) 18.8 (2.9)	Mean (SD) 18.8 (2.8)	Mean (SD) 19.9 (3.5)*	Mean (SD) 20.7 (4.1)	Mean (SD) 20.8 (4)	Mean (SD) 23.1 (4.9)*
Urban residence	No. (%) 960 (66.3)*	No. (%) 2,924 (55.3)*	No. (%) 11,548 (57.9)*	No. (%) 239 (86)	No. (%) 640 (81)	No. (%) 2,629 (82.1)
Income quintile	†	†	†			
Q5 (Highest)	34 (2.3)	112 (2.1)	523 (2.6)	14 (5)	56 (7.1)	244 (7.6)
Q4	81 (5.6)	325 (6.1)	1,269 (6.4)	22 (7.9)	68 (8.6)	268 (8.4)
Q3	124 (8.6)	450 (8.5)	1,724 (8.6)	42 (15.1)	127 (16.1)	531 (16.6)
Q2	237 (16.4)	1,031 (19.5)	3,980 (19.9)	69 (24.8)	193 (24.4)	781 (24.4)
Q1 (Lowest)	973 (67.1)	3,372 (63.7)	12,454 (62.4)	131 (47.1)	346 (43.8)	1,379 (43.1)
Maternal diabetes at child's birth	24 (1.7)	106 (2)	397 (2)	s (s)	8 (1)	20 (.6)
Received income assistance	933 (64.4)*	2,871 (54.3)*	7,523 (37.7)*	206 (74.1)*	504 (63.8)*	612 (19.1)*
Diagnosed with a mental disorder						
Mood/anxiety disorder	783 (54)*	2,392 (45.2)*	5,145 (25.8)*	158 (56.8)	415 (52.5)	1,026 (32)*
Personality disorder	92 (6.3)*	180 (3.4)*	195 (1)*	44 (15.8)*	58 (7.3)*	52 (1.6)*
Psychosis disorder	65 (4.5)*	138 (2.6)*	131 (.7)*	17 (6.1)*	18 (2.3)*	22 (.7)*
Substance use disorder	711 (49.1)*	1,837 (34.7)*	2,094 (10.5)*	109 (39.2)	258 (32.7)	166 (5.2)*
Previous child taken into care	762 (52.6)*	2,597 (49.1)*	3,197 (16)*	112 (40.3)	293 (37.1)	138 (4.3)*

Abbreviations: No., number; s, suppressed; SD, standard deviation.

* In each row, groups with * are significantly different from each other, and groups with no symbol do not differ.

† In this row, groups sharing a symbol are not significantly different from each other.

Table 2
Distribution of Study Outcomes Across Study Groups

Outcome	First Nations			All Other Manitobans		
	Prenatal Incarceration	Postnatal Incarceration	No Incarceration	Prenatal Incarceration	Postnatal Incarceration	No Incarceration
Count	<i>n</i> = 1,443	<i>n</i> = 5,264	<i>n</i> = 19,846	<i>n</i> = 278	<i>n</i> = 788	<i>n</i> = 3,192
Continuous outcomes	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Birthweight (grams)	3,336.3 (661.9)	3,383.6 (635.8)	3,505.8 (631.7)	3,195.6 (613.3)	3,235.3 (598.9)	3,396.7 (586.7)
Gestational age (weeks)	38.4 (2.4)	38.5 (2.1)	38.8 (2.1)	38.5 (2.7)	38.7 (2)	39 (2.2)
5-minute Apgar score	8.8 (1)	8.8 (.7)	8.9 (.8)	8.7 (.7)	8.8 (.7)	8.8 (.7)
Binary outcomes	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Low birthweight (<2,500 g)	133 (9.2)	413 (7.8)	1,045 (5.3)	26 (9.4)	81 (10.3)	173 (5.4)
Preterm birth						
Planned	50 (3.5)	190 (3.6)	645 (3.3)	8 (2.9)	32 (4.1)	83 (2.6)
Unplanned	161 (11.2)	497 (9.5)	1,207 (6.1)	26 (9.4)	68 (8.6)	147 (4.6)
Small for gestational age	123 (8.6)	438 (8.3)	1,215 (6.1)	38 (13.8)	124 (15.8)	311 (9.8)
Large for gestational age	224 (15.6)	817 (15.6)	3,892 (19.6)	21 (7.6)	59 (7.5)	336 (10.6)
Low 5-minute Apgar score (<7)	44 (3.1)	102 (2)	323 (1.6)	7 (2.5)	10 (1.3)	41 (1.3)
Low 5-minute Apgar score (<8)	74 (5.2)	206 (4)	662 (3.4)	17 (6.2)	37 (4.7)	123 (3.9)
Breastfeeding initiation	663 (46.5)	2,688 (51.6)	12,525 (63.4)	146 (52.9)	519 (66)	2,670 (84.2)
Cesarean birth	223 (15.4)	795 (15.1)	3,204 (16.1)	46 (16.7)	131 (16.6)	666 (20.9)
28-day neonatal readmission	20 (1.4)	86 (1.7)	358 (1.9)	s (s)	9 (1.2)	45 (1.4)

Abbreviations: No., number; s, suppressed; SD, standard deviation.

more likely to have low birthweight, be large for gestational age, and have a low Apgar score, and their birthing parents were less likely to initiate breastfeeding than birthing parents postnatally incarcerated. Other Manitoban birthing parents were more likely

to have an infant with a low Apgar score and less likely to initiate breastfeeding if they had been prenatally (vs. postnatally) incarcerated. Although we expected to see significant risk differences in several outcomes in the *prenatal/no incarceration*

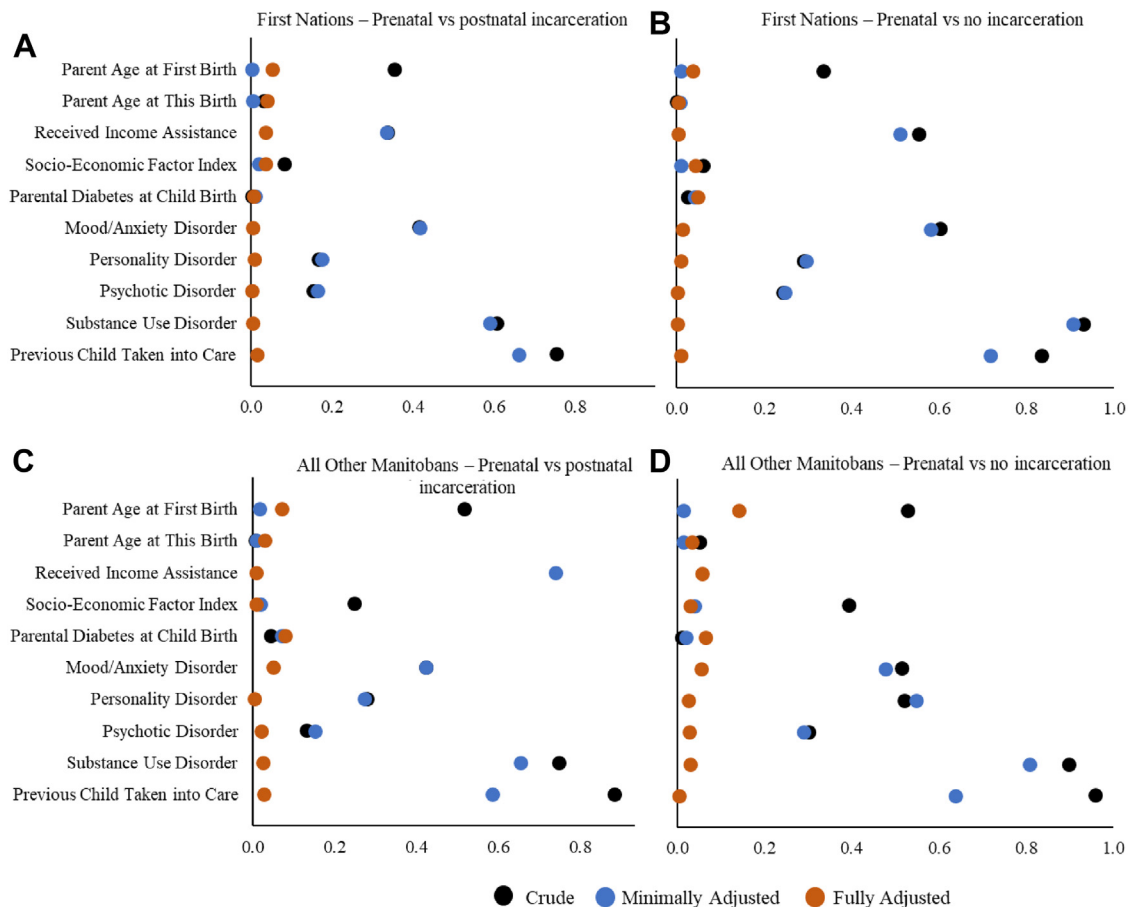


Figure 2. The study group comparisons are: (A) First Nations (prenatal vs. postnatal incarceration). (B) First Nations (prenatal vs. no incarceration). (C) All other Manitobans (prenatal vs. postnatal incarceration). (D) All other Manitobans (prenatal vs. no incarceration).

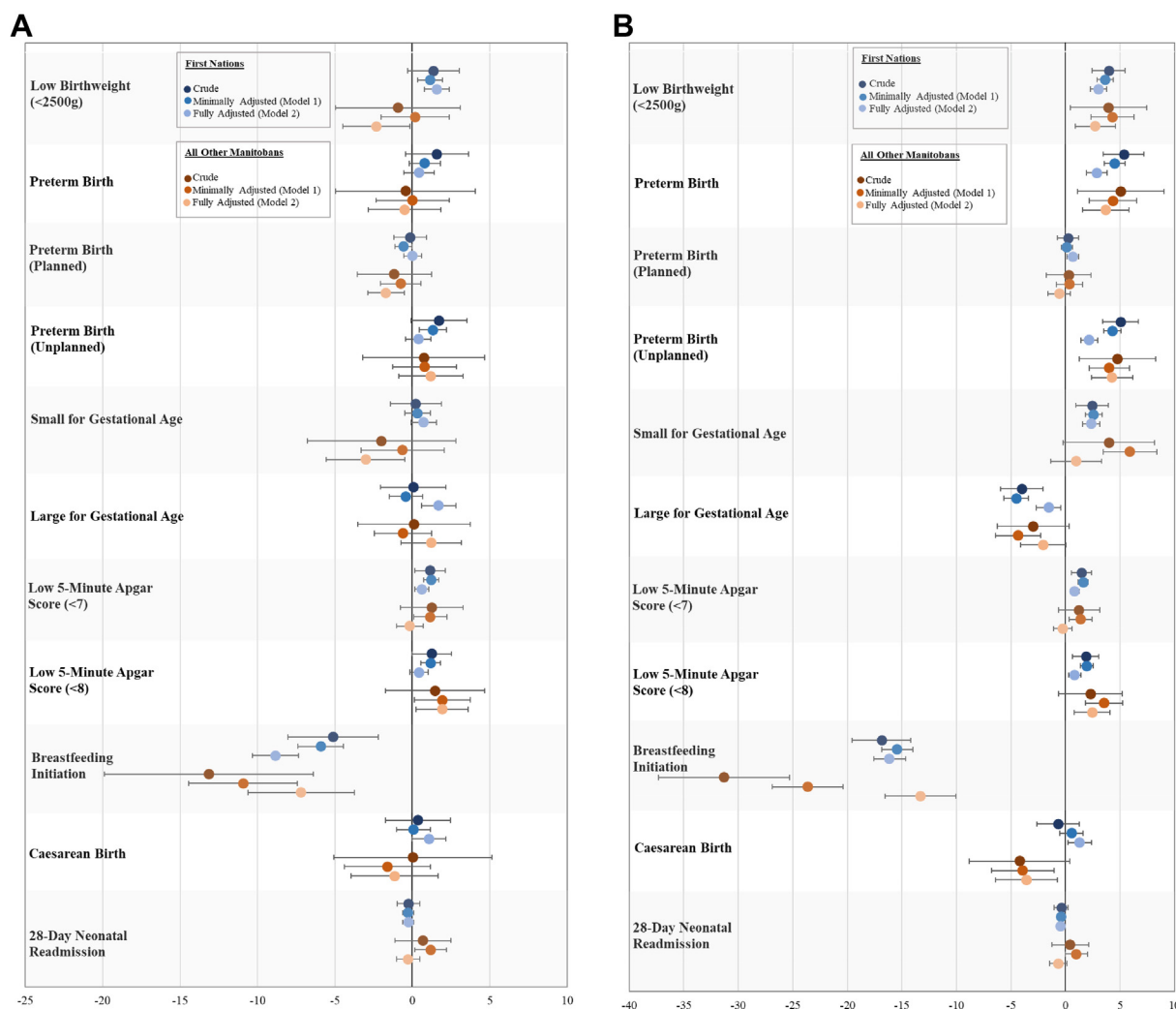


Figure 3. (A) Risk differences in First Nations and All Other Manitobans birth outcomes. Prenatal incarceration versus postnatal incarceration. (B) Risk differences in First Nations and All Other Manitobans birth outcomes. Prenatal incarceration versus no incarceration.

comparison, the significant differences observed in the *prenatal/postnatal* comparison are notable, because the *postnatal incarceration* group was more similar to the *prenatal incarceration* group on observed characteristics and may also share a number of unobserved characteristics.

An integrative review (2019) details how incarceration can be associated with both improved and worsened outcomes, depending to some extent on the length of the incarceration, rates of recidivism, and the timing of the incarceration during the pregnancy (Baker, 2019). For example, a period of incarceration early in the pregnancy (first trimester) has been associated with higher infant birthweight, perhaps because of better food stability, better access to prenatal care, and potential interruption/reduction of substance use in the carceral environment (Baker, 2019; Howard et al., 2008). Conversely, a research design similar to ours found there was an elevated risk for preterm birth, low birthweight, and small-for-gestational-age births when comparing women incarcerated during pregnancy and women who had been previously incarcerated (but not during pregnancy) in Ontario, Canada (Carter Ramirez, Liauw, Costescu, et al., 2020). Studies documenting the lower quality of health care (and limited continuity of care) birthing parents and their

infants receive also shed light on mechanisms of poor outcomes following a birth (Carter Ramirez, Liauw, Cavanagh, et al., 2020; Walker et al., 2014). Other research highlights the higher rates of chronic disease, mental health, and substance use disorders among incarcerated women in general, together with a wide array of detrimental social and structural determinants of health and well-being (poverty, homelessness, structural and systemic racism) (Subramanian et al., 2015). These conditions are collectively associated with compounded increased risk of negative health outcomes among pregnant people who experience incarceration, which then has a ripple effect for families and communities (Knittel & Sufrin, 2020).

Our study makes an important contribution to the research literature on birth outcomes of incarcerated birthing parents, and it brings attention to other harms resulting from decades of discriminatory colonial policies that have led to First Nations and other Indigenous populations being overrepresented in the carceral system (Cesaroni et al., 2019; Government of Canada's Department of Justice, 2019; Singh et al., 2019; Truth and Reconciliation Commission of Canada, 2019). The adverse birth outcomes associated with prenatal incarceration are only one example of how society's social and economic structures fail to

adequately provide the resources First Nations families and communities need for optimal health and well-being (Knittel & Sufrin, 2020). The overincarceration of Indigenous women has been linked directly to overrepresentation of Indigenous children in foster care (Brownell et al., 2020; Nickel et al., 2020), and it contributes to an inequitable distribution of health deficits, as well as an enormous burden of years of life lost attributable to incarceration for Indigenous Peoples. Thus, the discrimination embedded in the Canadian criminal legal system extends well beyond the sector and has a major impact on the physical and mental health and social well-being of multiple generations (Canadian Public Health Association, n.d.).

Implications for Practice and/or Policy

Given the findings of our study and others from the literature, we see an urgent need for policymakers in Canada to invest in establishing alternatives to incarceration. Many evidence-based alternatives exist, but in Canada, Indigenous People often lack equitable access to such routes (Cunneen, 2018; Gutierrez & Wanamaker, 2022; Murdocca, 2020). Canadian governments have pledged to address the inequities in Indigenous Peoples' well-being as part of their efforts toward reconciliation and should be held accountable to their promises to reform the criminal legal system to ensure that racism is eliminated and equity is upheld. Just as urgent is the need for public health to partner with the Department of Justice to refine our understanding of the mechanisms by which systemic racism operates and keeps rates of incarceration of Indigenous Peoples high. These mechanisms have been previously detailed in both decades-old and more recent reports (Aboriginal Justice Inquiry Commission, 1991; Truth and Reconciliation Commission of Canada, 2015), but the recommendations put forward in these documents have not yet been implemented. In the current system, we also see the need to improve care for pregnant people who are incarcerated, including ensuring access to high-quality prenatal care, adequate nutrition, and treatment for mental illness and substance use disorders; respectful, safe childbirth; and creating conditions that support breastfeeding and birthing parent/infant bonding (Knittel & Sufrin, 2020). Substandard care for pregnant people who are incarcerated has been detailed in numerous reports in Canada (Kirubakaran et al., 2022; Liauw et al., 2021; McLeod et al., 2023; Paynter et al., 2022), and enhancing perinatal care could contribute to closing gaps in adverse birth outcomes and reducing recidivism rates (Alirezai & Roudsari, 2020; Bard et al., 2016).

Limitations

There are several limitations of this study that warrant mention. As this is a retrospective, observational study using administrative data, the findings do not definitively show a causal link between prenatal incarceration and adverse birth outcomes, although the collective literature on this topic suggests a strong relationship between these factors. Administrative data are also not collected for the primary purpose of research, and interpretation of findings should be further contextualized by content experts and people with lived experience of the topic being studied. In our study, challenges with the data quality meant that we could only tell whether a person had been prenatally incarcerated but not whether they gave birth while incarcerated. As well, we were limited to analysis of provincial incarceration data, which meant that we could address the

research questions for the population of Manitoba, but the specific findings may not be universally applicable nationally or internationally. It would have been valuable to examine the timing of prenatal incarceration more closely (e.g., first vs. second trimester), but our study population size was not sufficiently powered for this type of analysis. Finally, the measures we use in this study are deficit-based indicators and thus do not fully reflect the strengths or the well-being of Indigenous Peoples; we continue to support and promote the development and use of strength-based measures in Indigenous-partnered research.

Conclusion

Our study presents evidence of an association between prenatal incarceration and adverse birth outcomes for First Nations and other parent-infant dyads in Manitoba, Canada. It provides evidence and impetus for improving care and promoting dignity for pregnant people who are incarcerated by ensuring delivery of high-quality prenatal care, adequate nutrition, and mental health and addiction treatment; creating the means for safe and respectful care at childbirth; and investing in alternatives to incarceration. The findings indicate the need to adopt equity-focused policies and to develop effective interventions to support optimal health for all Manitobans.

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Supplementary Data

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