

Neighbourhood material deprivation and severe maternal morbidity: A population-based cohort study in Ontario, Canada
Snelgrove JW *et al.*

Supplementary Appendix 1. Data sources for project

Discharge Abstract Database (DAD)

The DAD is compiled by the Canadian Institute for Health Information and contains administrative, clinical (diagnoses and procedures/interventions), demographic, and administrative information for all admissions to acute care hospitals, rehab, chronic, and day surgery institutions in Ontario. At ICES, consecutive DAD records are linked together to form 'episodes of care' among the hospitals to which patients have been transferred after their initial admission.

MOMBABY

The ICES MOMBABY Database is an ICES-derived cohort that links the DAD inpatient admission records of delivering mothers and their newborns. From 2002 onward, this linkage is performed deterministically using a maternal-newborn chart matching number. Prior to 2002, mothers were linked to their children by matching on the institutions they were admitted, their postal codes, and their admission/discharge dates.

Registered Persons Database (RPDB)

The RPDB provides basic demographic information (age, sex, location of residence, date of birth, and date of death for deceased individuals) for those issued an Ontario health insurance number. The RPDB also indicates the time periods for which an individual was eligible to receive publicly funded health insurance benefits and the best known

Ontario Health Insurance Plan (OHIP)

The OHIP claims database contains information on inpatient and outpatient services provided to Ontario residents eligible for the province's publicly funded health insurance system by fee-for-service health care practitioners (primarily physicians) and "shadow billings" for those paid through non-fee-for-service payment plans. The main data elements include patient and physician identifiers (encrypted), code for service provided, date of service, associated diagnosis, and fee paid.

Immigration, Refugees, and Citizenship Canada's (IRCC) Permanent Resident Database

The Ontario portion of the IRCC Permanent Resident Database includes immigration application records for people who initially applied to land in Ontario since 1985. The dataset contains permanent residents' demographic information such as country of citizenship, level of education, mother tongue, and landing date. New immigrants who are currently residing in Ontario but originally landed in another province are not captured in this dataset.

Ontario Marginalization Index (ONMARG)

ONMARG is a geographically (census) based index developed to quantify the degree of marginalization occurring across the province of Ontario. It is comprised of four major dimensions thought to underlie the construct of marginalization: residential instability, material deprivation, dependency, and ethnic concentration. The dataset contains census divisions (CD), census tracts (CT), census subdivisions (CSD), consolidated municipal service manager areas (CMSM), public health units (PHU), local health integration networks (LHIN), sub-LHINs, and dissemination areas (DA).

These datasets were linked using unique encoded identifiers and analyzed at ICES.

The dataset from this study is held securely in coded form at ICES. While data sharing agreements prohibit ICES from making the dataset publicly available, access may be granted to those who meet pre-specified criteria for confidential access, available at www.ices.on.ca/DAS. The full dataset creation plan and underlying analytic code are available from the authors upon request, understanding that the computer programs may rely upon coding templates or macros that are unique to ICES and are therefore either inaccessible or may require modification.

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Inclusion/Exclusion Criteria

Concept	Data Sources	Code Type	Window	Notes (including Dataset references)
Inclusion Criteria				
Hospital birth (live or stillbirth) at gestational age ≥ 20 weeks	DAD, MOMBABY	ICD-10 main patient service code for "Obstetrical birth"	Accrual window: 1 April 2002 – 17 Feb 2018	Canadian Institute for Health Information Discharge Abstract Database (DAD, linked to newborn record in MOMBABY dataset) See: https://datadictionary.ices.on.ca/Applications/DataDictionary/Library.aspx?Library=MOMBABY
Exclusion Criteria				
Missing or invalid IKN	RPDB		Index date	Registered Persons Database See: https://datadictionary.ices.on.ca/Applications/DataDictionary/Library.aspx?Library=RPDB
MOMBABY linkage warning	MOMBABY		Index date	
Missing or invalid age (<10 or >55)	RPDB		Index date	
Missing or invalid sex	RPDB		Index date	
Death before the index date	RPDB		Index date	
Non-Ontario residents / invalid OHIP number	RPDB		Index date	
Any births with an index date occurring outside of the accrual period	MOMBABY		Accrual window	Pregnancy onset before 1 April 2002
Any births occurring after accrual end date	MOMBABY		Accrual window	Births after 17 February 2018
Not first birth	MOMBABY		14 years prior to index date	Prior record in MOMBABY within past 14 years of index date
Not first birth in accrual period	MOMBABY		Accrual window	Subsequent records in MOMBABY

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Snelgrove JW et al.

Outcome

Concept	Data Sources	Code Type	Window	Notes (including Dataset references)
Severe maternal morbidity (SMM)	DAD	ICD 10 CCI	Start of lookback period (“pregnancy onset” = index date – gestational age at birth) to end of observation window (42 days following index date)	Patient considered to have outcome IF ANY code in ANY of the following: 1) Obstetric/ ill-defined or sudden death 2) Hypertensive heart/renal disease 3) Eclampsia 4) Cerebral venous thrombosis 5) Complications of anaesthesia – non-cardiac 6) Complications of anaesthesia – cardiac 7) Cardiac diseases (cardiac arrest, infarction, failure, pulmonary edema) 8) Placental abruption c/ coagulation defect 9) Antepartum hemorrhage c/ coagulation defect 10) Intrapartum hemorrhage c/ coagulation defect 11) Uterine rupture – before labour 12) Uterine rupture – during labour 13) Obstetric shock (including septic shock) 14) Septecemia during labour 15) Puerperal sepsis 16) Pulmonary embolism 17) Obstetric embolism 18) Cardiomyopathy 19) Acute renal failure 20) HIV disease 21) Cerebrovascular disease 22) Acute respiratory distress syndrome 23) Acute abdomen 24) Hepatic failure 25) Acute psychosis 26) Cerebral edema, coma 27) Disseminated intravascular coagulation 28) Sickle cell anemia crisis 29) Status asthmaticus 30) Status epilepticus 31) Assisted ventilation (endotracheal tube or tracheostomy) 32) Caesarean hysterectomy 33) Postpartum hysterectomy 34) Dialysis 35) Evacuation of incisional hematoma 36) Surgical repair of bladder, urethra, intestine 37) Intrapartum hemorrhage with no coagulation defect AND blood transfusion 38) Postpartum hemorrhage AND blood

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Snelgrove JW et al.

				transfusion 39) Placenta previa AND blood transfusion 40) Embolization/ ligation/ suturing AND postpartum hemorrhage See: Joseph KS et al, 2009, ¹ Joseph KS et al, 2010, ² ICD-10CA, 2009, ³ and CCHI, 2012. ⁴
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Neighbourhood material deprivation and severe maternal morbidity: A population-based cohort study in Ontario, Canada
Snelgrove JW et al.

Study exposures, covariates

Concept	Data Sources	Code Type	Window	Notes (including Dataset references)
Age	RPDB		Index date	
Index year	DAD		Index date	
Material deprivation index	ONMARG		Index date	Ontario Marginalization Index, Material Deprivation, in quintiles. Use version of ONMARG closest to year of index date: 2001 for 2002-2003 2006 for 2004-2018 See: https://datadictionary.ices.on.ca/Application/Dictionary/Library.aspx?Library=ONMARG
Income quintile	RPDB Census		Index date	Ontario Census area profile: income quintile. Use Census closest to year of index date: 2001 for 2002-2003 2006 for 2004-2018 See: https://datadictionary.ices.on.ca/Application/Dictionary/Library.aspx?Library=CENSUS
Rurality	RPDB		Index date	Rurality Index for Ontario (RIO). Use version of RIO closest to year of index date: RIO2004 for 2002-2006 RIO2008 for 2007-2018
Gestational age at birth	MOMBABY		Index date	
Induction of labour	DAD	CCI code	Within index hospitalization	Canadian Classification of Health Interventions (CCI)
Epidural	DAD OHIP	CCI code OHIP fee code	Within index hospitalization	Canadian Classification of Health Interventions (CCI); Ontario Health Insurance Plan Claims Database (OHIP)
Delivery mode	DAD	CCI code	Within index hospitalization	
Multiple gestations	MOMBABY		Within index hospitalization	
Stillbirth	MOMBABY		Within index hospitalization	
Immigration status	IRCC		Index date	Immigration, Refugees and Citizenship

Neighbourhood material deprivation and severe maternal morbidity: A population-based cohort study in Ontario, Canada
 Snelgrove JW et al.

				Canada (IRCC)'s Permanent Resident Database Number of years since arrived in Ontario. See: https://datadictionary.ices.on.ca/Application/DataDictionary/Library.aspx?Library=CIC
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References

1. Joseph KS, Fahey J, Canadian Perinatal Surveillance S. Validation of perinatal data in the Discharge Abstract Database of the Canadian Institute for Health Information. *Chronic Diseases in Canada*. 2009;29:96-100.
2. Joseph KS, Liu S, Rouleau J, et al. Severe maternal morbidity in Canada, 2003 to 2007: surveillance using routine hospitalization data and ICD-10CA codes. *Journal of Obstetrics & Gynaecology Canada: JOGC*. 2010;32:837-46.
3. *International Statistical Classification of Diseases and Related Health Problems. 10th Revision. ICD-10CA*: Canadian Institute for Health Information;2009.
4. *Canadian Classification of Health Interventions*. Ottawa: Canadian Institute for Health Information;2012.