Smoking during pregnancy

The term "women" is used throughout this document to stay consistent with the data source. People with various gender identities can get pregnant and have children and are included in these data.

Description

Percentage of women who reported smoking during pregnancy at admission for birth

Specific Indicators

- Percentage of women who reported smoking cigarettes at the time of admission for birth.

Ontario Public Health Standards

This indicator relates to the following Ontario Public Health Standards:

- Chronic Disease Prevention and Well-Being
- Healthy Growth and Development
- Substance Use and Injury Prevention

Corresponding Indicators in Public Health Practice

Corresponding Health Indicators from Statistics Canada and CIHI

- None

Corresponding Indicator(s) from Other Sources

- None

Data Source

Numerator & Denominator: BORN Information System (BIS)
Original Source: Better Outcomes Registry & Network (BORN) Ontario
Distributed by: Better Outcomes Registry & Network (BORN) Ontario

Citation (see Data Citation Notes): Public Health Unit Analytic Reporting Tool (Cube), BORN Information System (BIS), BORN Ontario. Information accessed on [Month DD, YYYY]

Maternal smoking at time of newborn's birth, by public health unit and province (Standard Report), BORN Information System (BIS), BORN Ontario. Information accessed on [Month DD, YYYY]

Alternative Data Sources

- Healthy Babies Healthy Children (HBHC) Healthy Child Development (HCD) - Integrated Services for Children Information System (ISCIS) using postpartum screening results:
    - Percentage of HBHC Clients with maternal smoking of cigarettes during pregnancy.
- The Healthy Babies Healthy Children (HBHC) Screening Tool was developed by the Ministry of Children, Community and Social Services (formerly Ministry of Children and Youth Services) and is a comprehensive tool for identifying families with potential risk factors that could affect healthy development among children. The screening tool includes a question regarding smoking during pregnancy (question 8) which is collected through the Integrated Services for Children Information System (ISCIS).

NOTE: The ISCIS database only contains data on families that give consent to share personal information and personal health information with the health unit and thus does not represent all births within a geographical area. Also, the smoking data element is worded differently in the HBHC screening tool, so results may not be comparable to those collected in the BIS. Be aware that use of ISCIS data for purposes outside the HBHC program is at the discretion of the privacy policies at each individual health unit.

Data Elements in the BORN Information System (BIS) Public Health Data Cube

Dimension	Categories	Description
Maternal smoking at time of labour/ admission (BORN ID – D0005)	● None ● <10 cigarettes/day ● 10-20 cigarettes/day ● >20 cigarettes/day ● Amount unknown* ● Missing data *Note that 'amount unknown' includes smoking but without a specific amount	**Data Dictionary definition:** Self-reported amount of smoking per day closest to time of labour/admission. This is also the variable used to populate the BIS PH Standard report.
Any Smoking at Admission	● Yes ● No ● Missing data	Derived variable based on BORN ID – D0005. This variable is only available in the Cube.
Newborn DOB Calendar	2013, 2014, etc	

Analysis Checklist

- BORN data are available to PHUs by custom request and through the BORN Ontario reporting environment as Public Health Standard Reports and the Public Health Unit

Analytical Reporting Tool (cube). All users are required to sign a data sharing agreement and adhere to strict privacy and security measures.

- Refer to the *Using BORN Ontario Data for Public Health Surveillance – User Guide* and the BORN Information System (BIS) resource for more information about the data, and the BORN Data Dictionary for a list and description of data elements captured in the BIS.
- For key information used by the Reproductive Health Sub-Group (RHSG) in their revision of the reproductive health core indicators and accompanying resources, refer to the Reproductive Health Core Indicators Document Report.
- Data from the Legacy Datasets (birth data prior to April 1, 2012) is available from BORN upon request. However, not all data elements available in BORN are available in the legacy datasets. As well, the smoking data element was not defined the same way as the corresponding data element in the BIS, and may not give consistent results over time.
- Although the BIS was launched in April 2012, data may not be complete for some elements and geographical areas in that first year. It is recommended that analyses begin from the calendar year 2013.
- The BORN licensing agreement with health units does not require suppression of small cells; however, BORN recommends the suppression of cells five or less, although zero counts may be presented. This practice decreases the risk of re-identifying individuals. In general, caution should be used when reporting data at a level that could identify individuals (e.g., reporting at the dissemination area by maternal age).
- Aggregation (combining years, age groups, geographic levels, categories or pick-list items) should be considered when dealing with small cell counts.
- Data in the Standard Reports represents all data that has been entered, submitted, and acknowledged into the BIS as of the date of extraction. Data in the PHU Analytics Cube is based on submitted data only. As such, the numbers are subject to change as organizations continue to submit, acknowledge, and fix errors in their data.
- The date of extraction must be included in the data source citation. The date of extraction is not automatically recorded when the user exports BIS data; the user must add it.
- For any analysis of the BIS, ensure that all or a majority of hospitals and midwifery practice groups in your area have acknowledged their data.
    - Every PHU standard report starts with a month-end data acknowledgement summary that can be used to verify the proportion of hospitals/midwife practice groups that have acknowledged their data in your area.
    - Please note: Midwife-attended hospital births must have acknowledgement from both the hospital AND the midwifery practice group in order for the month to show as acknowledged in the PHU acknowledgement report. Unacknowledged data does not necessarily mean that the data is missing, it has just not been signed off by the submitting organization.
- Caution should be taken when interpreting data, if the percentage of “missing data” for a particular data element is ≥10%. BORN Ontario recommends not reporting data if the missing data are ≥30%.
- In the Public Health Standard Reports, comparator data is provided for Ontario. This comparator is only available for six months prior to the date of extraction. The Ontario comparator includes all PHUs.
- **If using the Public Health Standard Reports:**
    - Select the PHU-Pregnancy report under Clinical Reports
    - Specify the dates/years and PHU of analysis

    - Go to the link for ‘Maternal smoking at time of newborn’s birth, by public health unit and province’
    - Calculate the percentages from the standard report or export the table to Excel
- **If using the Public Health Cube:**
    - Select Dimension of interest: “Smoking at Admission for Birth” or “Any Smoking at Admission” (both found under Dimensions > Pregnancy > Exposures)
    - Select Measure: “# of Pregnancies – Women Who Gave Birth” (found under Measures > Pregnancy)
    - Specify Filters by right clicking on each of the following dimensions and selecting the following categories:
        - Newborn DOB Calendar (found under Dimensions > Newborn DOB > Newborn DOB Calendar) = Deselect 2012 and others as appropriate for your analysis
    - Calculate percentages within the Cube or export to Excel

Method of Calculation

Percentage of women who smoked during pregnancy

$$\frac{\text{[Number of women who gave birth (live or still) who reported smoking any cigarettes at time of admission for birth]}}{\text{[Total number of women who gave birth (live or still)]}} \times 100$$

Basic Categories

- Geographic areas of PHU: Ontario, Public Health Unit, Dissemination Areas

Indicator Comments

- BORN Ontario staff indicate that data quality of the ‘smoking at first prenatal visit’ data element is questionable, as most hospitals enter this information retrospectively at labour and birth. If it is collected, it is pre-populated to the labour and birth encounter and supposed to be verified at that time. Given that these data do not tend to be collected around first prenatal visit, it is thus recommended not to analyze that data element to capture smoking during pregnancy – rather, it is recommended to use smoking at time of admission for birth, as reflected throughout the core indicator document. (2)
- In the standard reports and cube, geography is assigned based on the infant’s residence at the time of birth, not the location of birth. The majority of the time, but not always, the infant’s residence is the same as the mother’s residence. This is important for custom data requests, as requesters can specify if data should be analyzed by the infant’s residence or the mother’s.
- Outside of a custom data request, Ontario comparator data and data for other PHUs for selected indicators can be accessed through Public Health Ontario’s Maternal Health Snapshot.
- The Public Health Agency of Canada’s 2006-2007 Maternity Experiences Survey (MES) was a national self-reported telephone survey of Canadian women’s experiences,

perceptions, knowledge and practices before conception, during pregnancy and after birth. The MES asked women about smoking during pregnancy. The lack of timeliness of this data element limits its relevance as a corresponding national indicator, however the survey report may still prove a useful resource for other purposes, e.g., validated question wording. (3)

- Statistics Canada's Canadian Community Health Survey asks about smoking during pregnancy of females aged 15-55 years who gave birth in the past 5 years via the Smoking during maternal experience (MXS) module. Due to the very small sample sizes at a local level, as well as the lack of timely data, this data source may be of limited value for local surveillance purposes but remains a potentially useful resource for methodological (or other) purposes. (4)
- Measurement issues are complicated by cessation of use during pregnancy, as well as social desirability effects, as this is a self-reported indicator.
- Smoking in pregnancy increases the risk to the fetus of:
    - intrauterine growth restriction (IUGR) (5)
    - low birth weight (5)
    - preterm birth (6)
    - spontaneous abortion (7)
    - placental complications (8)
    - stillbirth (7,9)
    - sudden infant death syndrome (SIDS) (8)
    - childhood asthma and respiratory illness (10)
    - neurodevelopmental and behavioural problems (8)
    - some childhood cancers (11)
- Some of the long-term health impacts for babies born to women who smoke during pregnancy are a consequence of the perinatal complications they experience such as preterm birth and intrauterine growth restriction. (12)
- It is important to understand the degree, as well as the distribution (i.e., random vs systematic) of missing data for smoking during pregnancy from BORN for your health unit prior to reporting on it. Factors affecting missing data rates may include, but are not limited to, issues such as 1) the designation of the data element within the BIS (i.e., mandatory, conditional, optional); 2) hospital resources to input these data into the BIS (e.g., as of May 2023, one Ontario level 3 neonatal intensive care unit (NICU) does not yet enter data into the BIS); 3) certain questions on sensitive subjects may elicit stronger social desirability response bias or non-response.
    - The total missing for smoking at admission for birth for Ontario was 2.7% in 2023. (13)
    - By Public Health Unit, the total missing ranged from 0.0-4.2%, with a mean of 1.4% and median of 1.0%, in 2017. (14)

Cited References

(1) Ministry of Health. Ontario Public Health Standards: Requirements for Programs, Services, and Accountability.June 2021; Available at: http://www.ontario.ca/page/ontario-public-health-standards-requirements-programs-services-and-accountability f. Accessed 2024 Aug 20.

(2) Alton G (BORN Ontario). Personal communication. April 6 and August 14, 2018.

(3) Public Health Agency of Canada. What Mothers Say: The Canadian Maternity Experiences Survey. 2009; Available at: https://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/rhs-ssg/pdf/survey-eng.pdf. Accessed 2018 Jun 20.

(4) Statistics Canada.Canadian Community Health Survey (CCHS) - Annual Component - 2022; Available at: https://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&lang=en&Item_Id=1390243#archived. Accessed 2024 Aug 20.

(5) Abraham M, Alramadhan S, Iniguez C, Duijts L, Jaddoe VWV, Dekker HTD, et al. A systematic review of maternal smoking during pregnancy and fetal measurements with meta-analysis. PLoS ONE 2017 /2/23;12(2):1-13.

(6) Ion R, Bernal AL. Smoking and Preterm Birth. Reprod Sci 2015 08/01; 2018/08;22(8):918-926.

(7) Hyland A, Piazza KM, Hovey KM, Ockene JK, Andrews CA, Rivard C, et al. Associations of lifetime active and passive smoking with spontaneous abortion, stillbirth and tubal ectopic pregnancy: a cross-sectional analysis of historical data from the Women's Health Initiative. Tob Control 2014 02/05.

(8) U.S. Department of Health and Human Services. The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General. January 2014; . Accessed 2018 Aug 8.

(9) Marufu TC, Ahankari A, Coleman T, Lewis S. Maternal smoking and the risk of still birth: systematic review and meta-analysis. BMC Public Health 2015 03/13;15(1):239.

(10) Neuman Å, Hohmann C, Orsini N, Pershagen G, Eller E, Kjaer HF, et al. Maternal Smoking in Pregnancy and Asthma in Preschool Children. Am J Respir Crit Care Med 2012 11/15; 2018/08;186(10):1037-1043.

(11) Rumrich IK, Viluksela M, Vähäkangas K, Gissler M, Surcel H, Hänninen O. Maternal Smoking and the Risk of Cancer in Early Life-A Meta-Analysis. PLOS ONE 2016 11/08;11(11):e0165040.

(12) Chair CP, Chair CE. Consensus statement on healthy mothers–healthy babies: How to prevent low birth weight: Institute of Health Economics; Alberta Perinatal Health Program; Alberta Heritage Foundation for Medical Research, Calgary Health Region, and Capital Health, Alberta, Canada. Int J Technol Assess Health Care 2007;23(4):505-514.

(13) Maternal smoking at time of newborn's birth, by public health unit and province (Standard Report), BORN Information System (BIS), BORN Ontario. Information accessed on January 06, 2025.

(14) Public Health Unit Analytic Reporting Tool (Cube), BORN Information System (BIS), BORN Ontario. Information accessed on June 27, 2018.

Changes Made

Date	Type of Review	Changes Made By	Changes Made
April 27, 2004			Indicator completed on the website.
June 22, 2012 – January 16, 2013	Formal review	Reproductive Health Sub-Group	● Changed the data source to Niday Perinatal Database (available through the BORN Information System) from CCHS. ● Updated indicator comments and cited references.
August 15, 2018	Formal review	Reproductive Health Sub-Group	● Full update of indicator document including: ○ Changed the data source to BORN Information System and indicator definitions and analyses accordingly. ○ Updated indicator comments, cited references.
May 2023	Completed June 2018 review (on hold from pandemic)	Reproductive Health Sub-Group	Minor updates
April 2025	Formal Review	Reproductive Health Sub-Group	Review of all selections to ensure accuracy, up to date format and references.

Acknowledgements

Lead Authors	Jessica Deming, Natalie Causarano, Amira Ali
Contributing Authors	Reproductive Health Sub-Group Jenna Ashley
Reviewers	Kelsie Near Katrice Carson Erica Sawula Ainslie Butler Natalie Lewoc Gillian Alton Dina Tsirlin
Other Acknowledgements	Gillian Alton and Paula Morrison, BORN Ontario