

Alcohol, cannabis, and other substance exposures 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 the data.

Description

Percentage of women with alcohol, cannabis, and other drug and substance exposures during pregnancy

Specific Indicators

- Percentage of women with any alcohol exposure during pregnancy
- Percentage of women with any cannabis exposure during pregnancy
- Percentage of women with any drug and substance (excluding cannabis/alcohol) exposure during pregnancy
- Percentage of women with any alcohol and/or drug and substance exposures during pregnancy (excluding cannabis)

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]

Name of Table* (Standard Report), BORN Information System (BIS), BORN Ontario. Information accessed on [Month DD, YYYY]

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

Dimension	Categories	Description
Pregnancy Exposure Alcohol (BORN ID – D0012)	<ul style="list-style-type: none">• None• Less than one drink per month• One drink per month• 2-3 drinks per month• One drink per week• More than one drink per week• Episodic excessive drinking (binging)• Exposure prior to pregnancy	Data dictionary definition: Self-reported alcohol consumption during pregnancy. A standardized serving of alcohol beverage is approx a 12oz serving of regular beer (5%), a 5oz glass of wine (12%) or a 1.5oz glass of 40% spirit (SOGC, 2010). If the amount of drinking varied over the course of the pregnancy, estimate the total number

	<p>confirmed, amount unknown (response chosen if mother drank in first trimester and/or until she learned of her pregnancy)</p> <ul style="list-style-type: none"> ● Exposure, amount unknown (prior to April 2015) ● Missing data 	<p>of drinks and average it out over the entire pregnancy. Select the one that represents the highest exposure or impact. 'Episodic excessive drinking (binging)' is considered the greatest impact.</p>
<p>Pregnancy Exposure Drug and Substance</p> <p>(BORN ID – D0014)</p>	<ul style="list-style-type: none"> ● None ● Amphetamines ● Cocaine ● Gas/Glue ● Hallucinogens ● Marijuana (prior to April 2019) ● Methadone (prior to April 2014) ● Opioids ● Other ● Missing data 	<p>Data dictionary definition: Indicate Maternal self-reported drug and substance use during pregnancy. This refers to the use of street drugs and the inappropriate use of prescription and non-prescription drugs.</p>
<p>Cannabis exposure during pregnancy</p> <p>(BORN ID - P4355)</p>	<ul style="list-style-type: none"> ● N (None) ● U (Unknown) ● Y (Yes) 	<p>Data dictionary definition: Indicate whether mother used/tried cannabis at any point during this pregnancy as documented in the medical record. Cannabis may also be referred to as marijuana, weed, or other names. Cannabis can be smoked, vaped, eaten, taken in pill form, or applied topically. Note: UNKNOWN - It is unknown if the mother used or did not use cannabis during this pregnancy. This includes situations where the mother declined to provide information about cannabis exposure in pregnancy.</p> <p>Data element introduced April 2019. Prior to that, cannabis use was captured under the “Marijuana” category of the “Pregnancy exposure drug and substance use” dimension</p>
<p>Any alcohol</p>	<ul style="list-style-type: none"> ● Yes ● No ● Missing data 	<p>Derived variable based on BORN ID – D0012.</p>
<p>Any drug</p>	<ul style="list-style-type: none"> ● Yes ● No ● Missing data 	<p>Derived variable based on BORN ID – D0014.</p>

		Included cannabis prior to April 2019
Any drug or alcohol	<ul style="list-style-type: none"> • Yes • No • Missing data 	<p>Derived variable based on BORN ID – D0012 & D0014.</p> <p>Included cannabis prior to April 2019</p>
Newborn DOB calendar	<ul style="list-style-type: none"> • 2013-present 	

Notes:

1. The term “self-reported” refers to information that was provided by the patient to their care provider and documented in their medical records.
2. For births prior to April 1, 2019, cannabis exposure during pregnancy data are available as a subgroup “Marijuana (prior to April 2019)” under the “Pregnancy Exposure Drug and Substance” dimension. In April 2019, cannabis use was removed from the pregnancy exposure to drugs and substance use section of the BIS, and a new pregnancy exposure to cannabis section was created to capture this information on its own. Therefore for births in April 2019 and onwards, cannabis exposure during pregnancy data should be pulled from the “Pregnancy Exposure Cannabis” dimension.

Alternative Data Sources

CCHS

- The Canadian Community Health Survey asks questions about alcohol use during pregnancy to females aged 15-55 years who gave birth in the preceding 5 years. (1) The dataset for this question has a very small sample size at the local level, and questions are not asked on a regular basis. As a result, it may be of limited use.

Data Source	Module	Survey questions	Response Categories
CCHS	Maternal Experience – Alcohol during Pregnancy	MXA_005 In the three months before your pregnancy with ^DT_BABYSNAME, or before you realized you were pregnant, did you drink any alcohol?	1: Yes 2: No 8: RF (refused) 9: DK (don't know)
		MXA_010 How often did you drink?	1: Less than once per month 2: Once per month 3: 2 to 3 times per month 4: Once a week 5: 2 to 3 times per week

			6: 4 to 6 times per week 7: Everyday 8: RF 9: DK
		MXA_015 Once you found out you were pregnant with ^DT_BABYSNAME, did you drink any alcohol?	1: Yes 2: No 8: RF 9: DK
		MXA_020 How often did you drink?	1: Less than once per month 2: Once per month 3: 2 to 3 times per month 4: Once a week 5: 2 to 3 times per week 6: 4 to 6 times per week 7: Everyday 8: RF 9: DK
		MXA_025 During the last 3 months of your pregnancy (with ^DT_BABYSNAME), did you drink any alcohol?	1: Yes 2: No 8: RF 9: DK
		MXA_030 How often did you drink?	1: Less than once per month 2: Once per month 3: 2 to 3 times per month 4: Once a week 5: 2 to 3 times per week 6: 4 to 6 times per week 7: Everyday 8: RF 9: DK

HBHC

- Healthy Babies Healthy Children Integrated Services for Children Information System (HBHC-ISCIS) using postpartum screening results:
 - Percentage of HBHC Clients with maternal alcohol use during pregnancy.
 - Percentage of HBHC Clients with maternal drug use during pregnancy (includes illegal drug use and prescription drugs that impact on activities of daily living or are teratogenic).
- The screening tool does not specifically ask about cannabis use.
- The Healthy Babies Healthy Children (HBHC) screening tool was developed by the Ministry of Children and Youth Services and is a comprehensive tool for identifying families with potential risk of negative developmental outcomes for children.

NOTE: The ISCIS database only collects data on families that give consent for the HBHC program and thus does not represent all births within a geographical area. Also, the drug/substance data element is worded differently in the HBHC system, it does not capture frequency of use, and results may not be comparable to those collected in the BIS.

Analysis Check-List

- 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.
- 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.
- 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 analysis begin for 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 $\geq 10\%$. BORN Ontario recommends not reporting data if the missing data are $\geq 30\%$ or more.
- In the Public Health Standard Reports, comparator data is provided for Ontario, and also for Peer Group if there are more than three PHUs within the group. Both comparators are only available for six months prior to the date of extraction. The Ontario comparator includes all

PHUs, while the Peer Group comparator excludes the PHU using the report. PHUs are categorized into Peer Groups as per the [2011 classifications](#).

- **If using the Public Health Standard Reports:**
 - Select the PHU-Pregnancy report under Clinical Reports
 - Specify the dates/years of analysis
 - Go to the report link “Frequency of alcohol exposure in pregnancy, by public health unit and province” for data on alcohol exposure during pregnancy
 - Go to the report link “Frequency of drug and substance exposures during pregnancy, by public health unit and province” for data on drug and substance use during pregnancy. Cannabis is included prior to April 2019, and excluded from April 2019 onwards. This page can also be used to calculate cannabis exposure during pregnancy for births prior to April 2019.
 - Go to the report link “Frequency of cannabis exposure during pregnancy, by public health unit and province” for data on cannabis exposure during pregnancy for births from April 2019 onwards.
 - Calculate the percentages from the standard report or export the table to Excel
- **If using the Public Health Cube:**
 - Select Dimension of interest: *See table above for list of relevant dimensions* (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 with any alcohol exposure during pregnancy

[Number of women who gave birth (live or still) who reported any alcohol exposure during pregnancy/Total number of women who gave birth (live or still)] x 100

Percentage of women with any drug and substance exposure during pregnancy (excludes cannabis from April 2019 onwards)

[Number of women who gave birth (live or still) who reported any drug and substance exposure during pregnancy/Total number of women who gave birth (live or still)] x 100

Percentage of women with any cannabis exposure during pregnancy

[Number of women who gave birth (live or still) who reported any cannabis exposure during pregnancy /Total number of women who gave birth (live or still)] x 100

Percentage of women with any alcohol and/or drug and substance exposures during pregnancy (excludes cannabis from April 2019 onwards)

[Number of women who gave birth (live or still) who reported any alcohol and/or drug and substance exposures during pregnancy/Total number of women who gave birth (live or still)] x 100

Basic Categories

- Maternal age (it may be necessary to aggregate data based on age groups to produce stable rates), Geographic areas of maternal PHU of residence: Ontario, public health unit

Indicator Comments

- Substance use during pregnancy can result in a range of negative health outcomes for both the infant and pregnant person.
- Alcohol is a known teratogen (a factor causing malformation of an embryo or fetus). Prenatal exposure to alcohol can lead to a wide range of neurodevelopmental and physical impairments collectively referred to as Fetal Alcohol Spectrum Disorder.(2)
- There is no threshold of alcohol use during pregnancy that has been definitively proven to be safe.(2-3) Canada's Guidance on Alcohol and Health acknowledges that the safest choice is to drink no alcohol at all if a woman is pregnant or planning to become pregnant.(3)
- The use of illicit substances, as well as some legal addictive drugs such as opioids, during pregnancy is associated with a broad range of complications and negative birth outcomes, including increased risk of miscarriage or stillbirth, restricted fetal growth, premature labour, birth defects and neonatal issues such as substance withdrawal symptoms and developmental and behavioural issues.(4-6)
- Cannabis, also referred to as marijuana, weed, or other names (pot, bud, hash, etc.) has been legal for medical use in Canada since 2001 and cannabis use for non-medical use was legalized in fall 2018.
- There is no known safe amount of cannabis use during pregnancy. Health Canada and experts from the Society of Obstetricians and Gynaecologists of Canada recommend avoiding cannabis use during pregnancy.(7,8)
- Studies show that cannabis use during pregnancy may lead to negative birth outcomes such as low birth weight, preterm birth, small size for gestational age, stillbirth and/or admission to neonatal intensive care. (9-13) Studies also show that cannabis use during pregnancy can have subtle, yet persisting effects on children's neurocognitive development such as deficits in memory, attention, verbal skills and perceptual skills, visual reasoning, and can lead to behavioural issues such as hyperactivity and impulsivity.(9, 14-18)
- Co-usage of alcohol, cannabis and other substances is common and can lead to more pronounced negative perinatal outcomes for infants.(19)
- Alcohol, drug and substance exposure data elements from BORN are self-reported and thus subject to under-reporting and social desirability bias.
- It is important to understand the degree, as well as the distribution (i.e., random v.s. systematic) of missing data for alcohol, cannabis and other drug and substance use 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 alcohol exposure in pregnancy for Ontario was 4.4% in 2022 (20).
- The total missing for drug and substance exposure in pregnancy (excluding cannabis) for Ontario was 4.5% in 2022 (21).
- The total missing for cannabis exposure in pregnancy for Ontario was 5.4% in 2022 (22).
- 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](#).

Cited References

1. Statistics Canada. Canadian Community Health Survey (CCHS) 2019-2020 Questionnaire. 2020.
2. Popova S, Charness ME, Burd L, Crawford A, Hoyme HE, Mukherjee RAS, Riley EP, & Elliot EJ. Fetal alcohol spectrum disorders. *Nat Rev Dis Primers*. 2023; 9(11). <https://doi.org/10.1038/s41572-023-00420-x>
3. Paradis C, Butt P, Shield K, Poole N, Wells S, Naimi T, Sherk A & the Low-Risk Alcohol Drinking Guidelines Scientific Expert Panels. Canada's guidance on alcohol and health: final report. Ottawa, ON: Canadian Centre on Substance Use and Addiction; 2023.
4. Finnegan L. Licit and Illicit drug use during pregnancy: Maternal, neonatal and early childhood consequences. 2013. Canadian Centre on Substance Abuse. Accessed at: <http://www.ccsa.ca/Resource%20Library/CCSA-Drug-Use-during-Pregnancy-Report-2013-en.pdf> on November 10, 2023.

5. Salzwedel A, Chen G, Chen Y, Grewen K, Gao W. Functional dissection of prenatal drug effects on baby brain and behavioural development. *Hum Brain Mapp.* 2020; 41(17): 4789-4803.
6. Forray A. Substance use during pregnancy. *F1000Res.* 2016. 5: F1000 Faculty Rev-8
7. Blake JM & Cook JL. Cannabis: Implications for Pregnancy, Fetal Development, and Longer-Term Health Outcomes. The Society of Obstetricians and Gynaecologists of Canada. May 2018. Accessed on November 10, 2023: https://sencanada.ca/content/sen/committee/421/SOCI/Briefs/SocOfObsAndGynoCda_e.pdf
8. Health Canada. Thinking about using cannabis before or during pregnancy? October 2018. Accessed on November 10, 2023: <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/health-effects/before-during-pregnancy.html>.
9. Renard J, Konefal S. Clearing the smoke on cannabis: Cannabis use during pregnancy and breastfeeding - an update. Canadian Centre on Substance Use and Addiction. 2022. Accessed on November 10, 2023: <https://www.ccsa.ca/sites/default/files/2022-05/CCSA-Cannabis-Use-Pregnancy-Breastfeeding-Report-2022-en.pdf>.
10. El Marroun H, Hofman A, Huizink AC, Jaddoe VW, Steegers EA, Verhulst FC, & Tiemeier H. Intrauterine cannabis exposure affects fetal growth trajectories: the Generation R Study. *J Am Acad Child Adolesc Psychiatry.* 2009; 48(12): 117-181.
11. Flenady VJ, Gibbons KS, Hayatbakhsh MR, Hurrion E, Kingsbury AM, Mamun AA, & Najman JM. Birth outcomes associated with cannabis use before and during pregnancy. *Pediatr Res.* 2012; 71(2): 215–19.
12. Claire TR, Dekker LM, Kenny JE, Leemaqz GA, McCowan LC, Myers NAB, Shalem Y, & Simpson LP. Maternal marijuana use has independent effects on risk for spontaneous preterm birth but not other common late pregnancy complications. *Reprod Toxicol.* 2016; 62:77-86.
13. Center KE, Christ C, Ehiri, JE, Gibson SJ, Gunn JK, Nunez A, & Rosales CB. Prenatal exposure to cannabis and maternal and child health outcomes: a systematic review and meta-analysis. *BMJ Open.* 2016; 6(4):e009986.
14. Fried PA & Watkinson B. 36- and 48-month neurobehavioral follow-up of children prenatally exposed to marijuana, cigarettes, and alcohol. *J Dev Behav Pediatr.* 1990; 11(2): 49-58.
15. Fried PA & Watkinson B. Visuo-perceptual functioning differs in 9- to 12-year-olds prenatally exposed to cigarettes and marijuana. *Neurotoxicol Teratol.* 2000; 22(1): 11-20.
16. Day NL, Goldschmidt L, & Richardson GA. Effects of prenatal marijuana exposure on child behavior problems at age 10. *Neurotoxicol Teratol.* 2002; 22(3): 325-336.
17. Day NL, Goldschmidt L, Richardson GA, Ryan C, & Willford J. Prenatal alcohol and marijuana exposure: effects on neuropsychological outcomes at 10 years. *Neurotoxicol Teratol.* 2002; 24(3): 309–320.
18. Day NL, Goldschmidt L, Richardson GA, & Willford J. Prenatal marijuana exposure and intelligence test performance at age 6. *J Am Acad Child Adolesc Psychiatry.* 2008; 47(1): 254–263.
19. Fergusson DM, Horwood LJ, Northstone K; ALSPAC Study Team. Maternal use of cannabis and pregnancy outcome. *BJOG.* 2002; 109(1): 21-27.

20. Frequency of alcohol exposure in pregnancy, by public health unit and province (PHU-Pregnancy Standard Report), BORN Information System (BIS), BORN Ontario. Information accessed on July 13, 2023
21. Frequency of drug and substance exposures during pregnancy, by public health unit and province (PHU-Pregnancy Standard Report), BORN Information System (BIS), BORN Ontario. Information accessed on July 13, 2023
22. Frequency of cannabis exposure during pregnancy, by public health unit and province (PHU-Pregnancy Standard Report), BORN Information System (BIS), BORN Ontario. Information accessed on July 13, 2023

Changes Made

Date	Type of Review	Changes Made By	Changes Made
December 2023	Update	Reproductive Health Sub-Group - Megan Brunner, Nicole Bradley, Kelsie Near, Sarah Ahmed	Updates to all sections - In April 2019, cannabis was removed from the "Pregnancy Exposure Drug and Substance", and a new pregnancy exposure to cannabis section was created. Indicators were updated accordingly.
June 2017	New indicator	Reproductive Health Sub-Group	New indicator

Acknowledgements

Lead Authors	Jessica Deming, Adam Stevens, Denis Heng
Contributing Authors	Reproductive Health Sub-Group
Reviewers	Deborah Carr, Relationship Manager, DeGroote School of Business, McMaster University

	<p>Ashna Jinah, Epidemiologist/Program Evaluator, Elgin St. Thomas Health Unit</p> <p>Elsa Ho, Senior Health Analyst, Ministry of Health and Long-Term Care</p> <p>Brooke Kinniburgh, Epidemiologist, Perinatal Services BC Other</p>
Acknowledgements	<p>Paula Morrison and Gillian Alton, BORN Ontario</p>