

# Perinatal Mortality and Stillbirth Rates

Indicator Type: Core Indicator

## Description

- Perinatal mortality rate: the total number of deaths of a fetus or infant between the end of the 20th week gestation and the end of the 6th day of life in a calendar year per 1,000 total births (live births and stillbirths) in the same calendar year.
- Crude stillbirth rate: the total number of stillbirths per 1,000 total births in the same calendar year.
- Crude Stillbirth rate  $\geq$  500 g: the total number of stillbirths  $\geq$  500 g per 1,000 total births  $\geq$  500 g in the same calendar year.

## Related OPHS Topics

Reproductive Outcomes

## Method of Calculation

### Perinatal Mortality Rate

$$\frac{\text{total number of stillbirths } \geq 20 \text{ weeks gestation and deaths 0- 6 days of age}}{\text{total number of births (live births \& stillbirths)}} \times 1,000$$

### Crude Stillbirth Rate

$$\frac{\text{total number of stillbirths}}{\text{total number of births (live births \& stillbirths)}} \times 1,000$$

### Crude Stillbirth Rate $\geq$ 500 g

$$\frac{\text{total number of stillbirths } \geq 500 \text{ g}}{\text{total number of births (live births \& stillbirths) } \geq 500 \text{ g}} \times 1,000$$

## Recommended Subset Analysis Categories

- Geographic areas of patient residence:
  - Ontario
  - Public health unit
  - Municipality
  - Smaller areas of geography based on aggregated postal code
- Age of mother, gestational age, birth weight. There are no recommended groupings, consider category grouping based on the analysis question.
- Specific cause of death. Analyze by ICD code depending on the analysis question.

## Data Source(s) Table

Numerator:	Alternative Numerator 1:	Alternative Numerator 2:
<p><b>Vital Statistics</b></p> <p>Ontario Stillbirth Database Ontario Mortality Database</p>	<p><b>Hospital Deaths</b></p> <p><i>Stillbirths &lt;20 weeks gestation and ≥500 g will not be included. These are captured in Vital Statistics and BORN. Early neonatal deaths (0-6 days) that occur outside the hospital will not be captured.</i></p>	<p><b>BORN</b></p> <p>Stillbirths only</p>
<p><b>Original Source:</b> Vital Statistics, Ontario Office of the Registrar General (ORG)</p>	<p><b>Original Source:</b> Discharge Abstract Database (DAD), Canadian Institute for Health Information (CIHI)</p>	<p><b>Original Source:</b> Better Outcomes Registry &amp; Network (BORN) Ontario</p>
<p><b>Distributed by:</b> Ontario Ministry of Health: IntelliHEALTH ONTARIO (IntelliHEALTH)</p>	<p><b>Distributed by:</b> Ontario Ministry of Health: IntelliHEALTH ONTARIO (IntelliHEALTH)</p>	<p><b>Distributed by:</b> Better Outcomes Registry &amp; Network (BORN) Ontario</p>
<p><b>Suggested Citation:</b> Ontario Stillbirth Database [years], Ontario Registrar General, Ontario Ministry of Health, IntelliHEALTH ONTARIO, Date Extracted: [date]. Ontario Mortality Database [years], Ontario Registrar General, Ontario Ministry of Health, IntelliHEALTH ONTARIO, Date Extracted: [date].</p>	<p><b>Suggested Citation:</b> Inpatient Discharges [years], Ontario Registrar General, Ontario Ministry of Health, IntelliHEALTH ONTARIO, Date Extracted: [date].</p>	<p><b>Suggested Citation:</b> Public Health Unit Analytic Reporting Tool (Cube), BORN Information System (BIS), BORN Ontario. Information accessed on xxxx (the date).</p>

Denominator:	Alternative Denominator 1:	Alternative Denominator 2:
<p style="text-align: center;"><b>Vital Statistics</b></p> <p>Ontario Stillbirth Database Ontario Live Birth Database</p>	<p style="text-align: center;"><b>Hospitalizations</b></p> <p><i>Stillbirths &lt;20 weeks gestation and ≥500 g will not be included. These are captured in Vital Statistics and BORN.</i></p>	<p style="text-align: center;"><b>BORN</b></p> <p>Stillbirths and Live Births</p>
<p><b>Original Source:</b> Vital Statistics, Ontario Office of the Registrar General (ORG)</p>	<p><b>Original Source:</b> Discharge Abstract Database (DAD), Canadian Institute for Health Information (CIHI)</p>	<p><b>Original Source:</b> Better Outcomes Registry &amp; Network (BORN) Ontario</p>
<p><b>Distributed by:</b> Ontario Ministry of Health: IntelliHEALTH ONTARIO (IntelliHEALTH)</p>	<p><b>Distributed by:</b> Ontario Ministry of Health: IntelliHEALTH ONTARIO (IntelliHEALTH)</p>	<p><b>Distributed by:</b> Better Outcomes Registry &amp; Network (BORN) Ontario</p>
<p>Suggested Citation: Ontario Stillbirth Database [years], Ontario Registrar General, Ontario Ministry of Health, IntelliHEALTH ONTARIO, Date Extracted: [date].</p> <p>Ontario Vital Statistics Live Birth Database [years], Ontario Registrar General, Ontario Ministry of Health, IntelliHEALTH ONTARIO, Date Extracted: [date].</p>	<p>Suggested Citation: Inpatient Discharges [years], Ontario Registrar General, Ontario Ministry of Health, IntelliHEALTH ONTARIO, Date Extracted: [date].</p>	<p>Suggested Citation: Public Health Unit Analytic Reporting Tool (Cube), BORN Information System (BIS), BORN Ontario. Information accessed on xxxx (the date).</p>

## BIS Data Elements

Name and Description	Categories	Encounter	BORN ID
<p><b>Pregnancy / Birth outcome</b> Outcome of the pregnancy/birth, including live birth, stillbirth, termination, and loss. BORN encourages all hospitals to complete a Labour Birth encounter for all pregnancy losses.</p>	<ul style="list-style-type: none"> <li>➤ Pregnancy Continued</li> <li>➤ Pregnancy Loss &lt;20 weeks and &lt;500 gms \ Spontaneous Miscarriage</li> <li>➤ Pregnancy Loss &lt;20 weeks and &lt;500 gms \ Termination</li> <li>➤ Live birth</li> <li>➤ Stillbirth at &gt;=20wks or &gt;=500gms \ Spontaneous - Occurred during antepartum period</li> <li>➤ Stillbirth at &gt;=20wks or &gt;=500gms \ Spontaneous - Occurred during intrapartum period</li> <li>➤ Stillbirth at &gt;=20wks or &gt;=500gms \ Termination</li> </ul>	<ul style="list-style-type: none"> <li>➤ Birth (mother)</li> <li>➤ Birth (child)</li> <li>➤ Labour</li> <li>➤ Postpartum Mother</li> <li>➤ Antenatal General</li> </ul>	<b>F0053</b>

## Analysis Checklist

### General Checklist

- Note that three data sources are listed for use: 1) Vital Statistics, 2) Hospital Inpatient Discharges, 3) BORN. The choice of data source will depend upon data quality within a health unit as well as data access and the specific analysis questions. Possible alternatives are provided in case the Vital Statistics are too far out of date. For information related to the data sources, refer to the Data Source resources and the [Reproductive Health Core Indicators Documentation Report](#). A comparison of stillbirth and perinatal mortality counts by data source for Ontario can be found in Appendix B. A comparison of early neonatal mortality counts by data source for Ontario can be found in Appendix C.
- The IntelliHEALTH licensing agreement does not require suppression of small cells, but caution should be used when reporting at a level that could identify individuals, (e.g. reporting at the postal code level by age and sex). Please note that privacy policies may vary by organization. Prior to releasing data, ensure adherence to the privacy policy of your organization.
- Aggregation (e.g. combining years, age groups, categories) should also be considered when small numbers result in unstable rates.
- Analyze mortality and live birth data by infant residence, not place of death. Analyze stillbirth data by mother's residence.

### Vital Statistics - Live Birth and Stillbirth data:

- Standard Report
  - Use “Birth Summary v3” found in Team Content > IH Reports > Standard Reports > 01 Vital Stats.
  - This report summarizes information on births by type (live and still) by age group and mother's residence (Ontario, PHU and LHIN). IntelliHEALTH also provides population data (total population, female population aged 15-49 years) for the calculation of rates. Refer to the Notes tab for information. The report can be modified, renamed and saved under your own folder or can be exported into Excel.
  - The predefined report provides live birth and population data from the last 5 years ending with the last year.
  - The data contained in the Birth Summary v3 report includes birth to Ontario mothers in Ontario only.
  - The Background and Context to the Report provides important data caveats and background information on data sources and should be reviewed. Note that this report includes stillbirths due to pregnancy termination.
- To use an IntelliHEALTH package to create your own report
  - Use Vital Stats Birth data package from the IH Reports / Packages folder in IntelliHEALTH.
  - For live births, select “# Livebirth (ON Res)” measure (number of live births to Ontario mothers who gave birth in ON excluding ON mothers who gave birth outside ON).
  - For stillbirths, select “# stillbirth (ON Res)” measure (number of stillbirths to Ontario mothers who gave birth in ON excluding ON mothers who gave birth outside ON).
  - Filter on calendar year(s) (CYear) of birth from the Timer Period data items.
  - If you decide to exclude stillbirths due to pregnancy termination, apply the following filters:
    - [Vital Stats Birth].[Stillbirth ICD Information].[Stillbirth Cause ICD10 Code]<>'(P964)TERMINATION OF PREGNANCY, AFFECTING FETUS AND NEWBORN'
    - [Vital Stats Birth].[Stillbirth ICD Information].[Stillbirth Cause ICD10 Code]<>'(P964)TERMINATION OF PREGNANCY, FETUS AND NEWBORN'

### Vital Statistics - Mortality Data for 0-6 days:

- Use Vital Stats Deaths data package from the IH Reports / Packages folder in IntelliHEALTH, select “#Dths (ON Res)” measure (number of deaths for Ontario residents who died in Ontario). Note: deaths for Ontario residents who died outside the province are not captured in Vital Statistics.

- Filter by 'Infant Age (Days)'  $\leq 6$  for perinatal mortality from the Deceased Information data items.
- Select appropriate geography from Deceased Information data items (PHU of Deceased). Include other items, depending on your requirements (ICD10 Chapter, Lead Cause Group, age group, sex, etc.) from the Death Information data items.
- Filter of calendar year(s) (CYear) of death from the Time Period data items.

### Hospital Discharge Abstract Data - Live and Stillbirth data

- Standard report
  - Use "Hospital Births - newborns, stillbirths v2" found in Team Content > IH Reports > Standard Reports > 05 Inpatient Discharges
  - The Background and Context to the Report provides important data caveats and background information on data sources and should be reviewed.
- To use an IntelliHEALTH package to create your own report
  - Use Inpatient Discharges data package and filter the #Admit Entry Type# by
    - STILLBORN INFANT BORN IN REPORTING INSTITUTION for stillbirths
    - NEWBORN - BORN ALIVE IN REPORTING INSTITUTION for live births
  - If you decide to exclude stillbirths due to pregnancy termination, apply the following filter: [DAD Reporting].[Main Diagnosis].[MRDx]<>'(P964) TERMINATION OF PREGNANCY, AFFECTING FETUS AND NEWBORN'
  - Filter by calendar year(s) (CYear). Under Time Prompt filters, Prompt CYears will filter based on discharge date and Prompt Admit CYears will filter based on admitted date.
    - Prompt Admit CYears should be used

## Indicator Comments

### General Comments

- Perinatal mortality reflects quality of obstetric and pediatric care, as well as the effectiveness of public health initiatives (WHO, 2006).
- Perinatal mortality is associated with age of mother, marital status, poverty, birth weight, and length of gestation (Spong et al., 2011). Disparities in the risk of perinatal death across subpopulations have been reported previously in Canada (including aboriginal populations) (PHAC, 2008).
- The definition of stillbirth can vary over place and time. Since 1959, Canada has defined a stillbirth as  $\geq 20$  weeks gestation or  $\geq 500$  g for all provinces except Quebec (Joseph et al, 2021). In Quebec, the viability cut-off is based on a birth weight  $\geq 500$  g and does not reference the number of gestation weeks. However, this has not been consistent in all provinces over time. Other jurisdictions may have a different definition of stillbirth by length of gestation ( $\geq 20$ , 22, or 28 weeks), or weight ( $\geq 400$  g, 500 g, or 1,000 g), or both. Therefore, provincial or international comparisons of stillbirth and perinatal mortality rates should be made with caution.

- The definition of stillbirth is not consistent in Ontario. Vital Statistics and BORN applies the dual criteria of  $\geq 20$  weeks gestation or  $\geq 500$  g while the ICD10-CA coding standards used for the hospital Discharge Abstract Database (DAD) uses a single criteria;  $\geq 20$  weeks gestation (CIHI, 2018). This means that Vital Statistics stillbirth counts would include an infant weighing 500 g born with no signs of life at 19 weeks gestation as a stillbirth and the hospital DAD stillbirth counts would not. From 2012-2021, less than five stillbirths counted in Vital Statistics were born at less than 20 week gestation even when pregnancy terminations were included (Vital Statistics data extracted from IntelliHealth on April 11, 2024). Therefore, the impact from the difference in definitions is minimal.
- An additional inconsistency in Ontario is inclusion/exclusion of intentional pregnancy terminations (P964) as a stillbirth. Vital Statistics and Hospital Discharges include pregnancy terminations in the stillbirth count while BORN does not.
- Determining the true cause of death is not always clear resulting in a somewhat subjective primary cause of death being listed on the death certificate. The reported cause of death may also be influenced by the social or legal conditions surrounding the death and by the level of medical investigation (WHO, 2006). ICD code groupings provided in the Canadian Perinatal Health Report, appendix A.2, may be useful if examining cause-specific fetal mortality (5, p197). The stillbirth and infant mortality tables have been reproduced in Appendix D, below.
- The number of stillbirths may be under-reported. Data quality concerns for 1991 and 1992 stillbirth information indicate that it should not be used. Please refer to [Vital Statistics Live Births](#) and [Vital Statistics Stillbirths](#) resources for details.
- World Health Organization (WHO) defines stillbirth as a baby born with no signs of life at or after 28 weeks gestation or weighing  $\geq 1000$  g. See Health Topics, Stillbirth ([https://www.who.int/health-topics/stillbirth#tab=tab\\_1](https://www.who.int/health-topics/stillbirth#tab=tab_1)) or 2018 Global Reference List of 100 Core Health Indicators (<https://iris.who.int/handle/10665/259951>). For international comparisons, the WHO's stillbirth definition is used.
- The number of early neonatal deaths will be under-reported. Vital Statistics will be missing any early neonatal deaths that have an incomplete file (missing paperwork) and Hospital Discharges will be missing any early neonatal deaths that occurred outside an Ontario hospital.

### **Vital Statistics Live Birth and Stillbirth Data**

- The number of stillbirths in Ontario increased from 2001 through to 2012 then stabilized (see Appendix E and refer [Vital Statistics Stillbirths](#) documents for details). The increase in stillbirth numbers from 2001-2012 was due to those coded as P964 (Termination of pregnancy affecting fetus and newborn). It is unknown whether this increase is the result of a true increase in the occurrence of such events or the result of gradual improvements in record keeping for stillbirths due to termination of pregnancy. Health units may want to calculate overall rates as well as rates with P964-coded stillbirths removed to determine their impact. BORN does not include P964-coded stillbirths in their counts.
- There is limited research on late term abortions  $\geq 20$  weeks gestation, which can be coded as a stillbirth with cause due to (P964) pregnancy termination. A scoping review

noted they can include a large proportion of women with wanted pregnancies seeking a late term abortion because of maternal or fetal conditions (Demont et al., 2023). Excluding P964-coded stillbirths will exclude a proportion of pregnancies that could have resulted in perinatal and/or maternal mortality. Health units will need to consider whether to include P964-coded stillbirths.

- Mortality rate is higher among live births <500g (Joseph & Kramer, 1996). Excluding stillbirths and live births <500g from stillbirth and perinatal mortality rates may reduce fluctuations in estimates and facilitate comparisons across jurisdictions. Please refer to [Reproductive Health Documentation Report](#) for recommendations on excluding stillbirths and live births < 500 g from reproductive health indicators.
- Given the small number of stillbirths/perinatal and infant deaths, stillbirth rate, perinatal and infant mortality rates may fluctuate from year to year. It may be beneficial to group years when reporting stillbirth, perinatal mortality, infant mortality rates, or to calculate a three-year moving average (Refer to Document: [Methods for Calculating Moving Averages](#)).
- Refer to the [Reproductive Health Documentation Report](#) for a summary of data quality concerns identified for stillbirth data.
- Registration fees initiated in some Census Subdivisions (CSDs) in 1996 may have reduced the number of infants registered, especially for low income and/or adolescent parents (Bienefeld et al., 2001); however, it is worth noting that registration fees have since been discontinued in Ontario. For more details, including information about temporal changes in municipal fees for birth registration, please refer to the [Timeline of Changes in Live Birth Registration in Ontario](#) document.
- The number of births registered in some Census Subdivisions (CSDs) changed dramatically starting in 1991 when the Office of the Registrar General moved from Toronto to Thunder Bay (Woodward & Ardal, 2000). Aggregation may be necessary for reliability.
- Vital Statistics includes live births where a Statement of Live Birth is completed by parents and a Notice of Live Birth is completed by qualified health care providers. If one of the documents is missing, the file is incomplete, and the live birth will not be included in Vital Statistics. In all provinces except Ontario, parents are required to complete the statement of live birth before discharge from hospital regardless of the health status of the infant (Fell et al., 2020). As a result, Ontario has a higher number of infant death records with no corresponding live birth record in vital statistics. From 1991-2010, unlinked infant death registrations ranged from 19%-50% in Ontario (Fell et al., 2020). Fell et al. were able to link 96.4% of Vital Statistics infant death registrations from 2010 and 2011 with birth records from the hospital inpatient discharge data indicating the missing live birth data is specific to Vital Statistics.
- Vital Statistics includes stillbirths where a Statement of Stillbirth is completed by parents and a Notice of Stillbirth and Medical Certificate of Stillbirth are completed by qualified health care providers or the coroner. If one of these documents is missing, the file is incomplete, and the stillbirth will not be included in Vital Statistics. In 2020 and 2021, there is a decrease in Vital Statistics stillbirth counts that is not reflected in BORN or

Inpatient Discharges (see Appendix B). Personal communication with Service Ontario, Thunder Bay in Jan 2024, indicated the decrease is likely due to the COVID-19 pandemic. Many hospitals operated at or beyond capacity during the pandemic and may not have had the human resources available to assist parents with completing the Statement of Stillbirth in 2020 and 2021. Municipalities were also stretched for human resources during the pandemic and, as of Jan 2024, may still have files for 2020 and 2021 that have not yet been submitted to Service Ontario. Prior to and during implementation of an electronic newborn registration, and corresponding elimination of registration fees, Vital Statistics stillbirths had similar decreases in stillbirth counts compared to the Inpatient Discharge database.

### **Vital Statistics Early Neonatal Deaths**

- Vital Statistics excludes deaths that have an incomplete file. An early neonatal death will be excluded if one of the following documents are missing: (1) Statement of Live Birth completed by parents, (2) Notice of Live Birth is completed by qualified health care providers, or (3) Medical Certificate of Death complete by qualified health care providers. As shown in Appendix C, a number of early neonatal deaths are not included in Vital Statistics. Ontario infant mortality data is excluded from infant mortality indicators reported in the Canadian Perinatal Health Indicators (PHAC, 2008; PHAC, 2017 because of this problem with missing infant deaths.

### **Hospital Discharge Abstract Database Early Neonatal Deaths**

- Hospital discharges exclude any early neonatal deaths that occur outside of a hospital. As seen in Appendix C Table 1, over half of early neonatal deaths that occurred on days 3-6 from 2002-2021 took place outside of an Ontario hospital. Since it is likely that Vital Statistics has excluded deaths occurring in days 3-6 due to incomplete paperwork, the percentage of early neonatal deaths occurring outside an Ontario hospital is likely higher than what is shown in Appendix C Table1.

### **BORN Information System**

- Note: While BORN data is often the most up to date, users should take caution when using it as an alternative source for this indicator, as there have been issues identified with BORN stillbirth data (PHO, 2016). BORN has made improvements in data quality over time and undertook a comparison of BORN data to CIHI-DAD data in 2019, with a discussion around stillbirth capture in that publication (Miao et al., 2019). A more recent comparison of stillbirths counts between Vital Statistics, BORN, and Inpatient Discharges can be seen in Appendix B.
- BORN excludes stillbirth records with a postal code associated with a First Nations reserve in standard reports, the cube, and custom data requests.
- BORN excludes stillbirths coded P964, pregnancy termination

## Glossary

### Components of Fetal-Infant Mortality

- **Antepartum** - the period before childbirth
- **Intrapartum** - the time period spanning childbirth, from the onset of labor through delivery of the placenta.
- **Gestational age** - calculated as the interval between the date of delivery of the fetus or newborn and the first day of the mother's last normal menstrual period.
- **Live birth** - the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life (such as a heartbeat, umbilical cord pulsation, or definite movement of voluntary muscles), whether the umbilical cord has been cut or the placenta is attached. A live birth is not necessarily a viable birth.
- **Miscarriage** - pregnancies that end by spontaneous abortion before 20 weeks of gestation or a birth weight of less than 500 grams.
- **Perinatal mortality** - death during the period between 20 weeks of gestation and the 7th day of life (0 - 6 days of age).
- **Neonatal mortality** - death of a live born infant before the 28th day of life (0 - 27 days of age).
- **Early neonatal mortality** - death of a live born infant before the 7th day of life (0 - 6 days of age).
- **Late neonatal mortality** - death of a live born infant during the period between the 7th and 28th day of life (7 - 27 days of age).
- **Postneonatal mortality** - death of a live born infant between the 28th and 364th day of life.
- **Infant mortality** - death of a live born infant before the 365th day of life.
- **Stillbirth** - death prior to the complete expulsion or extraction from its mother of a product of conception. The death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. Only fetal deaths where the product of conception has a birth weight of 500 grams or more or the duration of pregnancy is 20 weeks or longer are registered in Canada.
- **Stillbirth rate** - the number of stillbirths per total births. Also called the fetal mortality rate.

(Statistics Canada, 2017; Statistics Canada, 2019)

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## Acknowledgements

Use the following table structure to lists all individuals (with their permission) that have contributed to the indicator as authors or reviewers:

<p><b>Lead Authors</b>  Adam Stevens, Brant County Health Unit  Natalie Greenidge, Public Health Ontario  Carol Paul, Ministry of Health and Long-Term Care  Enayetur Raheem, Windsor Essex County Health  Nancy Ramuscak, Peel Public Health  Emily Chemnitz, Niagara Region Public Health  Erica Clark, Huron Perth Public Health</p>	<p><b>Reviewers</b></p>
<p><b>Contributing Authors</b>  Sarah Ahmed, Reproductive Health Sub-Group</p>	<p><b>Other Acknowledgements</b></p>

## Revision History

Date	Review Type	Author	Changes	PDF
August 13, 2012 - January 16, 2013	Formal review	Reproductive Health Sub-Group	<ul style="list-style-type: none"> <li>➤ All sections updated in alignment with the Guide to Creating or Editing Core Indicator pages.</li> <li>➤ Updated the indicator definition. Added Stillbirth rate <math>\geq</math> 500 g to the Specific Indicators and removed Perinatal Mortality Ratio.</li> <li>➤ Three data sources cited with analysis check-list for each.</li> <li>➤ Updated Corresponding Indicators from Other Sources, Method of Calculation, Indicator Comments, Cited References.</li> </ul>	[Insert PDF Symbol]
February 22, 2019	Ad Hoc	Reproductive Health Sub-Group	<ul style="list-style-type: none"> <li>➤ Method of calculation for "Stillbirth Rate <math>\geq</math> 500 g": changed the denominator to "total number of births <math>\geq</math> 500 g" from "total number of births"</li> </ul>	
August 28, 2019	Formal review	Reproductive Health Sub-Group	<ul style="list-style-type: none"> <li>➤ Full update of indicator document including: Indicator definitions, corresponding indicators and analysis checklist accordingly.</li> </ul>	
April 2024	Formal review	Reproductive Health Sub-Group	<ul style="list-style-type: none"> <li>➤ Full update of indicator document including: Indicator definitions, corresponding indicators and analysis checklist accordingly.</li> </ul>	

## Appendix A

Table 1: Number of stillbirths to Ontario residents by data source excluding stillbirths due to pregnancy termination, 2013-2021

<b>Year</b>	<b>Vital Statistics</b>	<b>BORN</b>	<b>Hospital Inpatient Discharges</b>
2013	802	646	685
2014	817	659	708
2015	808	630	731
2016	767	663	722
2017	853	664	771
2018	810	633	707
2019	822	646	716
2020	616	644	677
2021	633	654	720

Data sources: (1) Vital Statistics Data [2001-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted November 10, 2023. (2) Better Outcomes Registry and Network (BORN) Ontario. Years Provided: (2013 to 2021). Resource Type: Tabulated data. Data Extracted on 20 Nov, 2018, 25 Oct, 2019, and 1 Jan, 2023. (3) Inpatient Discharges (infant record) [2013-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted November 2, 2023.

Notes:

- (1) All data sources exclude stillbirths to Ontario residents that occur out of province.
- (2) An explanation is not yet available for the decrease in stillbirth counts in the Vital Statistics data for 2020 and 2021.
- (3) BORN data exclude stillbirth records with postal codes associated with First Nations reserves.
- (4) Gestational age and birthweight are not available for the Inpatient Discharge data source, so it is assumed that all recorded stillbirths meet the Ontario definition of a stillbirth.

Table 2: Number of perinatal deaths for Ontario residents by data source excluding stillbirths due to pregnancy termination, 2002-2021

<b>Year</b>	<b>Vital Statistics</b>	<b>Hospital Inpatient Discharges</b>
2002	1206	1249
2003	1300	1539
2004	1235	1645
2005	1310	1678
2006	1194	1586
2007	1317	1691
2008	1314	1650
2009	1266	1355
2010	1241	1269
2011	1217	1312
2012	1245	1234
2013	1248	1220
2014	1241	1198
2015	1233	1212
2016	1170	1192
2017	1278	1270
2018	1211	1185
2019	1243	1172
2020	968	1104
2021	1021	1172

Data sources: (1) Vital Statistics Data [2002-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted January 5, 2024. (2) Inpatient Discharges (infant record) [2002-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted January 5, 2024.

Notes:

- (1) Gestational age not available in Inpatient Discharges therefore, stillbirths with unknown gestational age are included in Vital Statistics data as are those with gestational age=19 weeks (n<5 for 2002-2021)
- (2) Stillbirths due to pregnancy termination are excluded.
- (3) There is no explanation available yet for the drop in stillbirth counts for 2020 and 2021.

## Appendix B

Table 1: Early neonatal deaths for Ontario residents by infant age and data source, 2002-2021

<b>Age in Days</b>	<b>Vital Statistics</b>	<b>Hospital Discharges</b>
0	6,982	8,390
1	360	1,570
2	400	92
3	267	67
4	232	39
5	177	42
6	175	60
<b>Total</b>	<b>8,953</b>	<b>10,260</b>

Data sources: (1) Vital Statistics Data [2002-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted January 5, 2024. (2) Inpatient Discharges (infant record) [2002-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted January 5, 2024.

Table 2: Early neonatal deaths (0-6 days) for Ontario residents by year and data source, 2002-2021

<b>Year</b>	<b>Vital Statistics</b>	<b>Hospital Discharges</b>
2002	442	526
2003	437	532
2004	474	576
2005	472	576
2006	407	510
2007	473	570
2008	452	574
2009	446	529
2010	432	524
2011	430	527
2012	443	528
2013	446	535
2014	424	490
2015	425	481
2016	403	470
2017	425	499
2018	401	478
2019	421	456
2020	352	427
2021	388	452
<b>Total</b>	<b>8,593</b>	<b>10,260</b>

Data sources: (1) Vital Statistics Data [2002-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted January 5, 2024. (2) Inpatient Discharges (infant record) [2002-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted January 5, 2024.

## Appendix C

Table 1: Fetal mortality (stillbirth) causes

Causes	ICD-9	ICD-10
Congenital anomalies	740–759.9	Q00–Q99
Maternal complication of pregnancy	761	P01
Complication of placenta/cord/ membrane	762.0–762.9	P02.0–P02.9
Intrauterine hypoxia and birth asphyxia	768	P20; P21
Unspecified	779.9	P95; P96.9

Source: Public Health Agency of Canada. Canadian Perinatal Health Report, 2008 Edition. Ottawa, 2008. Retrieved from: <https://www.phac-aspc.gc.ca/publicat/2008/cphr-rspsc/pdf/cphr-rspsc08-eng.pdf>

Table 2: Infant mortality causes

Causes	ICD-9	ICD-10
Congenital anomalies	740–759.9	Q00–Q99
Asphyxia-related conditions	761.6; 761.7; 762.0–762.2; 762.6; 763; 766– 768; 770.1; 772.2; 779.0; 779.2	O43.8; O83.4; P01.6–P01.7; P02.0–P02.2; P02.6; P03.0–P04.0; P08.0–P08.2; P10.0–P10.1; P10.3–P21.9; P24.0–P24.9; P52.4–P52.5; P52.8; P90–P91.0; P91.4–P91.5; P91.9
Immaturity-related conditions	761.3–761.5; 761.8; 761.9; 762.7; 764.0– 765.1; 769; 770.2–770.9; 772.1; 774.0– 774.7; 777.5; 777.6; 778.2; 779.6; 779.8	D58.9; P01.3–P01.5; P01.8–P01.9; P02.7; P05.0–P05.9; P07.0–P07.3; P10.2; P22.0–P22.9; P25.0–P29.2; P29.4–P29.9; P52.0–P52.3; P57.8–P59.9; P77; P78.0; P80.0; P91.1–P91.2; P91.8; P94.1–P94.9; P96.0; P96.3–P96.5

Infections	001–139; 320–326; 382; 420–422; 460–466; 475–477; 480–491; 510; 511; 513; 540; 541; 566; 567; 570; 590; 591; 770.0; 771; 790	A00.0–B19.9; B25.0–B99; D86.0–D86.9; E79.0; G00.0–G09; G36.1; G37.3–G37.4; G92; G93.3–G93.4; G94.8; G96.1; H66.0–H67.8; H75.0; I30.0–I30.9; I32.0–I33.9; I39.8–I41.2; I42.3; I43.0; I52.0–I52.1; I72.9; I88.8; J00–J30.4; J36–J37.1; J39.9–J42; J44.1–J44.8; J65; J85.0–J92.9; J94.0–J94.9; J98.0; J98.4; J99.8; K35.0–K35.9; K37; K52.9; K61.0–K61.4; K65.0–K65.9; K67.0–K67.8; K72.0; K72.9; K76.2; K90.8; K93.0; L08.1; L44.8; L94.6; M02.1; M02.3; M35.2; N10–N13.3; N13.6; N15.1–N16.8; N17.2; N28.8; N29.1; N34.1; O98.0–O98.1; P23.0–P23.9; P35.0–P39.9; R06.5; R09.1; R29.1; R70.0–R71; R73.0–R74.9; R77.0–R78.0; R78.7–R79.9; R89.7; T62.9
Sudden infant death syndrome (SIDS)	798.0	R95
Other unexplained infant death	798.1; 798.2; 798.9; E913; 799	J96.0–J96.9; R09.0; R09.2; R41.8; R45.0; R45.2–R45.6; R45.8–R46.3; R46.5–R46.7; R53; R64; R68.1; R68.8;  R69; R96.0–R99; Z71.1; W75–W77; W81–W84
External causes	260–263; 507; E800–E912; E914–E999	E40–E46; E64.0; J69.0–J69.8; J95.8;  V01–Y98 (except W75–W77; W81–W84)
Others	Any code not mentioned above	Any code not mentioned above

Source: Public Health Agency of Canada. Canadian Perinatal Health Report, 2008 Edition. Ottawa, 2008. Retrieved from: <https://www.phac-aspc.gc.ca/publicat/2008/cphr-rspc/pdf/cphr-rspc08-eng.pdf>

## Appendix D

Table 1: Ontario resident pregnancy termination as percentage of total stillbirths, 2001-2021

Year	Stillbirths coded as (P964) Termination of pregnancy, affecting fetus and newborn	Total Stillbirths	P964 Stillbirths as % of all stillbirths
2001	23	836	3%
2002	52	816	6%
2003	96	959	10%
2004	73	834	9%
2005	66	904	7%
2006	154	941	16%
2007	295	1139	26%
2008	311	1173	27%
2009	307	1127	27%
2010	241	1050	23%
2011	387	1174	33%
2012	569	1371	42%
2013	568	1370	41%
2014	594	1411	42%
2015	618	1426	43%
2016	530	1297	41%
2017	613	1466	42%
2018	546	1356	40%
2019	592	1414	42%
2020	460	1076	43%
2021	487	1120	43%

Data source: Vital Statistics Data [2001-2021], Ontario Ministry of Health: IntelliHEALTH Ontario, extracted November 10, 2023.

Note: The decrease in stillbirth counts in 2020 and 2021 is only seen in the Vital Statistics data. BORN and Inpatient Discharges do not show a drop in those years.