

Appendix 1: Supplementary tables

Table S1. International Classification of Diseases and Related Health Problems Tenth Revision, Canada (ICD-10-CA) and Canadian Classification of Health Interventions (CCI) codes used for the study^{1,2}

| Diagnosis/Procedure | ICD-10-CA / DAD element | CCI | Study use |
|---|---|--|---|
| Single live birth | Z37.0 | | |
| Single stillbirth | Z37.1 | | |
| Spontaneous vaginal delivery | | 5.MD.50, 5.MD.51 | |
| Attempted forceps delivery | | 5.MD.53, 5.MD.60.RC, 5.MD.60.JZ, 5.MD.60.KC, 5.MD.60.RA, 5.MD.60.RE, 5.MD.60.JW, 5.MD.60.RG | |
| Attempted vacuum delivery | | 5.MD.54, 5.MD.55, 5.MD.60.RD, 5.MD.60.KA, 5.MD.60.KD, 5.MD.60.RB, 5.MD.60.RF, 5.MD.60.JX, 5.MD.60.RH, 5.MD.60.C | |
| Cesarean delivery | | 5.MD.60.KE, 5.MD.60.JY, 5.MD.60.KB, 5.MD.60.KG, 5.MD.60.KF, 5.MD.60.AA, 5.MD.60.KT | Inclusion criteria |
| Labour | O15.1, 42.02, O42.12, O42.09, O42.19, O60.2, O62, O63, O64, O65, O66, O67, O68, O69, O74, O75.0, O75.1 O75.2, O75.3, O75.8, O75.9 | 5.AC.30, 5.LD.31, 5.MD.40, 5.MD.53, 5.MD.54, 5.MD.55, 5.MD.60.RC, 5.MD.60.JZ, 5.MD.60.KC, 5.MD.60.RA, 5.MD.60.RE, 5.MD.60.JW, 5.MD.60.RG, 5.MD.60.RD, 5.MD.60.KA, 5.MD.60.KD, 5.MD.60.RB, 5.MD.60.RF, 5.MD.60.JX, 5.MD.60.RH, 5.MD.60.C | |
| Gestational age (≥ 37 weeks) | DAD element | | |
| Single stillbirth | Z37.1 | | |
| Previous cesarean delivery | O34.20, O66.40, O75.7 | | Exclusion criteria* |
| Congenital anomaly | Q | | |
| Obstetric trauma | | | |
| Obstetric anal sphincter injury | | | |
| 3 rd degree perineal tear | O70.2 | | |
| 4 th degree perineal tear | O70.3 | | |
| Repair for severe perineal tear | | 5.PC.80.JQ | |
| Cervical laceration | | | |
| Cervical laceration | O71.3 | | |
| Repair of cervical laceration | | 5.PC.80.JJ | Primary outcome: composite obstetric trauma |
| High vaginal laceration | O71.4 | | |
| Other pelvic trauma | | | |
| Obstetric injury to pelvic organs | O71.5 | | |
| Obstetric damage to pelvic joints and ligaments | O71.6 | | |
| Obstetric hematoma of the pelvis | O71.7 | | |
| Other specified obstetric trauma | O71.8 | | |
| Other unspecified obstetric trauma | O71.9 | | |
| Repair of urethra/bladder | | 5.PC.80.JR | |

| | | |
|---|----------------------------|--|
| Neonatal trauma | | |
| Intracranial laceration and hemorrhage due to birth injury | P10 | |
| Neonatal injury to the central nervous system | | |
| Cerebral edema due to birth injury | P11.0 | |
| Other specified brain damage due to birth injury | P11.1 | |
| Unspecified brain damage due to birth injury | P11.2 | |
| Birth injury to other cranial nerves | P11.4 | |
| Birth injury to the spine and spinal cord | P11.5 | |
| Epicranial subaponeurotic hemorrhage due to birth injury | P12.2 | Primary outcome: composite neonatal trauma |
| Neonatal injury to skeleton | | |
| Fracture of the skull due to birth injury | P13.0 | |
| Birth injury to the femur | P13.2 | |
| Birth injury to other long bones | P13.3 | |
| Neonatal injury to the peripheral nervous system | | |
| Erb's paralysis due to birth injury | P14.0 | |
| Klumpke's paralysis due to birth injury | P14.1 | |
| Other brachial plexus birth injuries | P14.3 | |
| Other neonatal injuries | | |
| Birth injury to liver | P15.0 | |
| Birth injury to spleen | P15.1 | |
| Neonatal seizures | P90 | |
| Neonatal death (before discharge) | DAD element | |
| <hr/> | | |
| Maternal age | DAD element | |
| Parity | DAD element | |
| Hypertension in pregnancy | O10, O11, O13-O16 | |
| Pre-existing diabetes | O24.5, O24.6, O24.7, P07.1 | |
| Gestational diabetes | O24.8, P07.0 | |
| Fetal distress | | |
| Fetal heart rate anomaly | O68.0 | |
| Meconium in amniotic fluid with or without fetal heart rate anomaly | O68.1, O68.2 | |
| Evidence of fetal asphyxia | O68.3 | |
| Umbilical cord complications | O69 | |
| Pelvic station | | |
| Outlet | | 5.MD.53.KJ, 5.MD.53.KH, 5.MD.54.KJ, 5.MD.54.KH, 5.MD.55.KJ, 5.MD.55.KH |
| Low | | 5.MD.53.KL, 5.MD.53.KK, 5.MD.54.KL, 5.MD.54.KK, 5.MD.55.KL, 5.MD.55.KK |
| Midpelvic | | 5.MD.53.KN, 5.MD.53.KM, 5.MD.54.KN, 5.MD.54.KM, 5.MD.55.KN, 5.MD.55.KM |
| Unknown/other | | 5.MD.53.KS, 5.MD.53.KP, 5.MD.53.JE, 5.MD.53.JD, 5.MD.54.NF, 5.MD.54.NE, 5.MD.55.KR, 5.MD.55.KQ |
| Confounder | | |
| Post-term infant (≥ 41 completed weeks gestation) | DAD element | |
| Macrosomic infant ($\geq 4,000$ g) | P08.0, P08.1 | |
| <hr/> | | |

DAD, Discharge Abstract Database

*Exclusion criterion applies only to analyses of neonatal outcomes (neonatal trauma composite and components).

Table S2. Validity of perinatal diagnoses and procedures in the Discharge Abstract Database, Canadian Institute for Health Information³

| Indicator | Sensitivity (95% CI) | Specificity (95% CI) |
|---------------------------------------|-----------------------------|-----------------------------|
| Obstetric factors | | |
| Cesarean delivery | 99.8 (99.5-100) | 98.7 (98.3-99.0) |
| Induction of labour | 89.2 (87.7-90.6) | 96.9 (96.4-97.4) |
| Maternal complications | | |
| Postpartum hemorrhage | 90.2 (86.2-93.3) | 98.2 (97.8-98.5) |
| Blood transfusion | 85.7 (42.1-99.6) | 99.8 (99.6-99.9) |
| Perineal lacerations | | |
| 1 st degree | 91.7 (89.7-93.3) | 97.9 (97.4-98.4) |
| 2 nd degree | 97.7 (96.8-98.3) | 99.1 (98.7-99.4) |
| 3 rd degree* | 97.1 (92.7-99.2) | 99.9 (99.8-100) |
| 4 th degree* | 94.7 (74.0-99.7) | 99.9 (99.8-100) |
| Chronic hypertension | 83.3 (73.6-90.6) | 99.9 (99.8-100) |
| Any gestational hypertensive disorder | 87.9 (85.0-90.4) | 99.6 (99.4-99.8) |
| Neonatal complications | | |
| Severe respiratory distress syndrome | 100 (95.5-100) | 99.6 (99.4-99.8) |
| Intraventricular hemorrhage | 88.9 (51.8-99.7) | 100 (99.9-100) |
| Fracture of clavicle | 91.7 (61.5-99.8) | 100 (99.3-100) |
| Bacterial sepsis | 67.4 (56.5-77.2) | 99.6 (99.4-99.8) |

CI: confidence interval

*A 2015/16 Discharge Abstract Database reabstraction study⁴ carried out in hospitals across Canada showed very high agreement for obstetric trauma (3rd- and 4th-degree perineal lacerations or other injury to pelvic organs), specifically 97.0% agreement, 95% CI 95.4%–98.6%.

Table S3. Numbers and rates of attempted and failed forceps deliveries, and numbers and rates of attempted and failed vacuum deliveries and associated rates of maternal trauma and neonatal trauma, Canada (excluding Quebec), April 2013 to March 2019

| Type of delivery | Deliveries | | Maternal trauma | | Births* | Neonatal trauma | |
|--|------------|---------------|-----------------|----------|-----------|-----------------|------------|
| | No. | Rate per 100† | No. | Rate/100 | | No. | Rate/1,000 |
| Attempted forceps | 38,500 | 2.9 | 9,728 | 25.3 | 35,663 | 341 | 9.6 |
| Successful | 36,894 | 95.8 | 9,613 | 26.1 | 34,202 | 319 | 9.3 |
| Failed (forceps followed by cesarean delivery) | 1,606 | 4.2 | 115 | 7.2 | 1,461 | 22 | 15.1 |
| Attempted vacuum | 110,987 | 8.4 | 14,614 | 13.2 | 103,000 | 987 | 9.6 |
| Successful | 102,196 | 92.1 | 12,632 | 12.4 | 94,894 | 795 | 8.4 |
| Failed | 8,791 | 7.9 | 1,982 | 22.5 | 8,106 | 192 | 23.7 |
| Vacuum followed by forceps delivery | 6,221 | 70.8 | 1,826 | 29.4 | 5,736 | 120 | 20.9 |
| Vacuum followed by cesarean delivery | 2,031 | 23.1 | 123 | 6.1 | 1,866 | 55 | 29.5 |
| Vacuum followed by forceps and cesarean delivery | 539 | 6.1 | 33 | 6.1 | 504 | 17 | 33.7 |
| Non-instrumental deliveries‡ | 1,176,704 | 88.7 | 36,097 | 3.1 | 1,097,374 | 2,305 | 2.10 |
| Total | 1,326,191 | 100.0 | 60,439 | 4.6 | 1,236,037 | 3,633 | 2.9 |

* Births with congenital anomalies excluded.

† Attempted forceps/vacuum expressed per 100 deliveries; successful/failed forceps and successful/failed vacuum deliveries expressed per 100 attempted forceps/vacuum deliveries. Subcategories of failed vacuum deliveries expressed per 100 failed vacuum deliveries.

‡ Non-instrumental deliveries included vaginal deliveries and cesarean deliveries not assisted by either forceps or vacuum.

Table S4. Crude, adjusted and stabilized rates of attempted forceps deliveries and live births, maternal trauma and neonatal trauma by province/territory, Canada (excluding Quebec), 2013-2019

| Province/ Territory | Deliveries | Attempted forceps deliveries | | | Maternal trauma | | | Live births (No CA) | Attempted forceps births* | | | Neonatal trauma | | |
|------------------------|------------|------------------------------|----------------------------|----------|-----------------------|----------------------------|-----------|------------------------|---------------------------|----------------------------|---------|------------------------|----------------------------|-----------|
| | | Crude rate/ 100 | Adjusted and stabilized | | Crude rate/ 100 | Adjusted and stabilized | | | Crude rate/ 100 | Adjusted and stabilized | | Crude rate/ 1000 | Adjusted and stabilized | |
| | | | Rate/ 100 | 95% CI | | Rate/ 100 | 95% CI | | | Rate/ 100 | 95% CI | | Rate/ 1000 | 95% CI |
| BC | 193,798 | 4.1 | 3.3 | 3.3-3.3 | 25.0 | 24.6 | 24.3-24.9 | 182,495 | 4.1 | 3.3 | 3.3-3.3 | 7.8 | 9.6 | 6.51-14.6 |
| AB | 239,684 | 3.7 | 3.5 | 3.5-3.5 | 27.3 | 26.9 | 26.7-27.1 | 217,536 | 3.7 | 3.5 | 3.5-3.5 | 9.6 | 9.5 | 6.70-13.8 |
| SK | 71,626 | 2.4 | 3.0 | 2.9-3.1 | 40.7 | 41.0† | 40.4-41.5 | 66,396 | 2.4 | 3.0 | 2.9-3.1 | 10.7 | 9.3 | 6.29-14.1 |
| MB | 78,947 | 1.5 | 2.0 | 1.9-2.1 | 32.2 | 32.5† | 31.2-33.6 | 74,909 | 1.5 | 2.1 | 2.0-2.1 | 14.0 | 10.1 | 6.65-16.1 |
| ON | 638,308 | 2.5 | 2.7 | 2.7-2.7 | 21.7 | 22.1 | 21.9-22.2 | 598,957 | 2.5 | 2.6 | 2.6-2.6 | 9.8 | 9.70 | 6.67-14.4 |
| NB | 31,143 | 2.3 | 2.4 | 2.3-2.5 | 24.3 | 24.7 | 22.9-26.5 | 29,690 | 2.3 | 2.4 | 2.3-2.5 | 14.8 | 10.3 | 6.56-16.3 |
| NS | 38,725 | 3.0 | 2.7 | 2.6--2.8 | 33.8 | 32.8† | 31.6-33.9 | 35,476 | 2.9 | 2.7 | 2.6-2.8 | 10.8 | 9.6 | 6.35-14.7 |
| PE | 6,197 | 1.5 | 1.7 | 1.5-2.0 | 38.9 | 37.2† | 30.5-43.9 | 5,553 | 1.5 | 1.7 | 1.5-2.0 | 0.0 | 0.00 | - |
| NL | 20,193 | 2.2 | 2.1 | 2.0-2.3 | 16.4 | 17.7 | 15.2-20.3 | 17,989 | 2.2 | 2.2 | 2.0-2.3 | 5.1 | 0.00 | - |
| CT | 7,570 | 0.4 | 0.8 | 0.6-1.0 | 31.3 | 29.9 | 21.1-39.8 | 7,036 | 0.4 | 0.8 | 0.6-1.1 | 0.0 | 0.00 | - |
| Total | 1,326,191 | 2.9 | | | 25.3 | | | 1,236,037 | 2.9 | | | 9.6 | | |

Table S5. Crude and adjusted and stabilized rates of attempted vacuum deliveries and live births, maternal trauma and neonatal trauma by province/territory, Canada (excluding Quebec), 2013-2019

| Province/ Territory | Deliveries | Attempted vacuum deliveries | | | Maternal trauma | | | Live births (No CA) | Attempted vacuum births* | | | Neonatal trauma | | |
|------------------------|------------|-----------------------------|----------------------------|----------|-----------------------|----------------------------|-----------|------------------------|--------------------------|----------------------------|---------|------------------------|----------------------------|-----------|
| | | Crude rate/ 100 | Adjusted and stabilized | | Crude rate/ 100 | Adjusted and stabilized | | | Crude rate/ 100 | Adjusted and stabilized | | Crude rate/ 1000 | Adjusted and stabilized | |
| | | | Rate/ 100 | 95% CI | | Rate/ 100 | 95% CI | | | Rate/ 100 | 95% CI | | Rate/ 1000 | 95% CI |
| BC | 193,798 | 7.2 | 7.7 | 7.6-7.7 | 11.7 | 12.0 | 11.8-12.2 | 182,495 | 7.2 | 7.6 | 7.6-7.7 | 6.4 | 7.8 | 7.2-8.4 |
| AB | 239,684 | 9.6 | 7.5 | 7.5-7.6 | 12.9 | 13.1 | 12.9-13.2 | 217,536 | 9.5 | 7.5 | 7.4-7.5 | 11.8 | 10.9 | 10.6-11.1 |
| SK | 71,626 | 12.5 | 9.7 | 9.7-9.8 | 19.4 | 20.0† | 19.8-20.2 | 66,396 | 12.4 | 9.7 | 9.7-9.8 | 7.9 | 8.7 | 8.1-9.3 |
| MB | 78,947 | 6.6 | 8.1 | 8.0-8.2 | 15.2 | 16.1† | 15.7-16.5 | 74,909 | 6.6 | 8.0 | 7.9-8.1 | 10.0 | 9.5 | 8.8-10.2 |
| ON | 638,308 | 8.1 | 8.9 | 8.9-8.9 | 12.6 | 12.3 | 12.2-12.3 | 598,957 | 8.1 | 8.9 | 8.9-8.9 | 9.7 | 9.5 | 9.4-9.6 |
| NB | 31,143 | 9.3 | 9.9 | 9.7-10.0 | 12.7 | 13.1 | 12.4-13.7 | 29,690 | 9.3 | 9.8 | 9.6-9.9 | 8.3 | 9.4 | 8.3-10.5 |
| NS | 38,725 | 7.2 | 6.7 | 6.6-6.8 | 15.0 | 15.0† | 14.3-15.7 | 35,476 | 7.2 | 6.7 | 6.5-6.8 | 7.9 | 9.5 | 8.4-10.7 |
| PE | 6,197 | 6.3 | 7.1 | 6.7-7.5 | 11.0 | 11.2 | 9.2-13.5 | 5,553 | 6.1 | 6.9 | 6.5-7.3 | 26.6 | 11.1 | 8.7-14.0 |
| NL | 20,193 | 9.8 | 8.7 | 8.5-8.8 | 8.2 | 8.4 | 7.7-9.3 | 17,989 | 9.7 | 8.7 | 8.5-8.9 | 12.6 | 11.2 | 9.6-13.1 |
| CT | 7,570 | 5.8 | 8.1 | 7.7-8.6 | 10.0 | 10.4 | 8.6-12.6 | 7,036 | 5.8 | 8.1 | 7.7-8.6 | 12.2 | 9.6 | 8.1-11.2 |
| Total | 1,326,191 | 8.4 | | | 13.3 | | | 1,236,037 | 8.3 | | | 9.6 | | |

CI, confidence interval; CA, congenital anomalies

* Infants with congenital anomalies excluded.

† Province/territory with obstetric trauma or neonatal trauma rate significantly higher than the rate in the rest of Canada.

Obstetric trauma included obstetric anal sphincter injury (3rd or 4th degree perineal laceration), cervical laceration, high vaginal laceration, other pelvic trauma, and repair of the urethra or bladder. Neonatal trauma included intracranial hemorrhage, skull fracture, injury to the central nervous system or peripheral nervous system, injury to the long bones, injury to the liver or spleen, seizures and neonatal death.

Table S6. Crude and adjusted and stabilized rates of maternal trauma (MT) with forceps and vacuum delivery by tier of obstetric service, British Columbia, Alberta, and Ontario, 2013-2019

| British Columbia | | | | | | | | | | | | |
|----------------------------------|---------------------------|-------------|----------------------|--|-----------------|-----------------|--------------------------|-------------|----------------------|--|-----------------|-----------------|
| Tier of obstetric service | Forceps Deliveries | N MT | Crude MT rate | Adjusted and stabilized MT rate | Lower CI | Upper CI | Vacuum deliveries | N MT | Crude MT rate | Adjusted and stabilized MT rate | Lower CI | Upper CI |
| 1.5 | 1,174 | 285 | 24.28 | 23.94 | 20.46 | 27.95 | 3,984 | 489 | 12.27 | 11.72 | 9.88 | 13.92 |
| 2 | 1,753 | 462 | 26.35 | 25.44 | 22.21 | 29.08 | 3,815 | 477 | 12.50 | 11.64 | 9.89 | 13.70 |
| 2.5 | 477 | 159 | 33.33 | 24.86 | 21.53 | 28.61 | 1,080 | 133 | 12.31 | 11.11 | 9.38 | 13.19 |
| 3 | 2,134 | 449 | 21.04 | 24.75 | 21.58 | 28.32 | 2,972 | 311 | 10.46 | 11.82 | 10.04 | 13.94 |
| 4 | 2,441 | 636 | 26.05 | 25.29 | 22.10 | 28.87 | 2,009 | 217 | 10.80 | 12.19 | 10.45 | 14.24 |
| All tiers | 7,979 | 1,991 | 24.95 | - | 24.01 | 25.92 | 13,860 | 1,627 | 11.74 | - | 11.21 | 12.29 |
| Alberta | | | | | | | | | | | | |
| Tier of obstetric service | Forceps Deliveries | N MT | Crude MT rate | Adjusted and stabilized MT rate | Lower CI | Upper CI | Vacuum deliveries | N MT | Crude MT rate | Adjusted and stabilized MT rate | Lower CI | Upper CI |
| 2 | 239 | 62 | 25.94 | 24.44 | 21.15 | 28.33 | 4,129 | 588 | 14.24 | 12.29 | 10.77 | 14.03 |
| 3 | 3,684 | 1,022 | 27.74 | 27.14 | 24.26 | 30.36 | 5,490 | 722 | 13.15 | 12.80 | 11.37 | 14.41 |
| 4 | 5,000 | 1,352 | 27.04 | 27.55 | 24.55 | 30.93 | 13,310 | 1,634 | 12.28 | 13.03 | 11.65 | 14.57 |
| All tiers | 8,923 | 2,436 | 27.30 | - | 26.38 | 28.24 | 22,929 | 2,944 | 12.84 | - | 12.41 | 13.28 |
| Ontario | | | | | | | | | | | | |
| Tier of obstetric service | Forceps Deliveries | N MT | Crude MT rate | Adjusted and stabilized MT rate | Lower CI | Upper CI | Vacuum deliveries | N MT | Crude MT rate | Adjusted and stabilized MT rate | Lower CI | Upper CI |
| 1.5 | 1,313 | 246 | 18.74 | 21.20 | 19.09 | 23.55 | 5,615 | 465 | 8.28 | 11.67 | 10.74 | 12.70 |
| 2 | 2,147 | 448 | 20.87 | 21.81 | 19.75 | 24.09 | 4,463 | 498 | 11.16 | 12.45 | 11.54 | 13.43 |
| 2.3 | 3,965 | 799 | 20.15 | 21.40 | 19.33 | 23.70 | 16,176 | 2,122 | 13.12 | 12.40 | 11.48 | 13.41 |
| 2.7 | 5,128 | 1,045 | 20.38 | 21.77 | 19.69 | 24.05 | 15,101 | 1,850 | 12.25 | 12.57 | 11.62 | 13.61 |
| 3 | 3,661 | 984 | 26.88 | 22.15 | 20.00 | 24.52 | 9,825 | 1,509 | 15.36 | 13.52 | 12.51 | 14.62 |
| All tiers | 16,214 | 3,522 | 21.72 | - | 21.09 | 22.36 | 51,180 | 6,444 | 12.59 | - | 12.30 | 12.88 |

Table S7. Crude and adjusted and stabilized rates of neonatal trauma (SBT) with forceps and vacuum births by tier of obstetric service, British Columbia, Alberta, and Ontario, 2013-2019

| British Columbia | | | | | | | | | | | | |
|----------------------------------|-----------------------|--------------|-----------------------|---|-----------------|-----------------|----------------------|--------------|-----------------------|---|-----------------|-----------------|
| Tier of obstetric service | Forceps Births | N SBT | Crude SBT rate | Adjusted and stabilized SBT rate | Lower CI | Upper CI | Vacuum Births | N SBT | Crude SBT rate | Adjusted and stabilized SBT rate | Lower CI | Upper CI |
| 1.5 | 1,100 | 7 | 6.36 | 8.15 | 2.84 | 38.16 | 3,787 | 26 | 6.87 | 6.85 | 3.08 | 30.19 |
| 2 | 1,687 | 7 | 4.15 | 7.79 | 3.12 | 25.87 | 3,646 | 25 | 6.86 | 6.25 | 2.96 | 21.58 |
| 2.5 | 446 | 6 | 13.45 | 9.16 | 3.42 | 34.67 | 1,021 | 5 | 4.90 | 6.89 | 3.10 | 27.37 |
| 3 | 1,935 | 13 | 6.72 | 6.97 | 2.85 | 20.73 | 2,705 | 22 | 8.13 | 6.15 | 2.89 | 19.53 |
| 4 | 2,310 | 25 | 10.82 | 7.93 | 3.25 | 25.25 | 1,901 | 6 | 3.16 | 6.11 | 3.00 | 18.97 |
| All tiers | 7,478 | 58 | 7.76 | - | 5.88 | 10.41 | 13,060 | 84 | 6.43 | - | 5.12 | 7.97 |
| Alberta | | | | | | | | | | | | |
| Tier of obstetric service | Forceps Births | N SBT | Crude SBT rate | Adjusted and stabilized SBT rate | Lower CI | Upper CI | Vacuum Births | N SBT | Crude SBT rate | Adjusted and stabilized SBT rate | Lower CI | Upper CI |
| 2 | 222 | 3 | 13.51 | 8.02 | 3.26 | 37.79 | 3,830 | 26 | 6.79 | 11.09 | 6.56 | 19.53 |
| 3 | 3,446 | 24 | 6.96 | 9.13 | 4.26 | 23.55 | 5,034 | 58 | 11.52 | 11.91 | 7.43 | 19.57 |
| 4 | 4,427 | 51 | 11.52 | 10.11 | 4.65 | 26.12 | 11,718 | 160 | 13.65 | 12.08 | 7.77 | 19.18 |
| All tiers | 8,095 | 78 | 9.64 | - | 7.61 | 12.03 | 20,582 | 244 | 11.86 | - | 10.43 | 13.39 |
| Ontario | | | | | | | | | | | | |
| Tier of obstetric service | Forceps Births | N SBT | Crude SBT rate | Adjusted and stabilized SBT rate | Lower CI | Upper CI | Vacuum Births | N SBT | Crude SBT rate | Adjusted and stabilized SBT rate | Lower CI | Upper CI |
| 1.5 | 1,209 | 5 | 4.14 | 9.24 | 5.19 | 19.72 | 5,174 | 57 | 11.02 | 10.68 | 7.47 | 15.46 |
| 2 | 1,969 | 19 | 9.65 | 10.17 | 5.62 | 23.70 | 4,112 | 34 | 8.27 | 9.95 | 7.13 | 14.08 |
| 2.3 | 3,764 | 48 | 12.75 | 9.66 | 5.42 | 23.09 | 15,439 | 169 | 10.95 | 9.88 | 7.05 | 14.02 |
| 2.7 | 4,758 | 33 | 6.94 | 9.72 | 5.48 | 19.89 | 14,276 | 128 | 8.97 | 9.71 | 6.92 | 13.77 |
| 3 | 3,427 | 44 | 12.84 | 10.27 | 5.64 | 23.67 | 9,082 | 77 | 8.48 | 8.55 | 6.04 | 12.28 |
| All tiers | 15,127 | 149 | 9.85 | - | 8.31 | 11.47 | 48,083 | 465 | 9.67 | - | 8.80 | 10.59 |

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