

# One in a Million

**BORN Ontario Biennial Report:  
2016-2018**



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# About this Report

The majority of data presented in this report is from fiscal year 2016-2017 (April 1, 2016 - March 31, 2017); exceptions are noted for unique data holdings and where trends are illustrated. Please consider the timeline when comparing data from differing data holdings. Program and research highlights span the course of two fiscal years (2016-2018).

**We welcome your comments and questions:**

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# Message from BORN Ontario's Executive Director, Dr. Lise Bisnaire



On April 25th 2017, BORN Ontario reached a major milestone - 1 million babies in the BORN Information System. If we lined up the cribs of those 1 million babies, they would stretch from Ottawa to Windsor and back again!

Powerful and secure, the BORN Information System holds data from thousands of users spanning all levels of care from pre-pregnancy to early childhood. Nearly 3,000 data entries are submitted each day cataloging more than 140,000 births each year in Ontario – approximately 40% of births in Canada.

BORN has been described as a 'gold mine' of data. It's an apt analogy as we think of 'extracting' a valuable resource - data - and then 'refining' that data into knowledge that has a positive impact on health care. A tremendous amount of work goes into making the data interpretable and actionable. BORN has a diverse team to make this happen including a variety of specialized clinical and technical roles.

The past two years have been incredibly busy, and we are proud of BORN's impact. Highlights include:

- Evaluating the **impact of the Ontario Fertility Program** on in vitro fertilization rates, practices and outcomes
- Studying utilization patterns and **performance of cell-free fetal DNA (cffDNA) screening** and the association between these screening results and adverse maternal and neonatal outcomes
- Implementing an **electronic version of the Healthy Babies Healthy Children screen** to enhance the way postpartum information moves from hospitals to public health units
- Launching the **Healthy Growth Initiative** – a formalized system to monitor healthy growth in children and youth
- Advancing the **BORN Information System's technical capacity**
- Linking BORN data to records within the Institute for Clinical Evaluative Sciences (ICES) to study **opioid use in pregnancy**

BORN is grateful to all those who partner with us to make a positive and lasting contribution to the health of mothers, newborns, children and the citizens of Ontario. I hope you enjoy this year's report.

Dr. Lise Bisnaire



# Message from CHEO's Vice President of Provincial Programs and Chief Innovation Officer, Mari Teitelbaum

How did we get so lucky...reaching the milestone of 1 million babies entered into the BORN information System (BIS) during our biennial conference? In fact, luck had little to do with it. It was all about hard work and commitment to ensuring the best possible beginnings for those children and their families:

- The work of the providers who not only supported and cared for all those mothers and children, but also took the time to document the care and outcomes in the BIS
- The work of the teams who use the reports available in the BIS to constantly improve the care they provide
- The work of the BORN team members who continuously strive to make the data as easy as possible to collect and who keep the data safe and secure
- The work of researchers who use this 'big data' to learn more about pressing issues such as preterm birth, cannabis use in pregnancy and quality of care
- The generosity and support of our funders who invest in information to drive quality of care
- The work of the experts across the province to ensure that BORN remains relevant as needs evolve and priorities change

Don't underestimate 1 million. Learning from all those experiences and making things better is what we're here to do.

Mari Teitelbaum

# Key Metrics:

Comparing Fiscal Year 2016-2017 with 2017-2018

2016-2017

2017-2018

144,909



Babies entered into the BORN Information System

145,153

8,583



People using the BORN Information System

9,315

88,240



Reports Generated by System Users

86,211

175



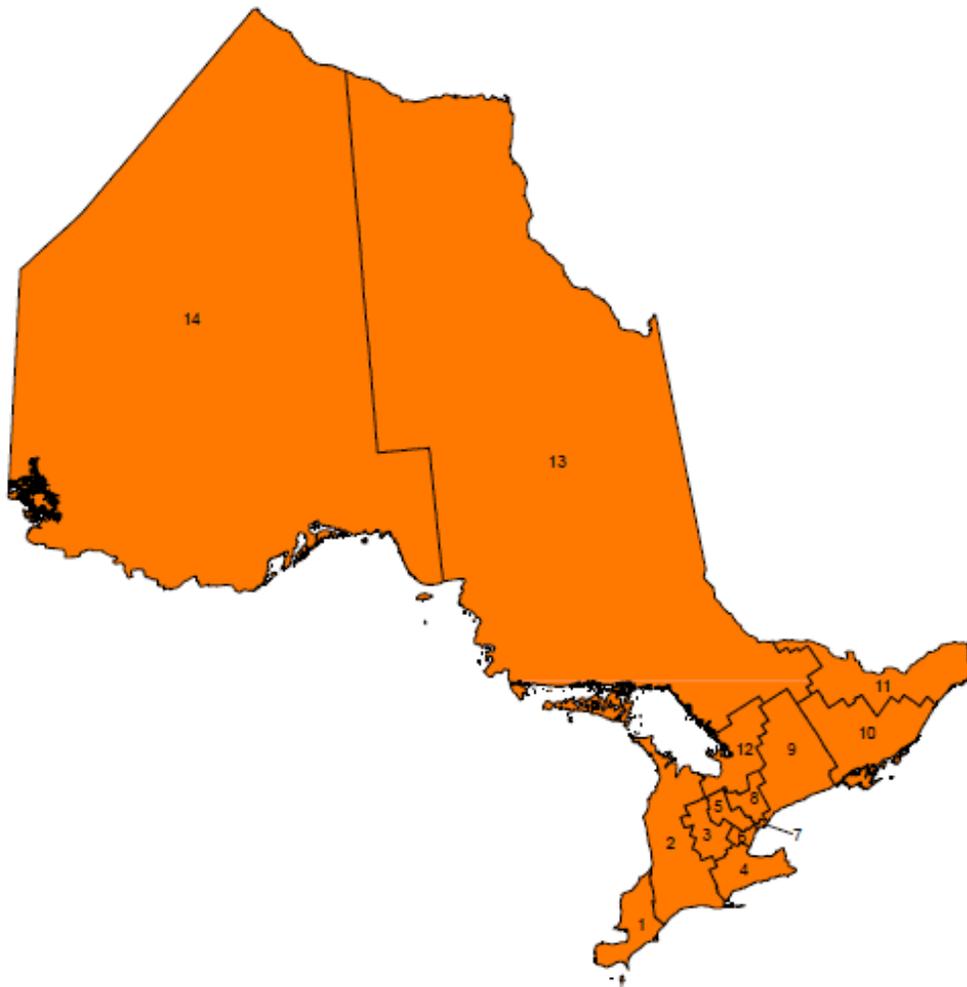
Custom Data Releases from BORN

228

# Local Health Integration Networks

Local Health Integration Networks (LHINs) are crown agencies established by the Government of Ontario to plan, coordinate, integrate and fund health services at a local level. 14 LHINs have been established across the province. LHINs are based on a principle that community-based care is best planned, coordinated and funded in an integrated manner at the community level, because local people are best able to determine their health service needs and priorities.

LHINs are referenced throughout this report (i.e. graphs, tables), so please use Figure 1 - a map of Ontario indicating the LHIN boundaries - as a visual reference.



**Figure 1: LHIN boundaries**

- |                                     |                       |                          |
|-------------------------------------|-----------------------|--------------------------|
| 1. Erie St. Clair                   | 6. Mississauga Halton | 11. Champlain            |
| 2. South West                       | 7. Toronto Central    | 12. North Simcoe Muskoka |
| 3. Waterloo Wellington              | 8. Central            | 13. North East           |
| 4. Hamilton Niagara Haldimand Brant | 9. Central East       | 14. North West           |
| 5. Central West                     | 10. South East        |                          |



# Emerging Trends in Maternal-Child Health Care

BORN's mandate is to facilitate and improve care for mothers, children and families and to provide scientific and technical leadership for Ontario's health system and innovation. To that end, the following examples highlight some of the novel projects currently underway at BORN or planned for the future.

## Opioid Use in Canada

Opioid use in Canada is increasing, with significant potential hazards to maternal and child health. Clinical studies have been unable to conclusively determine the risks of prenatal exposure to opioids. Robust, population-based data on perinatal and neurodevelopmental outcomes of in utero opioid exposure is necessary to understand this emerging health crisis. This ongoing work will use BORN birth registry data linked to health administrative records within the Institute for Clinical Evaluative Sciences (ICES) to estimate and compare rates of: 1) adverse perinatal and neonatal outcomes; 2) neurodevelopmental problems; and 3) rates of health service utilization up to six years of age in children born to mothers with and without opioid use in pregnancy.

## Racial/Ethnic Disparities in Pre-pregnancy Weight and Gestational Weight Gain in Ontario

BORN data suggest that pre-pregnancy obesity and unhealthy gestational weight gain (GWG)

significantly vary by race. Among women who had prenatal screening and a singleton birth in an Ontario hospital in fiscal year 2016-2017, 27.1% of Black women, 20.1% of Caucasian women and 8.3% of Asian women began their pregnancy with obesity. Caucasian women were more likely to have excessive GWG (62.8%) compared to Asian and Black women (45.6% and 54.8%). The prevalence of inadequate GWG was greater in ethnic minority women, with 25.9% of Asian women, 25.0% of Black women, and 15.8% Caucasian women experiencing inadequate GWG.

## Congenital Anomalies Data Capture in Ontario

Congenital anomalies (CA) are a substantial contributor to neonatal and infant deaths. The World Health Organization has placed a priority on CA surveillance and research. In order to improve the capture of CA, BORN researchers are developing strategies and methodology to link BORN data with other data sources including the Canadian Institutes of Health Information (CIHI) Discharge Abstract Database (DAD) and

the National Ambulatory Care Reporting System (NACRS) on all births, terminations and hospital visits for Ontario residents up to one year of age. This ongoing project will provide more reliable CA data to estimate the burden of diseases, examine etiology of CA, and explore utilization of care.

## Maternal Socioeconomic Disparities and Risk of Congenital Heart Disease

Congenital heart disease (CHD) is a major congenital anomaly and leading cause of infant mortality in Canada. A number of published studies have indicated that women with a lower socioeconomic status (SES) are at increased risk of having babies with CHD. However, findings remain unclear and inconsistent. In collaboration with external scientists and clinicians, BORN researchers have developed a project to examine the relationship between maternal SES and the risk of CHD in offspring. The results of this study could have important implications for health policy to minimize the equity gap and reduce the burden of disease.

## Cell-free Fetal DNA Screening and Future Possibilities for Research

As of January 2016, cell-free fetal DNA (cffDNA) screening data are being directly uploaded to BORN by two laboratories performing the test in Ontario. In order to include legacy data collected prior to January 2016, these data were linked to pregnancy records and incorporated into BORN datasets. This rich dataset will enable us to study utilization patterns and performance of cffDNA screening, to investigate the factors that influence the results and accuracy of this screen, and the associations between cffDNA screening

results and other adverse maternal and neonatal outcomes.

## Evaluation of the 'The Managing Obstetrical Risk Efficiently (MOREOB)' Program Implementation in Ontario Hospitals

The MOREOB program is a patient safety, professional development, and performance improvement program designed for hospital obstetric units. Implemented in Ontario in 2002, the program has expanded across Canada and elsewhere. In 2013 the Ministry of Health and Long-Term Care (MOHLTC) awarded funds to BORN so that a formal evaluation of the impact of the MOREOB program in Ontario could be conducted. BORN researchers carried out a rigorous evaluation of the MOREOB program which included:

1. Assessment of the effect of MOREOB implementation on rates of in-hospital adverse outcomes in mothers and infants
2. Interviews with participating health-care providers to gain understanding of their experiences with the program
3. Surveys and questionnaires administered to program participants to evaluate the effect of the program on knowledge and organizational culture

Improvements in adverse events were not found after program implementation, however, health-care provider knowledge increased, as did perception of organizational culture. Participants enjoyed the program and felt that it improved safety on their units. Currently, two manuscripts are being finalized for publication in the scientific literature.

**DID YOU  
KNOW**



The BORN Team includes a number of roles to support new knowledge: Epidemiologists, Data Analysts, Data Request and Research Coordinators, and Knowledge Translation Specialists.



# BORN's Clinical Impact

## Positive Trends after Fertility Treatment

BORN has been supporting the collection, storage, and use of fertility treatment information for fertility clinics in Canada through the Canadian Assisted Reproductive Technologies Register (CARTR) Plus since January 2013. Because of this support, Canadian fertility clinics have access to demographic, clinical and annual summary reports. For Ontario clinics (which represented 59% of fertility cycles in Canada in 2017), the BORN Information System is an invaluable resource for answering questions about the impact and success of fertility treatments (from the type of conception through to birth and the neonatal period).

### Evaluating the Ontario Fertility Program

Until the end of 2015, most fertility treatments in Ontario were only offered on a user-pay basis, which inherently limited access to those who could afford it. In December of 2015, Ontario introduced the Ontario Fertility Program (OFP). The aim of this program is to increase accessibility to treatment for patients requiring assisted reproductive technologies to conceive. The OFP funds a fixed number of fertility treatment cycles for Ontario residents - including in vitro fertilization (IVF), fertility preservation, and artificial insemination/intrauterine insemination.

Since the OFP was introduced, the number of live births in Ontario resulting from IVF treatments increased from 2,366 in 2015, to 3,190 in 2016. BORN is supporting the

evaluation of the OFP by analyzing IVF treatment information captured in CARTR Plus (i.e. IVF rates, practices, and outcomes). The findings are eagerly anticipated by the OFP, Ontario's fertility clinics, as well as the population of patients who have or will benefit from this important policy initiative.

### Limiting Single-Embryo Transfers: Does this Practice make a Difference?

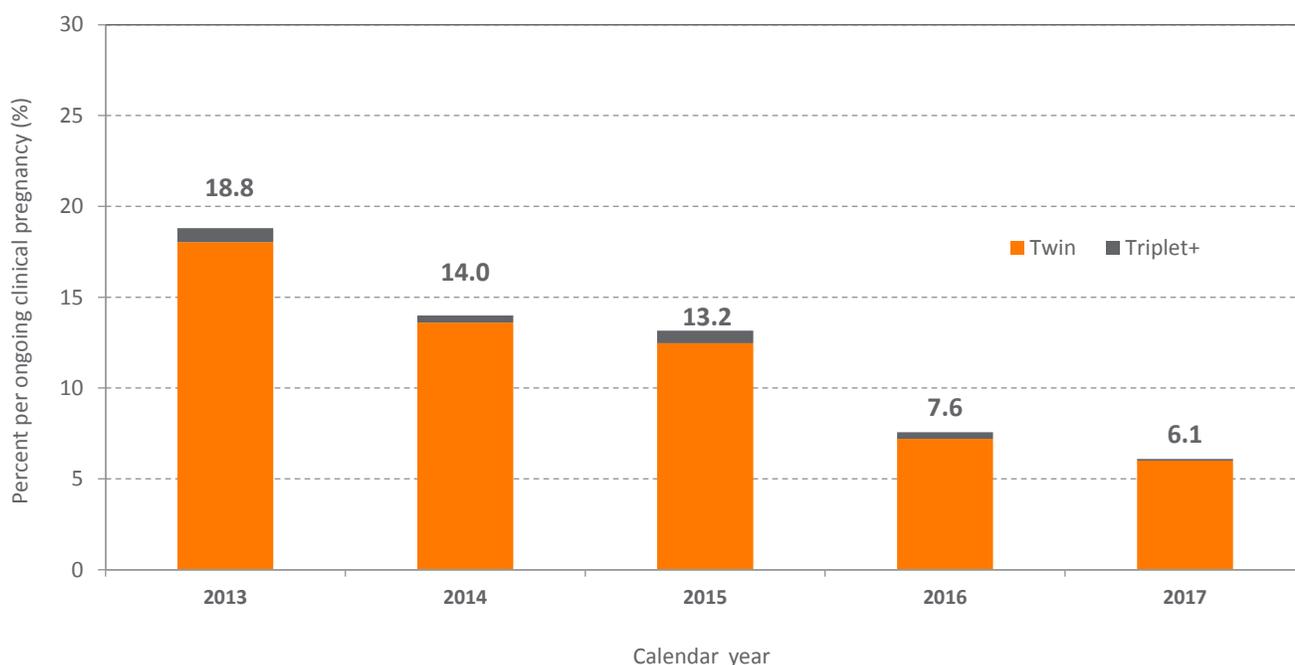
BORN's role in fertility treatment data reporting extends beyond Ontario's borders; BORN provides the Canadian Fertility and Andrology Society (CFAS) with an annual surveillance report on the status of IVF treatments that are performed at clinics across the country. This national-level information is used to guide evidence-based practice change.

One such change initiative is the promotion of single-embryo transfers, where only one embryo is transferred during a single fertility cycle. This practice is meant to reduce the rate of multiple gestation pregnancies that result from fertility treatments. Regardless of mode of conception, multiple gestation pregnancies increase the risk of a variety of maternal and neonatal complications. Limiting transfer to a single embryo reduces the occurrence of multiple gestation pregnancies, and therefore reduces the risk-related complications. The practice of

single-embryo transfer has been championed by the CFAS and is a key initiative for the OFP.

BORN data shows a significant decrease in the multiple pregnancy rate between 2013 and 2017 (Figure 2). The number of higher order gestation pregnancies (three or more fetuses) has also been dramatically reduced. Lowering the number of high-risk pregnancies is not only beneficial for families but also for our health-care system as a whole (i.e. reduces the cost of caring for these pregnancies and births).

**Figure 2: Percentage of multiple pregnancies for assisted reproductive technologies treatment cycles**



Twin	585	448	396	307	246
Triplet +	25	13	22	16	4

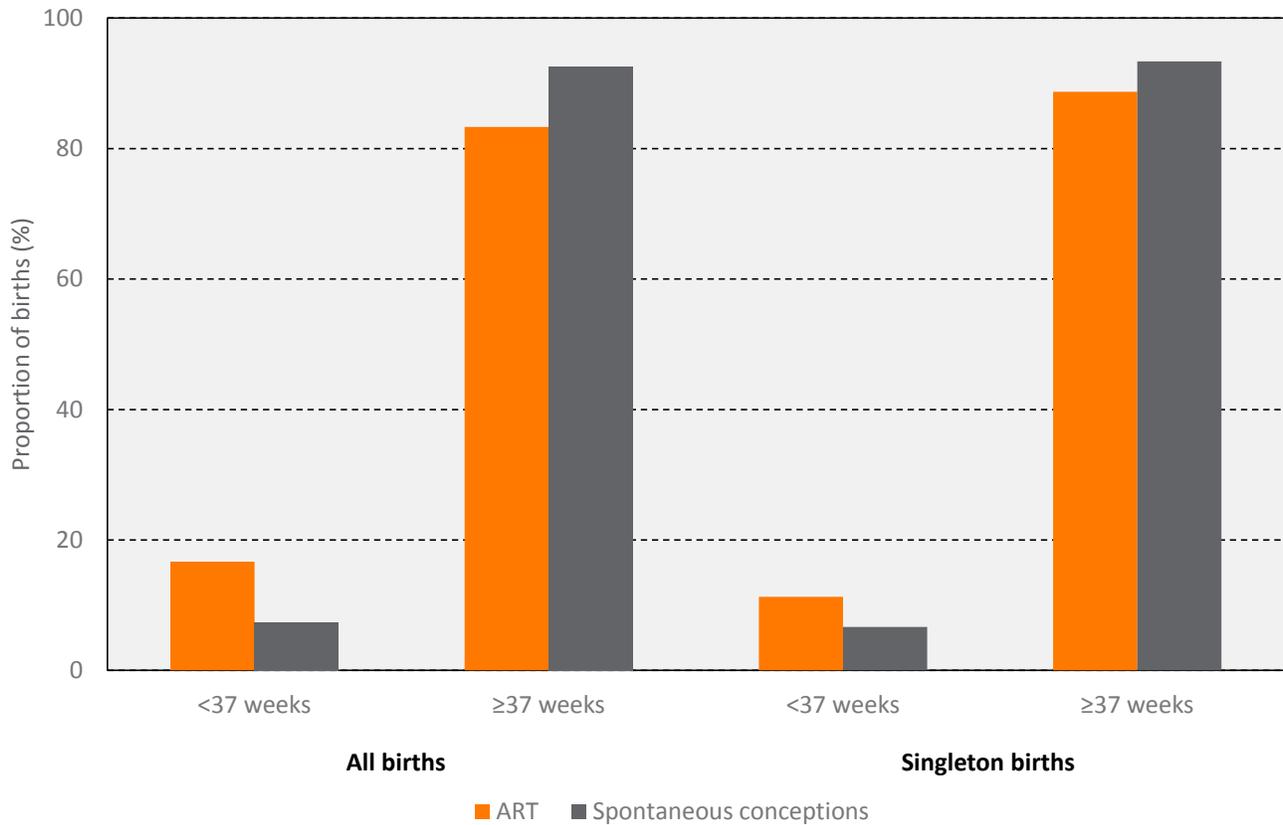
**Data source:** CARTR Plus, Ontario, 2013–2017 Calendar Year

**Definition of indicator:** Percentage of multiple pregnancies per ongoing clinical pregnancies among all Assisted Reproductive Technologies treatment cycles in Ontario fertility clinics by year. Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound. Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound.

## Does IVF Increase the Risk of Preterm Birth?

Although single-embryo transfer improves outcomes, CARTR Plus data shows that some differences in outcomes persist between pregnancies conceived naturally versus those that were conceived using IVF treatment, even when comparing singleton pregnancies. Figure 3 shows the increased risk of a preterm birth associated with the use of in vitro fertilization.

**Figure 3: Preterm births from assisted reproductive technologies (ART) compared to spontaneous conceptions**



**Data source:** CARTR Plus, Ontario, 2013–2016 Calendar Year

**Definition of indicator:** Examining the proportion of preterm births among Assisted Reproductive Technologies conceptions compared to spontaneous conceptions, among all births and singleton births in Ontario. Preterm births are defined as live birth or stillbirth at <37 weeks gestation. All other births are defined as live birth or stillbirth at ≥37 weeks gestation.

## Canadians are Unique and so is our Data

We need findings that are specific to our Canadian population. One of the most important features of CARTR Plus population-level data is that the findings are generalizable and can be

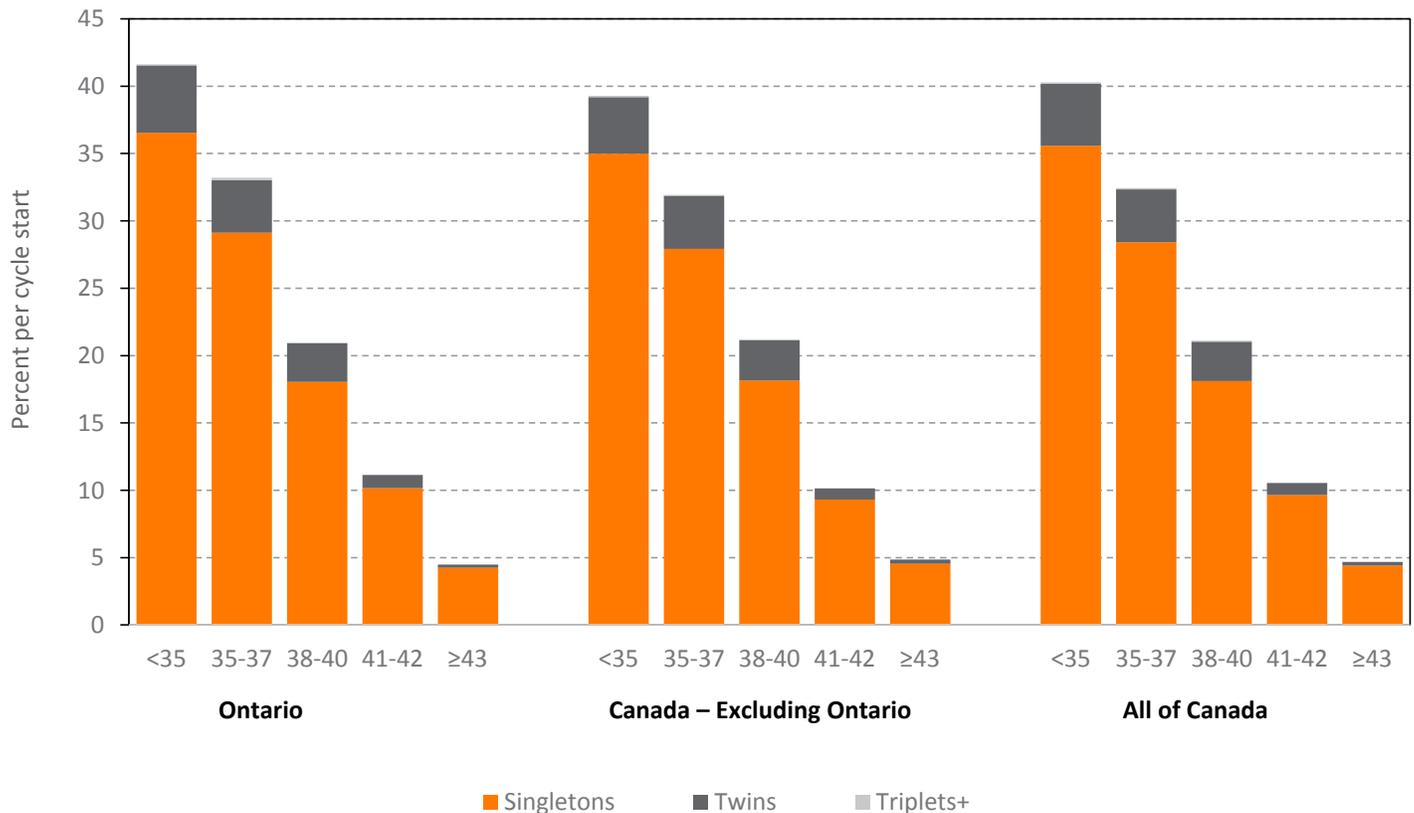
used to implement change across the country. Clinicians and researchers are using CARTR Plus data to answer questions that were previously impossible to answer in Canada.

**DID YOU KNOW**



**Singleton births from Assisted Reproductive Technologies are 70% more likely to result in preterm birth when compared to births from spontaneous conceptions.**

**Figure 4: Cumulative live birth rate within one year of retrieval among assisted reproductive technologies treatment cycles by maternal age**



**Data source:** CARTR Plus, 2013–2016 Calendar Year

**Definition of indicator:** Cumulative live birth rate within one year of egg retrieval among Assisted Reproductive Technologies treatment cycles, per batch of oocytes started between 2013–2016 by maternal age category (at time of retrieval) by geographic location.

**DID YOU KNOW**



Triplet births and higher order multiple births require more short- and long-term health care services than singleton and twin births. Single-embryo-transfer practice change in Canada has resulted in significantly reducing the number of higher order births from Assisted Reproductive Technologies to 0.23 percent per live birth in 2016.



## Introducing Prenatal Screening Ontario

2017 marked an important year for BORN, with the introduction of Prenatal Screening Ontario. In the 2017 Ontario Provincial Budget, the government announced that “Ontario is ... investing in the creation of a provincial prenatal screening program that will enhance access to standardized and high-quality prenatal screening across the province.”<sup>1</sup>

Since 2012, BORN has collected maternal multiple marker screening (MMS) results from all MMS laboratories in the province to facilitate quality assurance review and monitoring. In 2013, cell-free fetal DNA (cffDNA) screening was introduced (also known as non-invasive prenatal testing or NIPT). This technology changed the prenatal screening landscape, and in 2015, Ontario patriated cffDNA screening to two labs in the province. Since that time, cffDNA screening results have also been incorporated into BORN’s registry holdings.

Building on this history of partnership with the prenatal screening community, BORN was asked to be the operational home for Prenatal Screening Ontario. Advice and policy guidance through a new Prenatal Screening Advisory Committee is being managed by the Provincial Council for Maternal and Child Health (PCMCH).

### System of Care

The mandate of PSO is to coordinate and oversee the operations of prenatal screening services in Ontario, in order to maintain an integrated system of care. PSO is asked to:

- Enhance access to high-quality prenatal screening for all women in Ontario
- Provide the educational support, information, and transparency needed for health-care providers and women (and their families) to make informed decisions
- Undertake ongoing quality assurance and system performance evaluation to support all components of the system in functioning effectively and meeting the established standards
- Facilitate the incorporation of evolving technologies or screening options, supporting evidence-based integration
- Align screening service provision

<sup>1</sup> 2017 budget: <https://www.fin.gov.on.ca/en/budget/ontariobudgets/2017/>

PSO started hiring in the fall of 2017 and has focused on building and strengthening relationships with stakeholders, including laboratories, clinics, diagnostic imaging professionals, as well as patients and the public.

Program work will leverage BORN's current registry activities and PCMCH's policy expertise, ensure transparency and monitoring of system performance, and facilitate education and dissemination of practice guidelines and standards. While details for the mechanisms are pending, the new program will work with the various accountability structures, including hospitals, professional Colleges, and the relevant Branches of the Ministry of Health and Long-Term Care, to relay performance information and act as a conduit for accountability for all aspects of the prenatal screening system of care.

## Task Forces

PSO has four expert groups engaged to facilitate stakeholder input and advice on important operational areas:

1. The Standards Task Force will provide advice as appropriate regarding clinical issues related to prenatal screening
2. The Data and Quality Assurance Task Force is in place to advise PSO on data collection, performance metrics, and dissemination of key data

3. The Education Task Force will provide support and assist with the development of PSO Education Strategies
4. The Community Partnership Group will allow PSO to actively partner with the community in designing, planning and improving prenatal screening throughout Ontario by engaging with the public and those with recent, lived experience with prenatal screening.

Through its work with the prenatal screening community, both providers and the public, as well as through robust analyses of the data that BORN holds, PSO looks forward to providing Ontario-centric performance evaluation for all modalities of prenatal screening, as well as an understanding of how patients are engaging with the prenatal screening system in this province. These data will provide PSO with a sound foundation upon which new policy and screening guidelines can be built, improving the care for pregnant persons across Ontario.

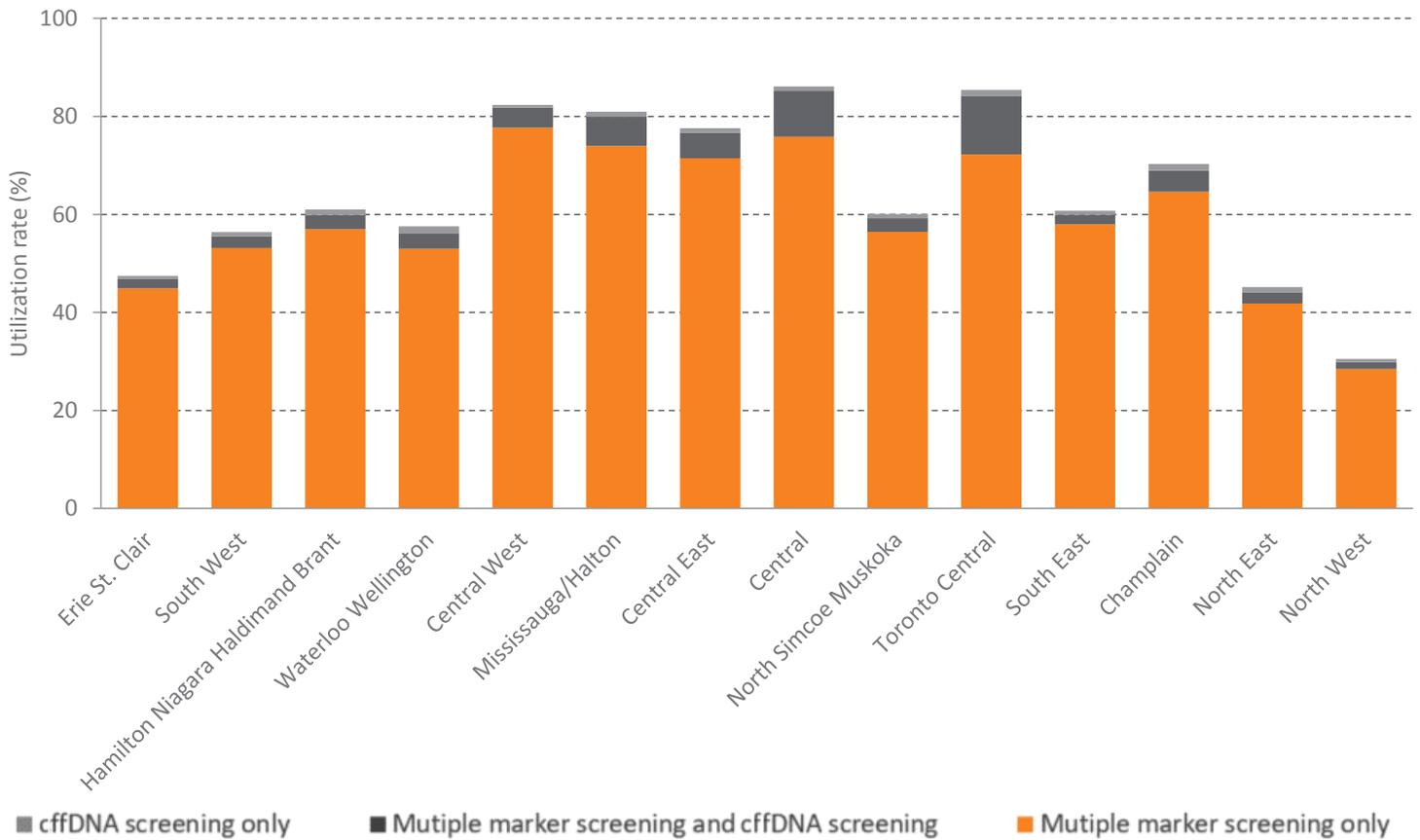
The following figures (5-7) highlight screening utilization rates as well as trends related to cell-free fetal DNA screening and amniocentesis/chorionic villous sampling.

**DID YOU  
KNOW**



The Prenatal Screening Ontario Team includes Genetic Counselors, Research Scientists, Diagnostic Imaging Specialists, Program Managers, Administrative Assistants, and Project Coordinators.

**Figure 5: Percent utilization of prenatal screening for all pregnancies by LHIN**



**Data source:** BORN Ontario, 2016–2017 Calendar Year

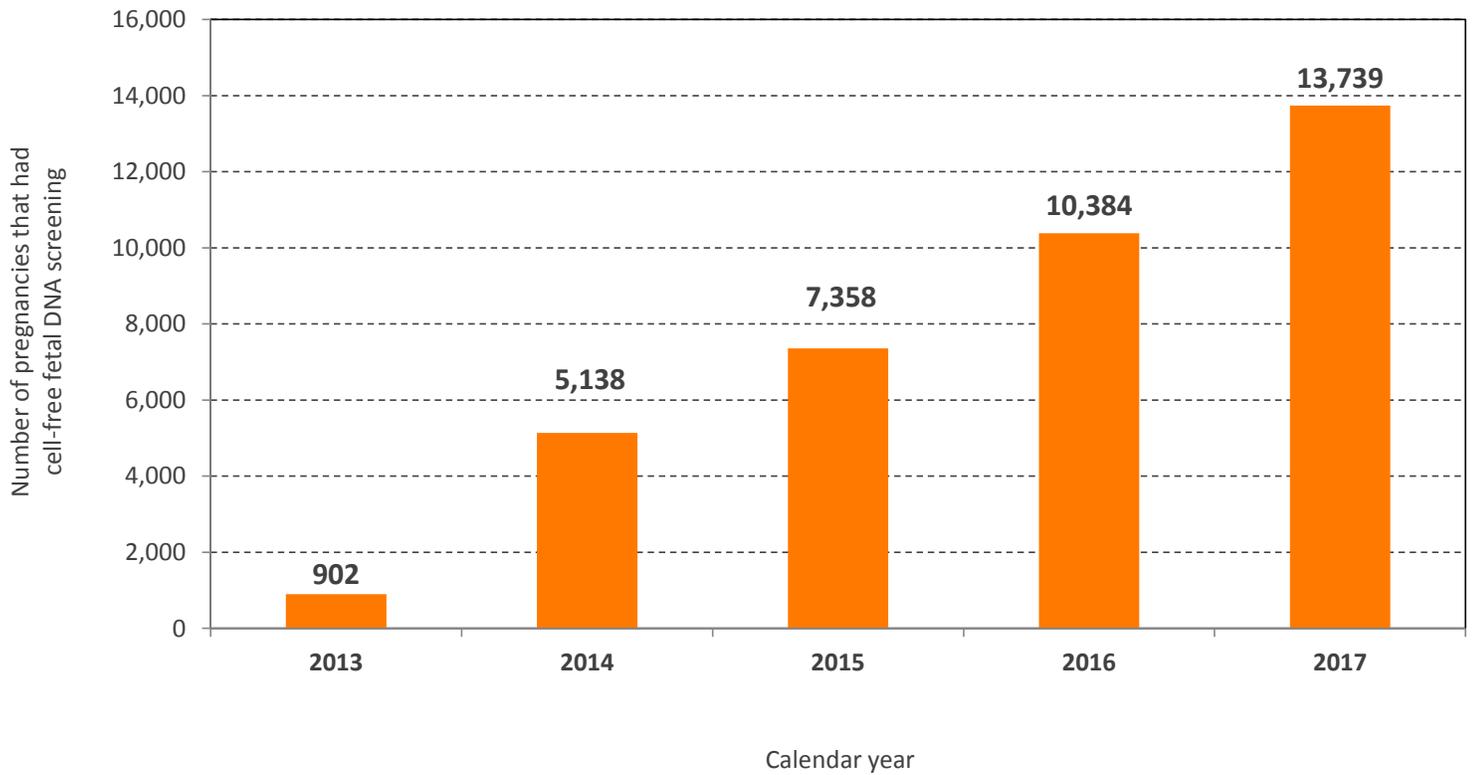
**Definition of indicator:** Number of women with singleton, twin or higher order multiple pregnancies that had multiple marker screening and/or cell-free fetal DNA screening during pregnancy expressed as a proportion of the total number of pregnancies in Ontario.

# DID YOU KNOW



The Northwest LHIN had the lowest prenatal screening rate at 30.5%, while Central LHIN had the highest at 86.2%. What accounts for this variation? Possibilities include personal choice, access to screening, and whether screening was even offered. Further studies are needed to delineate factors accounting for regional variations in uptake of these screening tests.

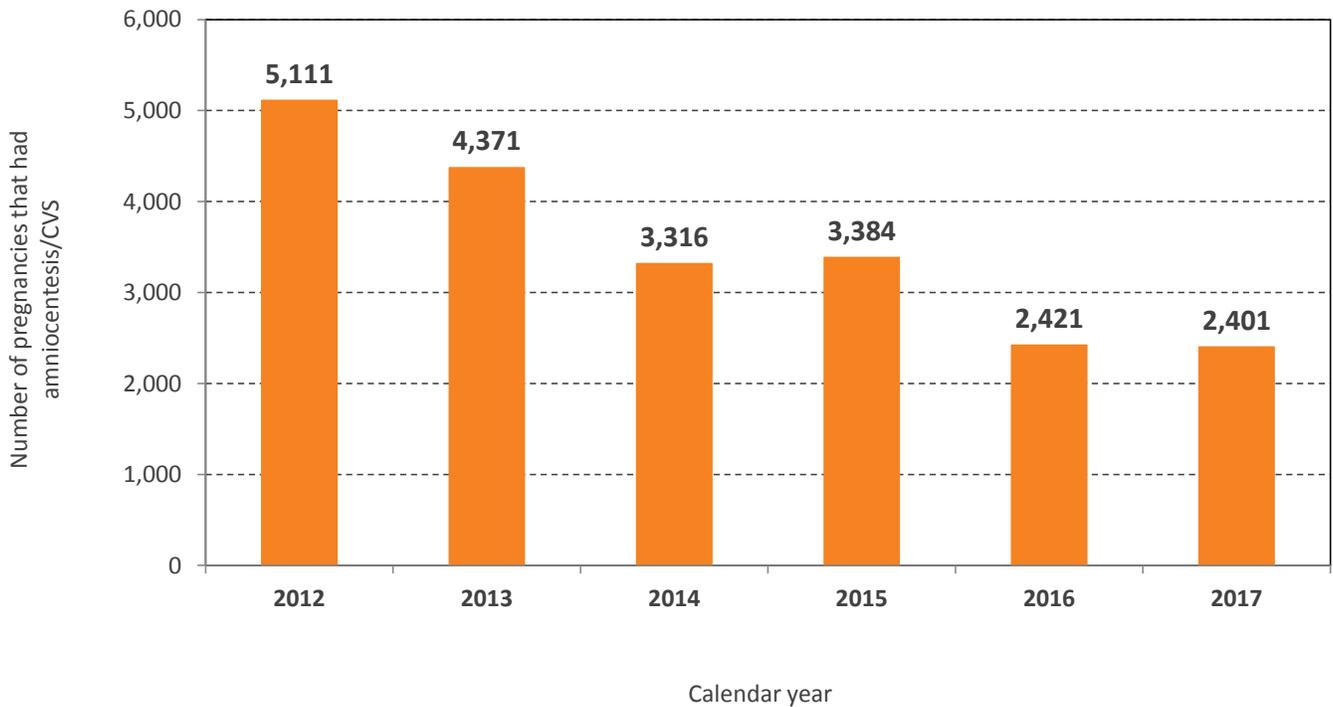
**Figure 6: Number of pregnancies that underwent cell-free fetal DNA screening by report date**



**Data source:** BORN Ontario, 2013–2017 Calendar Year

**Definition of indicator:** Number of singleton and twin or higher order multiple pregnancies that had cell-free fetal DNA (cffDNA) screening during pregnancy. Legacy cffDNA screening datasets are used for calendar years 2013–2015.

**Figure 7: Number of pregnancies that underwent prenatal diagnostic testing by sample date**



**Data source:** BORN Ontario, 2012–2017 Calendar Year

**Definition of indicator:** Number of singleton and twin or higher order multiple pregnancies that had a prenatal diagnostic test during pregnancy. Numbers estimated by counting amniocentesis/chorionic villous sampling (CVS) records of legacy cytogenetic datasets.

# DID YOU KNOW



Across all jurisdictions where cffDNA screening has been introduced, the rate of invasive diagnostic procedures has gone down. Ontario's data is consistent with this observation; invasive prenatal diagnostic procedure rates have dropped by over 50% since the introduction of funded cffDNA screening.

# The BORN Maternal Newborn Dashboard

In November 2012, BORN launched an audit and feedback system in hospitals providing maternal newborn care in Ontario: the Maternal Newborn Dashboard (MND). The MND provides feedback about six key performance indicators (KPIs) and allows hospitals to view their performance in relation to the established benchmarks and peer comparisons with hospitals of similar birth volume and level of care.

**Table 1: Maternal newborn dashboard – key performance indicators**

KPI #	Description
1	Proportion of newborn screening samples that were unsatisfactory for testing
2	Rate of episiotomy in women who had a spontaneous vaginal birth
3	Rate of formula supplementation from birth to discharge in term infants whose mothers intended to exclusively breastfeed
4	Proportion of women with a cesarean section performed from $\geq 37$ to $< 39$ weeks' gestation among low-risk women having a repeat cesarean section at term
5	Proportion of women who delivered at term and had Group B Streptococcus (GBS) screening at 35-37 weeks' gestation
6	Proportion of women who were induced with any indication of post-dates and were less than 41 weeks' gestation at delivery

## Does the Dashboard Make a Difference?

BORN completed a mixed methods study to assess the effect of the MND on rates of six KPIs in the province of Ontario.<sup>1</sup> An interrupted time series analysis (three years pre-MND implementation and two years post-implementation) revealed statistically significant improvements in rates of four of the six KPIs at 30 months post-implementation:

- ✓ KPI 2 - Episiotomy
- ✓ KPI 4 - Repeat cesarean section in low-risk women performed before 39 weeks
- ✓ KPI 5 - Group B Streptococcus screening
- ✓ KPI 6 - Induction for post-dates in women who were less than 41 weeks at delivery<sup>2</sup>

To improve our understanding of factors that explain variability in performance after implementation of the MND we completed focus groups with 107 people across 14 diverse maternal newborn hospitals. A number of barriers and facilitators were identified that influenced use of the MND to trigger practice change at the organization level.

## Barriers to Change included:

- Interprofessional hierarchies
- Limited interprofessional communication
- Work overload
- Limited resources for data entry and practice change
- Complexity of the practice issue
- Competing organizational priorities
- Lack of KPI alignment with organizational priorities
- Limited or no leadership endorsement/support for KPI prioritization
- Lack of team commitment to improving data quality and practice related to a specific KPI

## Implications for Policy, Practice and Future Research

The results of the MND study will:

- ✓ inform the design of future audit and feedback systems created to target other performance issues
- ✓ support the development of specific knowledge translation strategies to support practice change in hospitals
- ✓ help target clinical issues which are a priority for organizations like Health Quality Ontario and the Provincial Council for Maternal and Child Health

This work has been presented nationally and internationally and is influencing research beyond the context of maternal newborn care, positioning BORN on the cutting edge of audit and feedback research.

**Acknowledgment:** This study was funded by the Canadian Institutes of Health Research (CIHR) and the Ministry of Health and Long-Term Care.

### References:

1. Dunn S, Sprague AE, Grimshaw J, Graham ID, Taljaard M, Fell D, Peterson W, Darling E, Harrold J, Smith G, Reszel J, Lanes A, Truskoski C, Wilding J, Weiss D & Walker M. (2016). A mixed methods evaluation of the maternal-newborn dashboard in Ontario: dashboard attributes, contextual factors, and facilitators and barriers to use: a study protocol. *Implementation Science*, 11, 1-11.
2. Weiss D, Dunn SI, Sprague AE, Fell DB, Grimshaw JM, Darling E, Graham D, Harrold J, Smith GN, Peterson WE, Reszel J, Lanes A, Walker MC, Taljaard M. (2018) Effect of a population-level performance dashboard intervention on maternal-newborn outcomes: an interrupted time series study. *BMJ Quality & Safety*, 27:425-436. doi:10.1136/bmjqs-2017-007361

**DID YOU  
KNOW**



The BORN Team includes a variety of professionals who facilitate data entry, data quality, and data use: Regional Coordinators who support hospitals and midwifery practice groups across the province, Quality Management Specialists, Linking & Matching Clerks, and Information System Reporting Analysts.

## Going Green on KPI 6 – A Case Example

### Identifying the priority:

Following the launch of the dashboard, Greenview\* hospital identified KPI 6 - *Proportion of women who were induced with an indication of post-dates and were less than 41 weeks' gestation at delivery* - as a priority for improvement. Greenview audited their data by examining every case that did not meet the KPI 6 benchmark: Which cases were related data entry issues versus clinical practice issues?

### Developing tailored strategies for change:

Greenview developed a multifaceted approach for moving from red to green on KPI 6.

Approach	Description
Staff-targeted education	<ul style="list-style-type: none"><li>• Provided additional education for nurses re: data entry accuracy</li><li>• Follow-up by a designated obstetrician for all cases where inappropriate clinical practices were identified</li></ul>
Patient-targeted education	<ul style="list-style-type: none"><li>• Communicated clear information about the provincial standards to patients and explained why inductions for an indication of post-dates should not be done prior to 41 weeks' gestation</li></ul>
Policy Revision	<ul style="list-style-type: none"><li>• Revised induction policy (with input from inter-professional team, senior administration, and other sites)</li></ul>

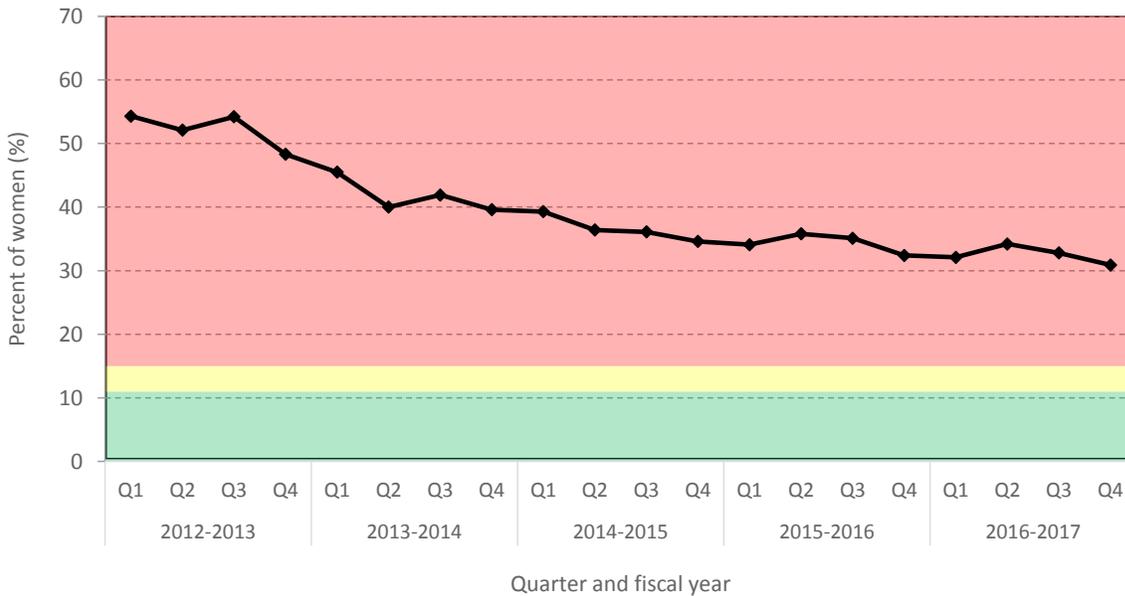
**Sustaining the change:** Continued use of their multifaceted strategies, a commitment to being a role model site for others, and a collaborative inter-professional team were critical to Greenview's success. They continue to regularly monitor and share their dashboard data within the inter-professional team to sustain change.

*\*Greenview is a fictional hospital.*

The next six pages showcase data related to KPI 4 and KPI 6. Figures 8-10 highlight KPI 4 trends, as well as KPI 4 rates by hospital and by LHIN.

Figures 11-13 highlight KPI 6 trends in addition to KPI 6 rates by hospital and LHIN.

**Figure 8: The proportion of women in Ontario with a cesarean section performed from  $\geq 37$  to  $< 39$  weeks' gestation among low-risk women having a repeat cesarean section at term**



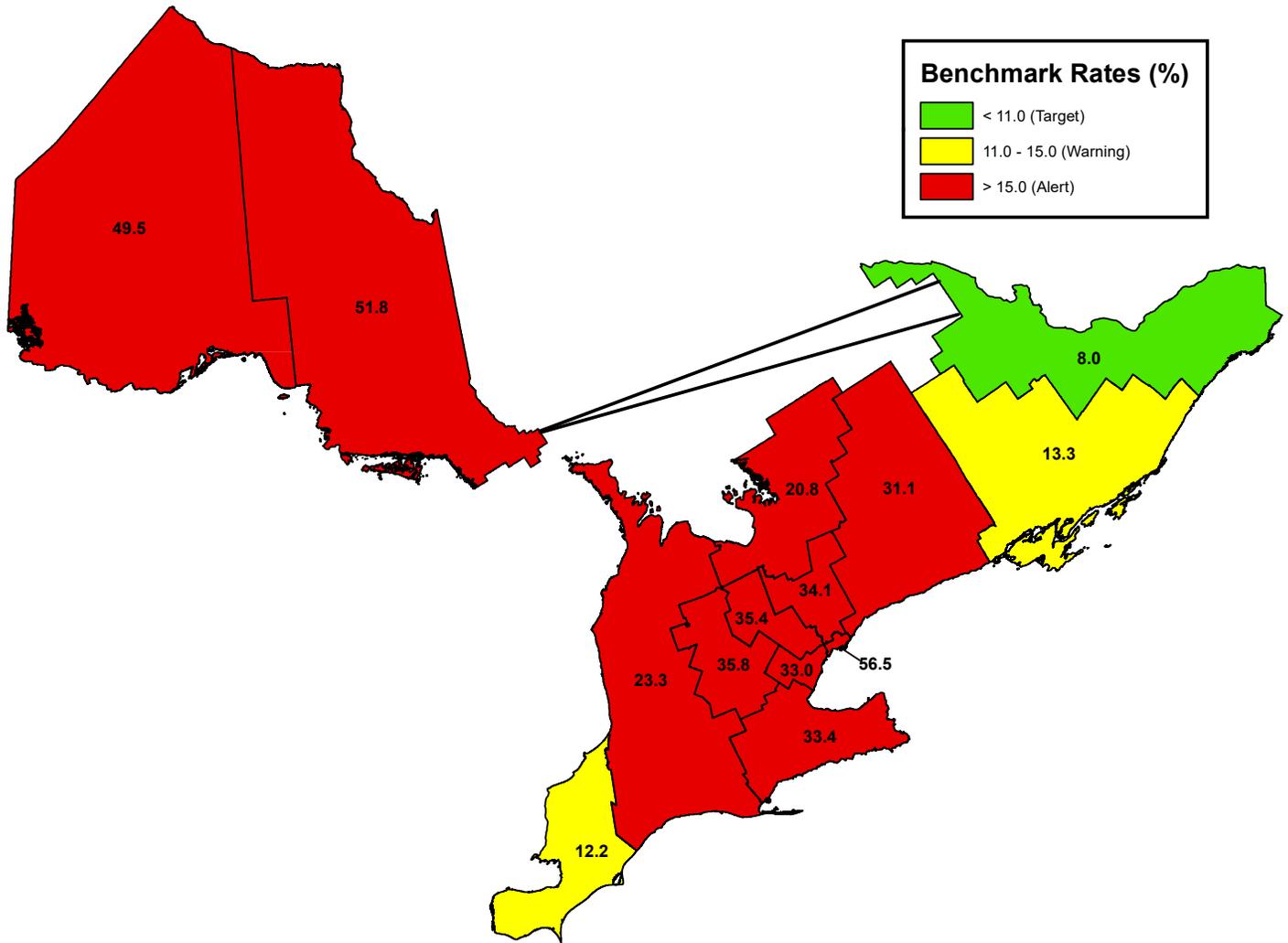
Q1: April–June      Q3: October–December  
 Q2: July–September      Q4: January–March

Benchmark rates (%)		
Target	Warning	Alert
<11.0	11.0–15.0	>15.0

**Data source:** BORN Ontario, 2012-2013 – 2016-2017 Fiscal Year, by quarter

**Definition of indicator:** The number of low-risk women with a cesarean section performed from  $\geq 37$  to  $< 39$  weeks' gestation (37 weeks' + 0 days' to 38 weeks' + 6 days' gestation), expressed as a percentage of the total number of low-risk women who had a repeat cesarean section at term ( $\geq 37$  weeks' gestation).

**Figure 9:** The proportion of women in Ontario with a cesarean section performed from  $\geq 37$  to  $< 39$  weeks' gestation among low-risk women having a repeat cesarean section at term, by LHIN of birth hospital



**Data source:** BORN Ontario, 2016-2017 Fiscal Year

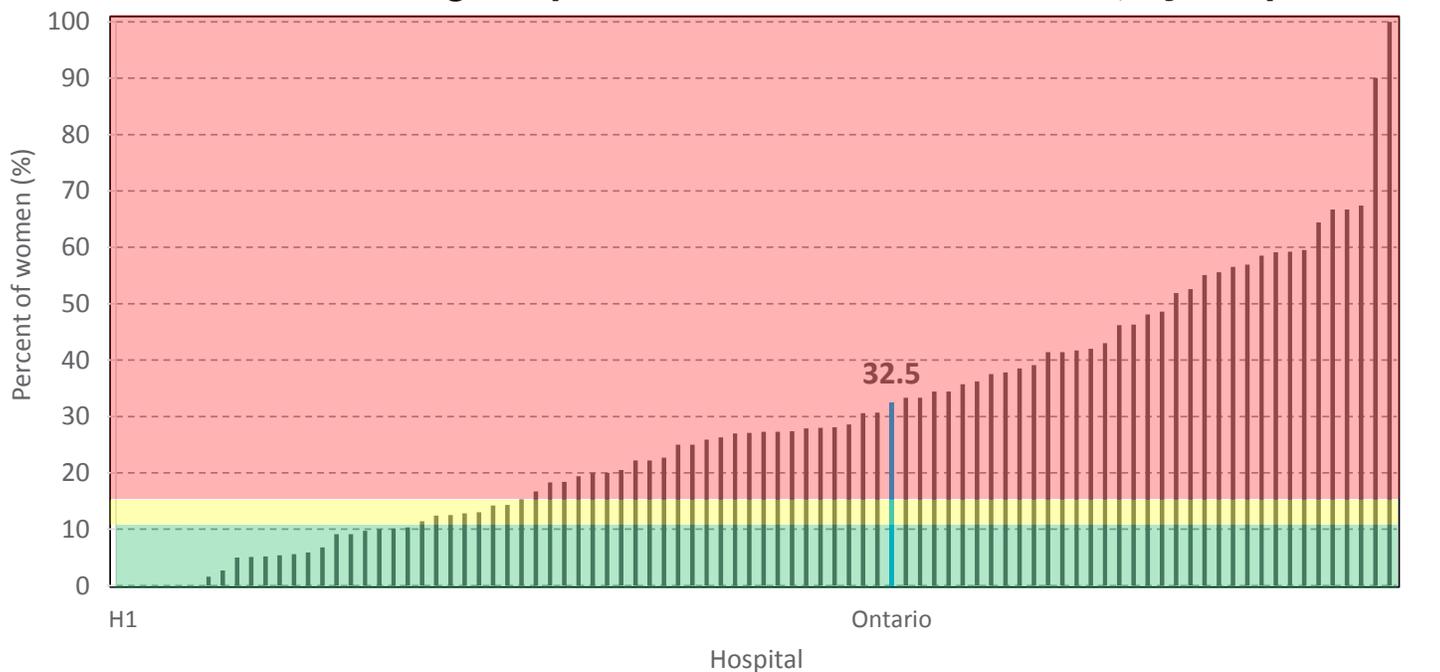
**Definition of indicator:** The number of low-risk women with a cesarean section performed from  $\geq 37$  to  $< 39$  weeks' gestation (37 weeks' + 0 days' to 38 weeks' + 6 days' gestation), expressed as a percentage of the total number of low-risk women who had a repeat cesarean section at term ( $\geq 37$  weeks' gestation).

**DID YOU KNOW |**



Compared to FY 2012-2013, the proportion of women with a cesarean section performed from  $\geq 37$  to  $< 39$  weeks' gestation among low-risk women having a repeat section at term has decreased in all LHINs. Decreases range from 8.3% to 32.3%.

**Figure 10: The proportion of women in Ontario with a cesarean section performed from  $\geq 37$  to  $< 39$  weeks' gestation among low-risk women having a repeat cesarean section at term, by hospital**



Benchmark rates (%)		
Target	Warning	Alert
<11.0	11.0–15.0	>15.0

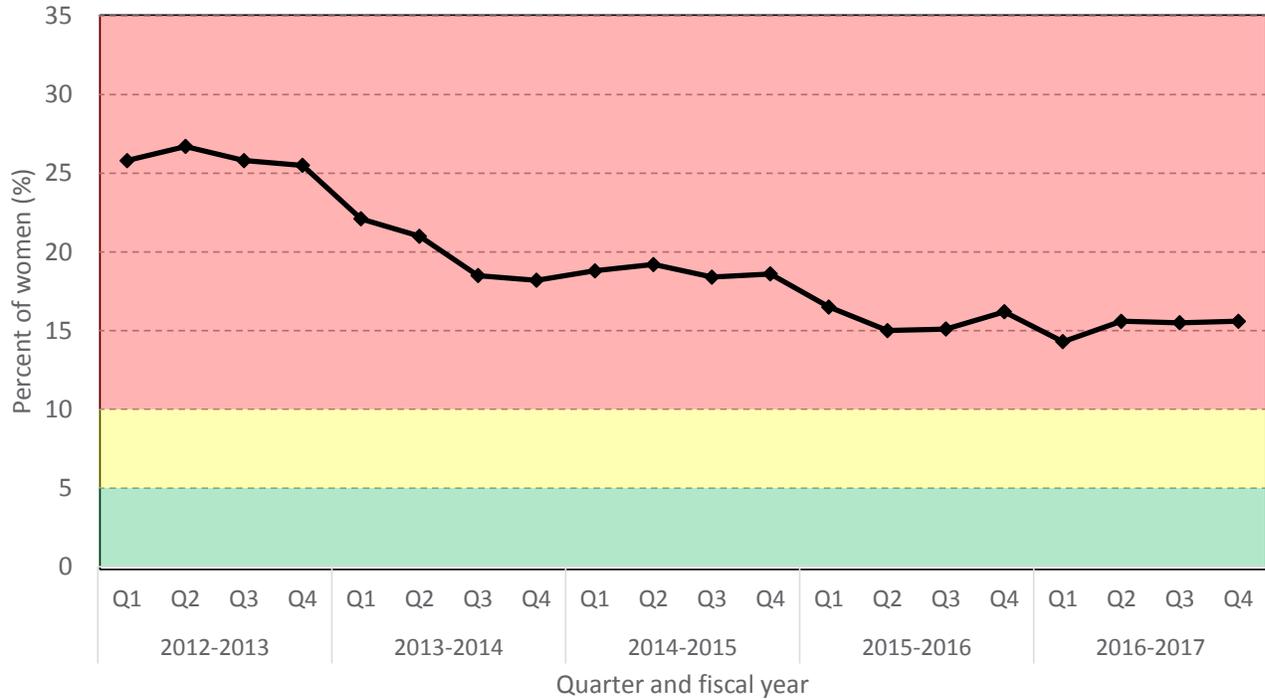
**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** The number of low-risk women with a cesarean section performed from  $\geq 37$  to  $< 39$  weeks' gestation (37 weeks' + 0 days' to 38 weeks' + 6 days' gestation), expressed as a percentage of the total number of low-risk women who had a repeat cesarean section at term ( $\geq 37$  weeks' gestation) by hospital. H1 represents the first hospital.

# DID YOU KNOW | ?

In FY 2016-2017, 21 obstetrical hospitals in Ontario met the target rate for this key performance indicator (i.e. the number of low-risk women who had a repeat cesarean section from  $\geq 37$  to  $< 39$  weeks' gestation was less than 11% at these hospitals). In fact, 6 of these hospitals reported 0%!

**Figure 11: The proportion of women who were induced with an indication of post-dates and were <41 weeks' gestation**



Q1: April–June      Q3: October–December  
 Q2: July–September      Q4: January–March

Benchmark rates (%)		
Target	Warning	Alert
<5.0	5.0-10.0	>10.0

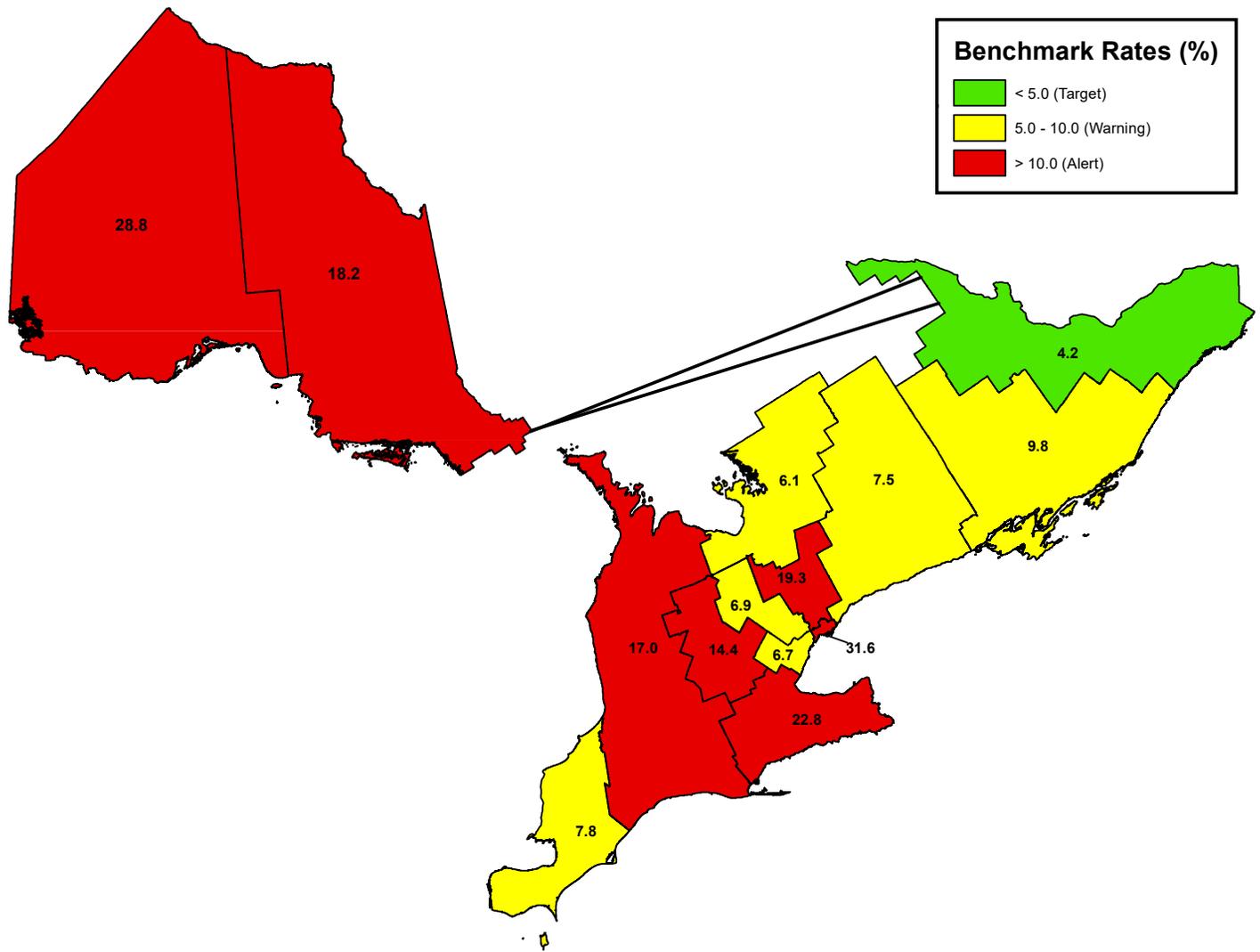
**Data source:** Ontario, 2012–2013 to 2016–2017 Fiscal Year

**Definition of indicator:** The number of women who were induced with an indication for induction of labour of post-dates ( $\geq 41$  weeks' gestation) and were actually less than 41 weeks' gestation (less than or equal to 40 weeks' + 6 days' gestation), expressed as a percentage of the total number of women who were induced with an indication for induction of labour of post-dates.

# DID YOU KNOW | ?

Overall, there has been a 10.2% decrease in the proportion of women in Ontario who were induced with an indication of post-dates who were <41 weeks' gestation, going from 25.8% in Q1 of FY 2012-2013 to 15.6% in Q4 of FY 2016-2017.

**Figure 12: The proportion of women who were induced with an indication of post-dates and were <41 weeks' gestation, by LHIN of birth hospital**



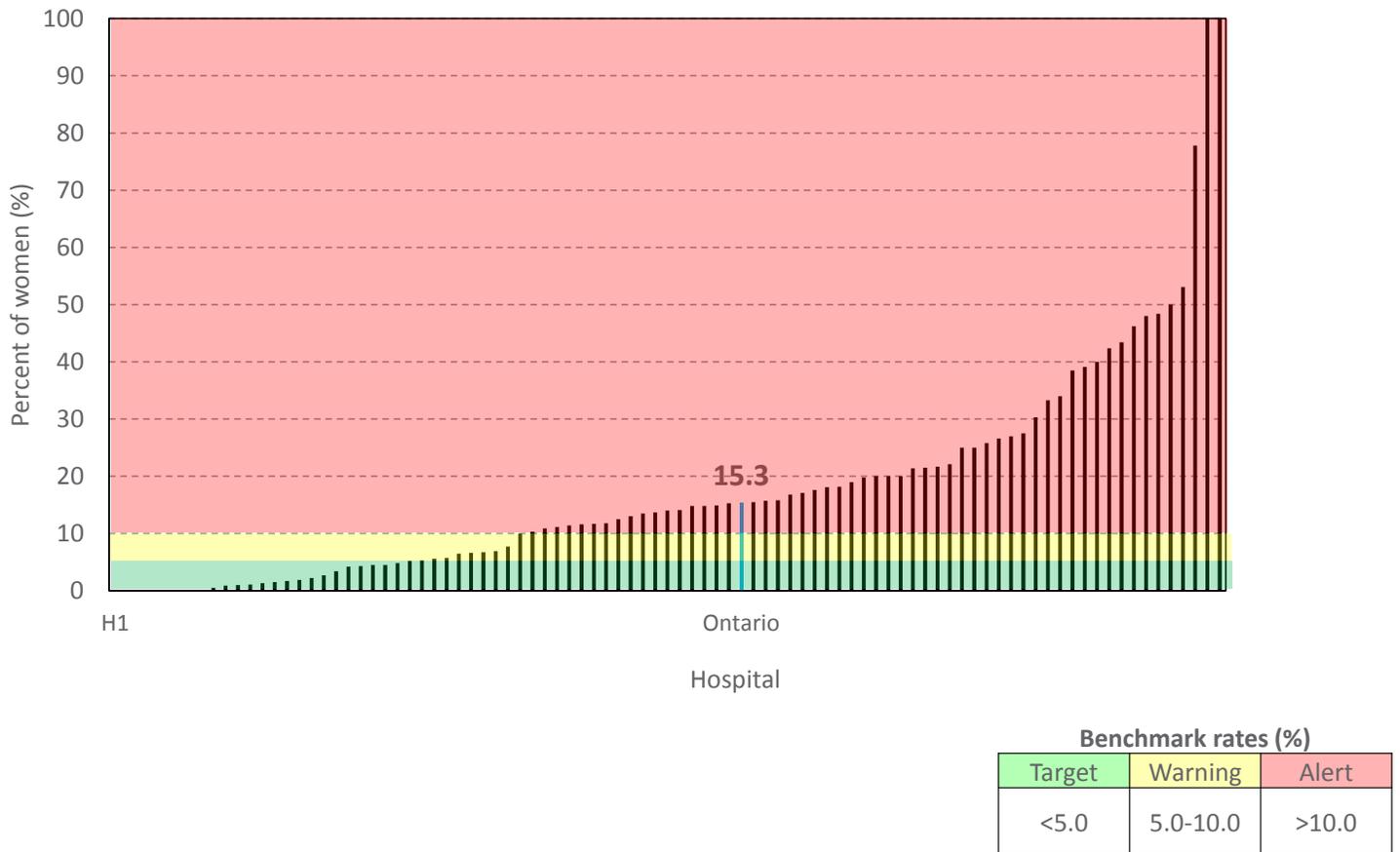
**Data source:** BORN Ontario 2016-2017 Fiscal Year

**Definition of indicator:** The number of women who were induced with an indication for induction of labour of post-dates ( $\geq 41$  weeks' gestation) and were actually less than 41 weeks' gestation (less than or equal to 40 weeks' + 6 days' gestation), expressed as a percentage of the total number of women who were induced with an indication for induction of labour of post-dates (in a given time and place).

**DID YOU KNOW | ?**

The proportion of women in Ontario who were induced with an indication of post-dates and were <41 weeks' gestation was 15.3% in FY 2016-2017.

**Figure 13: The proportion of women who were induced with an indication of post-dates and were <41 weeks' gestation, by hospital**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** The number of women who were induced with an indication for induction of labour of post-dates ( $\geq 41$  weeks' gestation) and were actually less than 41 weeks' gestation (less than or equal to 40 weeks' + 6 days' gestation), expressed as a percentage of the total number of women who were induced with an indication for induction of labour of post-dates by hospital. H1 represents the first hospital.

# DID YOU KNOW



In FY 2016-2017, 24 obstetrical hospitals in Ontario met the target rate of less than 5% of women induced with an indication of post-dates who were <41 weeks' gestation. 8 of these hospitals reported 0%.



## The Healthy Babies Healthy Children Initiative

A child's early years, from birth to six years of age, are a critical time for growth and development. A healthy start for babies increases the likelihood they will develop into healthy children, teenagers and adults. The Healthy Babies Healthy Children (HBHC) program (offered prenatally to transition to school) is a provincial public health program overseen by the Ministry of Children, Community and Social Services (MCCSS) and delivered by Ontario Public Health Units (PHUs).

The program uses a paper-based screening questionnaire - the HBHC Screening Tool - to determine if there are any risks that could affect a child's healthy development. Screening is voluntary and consent-based. Families and children identified to be 'with risk' are referred

to community programs and services designed to support new parents, such as breastfeeding help, nutrition and health services, parenting programs and family literacy programs or may be offered HBHC home visiting.

### ELECTRONIC HEALTHY BABIES HEALTHY CHILDREN SCREENING TOOL IN ACTION - A CASE EXAMPLE

Sonya is a young single first-time mother with a history of anxiety, depression and no local family support. She has recently given birth to a baby girl and is planning to breastfeed. While in hospital, Sonya consents to the HBHC screen. Sonya's nurse completes the screen using the BORN Information System and submits it electronically to her local health unit – a process that ensures Sonya's personal health information is protected as it moves between the hospital and health unit.

The PHU receives the screen immediately and Sonya is identified to be 'with risk' due to her health history and lack of social support. A public health nurse follows up with Sonya the day after she returns home from the hospital and connects her with needed resources. Sonya receives breastfeeding education and support and is linked to neighborhood resources: the Parent-Child Resource Centre and a "New Mom" support group. In addition to the public health nurse, she is paired up with a family visitor whose consistent visits encourage her and build her confidence as a parent. During a very vulnerable time, Sonya feels empowered and benefits from a community of support.

Sonya's example is similar to that of many women in Ontario. Depression and anxiety are among the top five areas of concern identified on the HBHC screen. Rates of anxiety among pregnant women in Ontario have increased over the past four years (see Figure 14).

## From Paper to Paperless

BORN, in collaboration with MCCSS, developed an electronic version of the screen (eHBHC) to enhance the way key postpartum (following childbirth) information moves from hospitals to public health units. BORN's electronic version, housed in the BORN Information System (BIS), permits the disclosure of relevant and timely information to PHUs and eliminates antiquated faxing issues. The eHBHC is transferred from the BIS to the Integrated Services for Children Information System (ISCIS), a multi-tier case management system designed to enable PHUs across Ontario to effectively administer the HBHC program.

## The Impact of the eHBHC Initiative

A 12-week pilot study with nine PHU-hospital pairs in 2016 demonstrated that the eHBHC could be transmitted from the BIS to ISCIS seamlessly while protecting personal health information. Participating hospitals and PHUs

reported a positive impact on care delivered to families, as well as relationships between hospital and PHU staff.

During the pilot, 88.5% of families were offered a postpartum HBHC screen. Parity (the number of times a woman has given birth) was a statistically significant factor determining whether a family would be offered a postpartum HBHC screen. Based on pilot data, it appears that women giving birth for the first time were more likely to have a missed eHBHC encounter in the BIS (e.g. no screen completed and no decline captured). This is of particular concern, as first-time mothers may require more postpartum support and assistance, particularly with breastfeeding. BORN data show very high initiation rates (see Figure 15), but adjusted breastfeeding rates are falling below provincial targets.

The pilot project provided the groundwork for the current provincial roll-out of this technology – another way BORN is supporting and facilitating community care to at-risk families in Ontario.

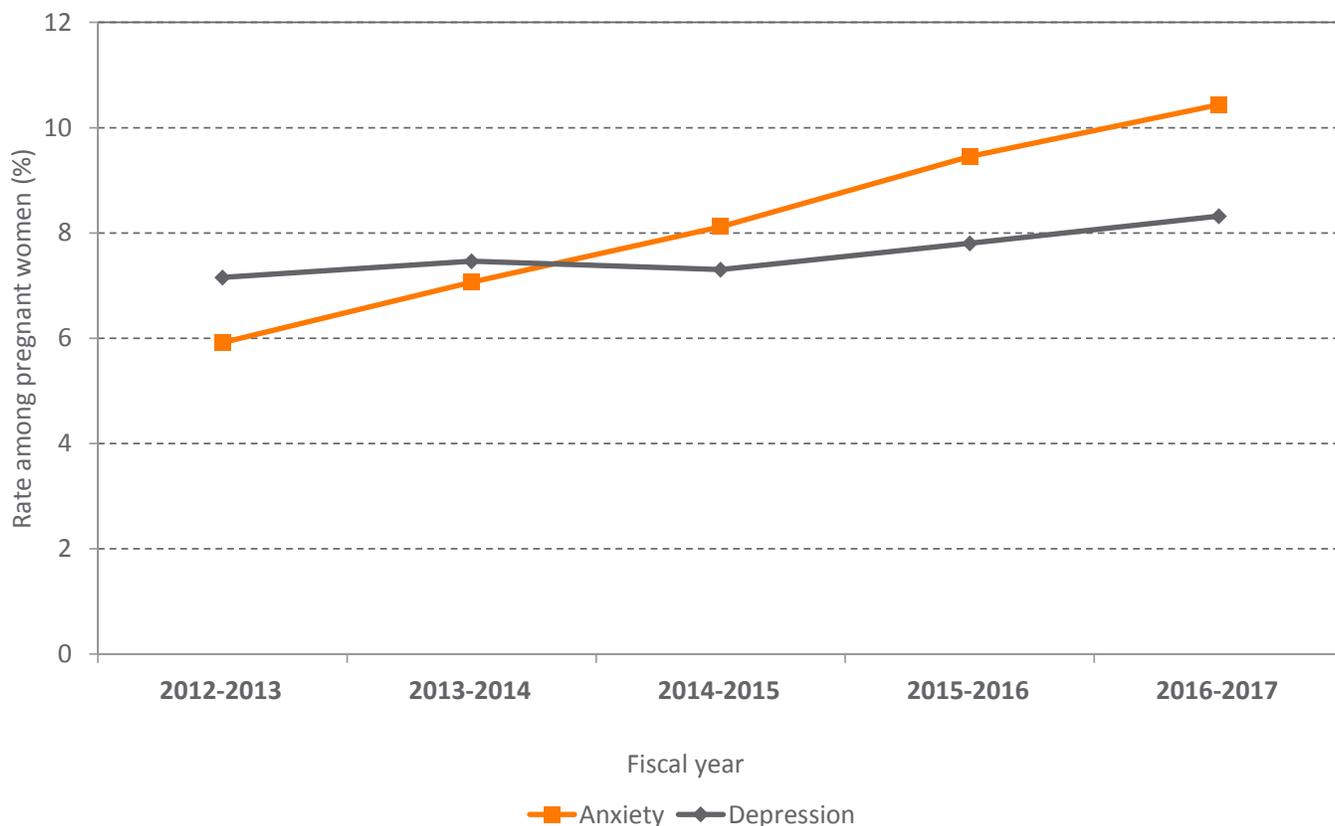
### IN YOUR WORDS: THE IMPACT OF THE eHBHC INITIATIVE

“ Implementation of a lead HBHC liaison Public Health Nurse (PHN) at each hospital has built better partnerships between liaison screening PHNs and nursing staff. Having a consistent contact person from Public Health HBHC Monday to Friday has helped to increase trust, collaboration and communication between organizations. Since hospital staff have increased communication and support from the liaison screening PHNs, all staff can more easily approach with any questions and discuss client needs.

This in turn has increased the quality, accuracy and consistency of HBHC screening in the postpartum period. This outcome means better care for clients in the transition from hospital to home and increased optimal growth and development along with family well-being.”

– City Of Hamilton Public Health Services, Public Health Nurses

**Figure 14: Rates of anxiety and depression among pregnant women**



**Data source:** BORN Ontario, 2012-2013 – 2016-2017 Fiscal Year

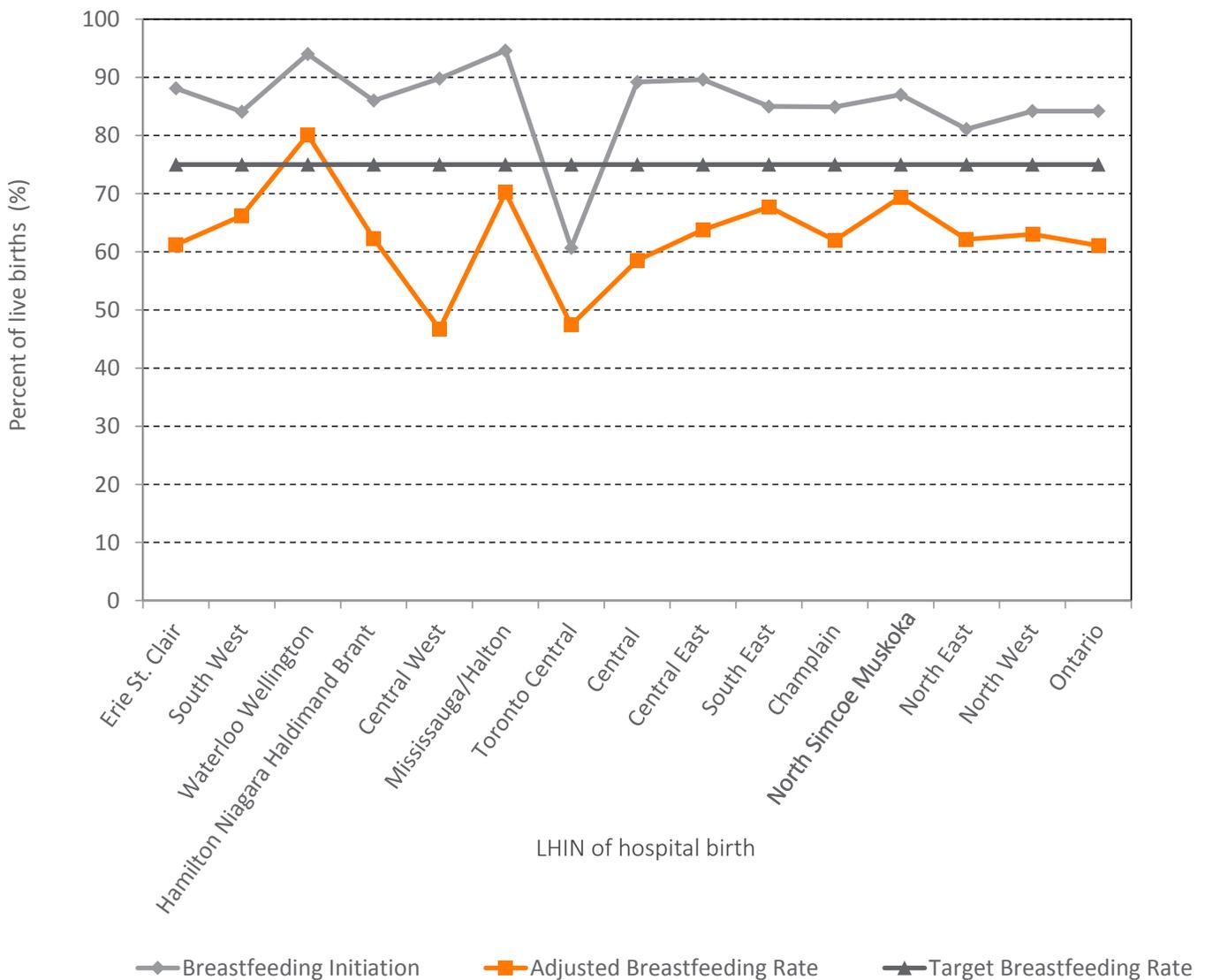
**Definition of indicator:** Rates of anxiety and depression, expressed as a percentage of women who reported anxiety and/or depression in mental health concerns during pregnancy (including pre-existing, diagnosed during pregnancy or active during pregnancy) by fiscal year. These two categories are not mutually exclusive. 5.8% of records were excluded for missing data.

**DID YOU  
KNOW** |



**Mental health screening was introduced  
in the Ontario Perinatal Record in 2017.**

**Figure 15: Breastfeeding initiation and adjusted breastfeeding rate by LHIN**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Breastfeeding initiation rate was expressed as a percentage of live infants who received at least one breastfeed from birth to discharge. Adjusted breastfeeding rate was expressed as the percentage of live infants who were exclusively breastfed or fed human milk from birth to discharge, or if they received any feeds other than human milk, this was because of documented medical reasons.

**DID YOU KNOW**



Members of the BORN Team who support the electronic Healthy Babies Healthy Children (eHBHC) initiative include: Clinical Content Specialists, Regional Coordinators, Epidemiologists, Project Managers, Project Coordinators, Technical Architects, System Administrators, Privacy Coordinators, Privacy Officers, Report Analysts, and Data Quality Specialists.

# The Healthy Growth Initiative

## Investing in Child Health

Childhood obesity is one of the leading pediatric health care concerns today. The 2009-2011 Canadian Health Measures Survey showed that **1 in 3 children and adolescents in Canada are either overweight or obese.**

Ontario has not had a formalized system to monitor healthy growth in children and youth; this resulted in a lack of robust, timely, representative estimates of growth being available at the provincial, regional and local levels. Data collection systems were often fragmented, self-reported and/or had samples that were too small to make meaningful conclusions. There was no mechanism to consistently collect behavioral risk and protective factors associated with growth.

The Healthy Kids Panel<sup>1</sup> recommended that the government develop a 'surveillance system to monitor childhood weights, risk factors and protective factors over time' to support the monitoring of trends and growth, to provide front-line care providers with information needed to guide care delivery, and to support the development and evaluation of programs and policies focused on pediatric growth.

## BORN Helps Bridge the Gap

BORN, in collaboration with eHealth Ontario and the Ministry of Health and Long-Term Care (MOHLTC), implemented the Healthy Growth Initiative (HGI), a surveillance system for pediatric growth parameters in Ontario using Electronic Medical Records (EMRs). The HGI was funded by the Ministry of Health and Long Term Care from 2016-2018.

The goals of the HGI have been to:

1. Collect data from a subpopulation of children from birth to 18 years of age (representative of the larger pediatric population)
2. Produce high-quality and timely reports at the provincial, regional (LHIN), local (Public Health Unit), and provider level.

<sup>1</sup>The Healthy Kids Panel conducted its deliberations from May to December 2012, and submitted its report, No Time to Wait: The Healthy Kids Strategy, to the Minister of Health and Long-Term Care in March 2013 <http://www.health.gov.on.ca/en/public/programs/obesity/>



As a prescribed registry, BORN has been well positioned to develop and implement the HGI:

- BORN can collect discrete codified data in a timely manner from the EMRs of primary care providers
- BORN can link these pediatric records with information in the BORN Information System (BIS); 96% of EMR records can be successfully matched to a birth record and 95% successfully linked to a birth mother
- Linking EMR and BIS data increases the usability and completeness of data for the HGI

## Behavioral Data

To capture important behavioural data elements not collected in EMRs or the BIS, BORN has partnered with CognisantMD to come up with a technical solution. During clinic visits with their primary care provider, parents/guardians or patients enter behavioral information (i.e. physical activity, screen time, diet etc.) on hand-held tablets available in the waiting room. The information entered into the tablet seamlessly integrates with EMRs.

Table 2 summarizes the data collected as part of the HGI and where it originates.

**Table 2: Healthy growth initiative – data sources and elements**

Data Source	Data Elements
Primary Care EMRs	<ul style="list-style-type: none"> <li>• Date of birth</li> <li>• Sex</li> <li>• Weight</li> <li>• Date weight recorded</li> <li>• Height</li> <li>• Date height recorded</li> <li>• Postal code</li> </ul>
BORN Information System	<ul style="list-style-type: none"> <li>• High birth weight</li> <li>• Rapid infant weight gain associated with low birth weight</li> <li>• Maternal weight</li> <li>• Gestational weight gain</li> <li>• Maternal smoking</li> <li>• Breastfeeding</li> </ul>
Parents/Guardians or Patients	<ul style="list-style-type: none"> <li>• Consumption of sugar-sweetened beverages</li> <li>• Physical activity</li> <li>• Screen time</li> <li>• Hours of sleep</li> <li>• Consumption of breakfast</li> <li>• Consumption of fruits</li> <li>• Consumption of vegetables</li> </ul>

## BORN Accomplishments: The Numbers Tell the Story

- Information about the HGI has been communicated to over 360 primary care sites.
- BORN currently receives data from 23 primary care sites across 13 of the 14 LHINs in Ontario. This represents over 250 clinicians.
- The BIS contains information on 20,000 pediatric patients with at least one valid height and weight measurement per year (based on data from May 26, 2011 to July 8, 2018).

**Of these 20,000, approximately 4% of patients were underweight, 81% were of normal weight, and 15% were overweight or obese based on age and sex specific World Health Organization (WHO) Growth Charts**

**BORN is currently recruiting more primary care providers to be part of the HGI. Interested in learning more about this initiative or how your organization can get involved? Contact BORN at:**

**Email: [HealthyGrowth@BORNOntario.ca](mailto:HealthyGrowth@BORNOntario.ca)**

**Telephone: 613-737-7600 ext.6023**

## Weight-Related Data Elements

BORN collects data elements to calculate pre-pregnancy body mass index (BMI) and total weight gain during pregnancy. This data is incredibly important to clinicians in order to support strategies related to healthy living and reduce maternal and childhood morbidity related to obesity.

Women who are overweight or obese at the start of pregnancy, or those who gain more than the recommended amount of weight in pregnancy, as well as their children, are at increased risk for serious health complications. Fortunately, gestational weight gain (GWG) is modifiable and pregnancy is a time when many women are motivated to adopt positive lifestyle habits (e.g. physical activity, healthy eating, smoking cessation) to support a healthy baby. These positive lifestyle habits can also translate to healthy growth and development of the child.

Table 3 outlines the recommended range of weight gain in pregnancy, based on the woman's weight classification prior to pregnancy.

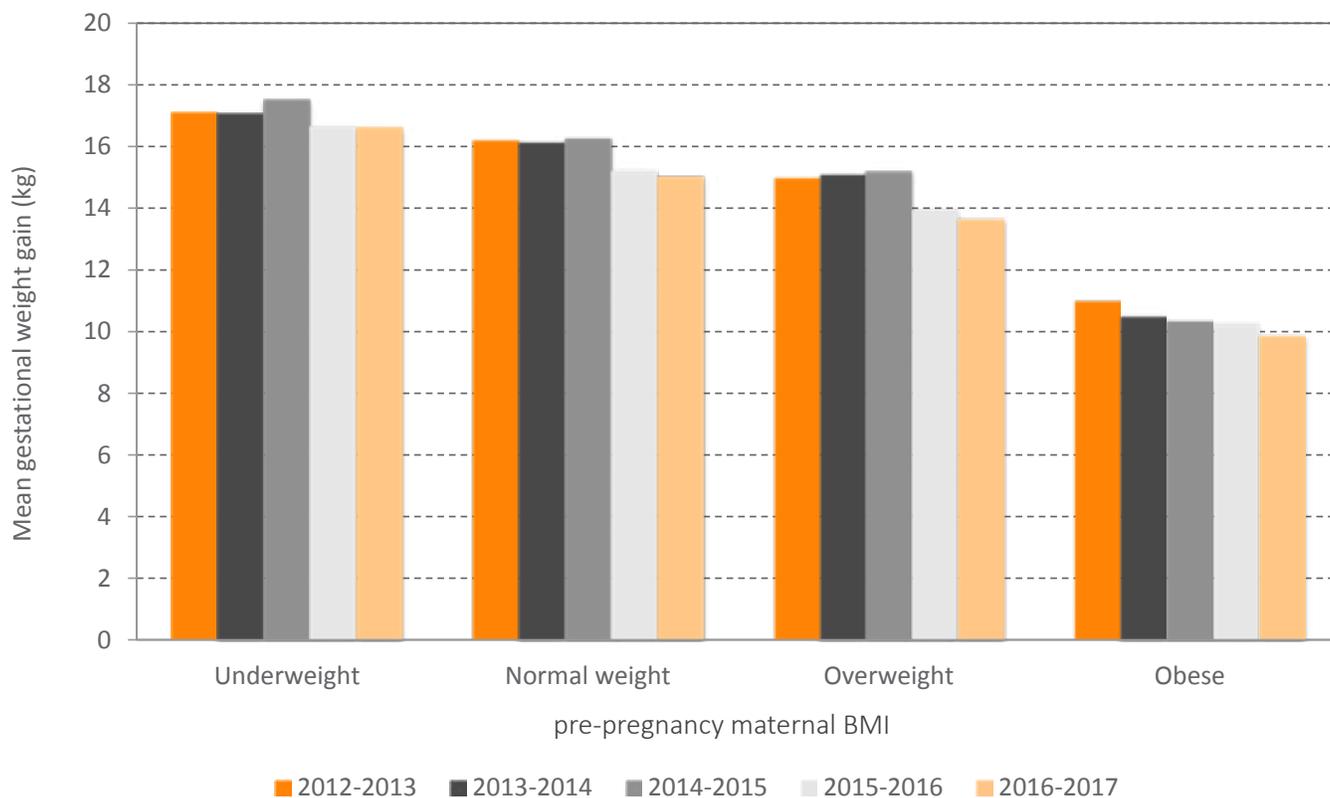
**Table 3: Recommended weight gain in pregnancy**

Pre-pregnancy Body Mass Index Classification	Recommended Weight Gain
Underweight (<18.5 kg/m <sup>2</sup> )	12.5 – 18 kg
Normal weight (18.5–24.9 kg/m <sup>2</sup> )	11.5 – 16 kg
Overweight (25.0–29.9 kg/m <sup>2</sup> )	7 – 11.5 kg
Obese (30.0+ kg/m <sup>2</sup> )	5 – 9 kg

*Reference: Institute of Medicine Weight Gain Recommendations for Pregnancy (2009).*

In order to support strategies related to healthy living for women and children, stakeholders require high-quality data. With the Healthy Growth Initiative, BORN now has the ability to monitor trends related to gestational weight gain (Figure 16). In addition, as a prescribed registry, BORN has the ability to further examine important relationships between pregnancy and birth-related risk and protective factors and the impact that can have on a child's growth beyond birth weight (Figure 17) and follow the growth of children and youth over time from birth to 18 years of age (Figure 18).

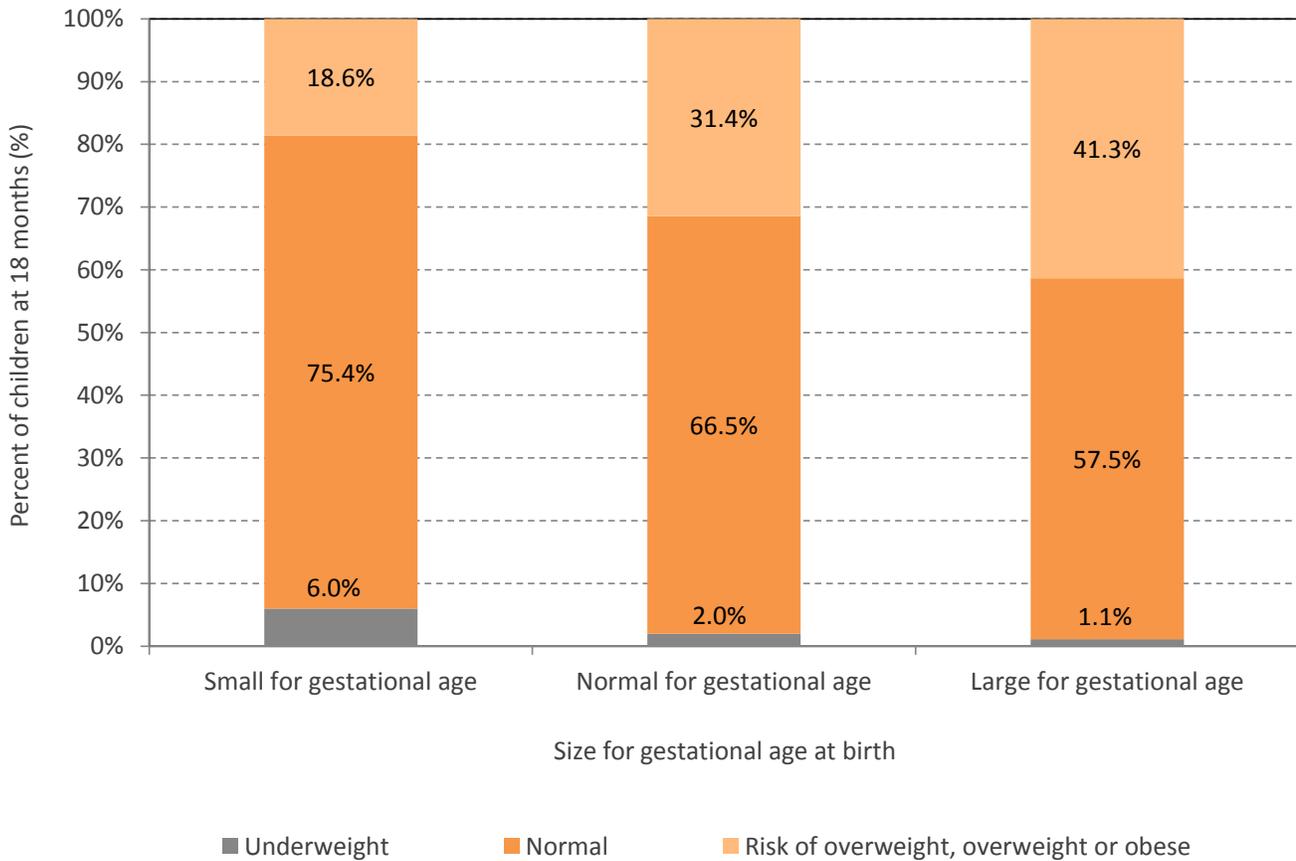
**Figure 16: Mean gestational weight gain by pre-pregnancy maternal BMI**



**Data source:** BORN Ontario, 2012–2017 Fiscal Year

**Definition of indicator:** Mean gestational weight gain (kg) by pre-pregnancy maternal Body Mass Index (BMI) Categories, expressed as the average (mean) gestational weight gain (kg) among BMI categories. BMI categories were defined according to the World Health Organization (WHO) Guidelines as: underweight (<18.5 kg/m<sup>2</sup>), normal weight (18.5–24.9 kg/m<sup>2</sup>), overweight (25.0–29.9 kg/m<sup>2</sup>), and obese (30.0+ kg/m<sup>2</sup>).

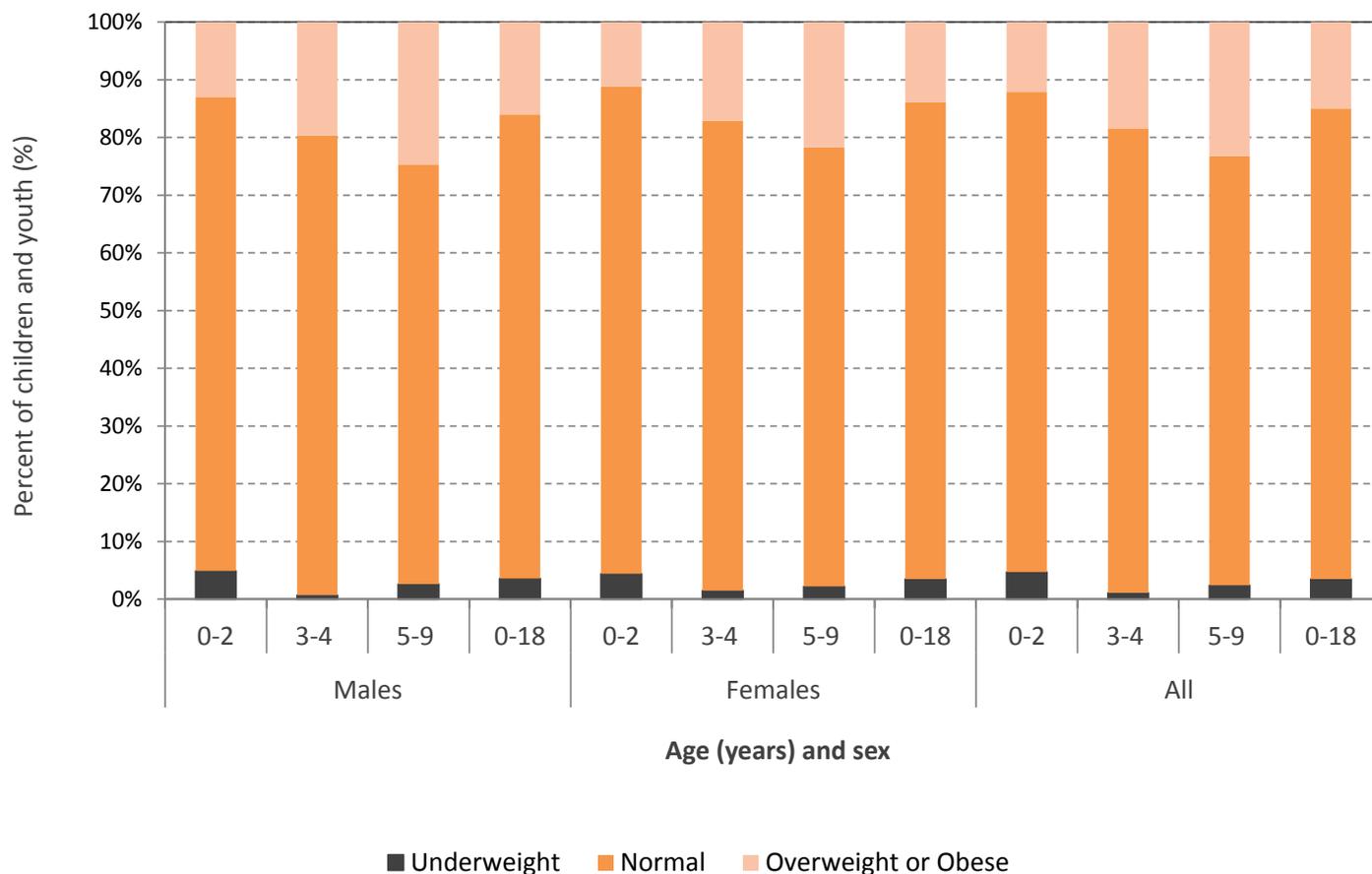
**Figure 17: Size for gestational age at birth compared to BMI at 18 months**



**Data source:** BORN Ontario, 2012-2013 – 2018-2019 Fiscal Year

**Definition of indicator:** Rates of size for gestational age categories are compared to the WHO age and sex-specific Body Mass Index (BMI) categories for children 17–19 months of age. Only records with a completed height and weight measurement at 17–19 months of age that were matched to a birth record with a completed size for gestational age variable, were used for analyses (N= 1,685). Partial year data is included for 2018-2019 (up to June 2018).

**Figure 18: BMI categories for children and youth**



**Data source:** BORN Ontario, 2012-2013 – 2018-2019 Fiscal Year

**Definition of indicator:** WHO Growth Charts for Canada were used to classify Body Mass Index (BMI) measurements for age and sex at time of primary care visit measurement. Only one measurement for each patient per calendar year was included. For consistency, only the last measurement made per year for each patient is included. BMI less than 10 and greater than 40 were removed from the analyses as they reflected possible measurement errors (N=809). Partial year data is included for 2018-2019 (up to June 2018).

## **Fast Forward: How Will the Healthy Growth Initiative Impact Care in the Future?**

**Date: January 2020**

**Setting: Family Health Team Clinic in Ottawa**

**Clinician: Emily is an experienced nurse practitioner at the clinic**

Emily notices many of her pediatric patients are presenting with age and sex-specific BMI percentiles in the overweight or obese category. Emily's clinic submits data on their pediatric patients to BORN through the Healthy Growth Initiative (HGI), so she consults the HGI report to explore trends.

The report shows that the percentage of patients in her clinic who are in the overweight or obese category has increased over the past five years. She also sees their clinic has higher rates of overweight and obese children than the provincial average. This information spurs Emily to consult with other clinicians and dieticians in their clinic to create some resources for healthy growth and development for pediatric patients in their clinic.

**Date: July 2020**

**Setting: Public Health Department**

**Public Health Professional: Eric is a new epidemiologist at a Public Health Unit**

Eric has been asked for trends on childhood growth in his PHU's region. Eric pulls reports from the BORN Information System to look at trends in their region for the past year. He notices that age and sex-specific BMI categories are within normal range compared to provincial estimates. Something else catches his eye - an increase in low-birthweight babies in their region compared to the previous year.

Knowing that smoking during pregnancy is strongly associated with adverse health outcomes in babies (i.e. low-birthweight, adverse physiological effects and sudden infant death syndrome), Eric checks the smoking rates. Based on the data, Eric thinks smoking during pregnancy may be contributing to the increase in low-birthweight babies in their region.

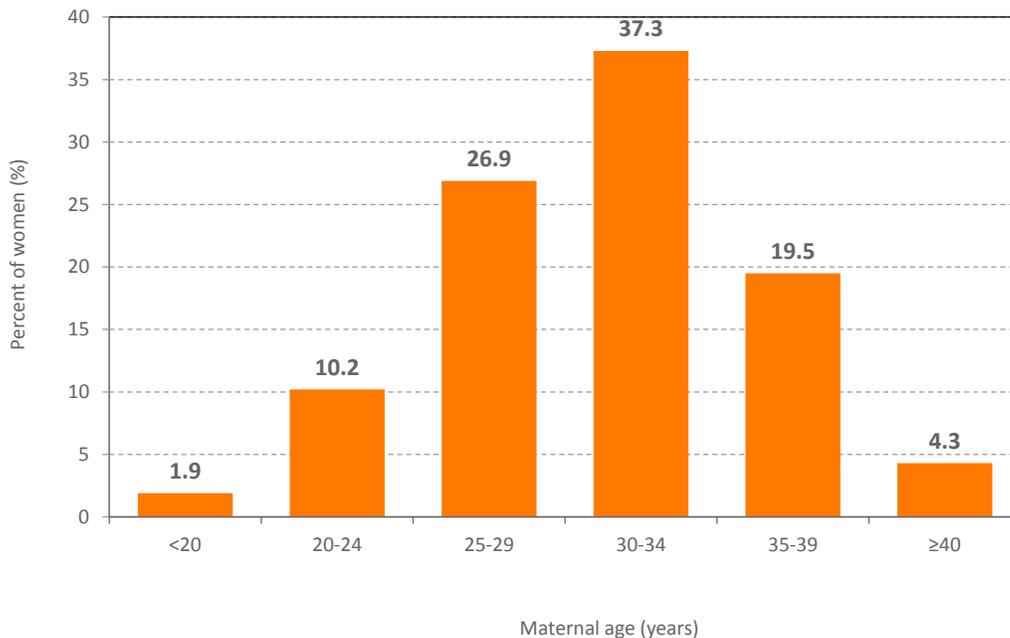
He presents the findings to his team and they agree; in response they develop a Smoking Cessation Program for pregnant clients and their partners. Eric plans to use the BORN reports to monitor the trends over the next three years and evaluate the impact the new smoking cessation program has on low-birthweight babies.



# Core Indicators: Maternal-Child Health

BORN's vision is the best possible beginnings for lifelong health. BORN collects and monitors a variety of health factors and outcomes related to fertility, pregnancy, birth, newborns and children. The following indicators represent the most commonly used and requested data elements from our stakeholders.

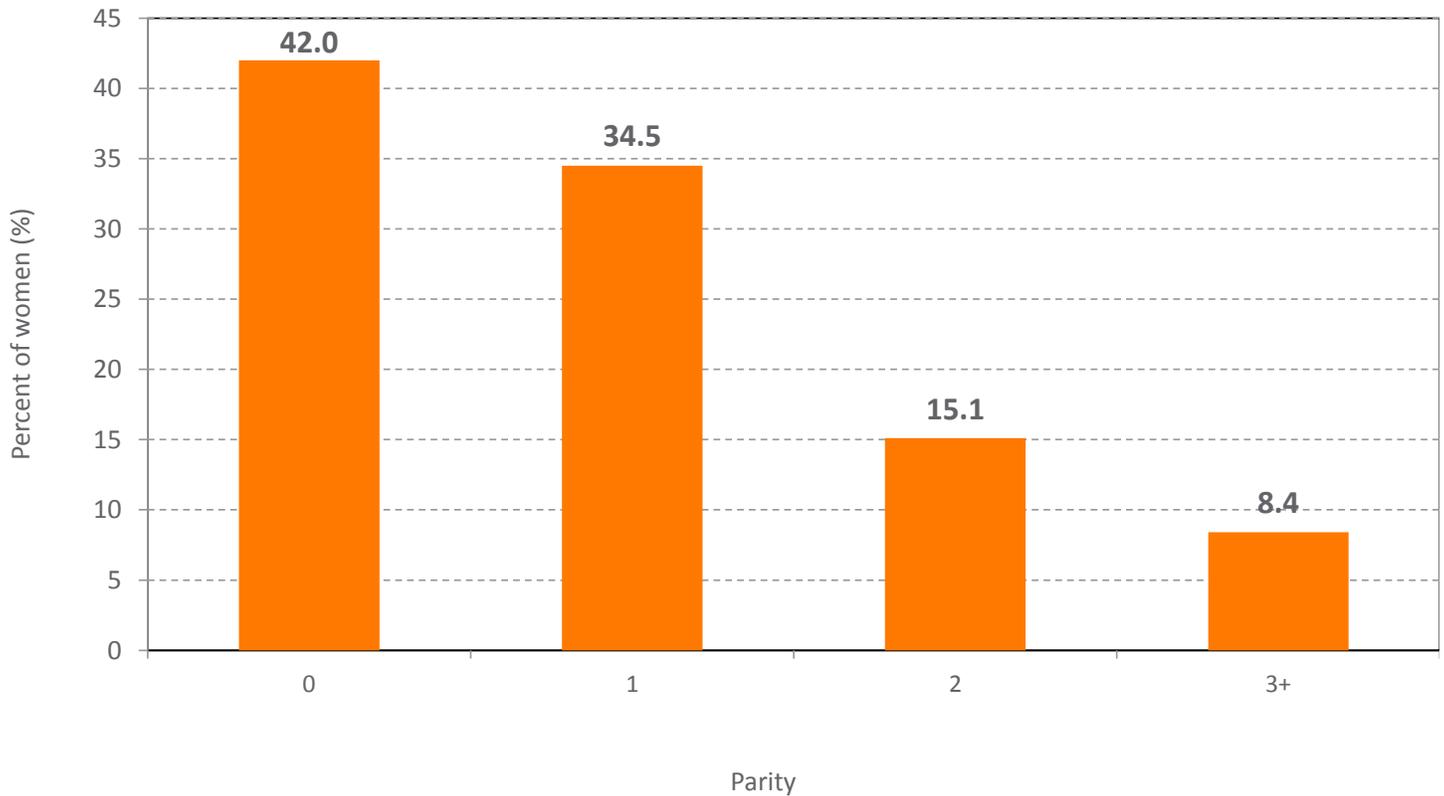
**Figure 19: Distribution of maternal age at birth**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Distribution of maternal age, expressed as a percentage of the total number of women who had a live birth or stillbirth in Ontario.

**Figure 20: Distribution of parity**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

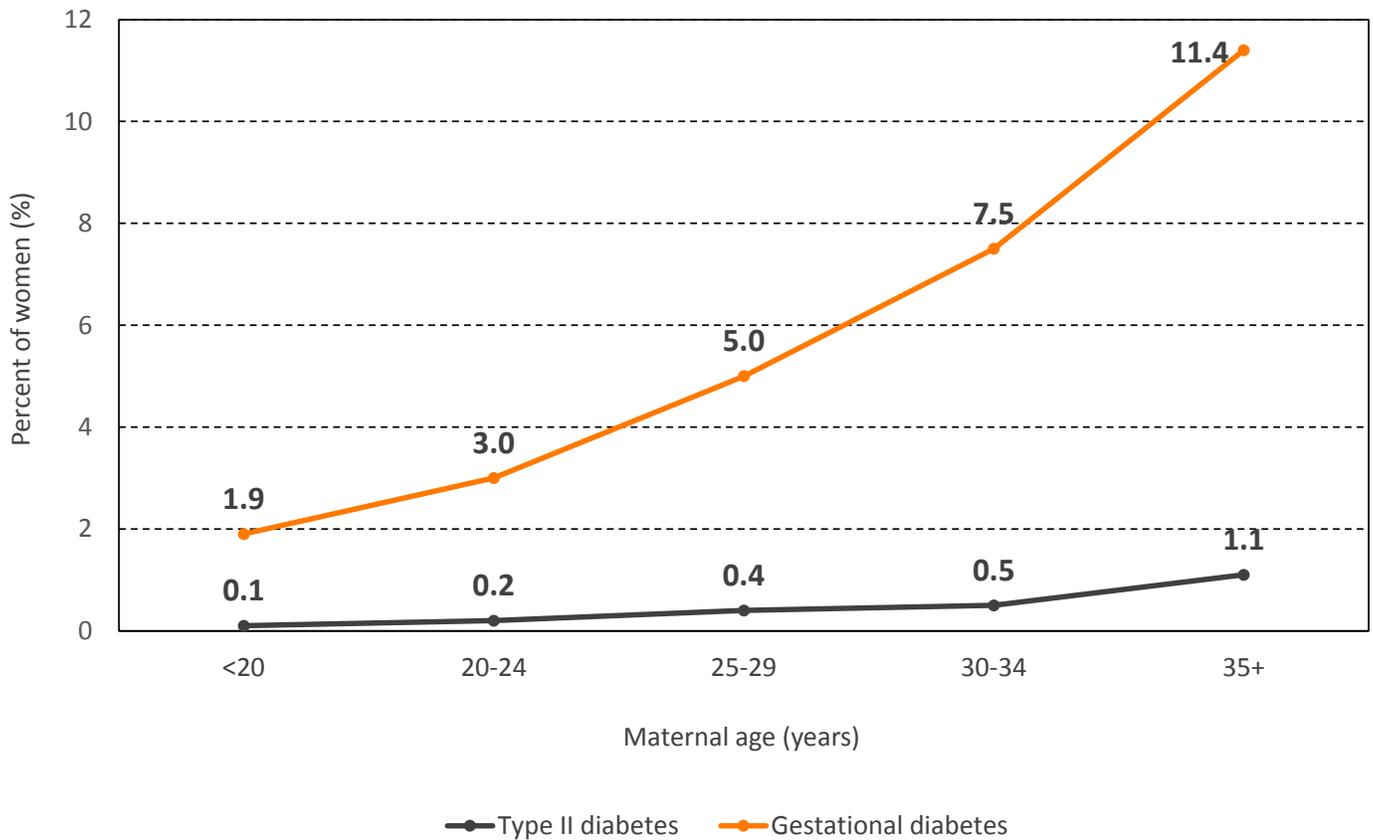
**Definition of indicator:** Distribution of parity, expressed as a percentage of the total number of women who had a live birth or stillbirth greater than or equal to 20 weeks' gestation. Parity is defined as the number of previous live births or stillbirths (0, 1, 2, 3+), excluding the current pregnancy.

**DID YOU  
KNOW** |



The BORN Data Analysis and Request Team supports hundreds of requests for custom data outputs each year. In FY 2017-2018, the number of data outputs increased by 30%! Data outputs can take many formats depending on the specific questions being posed. This growing team includes Data Request & Research Coordinators and Data Analysts.

**Figure 21: Distribution of diabetes by maternal age**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

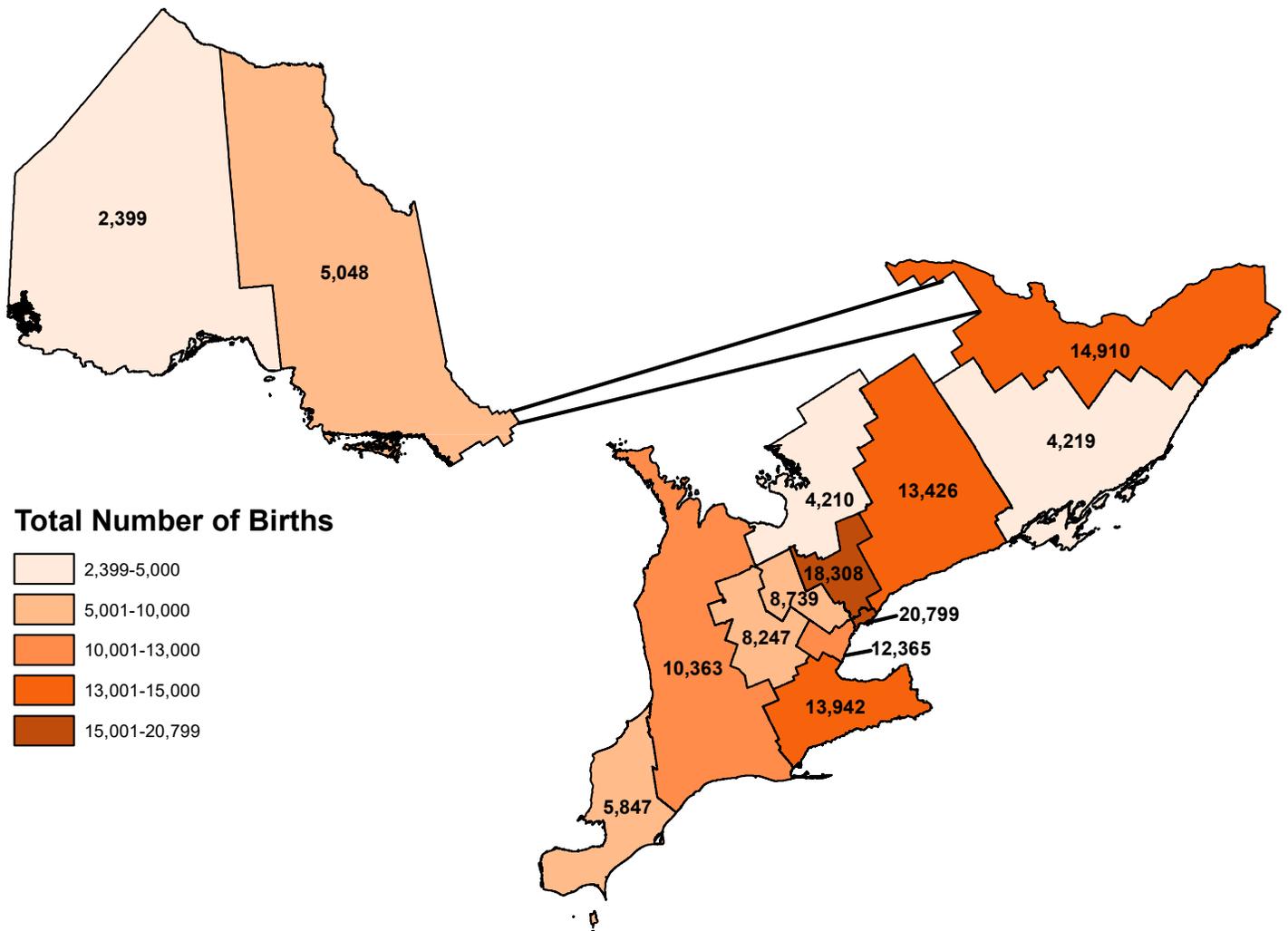
**Definition of indicator:** Distributions of type II diabetes and gestational diabetes, expressed as a percentage of the total number of women who had a live or still birth in Ontario.

**DID YOU KNOW** |



In FY 2016-2017, 7.2% of women in all age groups had gestational diabetes. 0.6% of women in all age groups had type II diabetes.

**Figure 22: Number of births by LHIN of birth**



**Data source:** BORN Ontario, 2016-2017 Fiscal Year

**Definition of indicator:** Total number of live and stillbirths with location of birth as home, hospital, or birth centre in Ontario, by LHIN of birth.

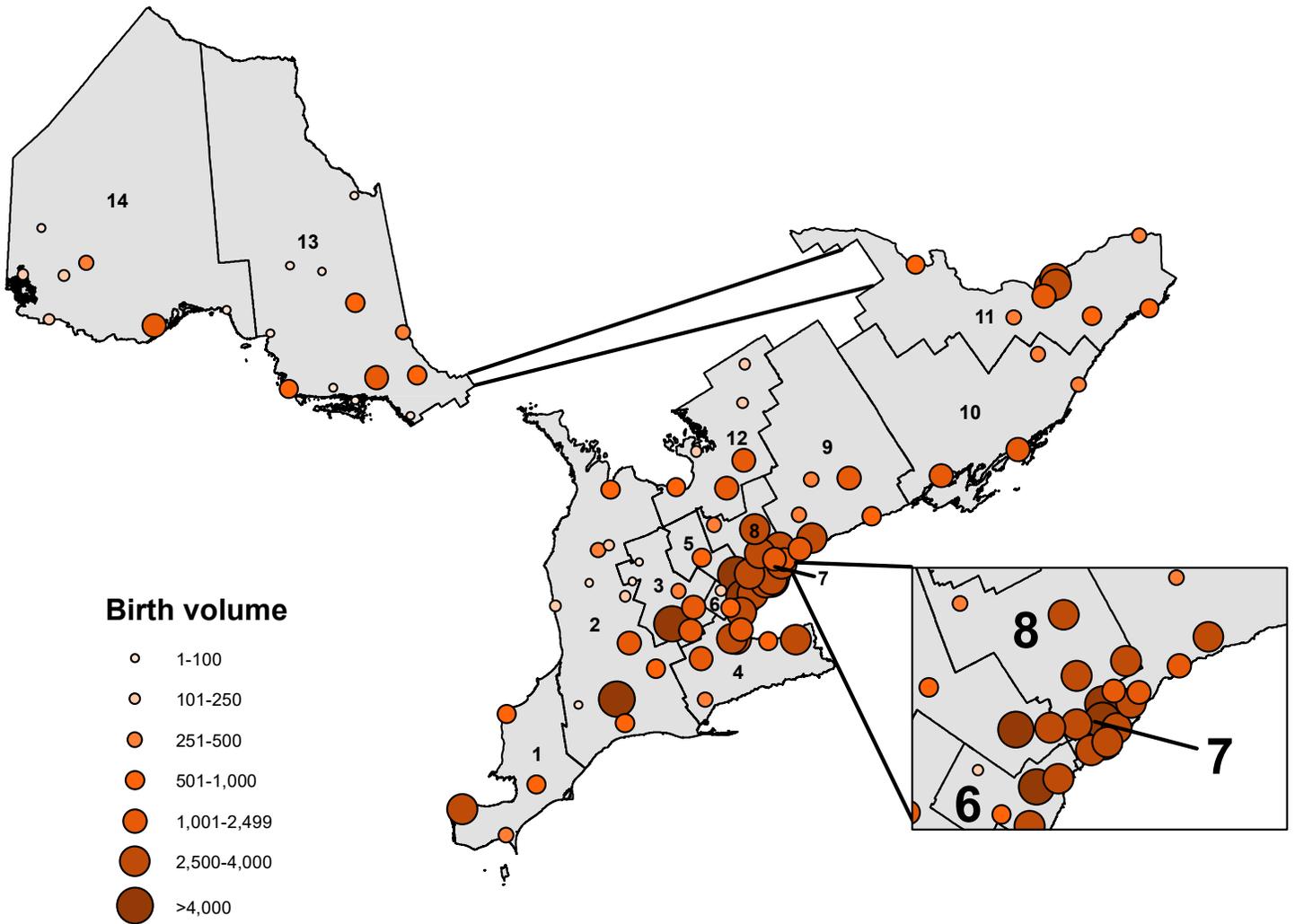
**Note:** 113 births could not be assigned to a LHIN due to missing data.

**DID YOU KNOW** |



There were 142,935 births in Ontario in FY 2016-2017 (April 1, 2016 - March 31, 2017).

**Figure 23: Birth volume in hospitals by LHIN of birth**



**Data source:** BORN Ontario, 2016-2017 Fiscal Year

**Definition of indicator:** Volume of live and stillbirths in Ontario hospitals by LHIN of birth.

**Table 4: Number of births by LHIN of maternal residence**

	LHIN of residence	Number of births	
		n	%
1	Erie St. Clair	5,979	4.2
2	South West	10,187	7.2
3	Waterloo Wellington	8,720	6.2
4	Hamilton Niagara Haldimand Brant	14,216	10.1
5	Central West	11,512	8.2
6	Mississauga/Halton	11,908	8.4
7	Toronto Central	13,845	9.8
8	Central	18,823	13.3
9	Central East	15,701	11.1
10	South East	4,465	3.2
11	Champlain	13,232	9.4
12	North Simcoe Muskoka	4,373	3.1
13	North East	5,280	3.7
14	North West	2,409	1.7
	LHIN is unknown	476	0.3
	<b>Ontario</b>	<b>141,126</b>	<b>100%</b>

**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Total number of live and stillbirths in Ontario by LHIN of maternal residence. Includes babies born to women who were residents of Ontario; babies born to women who were not residents of Ontario were excluded.

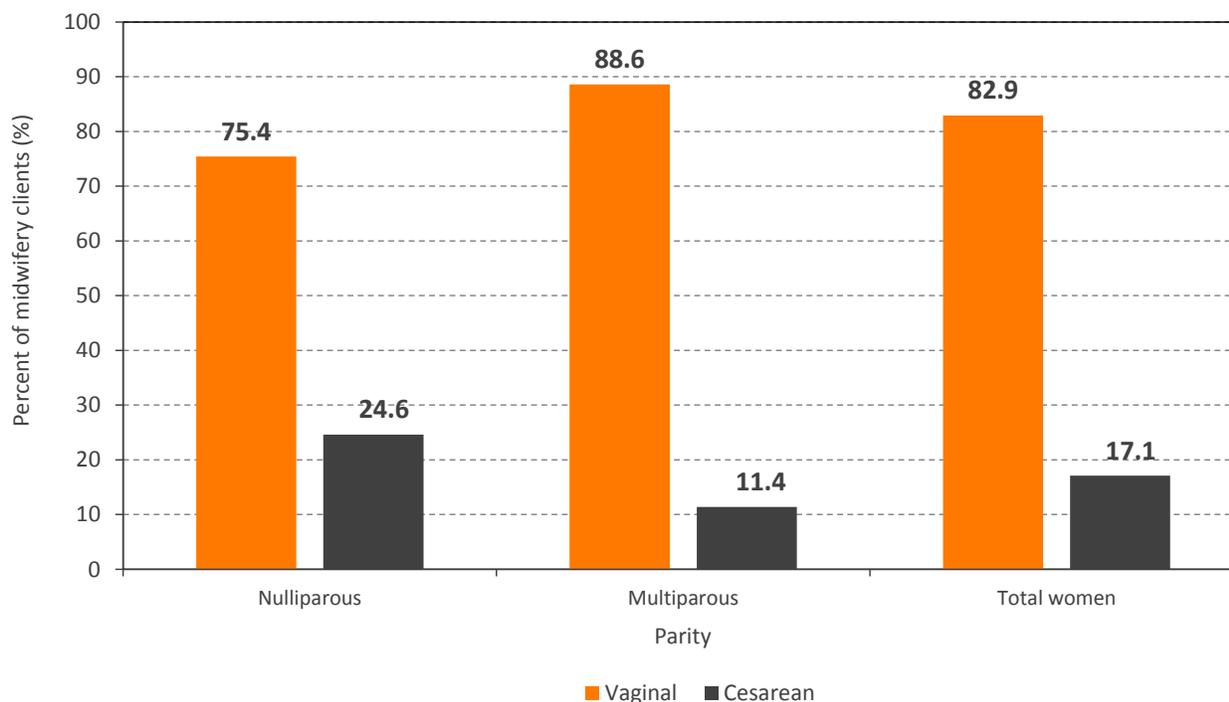
**Table 5: Distribution of type of birth by LHIN of maternal residence**

	LHIN of residence	Type of birth								
		Spontaneous vaginal		Assisted vaginal		Induced or spontaneous labour cesarean section		No labour – cesarean section		Total
		n	% (row)	n	% (row)	n	% (row)	n	% (row)	N
1	Erie St. Clair	3,882	66.6	455	7.8	695	11.9	800	13.7	5,832
2	South West	7,135	71.0	640	6.4	1,140	11.3	1,133	11.3	10,048
3	Waterloo Wellington	5,690	66.3	626	7.3	965	11.3	1,296	15.1	8,577
4	Hamilton Niagara Haldimand Brant	9,162	65.6	1,154	8.3	1,760	12.6	1,897	13.6	13,973
5	Central West	6,812	60.0	1,059	9.3	1,687	14.9	1,796	15.8	11,354
6	Mississauga/Halton	7,410	63.3	1,051	9.0	1,527	13.0	1,722	14.7	11,710
7	Toronto Central	8,210	60.3	1,536	11.3	1,953	14.3	1,917	14.1	13,616
8	Central	11,452	61.7	1,764	9.5	2,436	13.1	2,898	15.6	18,550
9	Central East	9,397	60.8	1,502	9.7	2,221	14.4	2,333	15.1	15,453
10	South East	2,924	66.7	354	8.1	515	11.7	590	13.5	4,383
11	Champlain	8,361	64.3	1,077	8.3	1,763	13.6	1,794	13.8	12,995
12	North Simcoe Muskoka	2,774	64.4	376	8.7	612	14.2	547	12.7	4,309
13	North East	3,334	64.1	340	6.5	668	12.8	860	16.5	5,202
14	North West	1,748	73.3	91	3.8	243	10.2	304	12.7	2,386
	LHIN is unknown	329	65.5	43	8.6	60	12.0	70	13.9	502
	<b>Ontario</b>	<b>88,620</b>	<b>63.8</b>	<b>12,068</b>	<b>8.7</b>	<b>18,245</b>	<b>13.1</b>	<b>19,957</b>	<b>14.4</b>	<b>138,890</b>

**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Distribution of type of birth by LHIN of maternal residence, expressed as a percentage of the total number of women who were Ontario residents and had a live birth or stillbirth. Type of birth by LHIN of maternal residence includes all women who were residents of Ontario; women who gave birth in Ontario, but were not residents were excluded. This table refers to pregnancies; women are only counted once regardless of how many fetuses they had.

**Figure 24: Distribution of type of birth for midwifery clients**



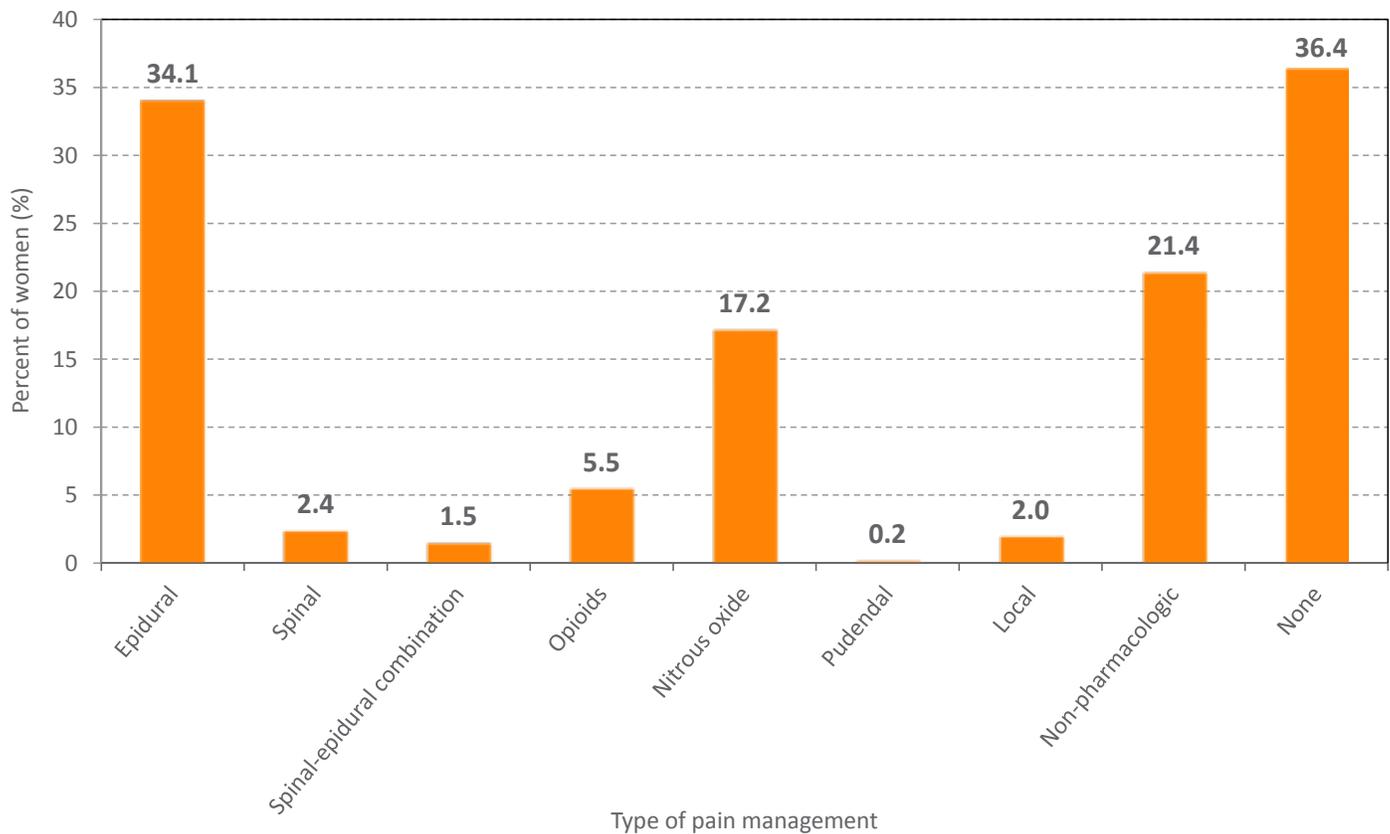
**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Distribution of type of birth (vaginal or cesarean section) for midwifery clients by parity, expressed as a percentage of the total number of midwifery clients who gave birth (live birth or stillbirth) by parity.

**DID YOU  
KNOW** | ?

In FY 2016-2017, 19,070 (82.9%) midwifery clients had a vaginal birth and 3,923 (17.1%) had a cesarean section.

**Figure 25: Distribution of pain management in labour for midwifery clients**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

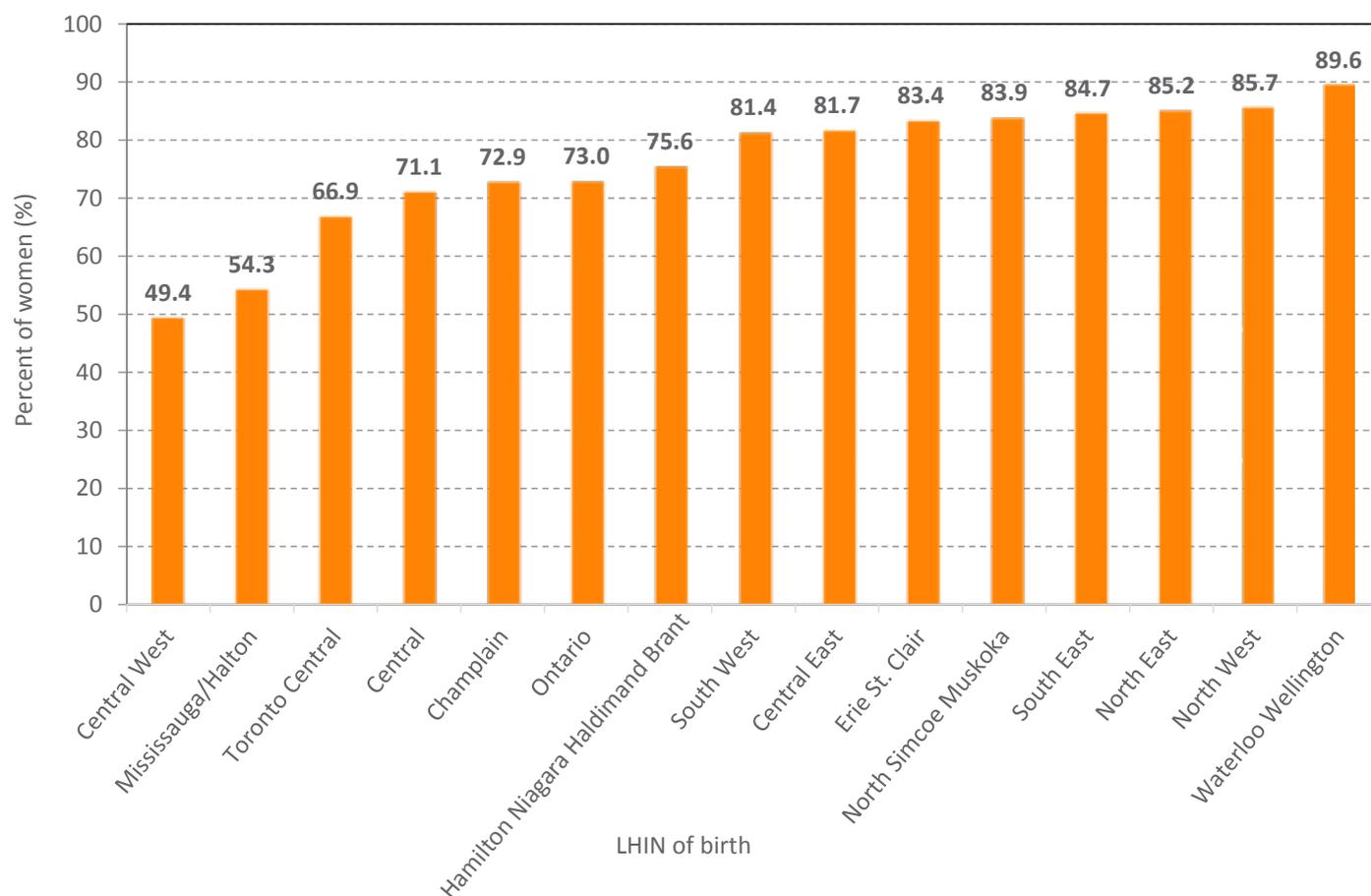
**Definition of indicator:** Distribution of pain management in labour for midwifery clients, expressed as a percentage of the total number of midwifery clients who laboured (in a given place and time). Women could receive more than one type of pain management and therefore the percentages will add up to more than 100. 0.6% of records were excluded due to missing data.

**DID YOU  
KNOW** |



Of women in midwifery care who laboured, 38.0% used an epidural, spinal, or epidural-spinal combination and 36.4% did not use any pain management.

**Figure 26: Rate of women eligible for VBAC with one or two previous cesarean sections**



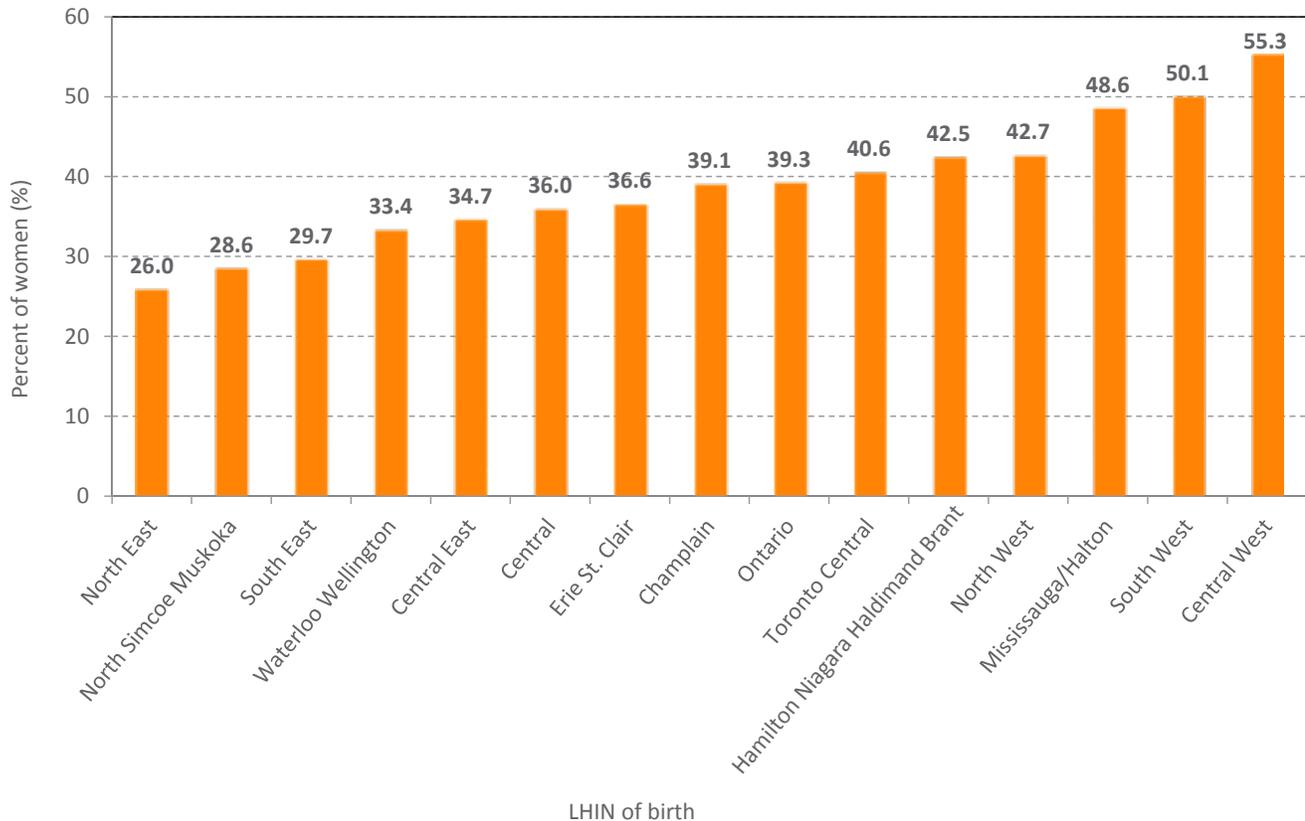
**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Rate of women eligible for vaginal birth after cesarean (VBAC), expressed as a percentage of women with 1–2 previous cesarean sections (CS) who gave birth at a hospital (by LHIN of birth hospital). Exclusions: 1. Without previous CS; 2. Previous uterine rupture; 3. Declined trial of labour (TOL) with planned scheduled repeated CS; 4. Placenta previa or placenta abruption or malpresentation; 5. Not eligible for VBAC is clearly identified in dataset.

# DID YOU KNOW | ?

Health Quality Ontario (HQO) and the Provincial Council for Maternal and Child Health (PCMCH) released a new quality standard for VBAC in 2018 to improve access to safe VBAC in Ontario and promote informed shared decision-making between patients and their health-care providers.

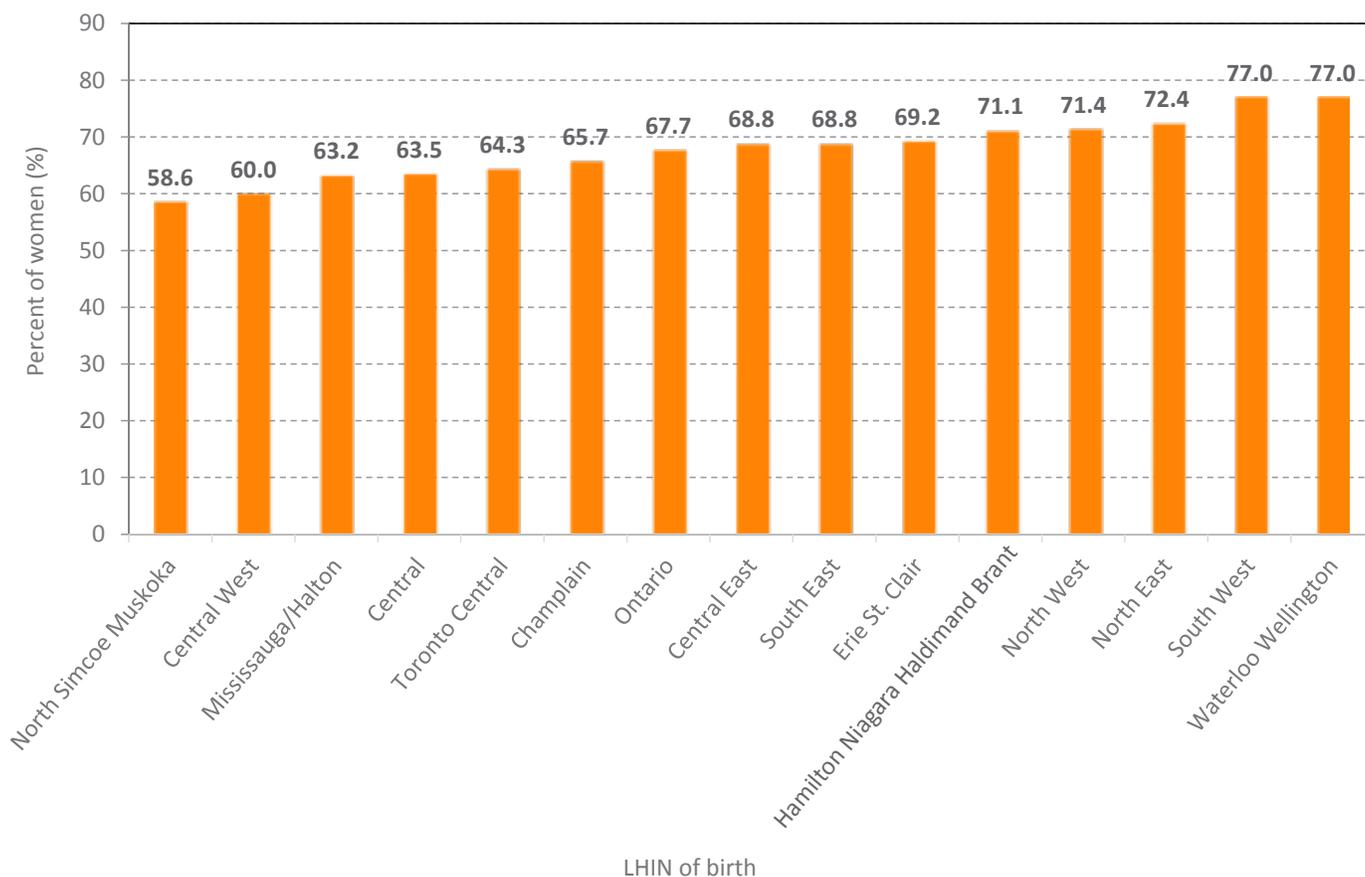
**Figure 27: Rate of attempted VBAC among eligible women with one or two previous cesarean sections**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Rate of attempted vaginal birth after cesarean (VBAC), expressed as a percentage of women with 1–2 previous cesarean sections (CS) who were eligible for VBAC and gave birth at a hospital (by LHIN of birth hospital) . Exclusions: 1. Without previous CS; 2. Previous uterine rupture; 3. Declined trial of labour (TOL) with planned scheduled repeated CS; 4. Placenta previa or placenta abruption or malpresentation; 5. Not eligible for VBAC is clearly identified in dataset.

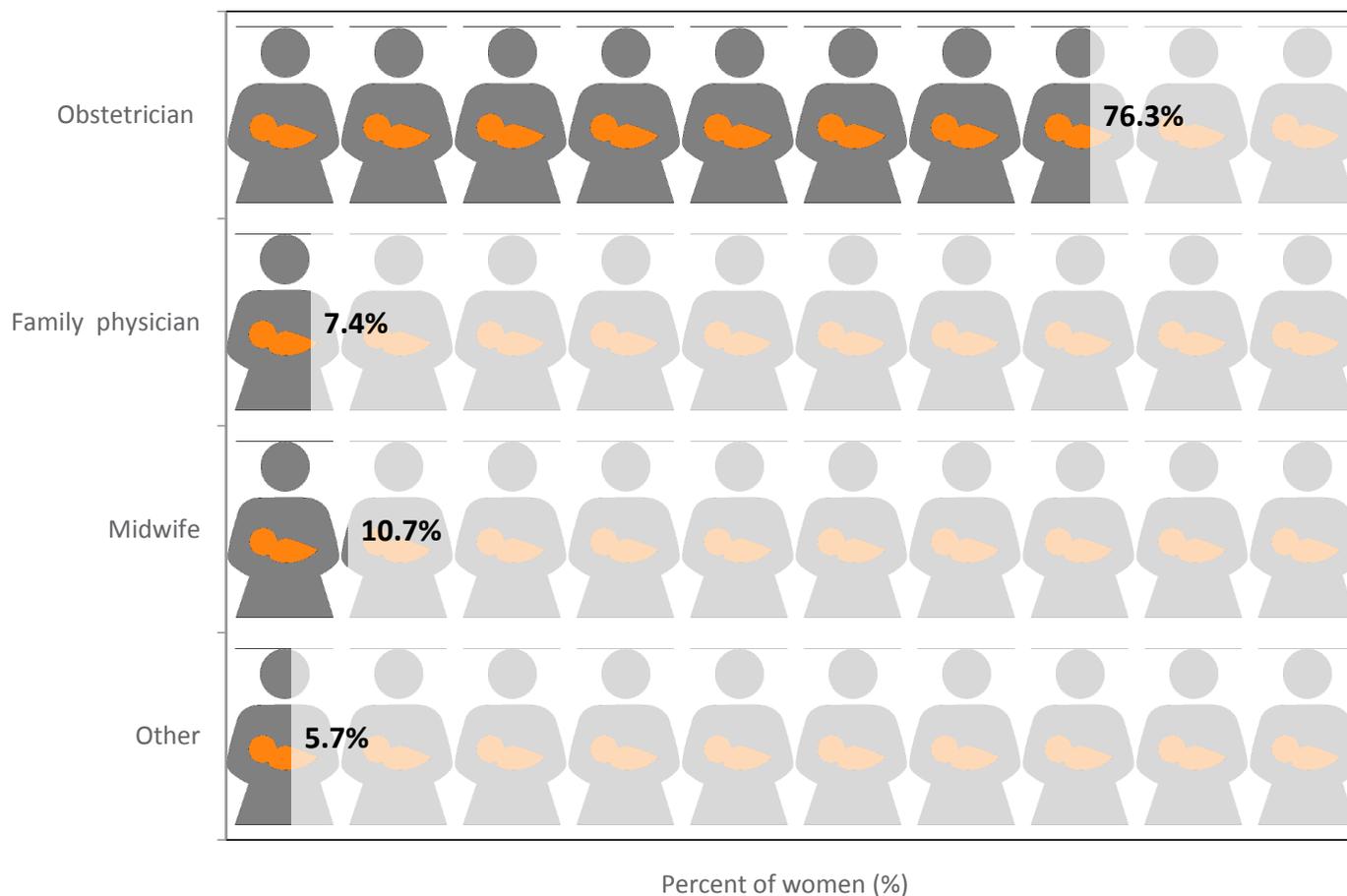
**Figure 28: Rate of successful VBAC in women who attempted with 1 or 2 previous cesarean sections**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Successful vaginal birth after attempted trial of labour following 1–2 previous cesarean sections expressed as a percentage of all women who attempted VBAC and had a hospital birth (by LHIN of birth hospital).

**Figure 29: Distribution of health-care provider attending births**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Distribution of type of health-care provider who attended the birth, expressed as a percentage of the total number of women who gave birth. The calculation was based on the element of ‘health-care provider who caught baby’, not the element of ‘billable course of care midwifery’ in BORN data.

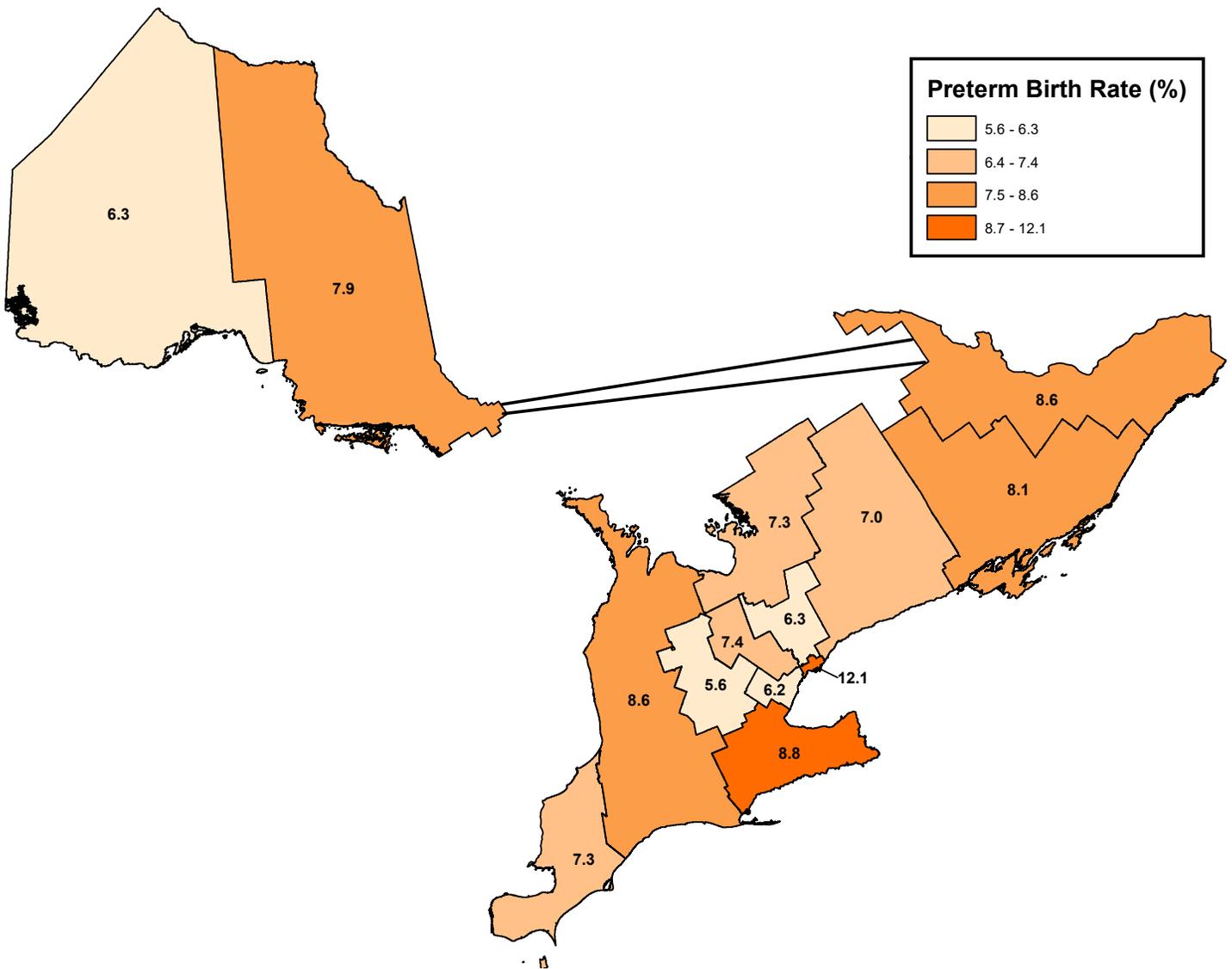
**DID YOU  
KNOW** |



In FY 2016–2017, obstetricians attended the births of 76.3% of Ontario women; this rate decreased from 78.7% in 2014–2016.

The proportion of births attended by a midwife increased to 10.7% from 10.1% in 2014–2016.

**Figure 30: Overall preterm birth rate by LHIN of birth hospital**



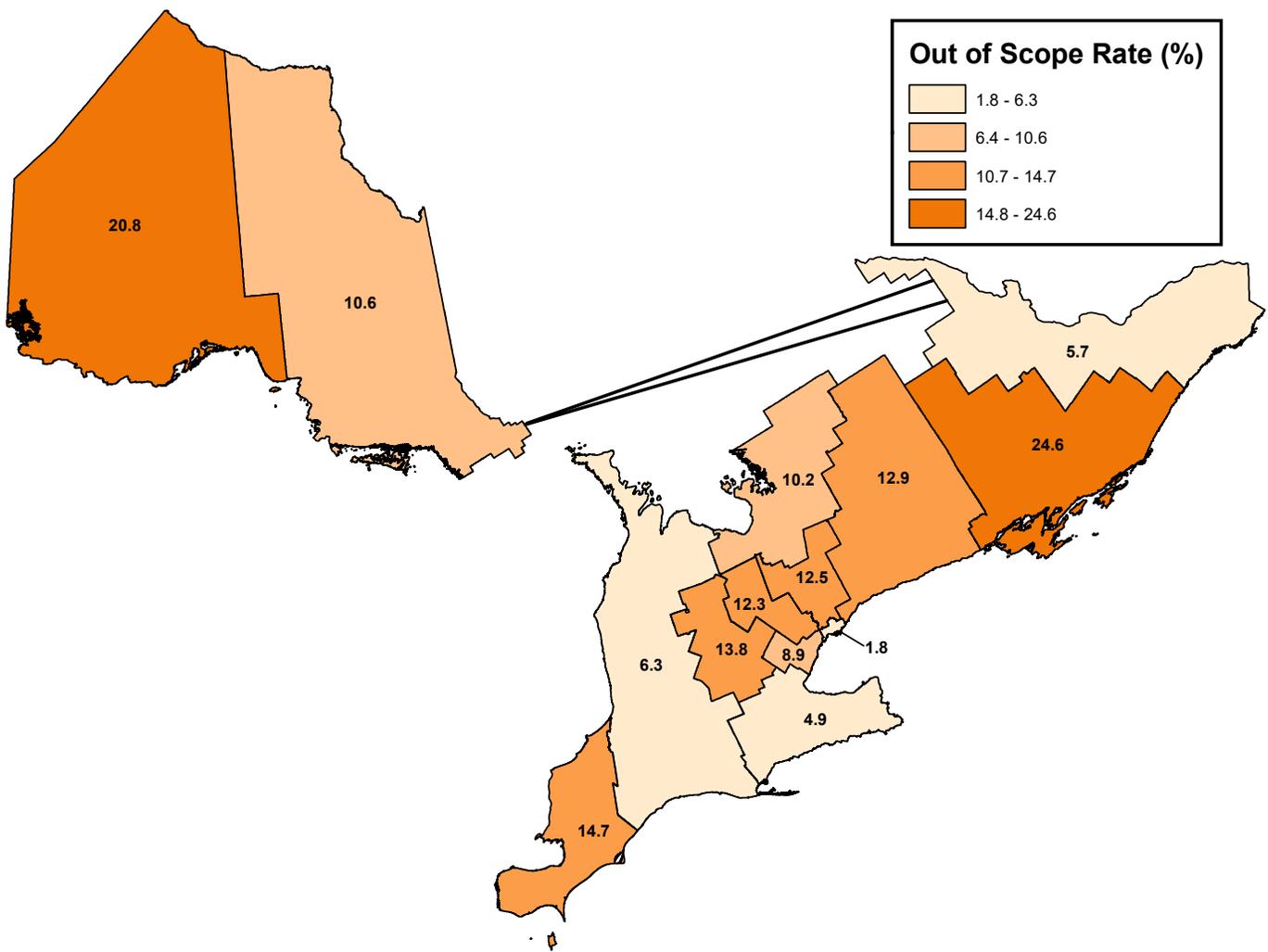
**Data source:** BORN Ontario, 2016-2017, Fiscal Year

**Definition of indicator:** Proportion of preterm infants (infants born <37 weeks' gestation) by LHIN of birth hospital. Expressed as a percentage of total live hospital births ≥20 weeks' gestation for each LHIN.

**DID YOU KNOW | ?**

8.1% of infants born in hospitals in Ontario in FY 2016-2017 were preterm.

**Figure 31: Proportion of hospital-born live preterm infants in Ontario born out of scope, by LHIN of birth hospital**



**Data source:** BORN Ontario, 2016-2017, Fiscal Year

**Definition of indicator:** Proportion of hospital-born live preterm infants less than 36 weeks' gestation born out of scope, among all hospital-born live preterm infants born less than 36 weeks' gestation, by LHIN of birth hospital for fiscal year 2016-2017. Out of scope in terms of gestational age was defined using Provincial Council for Maternal and Child Health (PCMCH) level of care definitions. Out of scope for Level I hospitals includes any babies born less than 36 weeks' gestation. Level IIa includes any babies born less than 34 weeks' gestation. Level IIb includes any babies born less than 32 weeks' gestation. Level IIc includes any babies born less than 30 weeks' gestation.

**DID YOU KNOW**

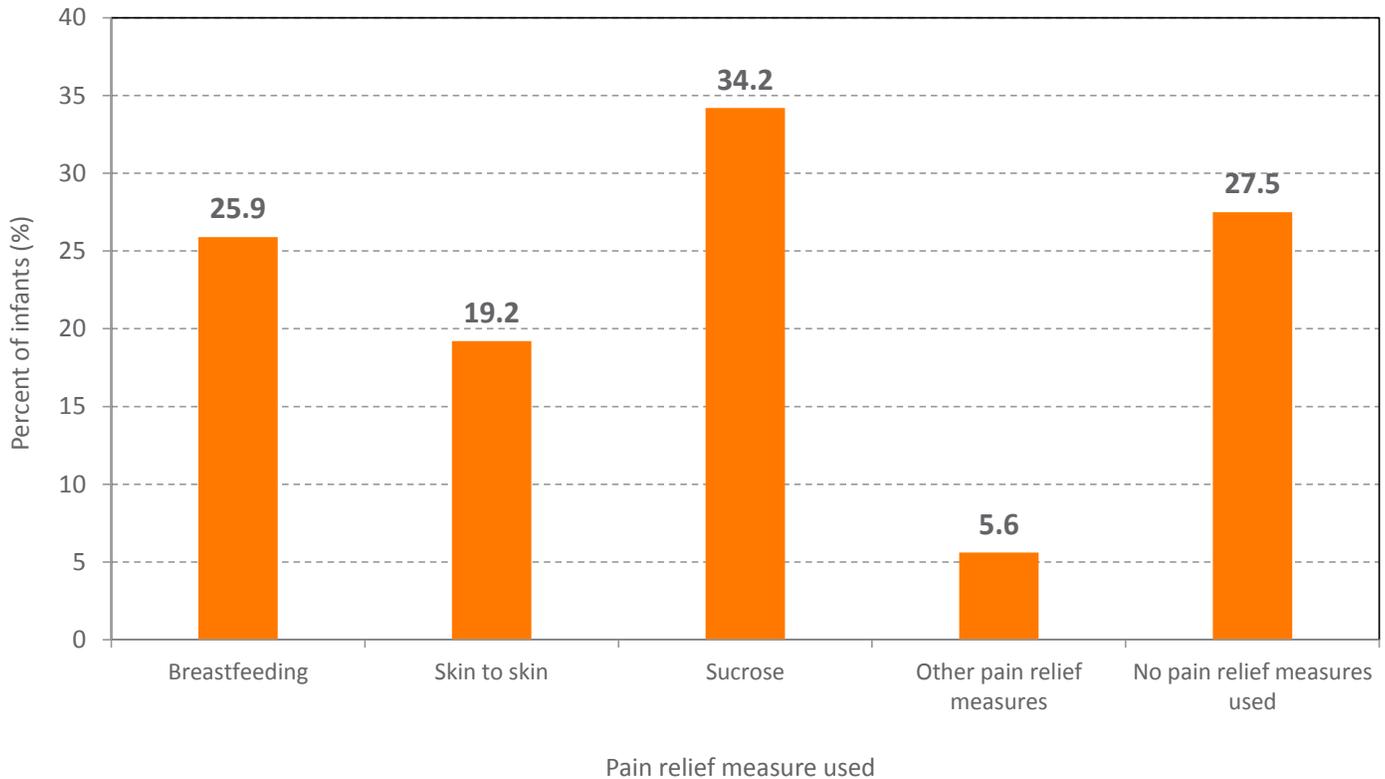


Ontario has approximately 100 hospitals that provide maternal and newborn care. Each hospital has a designated 'level of care' (meaning a standardized scope of service). Evidence suggests that infants born in the appropriate centre have better outcomes. In Ontario, however, 8% of infants born in FY 2016-2017 who required specialized care related to prematurity were born at hospitals not designated or resourced to care for their specific needs.

Blood sampling for newborn screening and bilirubin testing causes pain, distress and physiological changes in babies. Repeated painful procedures put infants at increased risk of long-term developmental delays.

Breastfeeding, holding babies skin-to-skin, or giving a few drops of sugar water (sucrose), reduces procedural pain and is recommended during painful procedures.

**Figure 32: Pain relief measures used during newborn screening or bilirubin sampling**



**Data source:** BORN Ontario, 2016–2017 Fiscal Year

**Definition of indicator:** Pain relief measures used during newborn screening or bilirubin sampling, expressed as a percentage of newborn babies receiving one or more pain relief measures among all newborn babies undergoing newborn screening or bilirubin sampling. The categories of breastfeeding, skin to skin, sucrose and other pain relief measures are not mutually exclusive. The rates in this graph reflect how often a specific pain relief measure was used. Therefore, data from a single child could be counted in more than one measure. **25.1% of records were excluded for missing data so data should be interpreted with caution.**

**DID YOU  
KNOW**



In FY 2016-2017, 67.6% of babies received pain relief measures. This is an improvement from 62.9% of babies in 2014-2016.



# Foundations of BORN

## Privacy at BORN

BORN is committed to protecting the privacy and security of the personal health information collected under its mandate of facilitating and improving the provision of health care to mothers, babies and children in Ontario.

As a prescribed registry under Ontario's Personal Health Information Protection Act (2004), BORN is required to have rigorous policies to protect the privacy and security of all personal health information in its custody. These policies are based on requirements from the Office of the Information and Privacy Commissioner of Ontario. They are reviewed by BORN annually, and they are also reviewed and approved by the Office of the Information and Privacy Commissioner every three years.

BORN collects data from various stakeholders such as hospitals, midwifery practice groups, Family Health Teams, fertility clinics, labs and other health information custodians. Ensuring

the security of personal health information is a crucial component of privacy with everyone at BORN playing a role in maintaining that trust and confidence.

Privacy and security at BORN begins with initial privacy and security training and is maintained through annual training updates and a strong culture of privacy within the BORN workplace. Our privacy approach is grounded in a Privacy and Security Governance Framework that includes industry best practices, physical and technical safeguards, access controls, audits, reporting tools and most importantly, shared responsibility across the organization.

**DID YOU  
KNOW** |



The BORN team includes Privacy Coordinators and Privacy Officers that oversee 69 policy and procedures and 355 data sharing agreements that govern the collection, use, disclosure, and security related to personal health information.



## Technology @ BORN

In order to remain current and relevant, BORN must adapt to new technologies and methods of providing the best possible services to its stakeholders. Over the past two years, BORN has advanced a number of new initiatives and has committed to engaging with system users and partners to ensure the solutions serve their diverse needs.

### Platform Power

BORN is advancing its capabilities through a new technical platform. This multi-year project provides a forward-looking solution that allows for sustained growth while maintaining up-to-date security and privacy technologies. Every in vitro fertilization cycle, pregnancy, and birth in Ontario brings more and more data into the BORN Information System (BIS), along with an increased demand for that data to inform care. The improved platform opens the door for Business Intelligence tools that will take reports to the next level, allowing users to customize reports that are meaningful to them in real time.

### New Look & Feel for the BIS

When the BIS first launched in 2012, it reflected the business needs of the time. Since then, requirements have changed as have design trends and web standards; it's time for a BIS "refresh." BORN has been engaging a variety of BIS users over the past year to help design a new look and feel for the BIS interface. Watch for the launch in 2019!

### Admission, Discharge, and Transfer Functionality

BORN is also committed to reducing the burden of data entry for BIS users and improving the

timeliness and accuracy of data collected. In hospitals, the Admission, Discharge, and Transfer (ADT) functionality is being deployed across the province to support users with real time data reconciliation. BORN has also kicked off work with hospitals to integrate various clinical information systems with the BIS via an HL7 live data feed, which will roll out provincially over the next few years.

### BORN Website Redesign

Aligning with the BIS refresh, BORN also launched a redesign of the BORN public website in 2018. A content audit has been completed and over this coming year, BORN will engage with a variety of users to help inform the content, design, and information flow of the new site.

### The OMama Platform

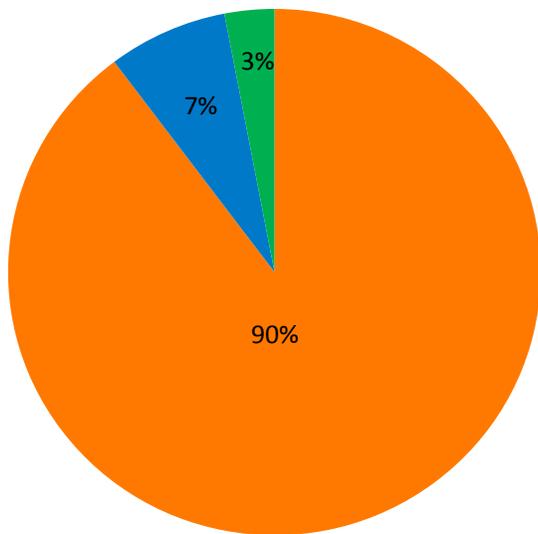
OMama is a website and a mobile app that connects Ontario families to trusted, evidence-informed pregnancy, birth and early parenting information. OMama contains information on over 100 topics, curated by Ontario experts from across a range of disciplines. BORN has maintained the technology to support the OMama platform since its launch in 2016. Stay tuned for more OMama updates in 2019.



# Finance at a Glance

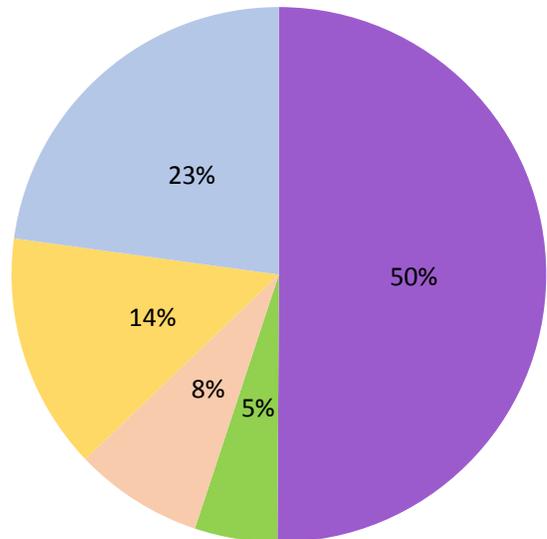
FY 2016-2017

**Figure 33: Revenue distribution  
FY 2016-2017**



- Ministry of Health and Long-Term Care
- Ministry of Children, Community and Social Services
- Data Service Partnerships

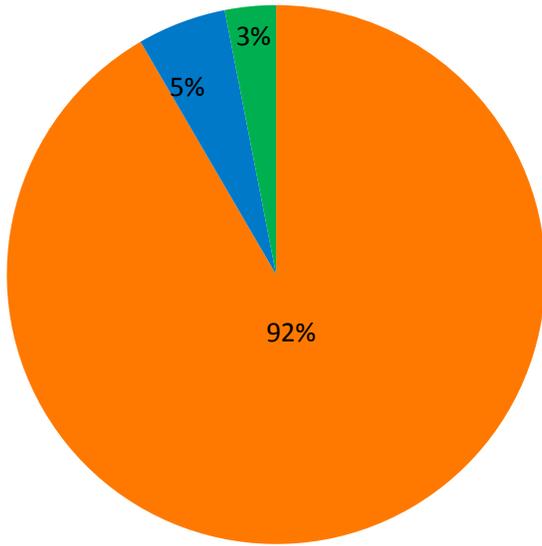
**Figure 34: Expenditure distribution  
FY 2016-2017**



- Perinatal & Fertility Programs
- General
- Depreciation
- Technology Infrastructure
- Strategic Projects

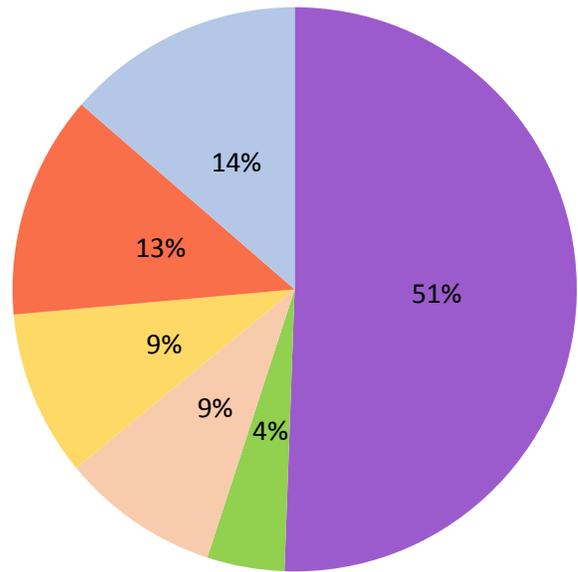
## FY 2017-2018

**Figure 35: Revenue distribution  
FY 2017-2018**



- Ministry of Health and Long-Term Care
- Ministry of Children, Community and Social Services
- Data Service Partnerships

**Figure 36: Expenditure distribution  
FY 2017-2018**



- Perinatal & Fertility Programs
- General
- Depreciation
- Technology Infrastructure
- Prenatal Screening Ontario
- Strategic Projects

**DID YOU  
KNOW** | ?

The BORN Team includes Project Managers, Project Coordinators, Business Coordinators, Administrative Assistants, and Communication Coordinators.



# **BORN Ontario**

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