



## **EVALUATION OF ONTARIO'S BIRTH CENTRE DEMONSTRATION PROJECT**

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**FINAL REPORT**

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**SUBMITTED BY: BORN ONTARIO (Better Outcomes Registry & Network)**

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### Disclaimer:

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## EXECUTIVE SUMMARY

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Free standing midwifery-led birth centres (BCs) have fulfilled a long-time wish of midwives and midwifery advocates in Ontario. Women in Ontario expressed interest in a BC option for labour and birth as early as the 1980s.<sup>1</sup> In funding two BCs in Toronto and Ottawa as part of the year-long demonstration project, the MOHLTC was working towards the goal of “shifting health services out of the hospital setting and into non-profit community based clinics where there is an opportunity to offer people access to high quality care, closer to home at lower cost”.<sup>2</sup> The evaluation of the demonstration project, designed and implemented by BORN Ontario, measured indicators of quality and safety of care, client satisfaction, integration with the existing obstetric care community, and cost avoidance.

Our evaluation concluded that care was low in intervention, safe (minimal negative outcomes and a transport rate comparable to the literature), well-integrated into the maternal-child health system, and satisfactory to women. From an economic perspective the avoidance of intervention in the BC cohort demonstrates potential cost savings to the system, with recognition that start-up costs and occupancy rates need further investigation to gain full understanding of the economic impact.

Of the 495 women admitted to a BC during the pilot year, 87.9% (435/495) experienced a spontaneous vaginal birth, regardless of the eventual location of birth, and 7.7% (38) had a cesarean birth. While 374 (75.5%) of women planning to give birth at the BC, ultimately did so, 26.3% (130/495) of mothers or babies required transport to another level of care. There were no maternal deaths. There was one intrauterine fetal death discovered during the admission process at one of the BCs with no apparent risk factors.

The findings from this evaluation are consistent with evidence about midwifery in general and out-of-hospital birth specifically both in Ontario/Canada and internationally. Though numbers were small, data collected from the BCs during the demonstration project supports the BC as a safe and effective option for women with low risk pregnancies seeking a low-intervention approach to their labour and birth.

### **Recommendations:**

#### **For policy makers**

- The development and integration of BCs should be considered as part of a strategy to continue to legitimize and integrate midwifery care into Ontario’s perinatal health services system.
- Maintain BCs as part of a strategy to support low-risk labour and birth in the province of Ontario.
- The MOHTLC in partnership with hospitals should consider working to support full privileges for midwives at hospitals that act as transport sites for the BCs.

- The collaborative approach used for planning and implementation of the BCs should be used as a template for the inception of other new independent healthcare facilities and programs.
- Based on the positive findings of reduction of interventions within the BC model, the MOHLTC should consider piloting variations such as in-hospital midwifery-led BCs, as well as expanding BCs to inter-professional care models.
- Further work is required to fully analyse the cost-effectiveness of the BCs. While we demonstrated some cost-avoidance, start-up and operational costs should be considered in a fulsome economic evaluation.
- In planning future Independent Health Facilities for birthing services, policy makers should consider the significant lead time required to plan, integrate and fully operationalize services into the community to reach full occupancy potential.
- A robust evaluation of quality and safety of care in a relatively healthy population where rates of adverse outcomes are low, takes a larger sample size than the study period of this project allowed. An additional one- to- two years of data collection and analysis would enhance the stability of the results.

#### **For care providers**

- Labour and birth in an Ontario BC can be safely offered to low-risk women as an alternative to home or hospital birth.
- The BCs offer an opportunity for education and training on low-risk birth which could be leveraged beyond midwifery education and include inter-professional students and medical residents.

#### **For women**

- For low risk women, planning a BC experience under the care of midwives in Ontario would appear to be a safe and effective way to achieve a birth with minimal interventions.

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## ABBREVIATIONS AND DEFINITIONS

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For the purpose of this report, we use the term “transport” when referring to the *physical movement* of a midwifery client from one location to another (i.e. a birth centre to a hospital), with or without the assistance of Paramedic Services. We use the term “transfer” when referring to *the transfer of care responsibility* from one health care provider to another (i.e. midwife to physician), where the accepting provider becomes most responsible for the care of the mother and/or newborn.

Additionally the following acronyms are used throughout the report:

Birth Centre	BC
BORN Information System	BIS
Better Outcomes Registry & Network	BORN Ontario
Midwifery Practice Group	MPG
The Ottawa Birth and Wellness Centre	OBWC
The Toronto Birth Centre, Inc.	TBC

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## CONTEXT/BACKGROUND

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On March 20, 2012 the Ontario Premier and the Health Minister announced funding for two freestanding, midwifery-led Birth Centres as part of *Ontario's Action Plan for Health Care*. A key aim of this three-part strategy, was to provide “The right care, at the right time, in the right place” with the intent of “shifting health services out of the hospital setting and into non-profit community based clinics where there is an opportunity to offer people access to high quality care, closer to home at lower cost”.<sup>2</sup> The Ministry of Health and Long Term Care (MOHTLC) awarded BORN Ontario (the Better Outcomes Registry & Network) the contract to develop and perform an evaluation of the Birth Centres, with a focus on measuring quality of care and economic feasibility. BORN formed a Birth Centre Evaluation Working Group that began with development of an evaluation framework in November of 2012. Data collection started once the Centres opened in January of 2014 and continued for a period of one year. This report provides a summary of the process and findings.

Evidence from international literature supports the safety of out- of-hospital birth in a low-risk population in systems where homebirth is well integrated in the broader maternal-child health program.<sup>3-11</sup> The safety of planned homebirth under midwifery care in Ontario has been established.<sup>12,13</sup> Though a stand-alone Birth Centre already existed in Ontario as part of Six Nations Health Services (where Aboriginal Midwives care for women), the two newly funded Centres marked the first instance in which midwifery care by Registered Midwives in Ontario has been systematically provided in a new setting since regulation of the profession in 1991 with proclamation of the Regulated Health Professions Act (RHPA) and the Midwifery Act.<sup>14</sup>

The aim of this project was to use a mixed methods approach to examine the implementation of the Birth Centre Demonstration Project and assess: 1) Clinical activities and outcomes, 2) Client experiences, 3) Provider experiences, and 4) Economic impact. We wanted to determine if the positive findings on out-of-hospital birth from the literature such as increased rates of normal birth and lower rates of interventions and complications as compared to similar low risk births in hospitals would be consistent for the new Ontario Birth Centres.

### **Establishment of the evaluation working group**

A working group was formed in the fall of 2012 to establish the framework to guide the evaluation and determine the clinical outcomes, client experience and economic indicators to measure. This panel of experts from the fields of obstetrics, midwifery, nursing, epidemiology and users of the maternity services provided input regarding data to be collected by the Birth Centres and from midwifery clients in order to supplement BORN's routinely collected data.

### **Development of the evaluation framework**

The initial working group objective was to define the evaluation framework. We chose to frame our evaluation around quality of care. Quality health care frameworks previously defined by the Institute of Medicine<sup>15</sup>, World Health Organization<sup>16</sup>, and the Ontario Health Quality Council<sup>17</sup> were reviewed. The working group also consulted with midwifery stakeholder groups (including

the Ontario Midwifery Program, the Association of Ontario Midwives, the College of Midwives of Ontario and the Midwifery Education Program) as the approach was developed. We focused our evaluation indicators on the following domains of quality: *Effective, Safe, Person-Centred, Accessible, Integrated and Equitable*. We included a number of indicators within each domain. The economic indicators for the BC Evaluation Project were developed with advice from the Health Analytics Branch, Economic Analysis and Evaluation Unit within the MOHLTC.

### **Ethics Approval**

REB approval was obtained from the Children’s Hospital of Eastern Ontario’s Research Ethics Board in September of 2013, with minor amendments accepted in September of 2014 and March and September of 2015.

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## **INDICATOR DEVELOPMENT**

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The Working Group used a Quality Framework to guide the indicator development. We based this on the *Ontario’s Action Plan for Health Care* which advocated for high quality care, closer to home at lower cost. To that end, we focused on six quality domains we felt were essential to a successful BC Model – *Effective, Safe, Person-Centred, Accessible, Integrated and Equitable*.

The Working Group used the considerable clinical, health service and evaluation expertise of the members to debate and choose indicators. An important part of the decision process included having an accurate measure of the indicators chosen.

Criteria that guided the choice included:

- 1) Demonstration of adherence to provincial/national guidelines (fetal surveillance methods, breastfeeding, normal birth);
- 2) Demonstration of safe care (transport, maternal or newborn morbidity or mortality, appropriate BC admissions);
- 3) Clinical relevance to midwifery stakeholders (client satisfaction, alignment with the model of care, integration of learners and other health care providers, equity of services, meeting the needs of vulnerable populations);
- 4) Assessment of impact on the local health system (transport, use of EMS, integration with the existing system of care, provider experience with the model).

We also wanted to provide the funder (MOHLTC) with data to assess their ‘return on investment’ of implementing the birth centres. For that reason, an economic evaluation was also included. This evaluation was based on assessing change in system costs associated with this new place of birth. In other words, what system/hospital costs were added or avoided for women laboring or giving birth in a BC. We specifically sought to identify the incremental effects of a BC on the probability of complications including caesarean section, episiotomy, epidural, assisted vaginal birth, infection and readmissions/admissions, NICU admissions,

emergency department visits, transport cost, severe morbidity and mortality for both mother and infant.

The working group members (on the title page) were mainly consistent over the 3 plus years of the project. From November 7, 2012 to the end of May 2013, the working group met nine times to choose indicators and monitor the project.

Table 1 defines the quality domains we selected and outlines the indicators mapped to each domain. It also includes the data source for each indicator. A description of each data source is provided in the next section of this report.

**Table 1 – The Birth Centre evaluation framework**

<b>Quality Domain</b>	<b>Definition</b>	<b>Indicators</b>	<b>Data Source</b>
Effective Care	Care based on scientific knowledge to all who could benefit, and refraining from provision of services to those not likely to benefit <sup>15</sup>	1. The proportion of clients who only have Intermittent Auscultation (IA) as a method of fetal surveillance in labour.	BORN Information System (BIS)
		2. The proportion of clients intending to breastfeed who have latch achieved within two hours.	BIS
		3. The distribution of delivery type and women who meet criteria for normal/undisturbed birth.	BIS
Safe Care	The avoidance of injuries to clients from care that is intended to help them. <sup>15</sup>	4. The proportion of clients planning a BC birth (at the onset of labour) whose infants had severe newborn morbidity or mortality.	BIS and Birth Centre (BC) Records
		5. The proportion of clients planning a BC birth (at the onset of labour) who had severe maternal morbidity or mortality.	BIS and Birth Centre (BC) Records
		6. The rate and frequency of reason for transport to hospital for maternal or newborn reasons.	BIS and BC Records
		7. The proportion of women who gave birth at BC who did not meet BC criteria.	BIS

<b>Quality Domain</b>	<b>Definition</b>	<b>Indicators</b>	<b>Data Source</b>
Person-Centred Care	Person-Centred was defined as care that is respectful of, and responsive to, individual patient preferences, needs and values, ensuring that patient values guide all clinical decisions. <sup>15</sup>	8. The proportion of clients satisfied with their BC experience.	Client Survey
		9. The proportion of clients who had a known midwife as their primary midwife present during labour and birth*.	Client Survey
		10. The proportion of clients who had 1:1 care during labour.	Client Survey
Accessible Care	<i>Accessibility</i> was defined as having the service available to women who are clinically eligible and who desire a BC experience	11. Rate and frequency of reasons why a registered BC client was not admitted to the BC.	Birth Centre Log
		12. Rate and frequency of reasons why a woman could not be registered for the BC.	Birth Centre Log
		13. The proportion of women arriving in labour without being a client of midwifery care –a requirement for admission to both Centres.	Birth Centre Log
Integrated Care	<i>Integrated</i> care was defined as care that is integrated with educational practices and the general maternal newborn community.	14. The proportion of births with midwifery or inter-professional student present at the time of labour and/or birth.	BIS
		15. The proportion of births with at least one other care provider present at the time of labour and/or birth.	BIS

<b>Quality Domain</b>	<b>Definition</b>	<b>Indicators</b>	<b>Data Source</b>
		16. The frequency of learners or other care providers present at the BC at time of labour and/or birth.	BIS
		17. The proportion of care providers satisfied with the experience of integration of birth centres into the existing maternal child care system.	Focus Groups
Equitable Care	Equitable care was defined as care that does not vary in quality because of personal characteristics such as gender, ethnicity and socio-economic status	18. Proportion of Birth Centre clients within each category of a deprivation index.	BIS + Census Data
		19. Proportion of Birth Centre clients that come from priority groups identified in Birth Centre proposal.	Birth Centre Log
		20. Proportion of Birth Centre clients without OHIP coverage.	BIS

\* The data element for known midwife is currently undefined in the BIS. The literature is varied on a definition of “known midwife” and “continuity of care”<sup>18,19</sup> while the College of Midwives of Ontario states that a 1:4 ratio of women to midwives results in a midwife being “known” to a woman.<sup>20</sup>

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## METHODS

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### 1. Description of the Data Sources

#### **BORN Information System (BIS)**

BORN is Ontario's pregnancy and child health registry and network. BORN Ontario manages an advanced database that delivers reliable, secure and comprehensive information on maternal and child care. The BORN Information System (BIS) is a web-based portal that allows for the collection of detailed information on the health and care of women during pregnancy and birth and their infants at and after birth. This database has a 100 percent capture for hospital, home, and birth centre births in the province of Ontario. When a woman has care during pregnancy or is admitted to give birth, data are collected from medical records, clinical forms and patient interview. These data are entered into the database either through a secure website by hospital or Midwifery Group Practice staff, or uploaded directly from hospitals that have electronic record capability. Each time point, or encounter, in the BORN system, can be queried separately or combined with other encounters to get the most accurate and complete data for a given pregnancy.

For this evaluation, BIS enhancements were required. The two Birth Centres were added as new organizations in the BIS to track planned and actual location of birth and the time of admission and birth in each site. We also modified some data elements and reports in the BIS to ensure that we could effectively track the movement of women through labour and birth. These updates helped facilitate a complete and effective record for the research process.

#### **Canadian Institutes of Health Information (CIHI) Discharge Abstracts Database**

The CIHI Discharge Abstract Database (DAD) contains demographic, clinical (i.e., medical diagnoses, interventions, vital disposition at time of discharge) and administrative information resulting from hospitalizations. Diagnoses are coded using the Canadian implementation of the International Classification of Diseases, 10th Revision (ICD-10-CA).

#### **Statistics Canada Census Data**

Statistics Canada's PCCF+ is a software package designed to assign postal codes to census dissemination areas using geocoding.<sup>41</sup> Within each dissemination area, a variety of neighbourhood-level information from the long form 2006 Canadian Census is available, including highest level of attained education and median household income.

#### **Birth Centre Records**

Clinical records kept by birth centres on each client/case cared for in the centre, regardless of the eventual place of birth (Birth Centre or Hospital).

## **Birth Centre Logs**

Data collected specifically by each BC to address the accessibility and equity indicators set out by the working group.

## **Client surveys**

Done via a web portal or by paper and returned by mail.

## **Focus Groups**

Inter-professional focus groups of hospital care providers (midwives, physicians, nurses), EMS personnel involved in transport of women from the BCs to hospitals, and BC staff.

## **Ottawa Hospital Case Costing Initiative (ADD)**

Costs relating to labour and birth care were obtained from the Ottawa Hospital Data Warehouse and their case costing software.

Where necessary, multiple data sources were used to confirm/triangulate results. In some cases the BIS and Birth Centre Records or Client Surveys were compared to assess congruence and data validity.

## **2. Preparation and Analysis**

### **Cohort Creation and Validation**

The study cohort included all women who gave birth between January 31, 2014 and February 3, 2015 and began labour planning to give birth at one of the two birth centres. The process of compiling and validating the cohort differed between the two BCs, as the OBWC signed a Data Sharing Agreement with BORN, allowing for a cohort to be extracted from data submitted to the BIS directly by the BC. For the TBC, however, we had to query the BORN database to select records that indicated a woman had laboured at the TBC, Inc. and then work with the Clinical Director to ensure we had a complete list. Each BC had developed a tool to track whether registered clients were ultimately admitted to the Centre, and to collect data on other elements of the evaluation that could not be captured from the BIS (such as inclusion of priority populations the BC indicated they were going to serve). These tracking tools were used as a basis for confirming the cohort.

### **Comparison Cohort**

We extracted additional records from the BIS to create a matched cohort of similar low-risk midwifery clients who gave birth in hospital during the same timeframe. These women served as a control group to allow for comparison for many of the indicators (i.e., Indicators 1-7, 9, 14-16, 20). The comparison group was restricted to women with singleton pregnancies and

spontaneous labour, and matching to the cohort planning to give birth in a birth centre was conducted on a 4:1 basis, based on gestational age at birth (within two weeks), parity (nulliparous vs multiparous), and maternal age (<30, 30-34, 35+). Matching for maternal health conditions was not done, but the rates of pre-existing maternal health conditions and pregnancy complications were compared between the BC Cohort and the control group, and confirmed by manual review of record level data performed by a member of the Evaluation Working Group (EG). This same control group dataset was also used as the basis of the economic evaluation cohort, with further details on this provided later in this report.

### **BIS Data and BIS Linkages**

After the cohort for the BC evaluation was validated, we extracted all data available from the BIS on these pregnancies and births. We also extracted all available data for the women and their infants selected in the control group to create an aggregated dataset that we used to calculate control values for the indicators that are available from the BIS data. Three sources of BIS data entry were used to derive the data for this project: data entered by the midwife (throughout pregnancy and birth), data entered by the hospital in cases when a patient was transferred from the BC, and data entered by the BC (in the case of the OBWC only). These linked records were then supplemented with data from the Canadian Institute for Health Information (CIHI)'s Discharge Abstract Database (DAD) for any additional data elements that were missing in the BORN data, and used as the basis for the evaluation of the clinical activities and outcome indicators for the BC Cohort.

For this evaluation, if discrepancies occurred, data submitted by the midwives was given precedence over data submitted by hospitals. If data was missing from the midwifery submitted records, we supplemented it with the data submitted by hospitals. In cases where both were missing, for example an infant's length of stay in a neonatal intensive care unit (NICU) from a hospital that does not submit data to BORN, this data was supplemented from the CIHI DAD.

All indicators calculated/reported from the BIS were calculated as percentages, with the total number of women in the numerator being divided by the total number of women in the denominator, excluding women with missing data for one or more of the data elements used to define the indicator. To examine the indicators related to equity we used the deprivation index. The National Deprivation Index (CITE), was merged into our files using the residence postal code for each record.<sup>21</sup> The Statistics Canada PCCF+ was linked with individual birth records from the BORN birth database using maternal postal code of residence to provide socio-economic information and calculate the deprivation index. Only the quintile of maternal social and material deprivation, based on the postal code provided for each mother, was included in this analysis.

Our normal birth indicator (#3), is based on a concept defined and promoted by various organizations, including the Society of Obstetricians and Gynecologists of Canada (SOGC) in partnership with the Canadian Association of Midwives (CAM) and the Association of Women's Health, Obstetric and Neonatal Nurses of Canada (AWHONN) following the World Health Organization's publication "Care in Normal Birth: A Practical Guide".<sup>22,23</sup> In the BIS, there is a clinical reporting tool for midwifery users that analyzes rates of normal birth among a low risk population according to three categories. The first category broadly meets the criteria of the SOGC/CAM/AWHONN joint statement, including women whose labours begin spontaneously

and result in a spontaneous vaginal birth (SVB) where there is opportunity for maternal/newborn skin to skin contact and/or latch within the first hour of birth. A second category of *Normal Birth with Minimal Interventions* is defined as labour that begins spontaneously and is augmented only with artificial rupture of membranes, if at all. The woman in this category receives only non-pharmacologic pain relief or nitrous oxide, and/or local anesthetic. The fetus is monitored only with IA. Labour results in a SVB with opportunity for skin-to-skin contact and/or latch within the first hour. Finally *Normal Birth with No Intervention* includes women with a spontaneous labour who receive no augmentation or pharmacologic pain management other than local anesthetic.

To assess the alignment of admissions with local birth centre admission policies, each BC shared their admission protocols with the Working Group. BIS records were then assessed both systematically using identified flags, and by hand by an experienced clinician member of the team in order to identify cases where the admission criteria might not have been clearly met.

Table 2 outlines the clinical events determined by the Working Group to be measures of severe morbidity. These markers were chosen through review of the literature and assessment of what could be measured within the BIS or via data linkage to CIHI.<sup>3 6 8 12 24-31</sup> Due to timelines of the project and a delay in obtaining CIHI data, the initial table was ultimately re-defined. Once potential cases were identified in the BIS, the clinical record was further evaluated by a member of the working group with experience in full-scope midwifery practice and out-of-hospital birth, who was not affiliated with either centre (DS). Care was evaluated only up to the point of discharge from a BC - hospital records were not obtained. Comparator data on these outcomes from the matched cohort was not obtained as the main purpose of the evaluation was care provided in the birth centre.

**Table 2 – Measures of severe maternal and neonatal morbidity**

<b>Severe Maternal Morbidity</b>	<b>Severe Neonatal Morbidity</b>
<b>Clinical Event</b>	<b>Clinical Event</b>
Severe hemorrhage requiring transfusion or hysterectomy In the absence of timely CIHI data, any hemorrhage resulting in a transport from the Birth Centre and/or associated with a hospital stay greater than 48 hours was used as a proxy.	Apgar < 4 at five minutes
Uterine rupture	Chest compressions during resuscitation
Eclampsia	Assisted ventilation > 24 hours
Obstetric shock	Intraventricular hemorrhage
Fourth degree laceration	Meconium aspiration
Sepsis In absence of timely CIHI data, any BC admission with fever or perinatal infection were used as a proxy	Significant birth trauma: fracture, hemorrhage
Obstetric embolism	Sepsis
Cerebrovascular event	Seizures
Cardiovascular event	Unexpected major congenital anomaly
Renal failure	Small for gestational age - ≤ 3 <sup>rd</sup> centile
Ventilator support	Large for gestational age - ≥ 97 <sup>th</sup> centile

Severe Maternal Morbidity	Severe Neonatal Morbidity
Clinical Event	Clinical Event
ICU admission	NICU admission greater than 48 hours
Transfer to hospital for non-labour related event	Any hospital admission or readmission within 4 weeks following discharge from the BC

### Analysis

All quantitative analyses were conducted using Statistical Analysis Software (SAS version 9.4).

### Birth Centre Records

When Birth Centre records were needed to evaluate morbidity or transport issues, blinded charts meeting the review criteria were reviewed on-site with special attention to examination of specific fields in the Ontario Antenatal Record and BC client chart that could be associated with the given outcome. Each BC was consulted and shared templates of the client record so that fields could be identified and approved by the ethics process. The central purpose of the review was to identify if clinical care within the BC, the location itself, or a systems issue generated by the location contributed to the outcome, rather than to establish whether or not standard of care was met. BC specific protocols were made available to the reviewer to use as a reference during the process. Care that occurred after the client left the BC was considered out of scope of this review.

### Birth Centre Logs

The BCs were directed to collect data outside the BIS on the rate and frequency of reasons why a client that planned a BC experience prior to labour was not admitted. Each Centre also collected the rate and frequency of reasons that a client could not be registered, and how often a woman arrived in labour without being a client of midwifery care – which was deemed necessary in protocols.

Each BC funding proposal identified priority groups for service. Each centre tracked registration by priority group (**Appendix 1**) and reported overall rates.

### Client Survey

The Client Experience Survey tool was designed to collect information specific to understanding and quantifying the experience of women admitted to a BC in labour, as compared to those receiving midwifery care in other already established settings (home and hospital).

Following a literature review on measurement of client satisfaction in healthcare broadly and maternity services specifically, questions were developed and circulated among members of the working group as well as stakeholders with experience in area of satisfaction measurement. Questions were designed to provide data for the identified quality indicators, as well as to provide specific information regarding satisfaction with BC facilities. In order to assist the BCs with requirements within their Facility Standards and Clinical Practice Protocols,<sup>32</sup> questions were also included regarding student involvement in care. Face validity was assessed by having team members review the questionnaire and provide suggestions for improvement. Once questions had been finalized, the survey was created in a REDCap database (Research Electronic

Data Capture) stored securely at the Children’s Hospital of Eastern Ontario (CHEO). The tool was pilot tested among the evaluation team and within the general BORN employee group and adjusted accordingly.

MPGs with midwives planning to admit to each BC were contacted and trained on consent processes. Consent was required because we needed a way to distribute the survey to women who had recently given birth. Midwives were asked to speak with women during the pregnancy and obtain consent for the research team to contact them. MPGs were encouraged to recruit women with expected dates of delivery between January 31<sup>st</sup> 2014 and February 3<sup>rd</sup> 2015, regardless of planned place of birth. We received 700 consents during the pilot year and up to six weeks after its close, allowing for postpartum capture of those delivering close to the end of the year. The consent forms were collated based on what city (Ottawa and Toronto) they were collected in. Information from the consent forms was then entered into an excel spreadsheet housed within BORN’s secure servers in CHEO. Information recorded included the name of the client, the e-mail of the client, whether the client did or did not provide consent, where the consent form was sent from, the date the client signed the consent form and the date the consent form was received. For the clients who consented to be a part of the study, their e-mail address was stored in CHEO’s Resource Electronic Data Capture System (REDCap); this program was used to e-mail consented clients with a link to the digital Client Experience Survey. Each client was e-mailed on three separate occasions, two weeks apart each with the opportunity to complete the Client Experience Survey. Once a client had completed the survey, REDCap would automatically indicate that the individual with the e-mail address had completed the survey. REDCap did not track the client’s survey responses or attach the name of a client to any specific survey. Clients were randomly assigned a client code name and this was used to blind the study participants and their responses from researchers. Furthermore, if the client had chosen to not complete the survey at this point, their e-mail was removed from the REDCap e-mail list.

Surveys were collected and compiled over the course of one year and descriptive analysis was conducted to calculate the indicator rates as set out by the working group.

Most of the indicators were based on single questions. Response choices were categorical and therefore the results were calculated as percentages. One composite indicator was calculated, which is referred to as the Composite Satisfaction Score (CSS). To generate this indicator, the responses for a series of questions were summed.<sup>33</sup> Questions 10 through 14 (see **Appendix 2** for full survey) were included in the score, by summing the responses on the 5 questions. The response choices “not at all” or “never” were assigned a value of 1, “somewhat” or “sometimes” a value of 2, “frequently” a value of 3, and “always” a value of 4. Possible values of the CSS ranged from 4 (lowest satisfaction) to 20 (highest satisfaction). Missing responses were assigned the mean for that question. The mean and standard deviation of the CSS was calculated for the various groups of interest, and statistical significance was assessed using one-way ANOVA.

### **Focus Groups**

Prior to opening, each BC established protocols should a labouring client or baby need to be transported to hospital. In each city one hospital was deemed the urgent transport facility for mothers, and another for neonates. Urgent transports are those where there is a potential need to transfer care responsibility from midwife to physician. Non-urgent transports were arranged

by the midwife and generally clients with these type of transports were taken to the hospital where the midwives had admitting privileges.

Focus groups were planned to assess the integration of the BCs into the existing perinatal health system, and provider experiences. The aim of the focus groups was to provide context on the process of both transport and transfer between the BC's and local transport hospitals - the communication, processes for gaining consultation or transfer of care, and general perceptions of teamwork. In collaboration with members of the working group, a semi-structured interview guide was developed to guide the focus group data collection (part of Appendix 3). Face validity for the tool was assessed by members of the working group and modified slightly based on their feedback.

We planned for four focus groups at transfer sites in Ottawa and Toronto with the possibility of doing interviews with interested persons who might not be able to attend the session at their site. Interdisciplinary professionals including physicians, nurses, paramedics, administrators and midwives were invited to participate. To ensure we collected information on both urgent and non-urgent transports, two hospitals in each city were purposefully selected to maximize the variation of provider experiences.

The four selected hospitals also varied with respect to whether or not midwives had admitting privileges. If midwives could admit women, the providers at the hospital had some experience receiving non-urgent transports from midwife attended home births. At the hospital without midwifery admissions, the providers had minimal experience receiving non-urgent transports from home births (Table 3).

**Table 3 - Characteristics of selected hospitals**

Location of hospital:	Hospital designated to receive:	Midwives could admit at this hospital:
Ottawa	Non-urgent transports	Yes (from specific midwifery groups)
Ottawa	Urgent transports	No
Toronto	Urgent transports	Yes (from specific midwifery groups)
Toronto	Non-urgent transports	Yes (from specific midwifery groups)

The research team contacted key individuals to assist with recruitment of eligible health care providers by (1) distributing an information page describing the study to eligible health care providers, and (2) inviting interested participants to the focus groups. Specifically, a nurse manager at each hospital recruited hospital-based health care providers, a clinical director from each BC recruited midwives, and leaders from paramedic services recruited paramedics.

**Data collection:** Focus groups and interviews took place in private rooms. Participants were given time to read the consent form, ask questions, and complete a brief demographic questionnaire. A printed copy of the semi-structured questions to be asked during the focus group/interview was provided to each of the participants. All of the discussions were facilitated by the same co-investigator and either the study coordinator or the research assistant. The discussions lasted approximately 60 minutes and were digitally recorded; notes were taken. The audio files were transcribed verbatim.

**Data Analysis:** The transcripts were imported into NVivo 10™<sup>34</sup> for data management. A descriptive qualitative approach to data analysis was undertaken.<sup>35–37</sup> Data analysis included examination of all of the transcripts together (across-groups), and for each transcript independently (within-group) to capture differences in context between hospitals. (1) *Across-group analysis:* All of the transcripts were read repeatedly by three research team members (WEP, DS, JR). Initial coding was done independently and then discussed. Several iterations of coding and discussion resulted in a final coding template. All of the transcripts were then coded by one research team member (JR) using the final template. Through discussion and writing, the codes were organized into themes (WEP, DS, JR). (2) *Within-group analysis:* The main themes arising from individual focus groups/interview were also discussed. A 1-2 page narrative summary of the main themes from each focus group/interview was written. The research team met regularly to discuss the coding, emerging themes and to build consensus regarding study findings.

### **Economic Analysis:**

The economic evaluation focused on the rate of obstetrical complications within the BC cohort as compared to a matched cohort of low-risk women in midwifery care who had planned to give birth in hospital. We then estimated the impact on costs to the system to evaluate the financial impact of the BCs providing an alternative to hospitals.

Costs relating to labour and birth care were obtained from the Ottawa Hospital Data Warehouse and the provincial case costing initiative (OCCI)<sup>2</sup> with the data stratified by epidural/anesthetic use, parity, induction of labour (yes/no), use of augmentation and types of delivery (including a breakdown by C-section, spontaneous vaginal birth and assisted birth by vacuum or forceps).

Other costs related to birth included: NICU costs, emergency transport fees<sup>38</sup>, physician's fees and medication costs.<sup>39</sup> NICU costs were also obtained from Ottawa Hospital Data Warehouse and stratified by gestational age at birth. Costs include all accumulated direct and indirect costs during a NICU stay.

Analyses were conducted from the viewpoint of the Ontario healthcare system. However, the costs per birth from the BC were unavailable so only costs from the hospital sector were included.

For this analysis, BORN data was used to obtain the clinical information and number of events needed for cost modelling. Place of birth was defined as the 'planned location of birth', not the location where the birth ultimately took place. This means that all women who were included in the BC cohorts we costed for the BC, not the hospital. However, if a woman was transported the actual location of birth was included in the dataset as a flag so that it could be considered as a sensitivity analysis. All record-level data were de-identified prior to use and only hospital birth data from the province of Ontario were considered in the analysis.

All of the economic analyses were conducted using Statistical Package for the Social Sciences (SPSS version 23) and Microsoft Excel (version 12).

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## RESULTS

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### 1. General characteristics of the Birth Centre and matched cohort

During the pilot project year, 495 women were admitted to a BC-- 175 in Ottawa and 320 in Toronto. To qualify for admission, women were expected to have a full-term pregnancy with a singleton fetus in a cephalic presentation and the expectation of an uncomplicated labour and healthy newborn. Table 4 presents the characteristics of the women included in the evaluation project.

Admission criteria varied slightly between the centres with Toronto accepting women attempting trial of labour after previous cesarean section while Ottawa did not. The OBWC guidelines restricted admissions to women with a pre-pregnancy BMI at or below 40, while Toronto did not specify.

**Table 4 - Characteristics of women admitted to the Birth Centres**

	<b>Birth Centre Admissions N (%)</b>	<b>Matched cohort admissions N (%)</b>
<b>Number of women</b>	495	1980
<b>Number of women who gave birth in the BC</b>	373(75.4)	0(0.0)
<b>Transports to hospital (maternal or neonatal)*</b>	<b>130 (26.3)</b>	<b>12(0.6)</b>
Maternal (BC n=121)		
--Nulliparous	101 (83.5)	4(50.0)
--Multiparous	20(16.5)	4(50.0)
Neonatal (BC n=16)		
--Nulliparous	15(93.8)	3(60.0)
--Multiparous	1(6.2)	2(40.0)
<b>Age range</b>		
< 20	10 (2.0)	25(1.3)
20-24	38(7.7)	151(7.6)
25-29	113(22.8)	468(23.6)
30-34	209(42.2)	836(42.0)
35-39	115(23.2)	452(22.8)
≥40	10(2.0)	48(2.4)
<b>Total</b>	<b>495 (100)</b>	<b>1980 (100)</b>
<b>BMI category (kg/height m<sup>2</sup>)</b>		

	<b>Birth Centre Admissions N (%)</b>	<b>Matched cohort admissions N (%)</b>
<21	192(38.8)	533(26.9)
21-25	217(43.8)	928(46.9)
26-30	64(12.9)	337(17.0)
31-35	14(2.8)	110(5.6)
36-40	4(0.8)	44(2.2)
≥ 41	4(0.8)	28(1.4)
<b>Total</b>	<b>495 (100)</b>	<b>1980 (100)</b>
<b>Parity</b>		
Nulliparous	292(59.0)	1,168(59.0)
Multiparous	203(41.0)	812(41.0)
<b>Total</b>	<b>495 (100)</b>	<b>1980 (100)</b>
<b>Previous Cesarean Section</b>		
	8(1.6)	108(5.5)
<b>Epidural in Labour</b>		
	78 (15.8)	787 (39.7)
<b>Labour Type</b>		
Spontaneous	486 (98.2)	1973 (99.6)
Induced <sup>^</sup>	9 (0.8)	7 (0.4)
<b>Total</b>	<b>495 (100)</b>	<b>1980 (100)</b>
<b>Augmentation</b>		
Yes	62 (12.5)	485 (24.5)
No	433 (87.5)	1495 (75.5)
<b>Total</b>	<b>495 (100)</b>	<b>1980 (100)</b>
<b>NICU admission</b>		
	27 (5.5)	141 (7.1)
<b>Delivery Type</b>		
Spontaneous vaginal	435(87.9)	1567(79.1)
Assisted - Vacuum/ forceps+	22(4.4)	174(8.8)
Cesarean section+	38(7.7)	239(12.1)
--primary	37(97.4)	207(86.6)
<b>Total</b>	<b>495 (100)</b>	<b>1980 (100)</b>

Missing data on some clinical parameters means totals do not always equal 100%

\*in some instances both mother and newborn were transported

<sup>^</sup>pharmacologic induction only: includes only cases where oxytocin or prostaglandin were used in the hospital which may have followed transport from a BC

+ any assisted vaginal birth or cesarean section was done in hospital

There were no cases of maternal mortality. In regards to fetal mortality, one woman was transported to the referral hospital shortly after admission to the BC when no fetal heartbeat could be identified.

Of the women (or their infants) who were transported to hospital from the BC (n=130), 33.8% (44/130) were transported by Emergency Medical Services (EMS) and 83.5% (101/121) of these women were nulliparous. The matched cohort of midwifery births had an EMS utilization rate of less than 1% (5/1980) – of which 4 used EMS to get to the hospital in labour and 1 for a postpartum newborn complication.

Rates of intervention (epidural, labour augmentation, assisted vaginal birth, cesarean section and NICU admission) were higher in the matched midwifery birth cohort across the board.

## **2. Quality Framework Results**

Subsequent results are presented in the groupings below which represent the criteria used to guide indicator selection.

### **2.1 Demonstration of adherence to provincial/national guidelines**

#### **A. Fetal Surveillance via intermittent auscultation (IA)**

Women admitted to a BC and not transported during the intrapartum period had an IA rate of 98.4% (365/371). In the low risk matched cohort of hospital admissions, the IA rate was 42.4% (838/1978).

#### **B. Breastfeeding**

Of women who intended to breastfeed and delivered at the BC, 85.1% (314/369) achieved a successful latch or had the opportunity for successful latch within two hours of their baby's birth. The cohort of women admitted to a BC regardless of the actual location of their birth had a slightly lower rate at 83.2% (400/481). In the matched cohort, the rate was 80.5% (1583/1966).

#### **C. Normal Birth**

Overall rates of normal birth among all three categories (described on p. 14), were higher in the women who laboured and birthed in a BC than in the matched cohort of hospital admissions. In the broadest of normal birth classifications, 91.4% (341/373) of those who delivered in a BC experienced a normal birth. For normal birth with minimal interventions, 89.1% (326/366) met the criteria and 60.7% (222/366) experienced birth with no interventions. For those women admitted to a BC (including those transported), the respective rates were 78.9% (390/494); 69.2% (332/480) and 47.4% (226/477). In the matched cohort the corresponding rates were 69.2% (1362/1968), 33.4% (650/1948) and 21% (409/1948).

## **2.2 Demonstration of safe care**

### **A. Appropriate admissions**

Contraindications for BC admission, as per the admission policies, were identified in 3.2% (16/495) of women admitted. Only two of these cases were also identified as having outcomes that could be considered markers for severe morbidity as per the protocol for Indicators 4 and 5. After further chart review, neither of these cases met criteria for severe morbidity.

### **B. Transport**

Table 5 demonstrates primary reason for transport during the evaluation period and the contribution of the indication to the overall rate of transport. Maternal and/or newborn transport to hospital occurred in 26.3% (130/495) of admissions to the BCs - 24.4% (121/495) of these transports had a maternal indication, and 3.2% (16/495) had an indication related to the neonate. The maternal urgent transport rate – defined as any transport for any indication other than pain management and prolonged labour – was 15.6% (77/495) representing 63.6% (77/121) of all maternal transports. Prolonged labour was the most frequent reason for transport to hospital, with 8.9% (44/495) of admissions transported, an equivalent of 36.4% (44/121) of all maternal transports.

**Table 5 - Frequency of reason for maternal/newborn transport among admissions to birth centres (Indicators 4 and 5)**

<b>Maternal and Newborn Transport Indications</b>	<b>Proportion of transport by specific indications (N = 495)</b>	<b>Contribution of the specific transport indication to overall transport rate (N =121)</b>
<b>Maternal</b>	<b>N (%)</b>	<b>N (%)</b>
Fetal well-being concerns	20(4.0%)	20 (16.5%)
Pain management	13(2.6%)	13(10.7%)
Prolonged labour	44(8.9%)	44(36.4%)
Other maternal conditions or complication	19(3.8%)	19(15.7%)
Other fetal condition or complication	10(2.0%)	10(8.3%)
Neonatal condition/complication	2(0.4%)	2(1.7%)
Postpartum hemorrhage	12(2.4%)	12(9.9%)
Other maternal clinical indication	1 (0.2%)	1(0.8%)
	<b>Proportion of transport by specific indications (N = 495)</b>	<b>Contribution of the specific transport indication to overall transport rate (N =16)</b>
<b>Newborn</b>	<b>N (%)</b>	<b>N (%)</b>
Respiratory distress	7(1.4%)	7 (43.8%)
Maternal clinical indication	3(0.6%)	3(18.8%)
Other neonatal clinical indication	6(1.2%)	6(37.5%)

### **C. Maternal or newborn morbidity/mortality:**

We identified 10.1% (50/495) of admissions that met pre-defined criteria for review because of markers for potential severe morbidity or mortality (Table 6 below). After review we found that in 92% of these cases (46/50) there was clear documentation of appropriate risk screening and care aligned with protocols. In 8% (4/50) of these cases there was a discrepancy between the decision to admit the client and the relevant protocols describing admission criteria. From the charts evaluated it could not be confirmed that admission criteria were met. None of these cases resulted in mortality, nor did data in the BIS demonstrate any prolonged impact up to the six week point of discharge from midwifery care.

Two factors which represent limitations on the review process could impact conclusions drawn from these cases. Final booking processes for each BC require submission of the Ontario Antenatal Record in advance of the expected due date. A form is submitted with the record that

notes intent to admit to the BC and is reviewed and signed by the Clinical Director. The charts provided to the reviewer therefore contained, in most instances, Antenatal Records which included clinical events only up to 35-36 weeks. It is possible that risk factors identified before this time period were addressed and resolved prior to admission, which was not available to the reviewer. The reviewer was not aware that a separate form was used to confirm admission criteria, and did not include that form in the ethics application or request it from the BCs. During the chart review a documented risk assessment was questioned, and the process came to light.

Outcomes were generally excellent in the BC Cohort. There was only one identified case of mortality – an intrauterine demise that was identified shortly after admission and transported to hospital and not related to intended place of birth. Each BC outlined lengthy protocols for quality assurance and chart review to the Working Group. The College of Midwives of Ontario as the regulating body had performed two review processes prior to completion of the Working Group Review.

**Table 6 –Severe maternal and neonatal morbidity/mortality events in the Birth Centre cohort (n=50)\***

Severe Maternal Morbidity		Severe Neonatal Morbidity/Mortality	
Clinical Event	#	Clinical Event	#
Severe hemorrhage requiring transfusion or hysterectomy In the absence of timely CIHI data, any hemorrhage resulting in a transport from the Birth Centre and/or associated with a hospital stay greater than 48 hours was used as a proxy.	9	Apgar < 4 at five minutes	0
Uterine rupture	0	Chest compressions during resuscitation	1
Eclampsia	0	Assisted ventilation > 24 hours	0
Obstetric shock	0	Intraventricular hemorrhage	0
Fourth degree laceration	1	Meconium aspiration	0
Sepsis In absence of timely CIHI data, any BC admission with fever or perinatal infection were used as a proxy.	6	Significant birth trauma: fracture, hemorrhage	0
Obstetric embolism	0	Sepsis	0
Cerebrovascular event	0	Seizures	0
Cardiovascular event	0	Unexpected major congenital anomaly	1
Renal failure	0	Small for gestational age - ≤ 3%	9
Ventilator support	0	Large for gestational age - ≥ 97%	10
ICU admission	0	NICU admission greater than 48 hours	7
Transfer to hospital for non-labour related event	0	Hospital admission or readmission within 4 weeks after discharge from a BC.	8
		Intrauterine fetal demise	1

\*Numbers add up to more than 50 as some cases had more than one qualifying event

### 2.3 Clinical relevance to midwifery stakeholders

#### A. Client satisfaction

In total, 700 women in midwifery care from January 31<sup>st</sup> 2014 to February 3<sup>rd</sup> 2015 consented to receive a survey. The survey response rate was 54.3% (380/700). Of those who responded, 47.3% (188/380) intended to give birth at a BC, 36.6% (139/380) were clients ultimately admitted to a BC, and 192 laboured either at home or in a hospital.

Almost half of respondents (47.9% - 182/380) were between the ages of 31 and 40, 22.6% (86/380) were between 36 and 40 and 22.4% (85/380) were aged 26 to 30. Of note, there were no respondents younger than 20 or older than 45 years. Just over half of respondents (53.7% - 204/380) completed college/university while 29.2% (111/380) had a post graduate degree. Only one respondent reported less than a high school education. The majority of respondents (79.7%

-303/380), were married, with an additional 17.4% (66/380) of respondents living with a partner. Most respondents, 78.7% (299/380), indicated English as their mother tongue, while 9.2% (35/380) indicated French, and 12.1% (46/380) selected “other”.

Of the 380 women, more women were nulliparous as compared to multiparous (53.2% versus 46.1%, respectively). This difference was more marked in the BC group, where 58.5% (110/188) were nulliparous, which is reflective of a higher rate of nulliparous women in the BC cohort.

In the survey of respondents intending to birth at a BC, 65.4% (123/188) ultimately gave birth in a BC, 9.6% (18/188) at home and 24.5% (46/188) in hospital. In the cohort of women planning a home or hospital birth, 24.5% (47/192) gave birth at home, 68.2% (131/192) at a hospital and 6.8% (13/192) in a BC.

Of the respondents, 83.9% (319/380) reported a spontaneous vaginal birth, 5.3% (20/380) an assisted vaginal birth and 10.5% (40/380) a caesarean section. The proportion of women who reported a spontaneous vaginal birth was higher in the BC group, 91.0% (171/188), with 3.2% (6/188) reporting an assisted vaginal birth and 5.9% (11/188) a caesarean section. This compares to the General Midwifery cohort, with proportions of 77.1% (148/192), 7.3% (14/192) and 15.1% (29/192), respectively. In the BC group, 73.9% (139/188) reported that their birth went as hoped either “very much” or “extremely so” as compared to 70.3% (135/192) amongst those in the General Midwifery cohort. Among multiparous women, this proportion was higher, with 85.1% (149/175) indicating their birth had gone as they had hoped. For multiparous women in the BC group, 89.7% (70/78) reported their birth had gone as they had hoped, compared to 81.4% (79/97) in the cohort of planned home or hospital birth. For the 18 respondents who were transported from a BC to a hospital in labour, all stated they understood the reason for transport either “very much” or “extremely so.” Over three-quarters (77.8%, 14/18) of these respondents said they would have changed nothing about the experience.

Of the 380 respondents, the mean Composite Satisfaction Score (CSS) was 19.2 out of 20 (SD 1.6), with a mean of 19.3 (SD 1.3) in the BC group, and 19.1 (1.9) in the home/hospital group. Scores were slightly higher for multiparous women as compared to nulliparous women, with means of 19.4 (1.3) and 19.0 (1.9), respectively, and those with a spontaneous birth had higher mean values as compared to those who had a caesarean section or an assisted vaginal delivery (means of 19.4 (1.5), 18.4, (2.3) and 18.3 (2.0) respectively). The differences between the BC and home/hospital group were not statistically significant, however, the differences between the groups based on parity and type of birth were statistically significant. The BC group was further subdivided into two groups, with one group comprising the women who were admitted into a BC in labour (n=139) and the other, those women who were not (n=45). Responses to the question on admission to the BC were missing for 4 women and therefore they were excluded from this subgroup analysis. Among those women who intended to give birth in a BC, satisfaction was higher in the women admitted to the BC as compared to those who were not (19.5 (1.2) versus 19.0 (1.6),  $p < 0.05$ ).

In the BC group, 95.2% (179/188) stated they had met at least one of the midwives or students who attended labour and birth. Of these, 79.8% (150/188) stated they had met this person “many times”, 10.6% (20/188) “a few times” and only 8% (15/188) once or twice. These findings were comparable to those in the home/hospital group, where 96.4% (185/192) reported

meeting one of the midwives or students prior to labour, 78.1% (150/192) of these “many times”, 8.3% (16/192) “a few times” and 5.7% (11/192) once or twice.

Among those in the BC group, 83.5% (157/188) indicated that they would choose to give birth in a BC, should they become pregnant again. In the home/hospital group, 81.3% (156/192) of women indicated that they would give birth at home or in a hospital should they become pregnant again, results which suggest that the majority of women were satisfied with their chosen location of delivery.

The next section of the survey focused exclusively on the experiences of women who were admitted to a BC. Among the 139 women who completed a survey and were admitted to a BC, 82 were in the OBWC and 57 were in the TBC. In regards to general logistics, we asked about accessibility. Overall parking at each facility was found to be sufficient with 79.1% (110/139) of respondents describing access to parking as “plenty” and 14.4% (20/139) as sufficient. The TBC group indicated a higher rate of “n/a” to this question at 12.3% (7/57), a predicted outcome given the density of population and public transportation in that city. Most respondents in the TBC group reported the Centre to be accessible by public transport – 45.6% (26/57) described this as “easy” and 15.8% (9/57) “fairly accessible”. Neither centre was rated as “difficult to access” by any respondent. Overall, most women described distance to travel as “fairly close” at a rate of 61.9% (86/139), while only 11.5% (16/139) stated the location was “not at all close” to home.

In regards to physical accessibility, the BCs were considered “very accessible” by 97.1% (135/139), and “very private” by 92.1% (128/139) of respondents. There were virtually no concerns about cleanliness, with 98.6% (137/139) rating the facilities “extremely clean” and none “not at all clean”. Overall, the rooms were considered adequate for needs in labour by 100% of women.

A selection of responses to the open ended questions on the survey are found in Appendix 7

## **B. Alignment with the model of care**

### **1) Known midwife**

From the client experience survey, the number of women who reported they had met at least one of the midwives or midwifery students who attended labour and birth was high - 95.2% (179/188) in the BC group and 96.4% (185/192) in the general midwifery cohort. Of these, over 75% of both groups (79.8% in BC cohort and 78.1% in the general midwifery cohort) stated they had met this person “many times”.

### **2) One-to-one care**

Client survey respondents were asked how much time their midwife or student midwife was with them during their labour and birth. Over 90% (351/380) indicated they were attended either “at all times” or “most of the time”, with only 2.1% (8/380) selecting the response “I was often unattended by my midwife during labour and/or birth”. Within the BC cohort 95.7% (180/188) indicated that their midwife or student midwife was present “at all times” or “most of

the time” with only one noting that she was “often unattended”. In the General Midwifery cohort, 89% (171/192) indicated their midwife or student midwife was present, and 3.6% (7/192) indicated that they were often unattended. Interestingly, the comments section in the survey, available only to women who were admitted to a BC, contained a few comments inferring there was too much presence from the midwife or student midwife: “ *Maybe just have a bit more privacy for me and my spouse having more time on our own without the midwives there the whole time.*” And, “*Maybe most people would want otherwise but I would have liked to have some time with my partner alone without the midwives there the whole time. And maybe call them into the room when necessary.*”

### **C. Integration of learners and other health care providers**

Students were involved in 52.7% (261/495) of labours that occurred in the BC. This rate was higher than in the hospital admission cohort with a rate of 12.2% (242/1980).

Other care providers were present during the labour and/or birth of 24.2% (120/495) of BC admissions, but at only 9.7% (36/373) of births that took place at a BC. This difference likely represents care providers that became involved in the 24.0% (119/495) of maternal transports. In the matched cohort the rate was 37.1% (734/1980) which could reflect increased complexity amongst this group of women, or be associated with a higher intervention rate.

When combined, students and non-midwife care providers were involved in the care of 67.1% (332/495) of women admitted to a BC. This number was lower in the matched cohort at 42.9% (850/1980), likely reflecting the lower rate of involvement of students. Of note, each BC employs BC Assistants who help midwives with care and are therefore becoming integrated into the maternal newborn community. However, presence of these assistants is not currently tracked in the BIS.

### **D. Equity of service**

Midwifery care is provided regardless of health insurance coverage. In Ottawa, 4.6% (8/175) of women admitted to the BC were without OHIP coverage compared to 23.8% (76/320) in Toronto. Among the matched midwifery cohort the rate of non-OHIP was 3.2% (63/1980). To provide context, in the first year of midwifery data collection in the BIS (fiscal 2012-13), 6% of midwifery clients overall were without OHIP coverage - 7.6% in the Toronto Central LHIN and 3.6% in the Champlain LHIN.

The OBWC and TBC had similar proportions of clients in the lowest material and social deprivation indices - 3.6% (6/165) in Ottawa and 3.7% (11/297) in Toronto). For the matched midwifery cohort, 3.3% (1839/1980) were in this category of deprivation.

### **E. Meeting the needs of vulnerable populations**

Early in the development of the Birth Centres, each group identified priority populations they intended to serve. In Ottawa, 4.0% (7/175) of women admitted were from an identified priority group, compared to Toronto at 52.8% (169/320).

The OBWC noted that the identifier was rarely completed on their registration form or birth log resulting in a lack of data to evaluate if they were meeting their goal.

## **2.4 Assessment of impact on local health services system**

### **A. Access to services**

The birth centres kept a log of those women planning to give birth at each location. Overall 1229 women registered to use one of the BCs during the pilot year and 40.3% (495/1229) went on to actually be admitted. This represents an almost 60% loss from registration in pregnancy to an admission. Of this drop-off rate of 734/1226, 75.4% (554/734) were admitted to a hospital, 23.4% (172/734) had their baby at home. Outcome data were missing for 8 registrations. Only one woman who intended to use a BC could not be admitted due to a planned building maintenance required by the landlord of the facility. No women appeared in labour without being in midwifery care during the pilot year.

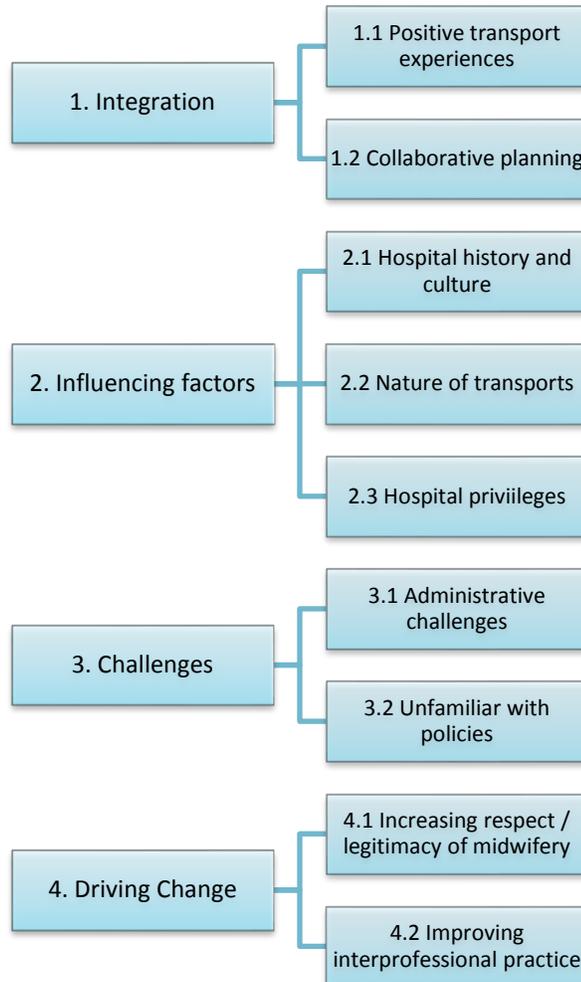
Although during indicator development we anticipated no issue obtaining data regarding the rate and frequency of reasons why a client could not be registered (Indicator 12), the BCs found it challenging to collect this information. Neither BC had a policy of limiting registrations of eligible women.

### **B. Transport, EMS utilization, integration with the existing system, provider experience**

Between February and April 2015, we conducted four focus groups at four different hospitals to gather feedback from health care providers (HCPs) involved in the BCs. Additionally there was one workplace interview for a participant unable to attend a focus group. A total of 24 HCPs participated: 2 registered nurses, 2 nurse educators, 5 nurse managers, 9 registered midwives (3 of whom were BC staff members), 2 obstetricians, 3 Paramedics and one Paramedic Superintendent.

Participants reported that the BCs were well integrated into their maternal newborn communities, and experiences with maternal-newborn transports have been very positive. Four main themes and their respective sub-themes were identified, and are presented below: integration, influencing factors, challenges, and driving change (Figure 1).

**Figure 1. Main themes and sub-themes from the focus groups**



## **1. Integration**

Participants' descriptions of how transports between the BCs and the hospitals function reflect a well-integrated system with need for only minor modifications. This integration is evident in participants' consistent descriptions of how the transports between BCs and hospitals have gone very well. This degree of integration after only one year is largely attributed to the extensive collaborative planning that occurred prior to the opening of the BCs.

### **1.1 Positive transport experiences**

Participants described positive experiences regarding the transport of women from the BCs to hospitals. One paramedic team member described the overall positive

experience to date and the successful use of ongoing monitoring to further improve the transport process:

*“But the ones [transports] that do happen, I personally find that they work well. I haven’t really received any negative feedback from the medic side in the last little while. They know to contact me if something weird happens. And like I said, from when they first started up, there was maybe two events that... they were minor or they were mitigated early on and since then I haven’t heard anything.” (Ottawa)*

Another participant echoed this positive transport experience, stating that multiple agencies collaborated to make the transports work well:

*“I can say I have been involved in a couple of mother and baby transports where both mom and baby had reasons to be [transported] into the hospital and both of those [transports] went very, very well. There were no issues with [Paramedic Services] and there were no issues with the BC getting the paperwork all together.” (Toronto)*

## **1.2 Collaborative planning**

Participants described the planning of each of the BCs as collaboration between key groups and individuals, including nurses, physicians, midwives, paramedics, administrators, the LHIN, and key stakeholders.

*“I would say that there were actually quite extensive conversations that took place and that I had most of those... or was involved in most of those conversations, but not exclusively just with [name of hospital]. They were conversations happening everywhere and it was really an evolution... I mean there was collaboration on all levels and... and, you know, there were challenges and, you know, different things that needed to be worked through but people were generally, I think, quite cooperative.” (Toronto)*

*“Prior to the opening of the BC, we managed collaboratively with our key stakeholders, so we managed with the nurse manager but also some of the physicians, the obstetricians, about developing our current [transport] protocol. So it was something that we worked really hard and had lots of meetings with to put together and in the end it is our [transport] protocol from the BC to the [name of hospital] but it also explains for the non-urgent [transports]. But it something that we, from scratch, met together collectively, collaboratively to get everyone’s approval for the current protocol that we have.” (Ottawa)*

## **2. Influencing factors**

Despite the finding that the BCs are well integrated into the system, participants described ways in which the context of individual hospitals influenced how easy or difficult it was to achieve this level of integration. Specific hospital factors that influence the ease with which integration was achieved were the hospital history and culture, the nature of the transports, and the presence or absence of midwifery hospital privileges.

### **2.1 Hospital history and culture**

Two of the four hospitals have a longstanding culture of supporting midwifery and participants at these two focus groups felt that the midwives were already integrated

into their system. The participants explained that even prior to the opening of the BCs there was a history of administrators, obstetricians and nursing welcoming midwives at these two hospitals. This existing history and the shared culture of birth as low risk greatly facilitated the integration of the BCs with these particular hospitals.

*“They are part of the regular team so that’s what makes it easy for us and for them.” (Ottawa)*

*“And we have a lot of colleagues who say if they just joined the [name of hospital], how much we do have it good here, how well, supportive and integrated we are at the [name of hospital]. And certainly, for some of us, we’ve only ever worked here but we know how good it is. But to be told by other colleagues that, you know, in other hospitals this is not what the atmosphere and environment is and it’s quite sad because we do think that this place should be everywhere.” (Ottawa)*

*“I think we’ve been pretty collaborative and integrated for a very long time, like we go way back.” (Toronto)*

When a hospital did not have a history of working collaboratively with midwives there were additional challenges to integration of the BC, including providers’ lack of knowledge about midwifery scope of practice:

*“I would say that given some of the experiences I’ve heard about recently, that there is still a lot of misunderstanding about midwifery in this institution here partly because midwives haven’t actually had practice privileges here since [year]. So yes, the [nurses] who worked at the [name of hospital] with [midwives] and worked at the [name of hospital], you know, worked with the initial [midwifery] practice here maybe, but I do think... and it’s not just the nurses, but I think a lot of the residents, medical students, and even obstetricians, some of the newer ones perhaps, aren’t as familiar with [midwifery] scope, how we manage complications. What, you know, all of that. So I think there’s still a long way to go. I really think that...” (Ottawa)*

## **2.2 Nature of transports**

The nature of the transports (non-urgent or urgent) received by hospitals also influenced the ease with which integration was achieved. In each city, one hospital was designated as an urgent transport site for all women requiring a higher level of care. However, if a maternal transport was non-urgent, they would be transported to the hospital where the midwife had admitting privileges. A second hospital in each city was designated to receive all newborns requiring further evaluation (whether urgent or non-urgent).

Therefore, the opening of the BCs meant that certain hospitals became the designated centres for receiving all urgent transports, when they may previously have only received the occasional transport from home births. This formalized relationship necessitated the development of new policies to define processes for transfers of care. These increased efforts were viewed as essential for successful integration of the BC into the system.

Additional efforts for hospitals placed in the position of having to accept all urgent transports, when they previously had not, included the need to provide additional training to emergency department staff.

*“So the simulations we ran [in the emergency department] is what can you do to stabilize the baby until we come to assist? So they’ll call a code pink and we’ll respond into ER. But of course we’re up on [another floor] and it’s going to take us a few minutes to get down there with all our equipment so we’ve left equipment in the ER... So we’ve collaborated with them to make sure that we’ve got enough equipment down there that they can start and then we would assist.” (Toronto)*

In contrast, when the opening of the BC meant that a hospital would now receive non-urgent transports from the BC in addition to the transports from homebirths that they already received, the integration of the BC was described as almost un-noticed.

*“So from our perspective, if they [midwives] were coming in, they were coming in really in no different circumstances than we had previously been dealing with.” (Toronto)*

### **2.3 Hospital privileges**

With multiple MPGs (MPGs) privileged at each BC, and a protocol that all of their urgent transports go to a designated hospital, midwives sometimes had to transport mothers to hospitals not familiar to them. Due to BC transport protocols, participants at two hospitals spoke about the increased frequency with which they were now collaborating with non-privileged midwives. This lack of midwifery privileges at specific hospitals influenced the transport/transfer experience for all providers involved. For example, one participant described the variable levels of communication during transfers due to midwives not being privileged at the receiving hospital:

*“I think that’s also a mixed bag in terms of communication when we’re here. Sometimes... so, for example, I’ve had a situation where I’ve had someone who’s here, who’s a transfer of care and when I’ve come to visit the client postpartum, some people that I talked to, the nurses, the doctors, will give me all the information I need, and some of them will refuse to tell me anything about my clients...” (Ottawa)*

Midwifery hospital privileges were identified as a consideration for midwives when determining the most appropriate receiving hospital, which then had to be further discussed or negotiated with the paramedic, should an ambulance transport be required. One participant explained the importance of avoiding a transport to a hospital where the midwife is not privileged if the woman is stable:

*“...it does affect the kind of relations, the midwife involvement, the kind of continuity of care that’s really the piece. So we do feel that when it is appropriate and the woman is stable, clinical judgement is there, that the postpartum [transport] to the [name of hospital], to the receiving hospital, where the midwife has privileges, is actually really appropriate. And, from the women’s perspectives in the women’s stories, they also state that. So they kind of feel well supported, well cared for by their midwives but also the nurses and the doctors. And they really see that kind of collaboration, the team collaboration together, come together to care for them. So having been involved in two*

*of the postpartum [transports] that's what I've heard from the clients who did come to [name of hospital].” (Ottawa)*

### **3. Challenges**

Overall, participants spoke positively about the integration of the BCs and transport/transfer processes. Generally areas for improvement were described as minor, or “tweaks” to a well-developed system. Based on participants’ previous experiences and the ongoing monitoring, two main areas for improvement were identified: administrative challenges and providers’ unfamiliarity with hospital policies - due to the low number of urgent transports.

#### **3.1 Administrative challenges**

Participants described occasional challenges with not knowing where to fax records or where to receive faxed records. In addition, for one hospital there was a lack of clarity surrounding who should be called prior to transport. Strategies for addressing these issues included regularly updating current policies to reflect the most efficient processes and correct contact information.

#### **3.2 Unfamiliar with policies**

Given the low number of urgent transports, participants from hospitals with large numbers of staff described the challenge of maintaining the staff’s familiarity with policies. Reviewing and debriefing on previous transports and reminding staff about policies and processes was identified as a means of maintaining their knowledge.

*“It doesn’t happen very often so you know what it’s like. There’s so many changes and so many updates and how do we file things and keep things organized and when an urgent [transport] happens you don’t have time to sit and read it.” (Ottawa)*

Despite having carried out simulations together prior to BC opening, some midwives identified concerns about lack of familiarity in a hospital in which they do not hold privileges. This concern was echoed by hospital staff members.

### **4. Driving Change**

Participants described important changes driven by the creation and integration of the BCs, most notably: a sense of increased respect or legitimacy of the midwifery profession, and improved inter-professional practice.

#### **4.1 Increasing respect/legitimacy of midwifery**

Many participants perceived that the creation of the BCs has increased the visibility and credibility of the midwifery profession, both to the public and to other health care professionals, allowing these groups to learn more about midwifery and ultimately increase respect for their education and practice.

*“And more understanding in the community of what midwifery is. We've been here for, you know, over 20 years and then all of a sudden we have a BC, people, “Oh, midwives.”... It legitimizes somehow.”(Ottawa)*

*“I think it’s caused the constant education, both in the communication centre and maybe with some paramedics to understand the scope of practice... now we’ve been able to*

*take it head on and go, you know, this is... these people are credentialed and licensed and here's all their skill sets and I think that's been great." (Toronto)*

*"It elevated the profession for sure, the midwifery. I think just having the facility in itself speaks volumes to the interest, the buy-in, the respect and the credibility of midwifery." (Toronto)*

#### **4.2 Improving inter-professional practice**

Participants described the planning, implementation, and monitoring of the BCs as a motivating force for collaboration between different groups and individuals, including nurses, physicians, midwives, paramedics, administrators, the LHIN, and key stakeholders. Some participants described few collaborative opportunities with other professional groups prior to the BC, despite working alongside one another in clinical care, and thus perceived that the BC created a positive opportunity for collaboration.

More specifically, the protocols implemented for transports between the BC and hospitals facilitated improved inter-professional practice and teamwork. For instance, participants described opportunities for clinicians to train together which increased their understanding of other professions and ultimately improved clinical practice.

*"So one is around inter-professional relationships that living, learning the [BC] has been a better collaboration in relation to the paramedic services. That's the biggest change in terms of level of awareness and collegiality and understanding." (Toronto)*

*"So I think it has had a ripple effect, especially for those of us that had that opportunity to be involved in that training and drilling beforehand. I just learned a lot that I didn't understand before about how paramedic services work and sort of what they're thinking and what their priorities are and what their needs are when they come in and see. I feel like I'm better equipped to receive them because of that training opportunity that we had. So I value that. I wish that they had that in school. It felt like sort of a gap that I didn't know was there and then when I got to do it, it was really informative and for that kind of communication that's so crucial in emergencies." (Toronto)*

*"I've seen the biggest impact into inter-professional interactions from the BC. And it may not be directly, but I think the BC provided this gateway to make other things happen." (Ottawa)*

*"So we try to make it as interdisciplinary as possible and we just try to run as many drills as we can to make sure whoever wants to attend that they have the invitation. And that helps with the equipment, right. So in terms of if we're all kind of training within [name of hospital], it's like what equipment are we using? So when you're coming, you know, to [name of hospital], either straight up to the floor...or if you're going to the Emerg, it's, you know, kind of transferring their comfort level of ... we're all using the same terminology, there's a whole framework right. We're all speaking the same language." (Toronto)*

The most commonly identified improvement in inter-professional practice brought about by the creation of BCs was between paramedic services and midwifery. Although

these two professions had previously worked together during home birth transports the new facilities and the associated policies led to an opportunity to formalize this collaboration, identify areas for improvement, and improve inter-professional practice. For example, many participants described the importance of defining the role of the paramedic and midwife and learning to share a common language to improve practice.

*“So I involved our dispatch centre as well. I gave [Name 3] the script that the dispatchers go through, so when they call 911, they know, these are the questions they’re going to be asking you. So prepare yourself when you call 911, so you’re not fumbling or whatever. And you know exactly what to say to the dispatcher to get the resources that you need. Because if you say certain things, you may get a fire truck as well so I don’t think you want a fire truck here necessarily. So say these certain things. We kind of scripted it out for them. So I don’t know where they’ve got it posted but I know that we haven’t had a problem with dispatch as well, so I... I was working with her at one point in time. I was asking just randomly and it was shortly after the program got up and running and they said they hadn’t had any problems with them so... they have the script as well. So again, that’s about sharing information.” (Ottawa)*

*“We’ve identified things that we can do better. We’ve identified gaps in terminology between the people talking on the phone, so we’ve been able to provide education. Yeah, it’s been very, very helpful. Had we not done that, I could see that we could have had conflicts simply because we didn’t understand each other and why we were doing things a certain way and I think we’ve been able to completely avoid that or interrupt it if it was going to start because we’ve been able to go, “Oh, why’d they do that?” (Toronto)*

## **Focus Group Summary**

Focus group participants describe positive experiences transporting mothers and/or newborns from the BCs to hospitals. These positive experiences are widely attributed to the collaborative planning, training and communication that occurred. The ease with which this level of integration has been achieved is dependent on specific hospital characteristics that include (1) whether the hospital has a history of clinical leadership that is inclusive of midwifery, (2) whether the staff at the hospital are experienced in working alongside midwives in low risk situations, and (3) whether the hospital grants admitting privileges to midwives. Participants described the need for only minor improvements to administrative processes and identified the challenge of keeping large numbers of staff updated with respect to urgent transport policies. Interestingly, participants consistently described the planning and opening of the BCs as a driving force in legitimizing midwifery and improving inter-professional practice between all providers.

### 3. Economic Evaluation

Our team was asked by the funder to evaluate the cost implications of delivery in a birth centre versus a hospital. The aim was to evaluate the financial impact of the BC model as an alternative to the hospital setting and to examine cost avoidance. We looked specifically at the incremental effects of a BC on the probability of the complication or intervention including caesarean section, episiotomy, epidural, assisted vaginal birth, infection and readmissions/admissions, NICU admissions, emergency department visits, transport cost, severe morbidity and mortality for both mother and infant.

Analyses were conducted from the perspective of the Ontario healthcare system. Costs per birth from the BC were not estimated, and were expected to be higher in a start-up years.

#### Baseline Probabilities

A discussion of the baseline characteristics of the BC cohort and the matched hospital birth cohort were provided previously presented in Table 4. Table 7 provides the detail about women who were transported to hospital following a BC admission.

**Table 7: Baseline characteristics for the economic analysis**

	<b>Birth Centre births N (%)</b>	<b>BC to Hospital N (%)</b>	<b>Total BC clients N(%)</b>	<b>Matched midwifery cohort N (%)</b>
Number of women	374	121	495	1980
<b>Parity</b>				
Nulliparous	186 (49.7)	106 (87.6)	292 (59.0)	1168 (59.0)
Multiparous	188 (50.3)	15 (12.4)	203 (41.0)	812 (41.0)
<b>Labour type</b>				
Spontaneous	371 (99.2)	115 (95.0)	486 (98.2)	1973 (99.6)
Induced	3 (0.8)	6 (5.0)	9 (0.8)	7 (0.4)
Labour augmentation	0	62 (51.2)	62 (12.5)	485 (24.5)
Epidural analgesia	0	78 (64.5)	78 (15.8)	787 (39.7)
<b>Delivery Type</b>				
Spontaneous	374 (100.0)	61 (50.4)	435 (87.9)	1567 (79.1)
Vacuum/ Forceps	0	22 (18.2)	22 (4.4)	174 (8.8)
C-section	0	38 (31.4)	38 (7.7)	239 (12.1)
EMS transport to hospital	24 (6.4)	20 (16.5)	44 (8.9)	5 (0.3)
NICU admission	17 (4.5)	10 (8.3)	27 (5.5)	141 (7.1)
<b>NICU mean (hrs)</b>				
Level 2	76.6	15.7	48.2	79.3
Level 3	101.0	-	101.0	99.9

Level 3 NICU costs ranged from \$509.80 per day for infants who were 39-41 weeks' gestation at birth to \$1,029.80 per day for infants who were 37-38 weeks' gestation. Emergency transport fees per transport were calculated to be \$254.90 and were obtained from Emergency Medical

Services (EMS) and updated by the Bank of Canada inflation calculator<sup>6</sup> from 2012 to 2014. Physician fees were \$498.70 for vaginal deliveries, \$67.80 for augmentation, \$535.60 for a vacuum or forceps delivery and \$579.80 for a C-section delivery. Medication costs for opioids were calculated at \$6.40, epidural and spinal- epidural anesthesia was \$338.0, and spinal anesthesia was \$382.98.

**Table 8 – Costs associated with birth and interventions**

<b>Birth Costs</b>	<b>Epidural</b>	<b>No Anesthetic</b>
<b>Nulliparous women</b>		
<b>Spontaneous labour with no augmentation</b>		
C-section delivery	\$6,470.60	
Spontaneous vaginal delivery	\$4,015.60	\$2,075.00
Vacuum or forceps delivery	\$4,788.70	\$2,757.60
<b>Spontaneous labour with augmentation</b>		
C-section delivery	\$5,620.50	
Spontaneous vaginal delivery	\$3,579.60	\$2,700.60
Vacuum or forceps delivery	\$4,086.40	
<b>Induction of labour:</b>		
C-section delivery	\$7,161.50	
Spontaneous vaginal delivery	\$5,217.60	\$4,289.10
Vacuum or forceps delivery	\$5,577.60	\$5,742.30
<b>Parous women</b>		
<b>Spontaneous labour with no augmentation</b>		
C-section delivery	\$4,344.50	
Spontaneous vaginal delivery	\$2,694.00	\$1,789.00
Vacuum or forceps delivery	\$3,450.80	\$3,929.00
<b>Spontaneous labour with augmentation</b>		
C-section delivery	\$4,412.00	
Spontaneous vaginal delivery	\$2,612.90	\$2,317.60
Vacuum or forceps delivery	\$3,038.20	\$1,978.80
<b>Induction of labour:</b>		
C-section delivery	\$5,639.70	
Spontaneous vaginal delivery	\$4,184.70	\$3,286.80
Vacuum or forceps delivery	\$4,213.70	\$4,843.30

**Table 9 - Other associated costs**

Other Costs	Costs \$
EMS Service	\$ 254.90
Physician's Fee	
Vaginal delivery	\$498.70
Augmentation	\$67.80
Vacuum/ forceps	\$535.60
C-section delivery	\$579.80
37-38 weeks gestation per day	
NICU level 2	\$746.80
NICU level 3	\$1029.80
39 - 41 weeks gestation per day	
NICU level 2	\$568.10
NICU level 3	\$509.80
Medication costs *	
Epidural	\$338.00
Spinal	\$383.00
Spinal-epidural combo	\$338.00
Opioids	\$6.40

\*Includes medication costs and anesthesiologist fees to administer the medication (if applicable)

Table 10 compares the incremental costs of giving birth in a hospital setting. The average hospital costs per woman for which a BC birth was intended was \$1,254.1 (95% CI: (\$1,021.3 - \$1,486.8) and average hospital costs per woman where a hospital birth was intended was \$3,775.9 (95% CI: \$3,686.8 - \$3,865.0). The incremental cost of the hospital based cohort compared to the BC cohort was \$79.6 for NICU (95% CI: -\$2.3 - \$161.5), (-\$24.6 for transportation costs (95% CI:(- \$31.5) – (-\$17.6)), labour and birth costs \$2,378.2 (95% CI: \$2,323.8 - \$2,432.6) and \$88.6 (95% CI: \$80.9 - \$96.3) for medication costs. Thus, the incremental hospital costs from the hospital setting compared to the BC cohort was \$2,521.9 (95% CI: \$2,418.3 - \$2,625.4); though, this excludes the costs of deliveries in the BC which were unknown.

To determine the maximum cost that a BC delivery can be for it to remain cost saving, we divided the incremental cost for the hospital based cohort by the proportion of patients in the BC cohort who delivered at the BC. The maximum cost for a delivery at the BC, for the BC to remain cost saving compared to the hospital, is \$3,337.8 (95% CI: \$3,200.4 - \$3,474.9).

**Table 10 - Average costs per birth delivery mode (Group mean  $\pm$  95% CI)**

	<b>BC only (n=372)</b>	<b>BC to Hospital (n=120)</b>	<b>All BC (n=492)</b>	<b>Hospital (n=1959)</b>	<b>Incremental Cost of Hospital Setting</b>
<b>NICU costs</b>	\$69.70	\$21.50	\$57.90	\$137.50	\$79.60 (-\$2.3 - \$161.5)
<b>Transport costs</b>	\$17.80	\$45.90	\$24.70	\$0.10	-\$24.60 (-\$31.5 - -\$17.6)
<b>Labour and birth costs</b>	\$0	\$4,564.80	\$1,115.90	\$3,494.00	\$2,378.20 (\$2,323.8 - \$2,432.6)
<b>Medication costs</b>	\$0	\$227.50	\$55.60	\$144.20	\$88.60 (\$80.9 - \$96.3)
<b>Average cost per patient</b>	\$87.50 (\$32.8 - \$142.2)	\$4,859.70 (\$4,581.1 - \$5,138.3)	\$1,254.10 (\$1,021.3 - \$1,486.8)	\$3,775.90 (\$3,686.8 - \$3,865.0)	\$2,521.90 (\$2,418.3 - \$2,625.4)

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## DISCUSSION

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Care in the Ontario BCs during the pilot year met recommendations associated with provincial/national guidelines, as well as international standards. Rates of intervention were lower among BC admissions than those planning hospital births. While selection bias may contribute to this finding (highly motivated, low risk women choosing midwifery care and a BC experience), similar rates occur in the literature. Outcomes from the American National Birth Centre Study demonstrate a 93% SVB rate, a 1% assisted vaginal birth rate and a 6% caesarean birth rate among a much larger cohort of 15,574 women.<sup>40</sup> The 2010 Cochrane review on alternative institutional settings for low-risk birth also demonstrated an increased likelihood of SVB with decreased use of analgesia/anesthesia and oxytocin augmentation.<sup>9</sup>

Use of intermittent auscultation for fetal monitoring was high, meeting standards established by the National Centre for Clinical Excellence for fetal assessment in labour for low-risk women.<sup>41</sup> Women intending to breastfeed were provided with the opportunity to initiate this shortly after giving birth, whether in a BC or having been transported to a hospital. While the WHO/Unicef Baby Friendly Guidelines<sup>42</sup> recommend that an attempt to breastfeed happen within 30 minutes of birth, the evaluation measured this indicator through picklist options available within the BIS. These guidelines are accepted and promoted by the Breastfeeding Committee for Canada<sup>43</sup>. Members of the Working Group who are also BIS users noted that this rate is likely under reported due to design of the *early attachment and feeding* data element. Users are required to take the extra step of clicking open a box in order to visualize all picklist options.

Rates of Normal Birth, though without national/or international targets, were also high. A limitation of this particular analysis was identified during presentation of preliminary results but could not be fully verified within the timelines of this project. The Normal Birth definitions require the opportunity for early attachment practices such as skin-to-skin contact or latch and the limitation of this is described above. In fact, this would lead to the exclusion of women who might otherwise meet the requirements for Normal Birth. In order to allow for this potential data entry discrepancy the data were run a second time including the options of “opportunity to latch in first hour” and “latch attempted in second hour”. When calculated without excluding these items rates were higher at 83.3% for those admitted and 85.1% for those delivered at a BC. The matched cohort of hospital admitted clients demonstrated a latch achieved rate of 62.3% using the initial criteria, and 81.6% once adjusted to include more pick-list options. Further analysis is required. It is important to note that overall incidence of intervention was higher in the hospital cohort – augmentation, epidural, assisted vaginal and caesarean birth, which supports international literature on lower intervention rates in of out-of-hospital birth.<sup>8,11,13</sup>

The identified rate of “known midwives” support the statement that the model of care provided within the BCs has had no impact on the provision of continuity of care central to Ontario midwifery model.<sup>44</sup>

Transport rates for the BC cohort were similar to some of the literature, but higher than other studies. Hutton’s much larger recent study of 11,493 planned home births in Ontario had a 24.4% rate of transport to hospital, significantly lower in the multiparous population (14.3%) than in the nulliparous group (45.6%).<sup>13</sup> Ontario BC transport rates were overall higher than

Hutton's study, but significantly lower for nulliparous women. Stapleton, Osborne and Illuzi demonstrated a lower transport rate from the American Birth Centres, at about half the rate (12% after BC admission) again, with a much higher sample size (15,574).<sup>40</sup> Both these studies, as well as data from the BC pilot year, also described a low neonatal transport rate, demonstrating appropriate care and risk assessment in labour. It is possible that the small sample size during this pilot, a higher rate of nulliparous admissions (59.9% in the BC Evaluation compared to 47.2% in the Stapleton study) and a very-cautious approach in a new clinical setting might have contributed to higher transport rates. As in the Stapleton paper, the largest portion of transports were for prolonged labour.<sup>40</sup>

In this study, rates of morbidity were low among the BC cohort, as they were in the matched cohort of planned hospital births. In general, perinatal asphyxia has an incidence of 1 to 6 per 1,000 live full-term births.<sup>45</sup> Stapleton et al. demonstrated an intrapartum fetal mortality rate of 0.47/1000 among BC admissions and a neonatal mortality rate of 0.40/1000 excluding anomalies.<sup>40</sup> Hutton et al.<sup>13</sup> found no difference in the composite outcome of stillbirth, neonatal death or morbidity with an absolute risk of 0.39% in both the home and hospital groups studied. It is therefore not surprising that there were no serious fetal/newborn problems seen in this relatively small number of low-risk births.

As expected, client satisfaction rates were high in this evaluation. Whether this is related to the type of care provider, low rates of interventions, maternal feelings of control and choice or a combination of factors cannot be determined. In a Canadian study, Chalmers and Dzakpsu found that among women having vaginal births, fewer interventions during labour was significantly associated with higher overall satisfaction with the labour and birth experience.<sup>46</sup> Over 80% of women in this study would choose a BC experience again. However, about the same number of women in the general midwifery cohort would also choose their hospital experience again. This likely reflects the overall positive experience with midwifery care in Canada.<sup>47</sup>

Conclusions cannot be drawn as to why there was a higher rate of women admitted to a BC without OHIP, particularly in Toronto. We speculate that this rate is related to payment. Hospitals required payment for services, while midwifery care in a BC was provided at no cost to the woman.

In regards to integration with learners, both the OBWC and TBC developed relationships with the Midwifery Education Programs to support student involvement, providing exposure beyond what might be usually expected during clinical placements with specific MPGs. Both BCs offered 120-hr, 1 month placements as part of the standard inter-professional Community Placements undertaken as part of the Midwifery Education Program. Midwifery students were also included in peer review processes, emergency drills and workshops on-site. We suspect that midwifery student involvement in the BCs was in fact higher than captured via BIS data. We believe that there is tremendous opportunity for inter-professional education and training on low-risk birth within the BC model which could be leveraged beyond midwifery education.

As expected, use of EMS was higher in the BC cohort than those planning hospital births. This utilization of EMS however was offset by the lower rates of intervention overall in the BC cohort. Focus group data suggested no negative impact on the EMS system as a result of BCs. Without understanding how the BCs will impact the number of home births in the province, it remains

difficult to estimate if overall EMS utilization will increase should BCs be replicated or grow in capacity. Use of EMS within the recent homebirth paper by Hutton et al was 927/11,493 (8.06%) compared to 44/495 (8.9%) in the much smaller BC cohort.<sup>13</sup>

The optimized relationship between the midwifery community and EMS, as described through the focus groups is notable. Focus Group participants commented that no new healthcare facilities in Ontario had considered EMS to such an extent from start-up in both design and protocol. In Toronto, establishment of the BC led to altered processes within the EMS call centre to expedite response to calls initiated by midwives, even at home.

Some loss from registration in pregnancy to admission at a BC was expected. However the nearly 60% loss combined with lower than expected admissions represents a challenge to sustainability of the model. A similar challenge has been reported regarding lower than expected use at a new BC in Winnipeg who had challenges due to a discrepancy between supply and demand for midwifery services.<sup>48</sup> In Ontario there are similar caseload capacity issues within MPGs. While we know that during the pilot year a number of women were not admitted due to a changing risk profile, a proportion ultimately chose to give birth at home or in a hospital. The positive findings from this evaluation may serve to reassure women about the safety of a BC experience.

In a health care system, sustainability and economic viability of services is important. The aim of the BCs was to offer safe and high quality out-of-hospital care but at a lower cost than hospital care. In a recent meta-analysis of alternative birth settings for low risk women, the authors found only eleven studies to inform their work and a variation in results. Eight of the eleven studies found reduced costs for alternative birth settings, two found no difference and one found that alternative birth settings cost more.<sup>49</sup> In this evaluation, we were unable to model the true costs because start-up and operational costs were not available, nor did we build economic models beyond direct hospital and physician charges. However, it is reassuring that interventions across the board were less in the BC than in hospital care. If the MOHLTC is planning to replicate the BC models in other areas of Ontario, this should provide some evidence to support the premise that BCs (at least from a clinical perspective) lead to cost avoidance.

## **Limitations**

As previously mentioned, the number of women delivering at the BCs was lower than expected, for a variety of reasons. When designing the evaluation, we expected to have more women included in the BC cohort. Since the rates of adverse perinatal events are low in this predominantly healthy population, our ability to fully measure safety was somewhat limited. In some cases, we also had to use proxy measures since data was not easily available to meet the timelines of the evaluation.

The BORN Information System was enhanced prior to the start-up of care at the BCs in order to capture information necessary for the evaluation. As with any new data collection, there is bound to be a 'phased-in' approach and it takes a while to evaluate how well data is being collected as well as plan quality improvement strategies when data issues are identified. In this evaluation, breastfeeding data as well as student involvement in care was noted as potentially

being under-reported. The breastfeeding data issue also had an impact on rates of normal birth as it is one of the key components of this composite outcome.

The matched hospital birth midwifery cohort was only used for the cost and intervention comparisons, but not for the morbidity and mortality comparisons. While this is an important comparison, it was not able to be completed for this study as it would have involved getting access to hospital charts for intensive review which was not in scope for this project.

Despite these limitations, findings from this mixed-methods evaluation are consistent with evidence about midwifery in general and out-of-hospital birth specifically both in Ontario/Canada and internationally. Though numbers were small, data collected from the BCs during the demonstration project supports the BC as a safe and effective option for women with low risk pregnancies seeking a low-intervention approach to their labour and birth.

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## RECOMMENDATIONS

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### Recommendations:

#### For policy makers

- The development and integration of BCs should be considered as part of a strategy to continue to legitimize and integrate midwifery care into Ontario's perinatal health services system.
- Maintain BCs as part of a strategy to support low-risk labour and birth in the province of Ontario.
- The MOHTLC in partnership with hospitals should consider working to support full privileges for midwives at hospitals that act as transport sites for the BCs.
- The collaborative approach used for planning and implementation of the BCs should be used as a template for the inception of other new independent healthcare facilities and programs.
- Based on the positive findings of reduction of interventions within the BC model, the MOHTLC should consider piloting variations such as in-hospital midwifery-led BCs, as well as expanding BCs to inter-professional care models.
- Further work is required to fully analyse the cost-effectiveness of the BCs. While we demonstrated some cost-avoidance, start-up and operational costs should be considered in a fulsome economic evaluation.

- In planning future Independent Health Facilities for birthing services, policy makers should consider the significant lead time required to plan, integrate and fully operationalize services into the community to reach full occupancy potential.
- A robust evaluation of quality and safety of care in a relatively healthy population where rates of adverse outcomes are low, takes a larger sample size than the study period of this project allowed. An additional one- to- two years of data collection and analysis would enhance the stability of the results.

#### **For care providers**

- Labour and birth in an Ontario BC can be safely offered to low-risk women as an alternative to home or hospital birth.
- The BCs offer an opportunity for education and training on low-risk birth which could be leveraged beyond midwifery education and include inter-professional students and medical residents.

#### **For women**

- For low risk women, planning a BC experience under the care of midwives in Ontario would appear to be a safe and effective way to achieve a birth with minimal interventions.

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## APPENDICES

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## Appendix 1: Intended priority groups for the Birth Centres

Ottawa Birth & Wellness Centre	Toronto Birth Centre
Adolescents	Aboriginal peoples (e.g., First Nations, Inuit, Metis, Native, Indigenous etc.), by self-identification
Single Women	Age-related groups (e.g., youth, teens etc.)
Aboriginal Women	Disability (e.g., physical, D/deaf deafened or hard of hearing, visual, intellectual/developmental, learning, mental illness, addictions/substance use etc.)
New Immigrants	Ethno-racial communities (e.g., racial/racialized or cultural minorities, immigrants and refugees etc.)
Committed to serve in both official languages	Francophone (including new immigrant Francophones, deaf communities using LSQ/LSF, etc.)
	Homeless (including marginally or under-housed, etc.)
	Linguistic communities (e.g., uncomfortable using English or French, fluency or literacy affects communication, etc., including cultural security and context).
	Low income (e.g., unemployed, underemployed, on OW or ODSP, etc.)
	Religious/faith communities that experience discrimination in mainstream context
	Inner-urban populations (e.g., geographic or social isolation, under-serviced areas, transportation barriers, etc.)
	Sex/gender (e.g., male, female, women, men, trans, transsexual, transgendered, etc.)
	Sexual orientation (e.g., two-spirited, lesbian, gay, bisexual, etc.)
	Other (e.g., uninsured)

## Appendix 2: Client experience survey

### Birth Centre Client Experience Survey

Thank you for agreeing to participate in this survey. Information gathered here will help the Ontario Ministry of Health and Long Term Care evaluate the Ontario Birth Centre Demonstration Project.

We are seeking to compare experiences of midwifery clients who gave birth at home, in hospital, or in one of the Birth Centre Demonstration Project settings.

Please complete the following questions. We expect the tool will take no longer than 20 minutes to complete.

What is your postal code?

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What is your highest level of schooling?

- less than high school
- completed high school / GED
- some college / university
- completed college / university
- some graduate work
- post-graduate degree

What is your marital status?

- single
- married
- co-habiting
- divorced / separated
- widowed
- other

What is your mother tongue?

- English
- French
- Arabic
- Mandarin
- Cantonese
- Bengali/urdu/Punjabi
- Spanish
- An aboriginal language
- Other

What do you mean by “other” mother tongue? \_\_\_\_\_

How old were you when your baby was born?

- <20
- 21-25
- 26-30
- 31-35
- 36-40
- 41-45
- >45

Was this your first baby?

- yes
- no

Was your last baby born in Ontario?

- yes
- no

Was your last baby born:

- at home
- in a hospital
- in a birth centre
- in another location

In this pregnancy, where did you plan on giving birth when your labour started?

- at home
- in a hospital
- in a birth centre
- in another location

Were you admitted to the Birth Centre in labour?

- yes
- no

Where was your baby actually born?

- at home
- in a hospital
- in a birth centre
- in another location

How was your baby born?

- pushed out without help
- helped with forceps or vacuum
- cesarean section

	extremely so	not at all	somewhat	very much so
I felt emotionally supported during my labour and birth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt my physical needs were supported during my labour and birth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt involved in decision making during my labour and birth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My preferences were respected during my labour and birth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

During my labour and birth, my caregivers explained things in a way I could understand:

- never
- sometimes
- frequently
- always

My midwife or student midwife was with me during labour:

- at all times
- most of the time
- some of the time
- I was often unattended by my midwife during labour and/or birth

Had you previously met at least one of the midwives or student midwives who attended your labour and birth?

- yes
- no

If “yes”, approximately how many times had you met that student midwife or midwife?

- once
- twice
- a few times
- many times

If you planned to breastfeed, did you have the opportunity to try within two hours of giving birth?

- yes
- no
- I did not plan on breastfeeding

My birth went as I hoped it would.

- not at all
- somewhat
- very much so
- extremely so

If I have another baby I would plan to give birth:

- at home
- in a hospital
- in a birth centre
- in another location

How did you hear about the Birth Centre?

- a midwife
- an obstetrician
- a family doctor
- a friend, family member or acquaintance
- a community health centre
- other community resource
- newspaper
- radio
- internet
- other media
- other

What do you mean by “other” referral source? \_\_\_\_\_

**Please rate how well the Birth Centre met your needs in the following areas:**

- *parking facilities*
  - plenty
  - sufficient
  - insufficient
  - n/a
  
- *accessibility by public transport*
  - easily accessible
  - fairly accessible
  - difficult to access
  - n/a
  
- *distance from your home*
  - very close
  - fairly close
  - not at all close

- *physical accessibility*
  - very accessible
  - fairly accessible
  - difficult to access
  
- *privacy*
  - very private
  - fairly private
  - not at all private
  
- *cleanliness*
  - extremely clean
  - somewhat clean
  - not at all clean

Was the birthing room adequate for your needs in labour?

- yes
- no

**How was the birthing room inadequate for your needs in labour?**

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Was a student involved in your care during labour and birth?

- yes
- no

How satisfied were you with student participation in your care?

- not at all
- somewhat
- very much so
- extremely

If you did not give birth at the Birth Centre, did you understand the reason for your transfer to the hospital?

- not at all
- somewhat
- very much so
- extremely

Is there anything you would have changed about your experience of transfer to hospital?

- would have gone sooner
- could have **been** better prepared
- could have had more information
- would have had a supportive person with me
- would have gone by ambulance
- would have gone in own vehicle
- could have had better interaction with hospital staff
- would have changed nothing

other

What “other” aspect of your transfer experience would you have changed?

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What were the most positive things about your Birth Centre experience?

What, if anything, would you change about your experience?

Please leave any additional comments.

## Appendix 3 - Focus Group Guide

### Evaluation of the Birth Centres Demonstration Project in Ontario

#### Focus Group - Semi-Structured Interview Guide

Introduction (for the beginning of the interview and to explain the structure of the interview)

Hi,

My name is \_\_\_\_\_ and I work as XXX in the Birth Centre Evaluation project. Thank you for interest to take part in this focus group. Your feedback will be very useful for the project and eventually for the improvement of obstetric care in Ontario.

This interview will include two sections. The first consists of 5 questions around your demographics and your work information. The first section of the interview will not be recorded.

The second section consists of 8 questions that ask for your feedback on the Birth Centre. These questions are open-ended and I should remind you that we are interested in hearing about positive and negative experiences. With your consent, this section of the interview will be recorded. All of the information that you provide will remain confidential and you have total freedom to refrain from answering any question or to stop the interview at any time.

The estimated time of the whole session will be up to one hour. If there is sufficient material that needs further follow-up, we will approach group members for follow-up interviews at your convenience.

Do you have any questions?

Thank you.

**Now, let's start with the first section:**

**Part 1 - General Information**

DEMOGRAPHIC VARIABLE	RESPONSE	
SEX	<input type="checkbox"/> Female	
	<input type="checkbox"/> Male	
AGE	<input type="checkbox"/> 24 or under	<input type="checkbox"/> 45-54
	<input type="checkbox"/> 25-34	<input type="checkbox"/> 55-64
	<input type="checkbox"/> 35-44	<input type="checkbox"/> 65 or over
CURRENT PROFESSIONAL PRACTICE (Select one only)	<input type="checkbox"/> Registered nurse	<input type="checkbox"/> Family physician
	<input type="checkbox"/> Registered midwife	<input type="checkbox"/> Obstetrician
	<input type="checkbox"/> Administrator	<input type="checkbox"/> Neonatologist
	<input type="checkbox"/> EMS staff	<input type="checkbox"/> Other: specify _____
NUMBER OF YEARS INVOLVED WITH INTRAPARTUM CARE	<input type="checkbox"/> 0 to 4 years	<input type="checkbox"/> 20 to 24 years
	<input type="checkbox"/> 5 to 9 years	<input type="checkbox"/> 25-29 years
	<input type="checkbox"/> 10 to 14 years	<input type="checkbox"/> 30-34 years
	<input type="checkbox"/> 15 to 19 years	<input type="checkbox"/> >35 years
NAME OF THE WORKPLACE ( <i>PLEASE NOTE THIS QUESTION WILL ONLY BE USEFUL FOR OUR INTERNAL ANALYSIS, AND THE NAME WILL NOT BE PUBLISHED IN THE FINAL REPORT</i> )		
_____		

Now I will move into the focus group questions to gain an understanding of the integration between the Birth Centre and the transport hospital. I will start recording now.

[interviewer turn on recorder]

Today is [day of week, date including year]. I, [full name of interviewer] am conducting this focus group of participants from [name of institution] for the evaluation of Ontario’s Birth Centre Demonstration

Project. I would like to begin by clarifying that we will be discussing transfers from the Toronto Birth Centre, Inc/Ottawa Birth and Wellness Centre only – not transfers from planned home births - and ask that participants keep this principle in mind as we progress with the group.

### **Semi-Structured Focus Group Guide – Birth Centre Study**

1. Were any new processes/policies put into place surrounding transfer to your facility from the Birth Centre and if so, describe.
2. Was collaboration undertaken to establish these processes, and if so, who was involved in that collaboration. Can you describe the collaboration?
3. What kind of communication took place before opening and was it sufficient?
4. Were established processes reflected in practice once transfers occurred?
5. What worked well during transports from the Birth Centre, both urgent and non-urgent?
6. Were any changes in process instituted once transports began?
7. What could have been done differently?
8. How has the Birth Centre impacted inter-professional interactions in your facility?
9. What, if anything, do you see as different between birth at the Birth Centre and birth in the hospital?

**Appendix 4: - Characteristics of participants in the BC Client experience survey**

<b>Characteristic</b>	<b>Full sample n=380</b>	<b>Birth Centre n=188</b>	<b>General Midwifery n=192</b>
Age	n (%)	n (%)	n (%)
<20	0 (0.0)	0 (0.0)	0 (0.0)
21-25	15 (3.9)	11 (5.9)	4 (2.1)
26-30	85 (22.4)	53 (28.2)	32 (16.7)
31-35	182 (47.9)	86 (45.7)	96 (50.0)
36-40	86 (22.6)	34 (18.1)	52 (27.1)
41-45	10 (2.6)	2 (1.1)	8 (4.2)
>45	0 (0.0)	0 (0.0)	0 (0.0)
<b>Level of schooling</b>			
Less than high school	1 (0.26)	1 (0.5)	0 (0.0)
Completed high school/GED	9 (2.37)	7 (3.7)	2 (1.0)
Some college/university	20 (5.26)	12 (6.4)	8 (4.2)
Completed college/university	204 (53.68)	98 (52.1)	106 (55.2)
Some graduate work	35 (9.21)	15 (8.0)	20 (10.4)
Post graduate degree	111 (29.21)	55 (29.3)	56 (29.2)
<b>Marital status</b>			
Single	7 (1.8)	3 (1.6)	4 (2.1)
Married	303 (79.7)	146 (77.7)	157 (81.8)
Co-habiting	66 (17.4)	37 (19.7)	29 (15.1)
Divorced/separated	2 (0.5)	1 (0.5)	1 (0.5)
Widowed	0 (0.0)	0 (0.0)	0 (0.0)
Other	2 (0.5)	1 (0.5)	1 (0.5)
<b>Mother tongue</b>			
English	299 (78.7)	155 (82.4)	144 (75.0)
French	35 (9.2)	16 (8.5)	19 (9.9)
Other	46 (12.1)	17 (9.0)	29 (15.1)
<b>First baby</b>			
Yes	202 (53.2)	110 (58.5)	92 (47.9)
No	175 (46.1)	78 (41.5)	97 (50.5)
<b>Actual location of birth</b>			
At home	65 (17.1)	18 (9.6)	47 (24.5)
In a hospital	177 (46.6)	46 (24.5)	131 (68.2)
In a BC	136 (35.8)	123 (65.4)	13 (6.8)
In another location	0 (0.0)	0 (0.0)	0 (0.0)
<b>Type of birth</b>			
Pushed out without help	319 (83.9)	171 (91.0)	148 (77.1)
Helped with forceps or vacuum	20 (5.3)	6 (3.2)	14 (7.3)
Cesarean section	4 (10.5)	11 (5.9)	29 (15.1)

## Appendix 5: Satisfaction with “Facilities”

Please rate how well the Birth Centre met your needs on the following	Birth Centre-Admitted Sample, n=139	
	n	%
<b>Parking</b>		
Plenty	110	79.1
Sufficient	20	14.4
Insufficient	2	1.4
N/A	7	5.0
<b>Accessibility by public transport</b>		
Easily accessible	37	26.6
Fairly accessible	12	8.6
Difficult to access	0	0.0
N/A	85	61.2
<b>Distance from your home</b>		
Very close	37	26.6
Fairly close	86	61.9
Not at all close	16	11.5
<b>Physical accessibility</b>		
Very accessible	135	97.1
Fairly accessible	3	2.2
Difficult to access	0	0.0
<b>Privacy</b>		
Very private	128	92.1
Fairly private	11	7.9
Not at all private	0	0.0
<b>Cleanliness</b>		
Extremely clean	137	98.6
Somewhat clean	2	1.4
Not at all clean	0	0.0
<b>Was the birthing room adequate for your needs in labour?</b>		
Yes	139	100.0
No	0	0.0

## Appendix 6: General comments on the Client Experience Survey

When asked the open ended question about the **most positive things** regarding the BC comments identified the facilities and environment as central to the experience. Responsiveness of care providers was also identified frequently:

- “The tub, the spaciousness, the lack of a ‘clinical’ feeling, the ability to make ourselves feel at home”
- “I loved everything about the birthing centre, i.e., the cleanliness, the privacy, the room itself ... “
- “The facilities were calm, clean and comfortable”.
- “The facilities were so clean and there were many tools available to make labour more comfortable. I loved how spacious the room and the bed were, that the room could be temperature controlled, and everything was so modern and cheerful.”
- “I really liked all the options for comfortable places to give birth”
- “The staff, the facilities, the cleanliness, the atmosphere”.
- “Having the amenities to take care of me during birth at my disposal without a medicalised setting and without having to set up those things in my own home ...”
- “ .... My midwife and the birth aides who assisted during and after my labour were fantastic, anticipating my needs and guiding me through the whole process with quiet and confidence.”

Respondents were also asked directly **what they might have changed** about their experience. Many who completed this section stated they would change nothing. Some commented on issues related to the tubs – whether they were not available when clients had expected to use them, or whether water temperature needed adjustment. There was a brief period during the pilot year when one of the BCs was prohibited from using their tubs until requirements established by the regulator could be met.

- Some commented on the early discharge as problematic.
- “We were told the birth tub was not to be used and this was a main reason for choosing the BC”
- “I wish we weren’t as rushed to try to get the baby to latch – did not have a chance to try baby-led feeding before we were rushed to go home”
- “I wish I could have been able to stay a little bit longer at the BC to rest ...”

**General comments** included:

- “I left feeling great and relaxed and happy and in control. I keep telling people what an amazing experience I had!”
- “Overall the XX BC was a wonderful experience and I hope the pilot is a success so many other mothers can have such a great experience with their birth”.
- “Thank you for creating this BC, I had an amazing experience delivering my baby would do it all over again!”
- “... I often go back in my memories and try to remember everything and I love every moment of it.”
- “Everyone should be entitled to the level of care provided by midwives and have the option of birthing at a BC.”
- “I feel that the BC is an incredibly important facility that could revolutionize the options available to XX women. .... Overall it was the most beautiful and powerful experience of my life”.