

**CHILDBIRTH DECISION MAKING PROCESSES: INFLUENCES ON MODE OF BIRTH AFTER A
PREVIOUS CAESAREAN SECTION**

By

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ABSTRACT

Background: An increasing proportion of Canadian women are experiencing a Caesarean section (CS) and a subsequent repeat CS. While CS can be necessary and lifesaving for mothers and their infants in some situations, it is also associated with greater morbidity risks to women and infants than vaginal birth. Clinical practice guidelines recommend the involvement of pregnant women in making decisions about mode of birth and shared decision making improves the informed consent process. This research examines the factors that influence mode of birth after a previous CS.

Methods: Two cross sectional descriptive studies and a prospective pre-post cohort study with control were conducted to investigate the high use of repeat CS at the levels of health care providers, maternity care clients, and the organizational structure of a birthing unit.

1. Interviews and surveys with obstetricians, family physicians, midwives, and nurses were conducted to investigate the attitudes, values, and perceptions that guide their care practices for clients with a previous CS. The specific research question was: What are the factors that influence the practices of maternity care providers (obstetricians, family physicians, midwives, and nurses) regarding mode of birth after a previous CS? Data was analyzed using iterative deductive and inductive coding.
2. Interviews and surveys were conducted during pregnancy and after giving birth with healthy women who have had a previous CS to explore their decision making processes regarding mode of birth after a previous CS. The specific research question was: How do

women eligible for a VBAC make decisions about their upcoming mode of birth? A thematic framework approach was used for data analysis.

3. Data from the Better Outcomes Registry and Network (“BORN”) Ontario was analyzed to examine the effectiveness of a hospital based strategy on overall proportions of CS and within Robson groups 1, 2a, and 5. The Caesarean section reduction (CARE) strategy includes interventions that target health care providers, pregnant women, and hospital policies.

Results:

1. Maternity care providers would recommend a vaginal birth after CS (VBAC) for healthy pregnant women with a previous CS. They had different perceptions of the safety of birth to the health of women and infants and different approaches to engage in decision making during consultation. Providers believed women make their decision about mode of birth outside of the clinical consultation and often prior to their subsequent pregnancy.
2. The main themes that influenced the decisions of maternity care clients about mode of birth were mothers’ experiential reasoning regarding mode of birth and recovery, experiential knowledge from significant others, scheduling of CS regardless of the mode of birth decision, rating and prioritizing risks, fear of risks, and decisional conflict. When women discussed the factors that impacted their decisions about mode of birth six to eight weeks after they had given birth, the main themes were the recovery experience and fear related to the mode of birth. A lack of time during consultation was identified

as a major barrier inhibiting shared decision making, specifically among clients of obstetricians. Other barriers included reliance on routine obstetric practices that are not evidence based.

3. Proportions of CS decreased at the intervention hospital by 3.9% ($p=0.0006$), from 30.3% ($n=964$) in 2009/10 to 26.4% ($n=803$) in 2012/13. During the same time frame, proportions of CS in the control group were stable with 28.1% ($n=23,694$) in 2009/10 and 28.2% ($n=23,683$) in 2012/13. Within the Robson classification system, the proportions of repeat CS among all low risk women with a previous CS decreased at the intervention hospital by 5.6% ($p=0.0044$) from 84.3% to 78.7%. In the control group, also fewer women had a repeat CS over the study period, but the decrease was smaller with 3.9% ($p<0.0001$) from 84.5% to 80.6%.

Conclusion: A true shared decision making process addresses the power imbalance between providers and women through an incorporation of the clinical expertise of providers and the experiential expertise of pregnant women before reaching a decision about mode of birth. The use of routine obstetric practices that are not evidence based inhibited women to make decisions about their mode of birth. The introduction of the CARE strategy to a hospital birthing unit was associated with improvements in proportions of CS and VBAC among low risk women.

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GLOSSARY

Absolute risk

Statistically, absolute risk represents the number of good or bad occurrences in a group divided by the total number of people in that group (BMJ, 2012).

Caesarean section

Caesarean section refers to surgical birth. An incision is made through the pregnant woman's abdomen and uterus through which the fetus is delivered (ACOG, 2010).

Induction

Labour is induced when contractions are initiated in a pregnant woman who is not in labour (SOGC, 2013).

Level II hospital

Women with low to moderate maternal risk can choose to give birth at a level II hospital. Induction and augmentation of labour is available at all times and the possibility of an assessment by obstetrics, anaesthesia and paediatrics is available within 30 minutes (PCMCH, 2011).

Macrosomia

The newborns weight is predicted to be greater than 4000g (SOGC, 2013).

Placenta accreta

Placenta accreta occurs during pregnancy when all or parts of the placenta attach abnormally to the wall of the uterus. Placenta accreta can lead to life-threatening hemorrhage during birth and often requires a hysterectomy (Belfort, 2010).

Placenta increta

All or parts of the placenta attach abnormally in the wall of the uterus during pregnancy (Heller, 2013).

Placenta percreta

All or parts of the placenta attach abnormally through the wall of the uterus during pregnancy (Heller, 2013).

Placenta previa

All or parts of the placenta attach abnormally to the lower segment of the uterus, totally or partially covering the opening of the cervix and increasing the risk of morbidity for the pregnant woman (SOGC, 2007).

Relative risk

Statistically, relative risk is absolute risk of good or bad occurrences in the intervention group divided by the absolute risk of good or bad occurrences in the control group (BMJ, 2012)

Uterine rupture

Uterine rupture is the complete separation of the wall of the uterus with or without extrusion of the fetal parts into the maternal peritoneal cavity. It requires emergency Caesarean section (SOGC, 2005).

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CHAPTER 1

INTRODUCTION

General introduction

The majority of women give birth at least once throughout their lifetime (Martinez, Daniels & Chandra, 2012) and an increasing proportion of women in Canada give birth by Caesarean section (CS). The latest reliable figure indicates that the overall proportion of CS in Canada has increased from 17.6% in 1992-1993 (Canadian Institute for Health Information, 2007) to 27.5% in 2014 (Canadian Institute for Health Information, 2016). CS can be lifesaving for mothers and their infants, but it is also associated with a greater risk of morbidity to women and infants than vaginal birth (Xie *et al.*, 2015; Galyean *et al.*, 2009; Liu *et al.*, 2007). Corresponding to the increase in proportions of CS, the proportion of pregnant women with a previous CS who give birth with another CS (repeat CS) has been increasing as well from 64.7% in 1995-1996 (Liu, Liston & Fraser, 2008) to 82.5% in 2011-2012 (CIHI, 2013). Repeat CS is the biggest contributor to the increasing proportion of CS (Catling-Paull *et al.*, 2011). In their review of preventable obstetrical interventions, Rossignol and colleagues (2013) argue that an increase in proportions of vaginal birth after CS (VBAC) would greatly reduce the overall proportions of CS in Canada. They compared the rates of CS and VBAC across regions of Quebec, Canada from 1990 to 2005 and found a strong inverse correlation between these rates (Pearson coefficient = -0.50; P = 0.05). Rossignol and colleagues (2013) outline that potential VBAC candidates need to be appropriately identified, and specially trained providers must be available in maternity care units to ensure VBAC uptake and safety. My research examines the factors that influence mode of birth after a previous CS through three studies.

The research detailed in this thesis took place at two hospitals in Ontario, Canada, that implemented an intervention strategy with the intention to improve proportions of CS and repeat CS. The first study investigated the factors that influence the practices of maternity care providers (obstetricians, family physicians, nurses, and midwives) regarding mode of birth after previous CS. The second study explored women's decision making processes in relation to their mode of birth after a previous CS. The third study evaluated the effectiveness of the strategy on rates of CS and repeat CS.

This introductory chapter reviews the literature regarding the CS and VBAC debates specifically within a Canadian context, the health risks, benefits and costs associated with different modes of birth, and professional practice responses regarding mode of birth after CS. An overview is provided of the study setting and the intervention strategy that took place in the hospitals involved in the research. A discussion follows of the theoretical frameworks that conceptually guided the design and integrated analysis of the research. The ethical approvals for the research are outlined as well as an overview of the following thesis chapters.

Background

The CS debate

As noted at the outset, CS rates have been increasing steadily in Canada over the past two decades. Many interacting factors have contributed to the CS rise, including "improved surgical and anesthetic techniques, reduced risk of post-operative complications, demographic and nutritional factors, providers' and patients' perception of the safety of the procedure,

obstetricians' defensive practice, and patient demand" (Villar *et al.*, 2006, p.1819). Currently, CS births represent one of the most common surgical procedures in North America (Grant, 2009). According to a cross-sectional ecological study including all 194 member states of the World Health Organization, an ideal CS rates would range up to 19% (Molina *et al.*, 2015). A primary CS rate should also not reach below 10% as this is indicative of a lack of maternity care services and is accompanied with maternal and infant morbidity and mortality (WHO, 1994). In high income countries where most women have access to maternity care services, proportions of CS are positively correlated with proportions of infant mortality suggesting that excessively high rates of CS are more harmful than beneficial to infants' health outcomes (Xie *et al.*, 2015). Xie and colleagues (2015) suggest a U-shaped relationship between CS rate and infant health outcomes; infant morbidity and mortality rates increase if CS birth rates are too low or too high.

From a Canadian standpoint, it appears evident that a national CS rate of no higher than 20% could be achieved and is desirable (Rossignol *et al.*, 2013). Several European countries have a CS rate closer to the 15% target, that was set by the WHO (1985), while maintaining very low rates of perinatal mortality (ranging from 4 to 7/1000) (OECD, 2011). Rossignol and colleagues (2013) compared CS and VBAC rates in in different regions of Quebec across time and found no further improvements in perinatal and maternal mortality once the CS rate reached 18% in 1995. They further report the lowest rate with 19.1% in 2009 from the region Cantons de l'Est, a university hospital region, while the average for Quebec was 23.2%. The provinces Manitoba and Saskatchewan had CS rates of 20.2% and 22.1% respectively that same year (CIHI, 2011). The benefits and risks of CS and vaginal birth are important components of the debate and are outlined in the following sections.

Benefits of CS/risks of vaginal birth

CS is a lifesaving and necessary method of birth in emergency situations or when certain maternal or newborn health conditions prohibit vaginal birth. Some studies suggest that a vaginal birth can increase a woman's risk for pelvic floor disorders later in life, such as anal incontinence, urinary incontinence, and pelvic organ prolapse (Wu, Hundley & Visco, 2005; Hannah, 2004). CS is believed to protect the mother from labour pain and from post-vaginal birth sexual malfunction (Villar *et al.*, 2006; Klein, 2004; Kirby & Hanlon-Lundberg, 1999). Other maternal benefits from CS include reduced anxiety about the labouring process and about the infant's health, because CS may reduce the risk of certain complications such as clinical chorioamnionitis, fetal heart rate abnormalities, and cord prolapse (Hannah, 2004).

Risks of CS/benefits of vaginal birth

As a form of surgery, CS has associated risks. It can affect the health of women, increases foetal risk and maternal risk in future pregnancies, leads to longer hospital stays and is economically undesirable (NIH, 2010). A large retrospective study of all women who gave birth in Canada (except Manitoba and Quebec) between April 1991 and March 2005 showed that with CS planned before labour in low risk pregnancies, there is a three-fold increase in the likelihood of severe maternal morbidity, such as cardiac arrest, wound haematoma, hysterectomy, major postpartum infection, anaesthesia complication, thromboembolism, and haemorrhage (Lui *et al.*, 2007). Other studies have found that women with a prior CS are more likely to experience decreased fertility (OR 2.9 [2.8, 3.0]) (Hemminki, 2007) and that the risk of experiencing an unexplained stillbirth in the subsequent pregnancy is nearly three-fold higher

(hazard ratio adjusted 2.74 [1.74, 4.30]) (Smith *et al.*, 2003). CS is also associated with an increase in the rates of fetal death, and in the number of infants admitted to the neonatal intensive care unit, because of a higher risk of neonatal respiratory distress during CS that necessitates oxygen therapy (Villar *et al.*, 2006; Hannah, 2004).

The mode of birth after CS debate

The controversy regarding CS and repeat CS started in 1916 when the prominent obstetrician Edwin Cragin coined the phrase “*once a caesarean, always a caesarean.*” Cragin was in high regard in the obstetric community as the Vice President of the Academy of Medicine in the United States and a consulting surgeon to many New York hospitals (The New York Times, 1918). He wrote this statement in a journal article because he was urging his colleagues to avoid unnecessary CS whenever possible and also to avoid possible repeat CS. In 1926, another prominent obstetrician who was the author of major obstetric textbooks, Munro Kerr started promoting the use of the low transverse uterine incision for CS, instead of the previous vertical uterine incision. This new CS technique made the procedure safer for mothers overall and it also made VBAC safer because the possibility of uterine rupture during birth after CS was reduced (SOGC, 2005).

A persistent increase in proportions of CS and a corresponding increase in proportions of repeat CS began in the 1990s in Canada (Nair, 1991). According to data from the Canadian Hospital Morbidity Database, the national rate of repeat CS increased from 64.7% in 1995/96 to 80% in 2004/05 (Liu *et al.*, 2008), and to 83% in 2008/09 (CIHI, 2010). Repeat CS is a key contributor to the overall increase in CS rates (Catling-Paull *et al.*, 2011). VBAC rates are

significantly inversely correlated with CS rates, regions with high rates of CS have low rates of VBAC and vice versa (Rossignol *et al.*, 2013). The repeat CS rate might be deceptively high, because it does not distinguish between repeat CS that are planned before the onset of labour and women who have decided for a VBAC and have had a trial of labour but ended up with a CS due to complications during labour or birth. Indeed, no national data are currently available on the rate of trial of labour. Canadian population-based research shows that the majority of women who have a trial of labour after a previous CS have a successful VBAC (70%) (Wen *et al.*, 2004), and slightly more recent data from hospitals in the U.S confirm this rate (Tahseen & Griffiths, 2010). Similar to the case of CS, the evidence regarding the benefits and risks of repeat CS and VBAC have an influence on the debate of mode of birth after a previous CS.

Benefits of repeat CS/risks of VBAC

The greatest medical risk associated with VBAC is uterine rupture, which can cause maternal and fetal mortality and morbidity (Guise *et al.*, 2010). In the 1990s, a number of North American researchers began to recommend repeat CS to reduce risks of maternal and fetal complications. In the United States, Scott (1991) and Jones and colleagues (1991) concluded that the risk of uterine rupture during trial of labour was too high to safely recommend based on case reports. Scott (1991) reported 14 cases of uterine ruptures during trial of labour between 1982 and 1991 in Salt Lake City (incidence rate of 1.5%). Jones and colleagues (1991) reported eight cases of uterine rupture for 1989 in the Denver metropolitan area (incidence rate of 0.7%). Neither study compared the complications associated with trial of labour with complications of repeat CS.

A population-based, longitudinal Canadian study by McMahon and colleagues in 1996 with 6,138 women from Nova Scotia compared the risks of VBAC with those of repeat CS. Among the women deciding to have a trial of labour, 7.9% experienced maternal morbidity, including ten cases of uterine rupture, compared to 8.4% of maternal morbidity among women choosing repeat CS, including one uterine rupture. The authors concluded that repeat CS is safer for the majority of women because the incidence of major complications (uterine rupture, hysterectomy, and operative injury) were higher among women who had a trial of labour than women who gave birth with a planned repeat CS (1.6% versus 0.8%).

Landon and colleagues (2004) conducted a prospective cohort study from 1999 to 2002 for the United States National Institute of Child Health and Human Development including 33,699 women to evaluate maternal and perinatal outcomes for birth after previous CS. The rate of uterine rupture for women who had a trial of labour was 0.7% and no uterine ruptures occurred in the repeat CS group. Regarding infant morbidity, 12 infants experienced hypoxic-ischemic encephalopathy in the trial of labour group and none born to mothers with repeat CS. Maternal and fetal death rates did not differ significantly. The authors write in their conclusion that even though the risk of an adverse perinatal event is small, with an absolute risk of 1 in 2000 for a trial of labour, it is greater than the risk associated with repeat CS.

A meta-analysis by Rossi and D'Addario (2008) also came to the conclusion that the risk associated with a trial of labour is too high to safely recommend it to the majority of women. They included in their analysis English publications from 2000 to 2007 that compared maternal morbidity in women with a previous CS undergoing a trial of labour in developed countries

(N=24,349) with women having repeat CS (N=18,621). The aggregate maternal morbidity was not significantly different between the two groups (6.7% for trial of labour versus 4.0% for repeat CS, $p=0.12$), but the proportion of uterine ruptures was significantly higher in women who had a trial of labour (1.3% for trial of labour versus 0.4% for repeat CS, $p<0.001$).

In summary, different study designs have shown over the years that the risk of uterine rupture can be minimized with a repeat CS, while the overall small risk of uterine rupture needs to be acknowledged.

Uterine rupture and fetal macrosomia

A number of clinical factors are correlated with an increased risk of uterine rupture after a previous CS, including a spacing between the pregnancies of less than 24 months (Bujold *et al.*, 2002), fetal macrosomia (Jastrow *et al.*, 2010; Zelop *et al.*, 2001), labour induction (Grobman *et al.*, 2007; Macones *et al.*, 2006), and no prior vaginal birth (Macones *et al.*, 2005; Zelop *et al.*, 2000). Providers assess the risk factors when reviewing a woman's previous birth history and the length of time between the pregnancies and the number of prior vaginal births can be assessed easily and incorporated into a woman's individual risk status. The use of inducing agents can be limited prior to labour to avoid increasing the risk of rupture. Some providers use ultrasound to try to make predictions of the infant's birth weight during pregnancy. Ultrasound predicted birth weight is based on regression analysis in combination with one or more biometric sonographic measurements of the fetus, such as biparietal diameter, femur length, and head or abdominal circumference. Clinical estimates are based on the measurement of fundal height and a review of the woman's obstetric history (Ray, Alhusen,

2016). According to a systematic review by Chauhan and colleagues (2005), the accuracy to detect a macrosomic fetus is not very reliable as the accuracy of ultrasound estimates ranges from 15% to 79% and the accuracy of clinical estimates ranges from 40% to 52%.

Risks of repeat CS/benefits of VBAC

While the risk of uterine rupture can be minimized with a repeat CS, the procedure is associated with other medical risks to mothers and infants. A study by Flamm and colleagues in 1994 in the United States with about 7000 women found no difference in major maternal complications between women having a VBAC and a repeat CS, but that women who had a repeat CS had longer hospital stays, and higher rates of postpartum fever and of postpartum transfusion. And a study conducted by Neuhaus and colleagues (2001) found that most cases of uterine rupture in women who had previously delivered by CS occurred during their pregnancy, and not during vaginal birth. The authors concluded from their retrospective analysis extending over 15 years that vaginal birth is to be recommended after previous birth by CS.

A Canadian retrospective population based study of 308,755 women who gave birth with a previous CS between 1988 and 2000 found an increased risk of uterine rupture for women who had a trial of labour compared to women who had repeat CS (0.65% versus 0.25%, adjusted OR 2.38, CI 2.12-2.67). Rates of maternal death were lower though among women who had a trial of labour compared to women who had a repeat CS (5.6/100,000 versus 1.6/100,000; adjusted OR 0.32; CI 0.07-1.47) (Wen *et al.*, 2004). Similarly, Liston and colleagues (2007) found that repeat CS is associated with an increased risk of maternal mortality, and an

increased incidence of placenta previa, accreta, increta, and percreta in subsequent pregnancies.

The risk of abnormal placentas during future pregnancies is significant after a repeated CS (Cheng *et al.*, 2011; Silver *et al.*, 2006). Placenta previa and accreta are difficult to manage clinically and can cause severe maternal hemorrhage, emergency hysterectomy, bladder and bowel injuries and maternal mortality (Scott, 2011). Guide and colleagues (2010) stipulate the risk of placenta previa at 12 per 1000 for women with a history of CS (95% CI 8-15 per 1000; $p < 0.001$), and that the incidence of previa in subsequent pregnancies increases from 0.01% after one CS (95% CI 6-13 per 1000) to 28% after three or more CS births (95% CI 18-37 per 1000). Incidences of placenta accreta have been found to increase with each additional CS (Grobman *et al.*, 2007).

Infants who are born by repeat CS have an increased risk of respiratory issues. Kamath and colleagues (2009) analyzed the charts of 672 women who had given birth with a previous CS in Denver to evaluate infant health outcomes of type of birth after CS. Infants born by repeat CS had significantly higher rates of respiratory problems which necessitated admission to the neonatal intensive care unit compared to infants born by VBAC (aOR 2.9; CL 1.3-6.7).

Probability of successful VBAC

A number of characteristics can be used to make predictions about a woman's chance of a trial of labour ending up in a successful VBAC. The most important characteristics are having experienced a previous vaginal birth or a previous VBAC, the mother's age and her body mass index (Metz *et al.*, 2013; Troyer & Parisi, 1992; Hibbard *et al.*, 2006). Maternity care providers

ideally individualize a client's counselling regarding birth after a previous CS based on her clinical characteristics. Newman and colleagues (2012) found that providers' prediction of a woman's chance to have a successful VBAC tended to be generally inaccurate if multiple factors needed to be integrated. When they surveyed providers in the United States, 62% of respondents indicated that they did not feel adequately trained to make proper individualized predictions about a woman's likelihood of success if she decided to have a trial of labour.

Cost of trial of labour versus repeat CS for the health care system

The economic costs associated with a VBAC and a repeat CS are also relevant in the debate regarding how to give birth after a previous CS. Research from the United States found that a trial of labour after a repeat CS is more cost effective than an repeat CS, but only if the trial of labour ended up in a successful VBAC at least 75% of the time (Chung *et al.*, 2001). Fawsitt and colleagues (2013) conducted a cost-effectiveness analysis comparing trial of labour with repeat CS in Ireland. They used direct costs to the health system and also health gains to the clients, measured in quality-adjusted life years (QUALY). Trial of labour was found to be less costly and more effective in increasing QUALYs than repeat CS. Women required less help after a successful VBAC and spend fewer days in hospitals, which were the main reasons for the higher cost-effectiveness of trial of labour. The results also showed that a specific threshold of VBAC success had to be reached (at least 64%) for a trial of labour to be more cost-effective than a planned repeat CS.

Professional practice responses to birth after CS debate

In 2005, the Society of Obstetricians and Gynaecologists of Canada (SOGC) reviewed the research evidence in relation to the mode of birth after a previous CS debate and released a national clinical practice guideline on VBAC. The guideline encourages trial of labour after a previous CS for women who experience a healthy and low risk pregnancy. They make 19 recommendations to increase success and safety of VBAC. The guideline concludes: a trial of labour after a previous CS “should be considered in women who have no contraindications after appropriate discussion. The efficacy and safety of TOL [trial of labour] after Caesarean in appropriately selected women about to give birth in a hospital where timely Caesarean section facilities are available is well supported” (p.172). A few years after the release of the guideline and in response to the continuing trend of increasing CS rates, the SOGC, the Canadian Association of Midwives (CAM), the Association of Women’s Health, Obstetric and Neonatal Nurses of Canada (AWOHNN), the College of Family Physicians of Canada (CFPC) and the Society of Rural Physicians of Canada (SRPC) released a Joint Policy Statement in 2008 promoting non-interventional birth and addressing unnecessary interventions. Trying to change practice based on the research evidence, they recommend that women who have had a CS in the past and who are having a normal and healthy pregnancy attempt a VBAC rather than to book a repeat CS.

The CARE strategy

Development of the CARE strategy

In the fall of 2010, the hospital administration of an urban level II community hospital (referring to a hospital without teaching status that cares for pregnant women who experience low to moderate maternal risk) from Ontario, Canada notified the administration of their maternity unit to stop allowing an increasing number of women to birth in the unit because the hospital was facing major budget constraints. The administrators of the maternity care unit formed a committee together with representatives from each of the disciplines who care for labouring and birthing women and their infants; obstetricians, family physicians, midwives, nurses, and pediatricians. Together, they decided to run an audit of their unit to find out where care practices could be improved and cost simultaneously be reduced because they agreed that they were strongly opposed to halting or reducing the number of women who were allowed to birth at the hospital. During an audit, they found a monthly proportion of CS of 29.6% and a proportion of labour induction of 24%, which the committee considered unnecessarily high for a level II community hospital. Further, their proportion for VBAC was only 15% even though their VBAC success rate was 77%. They also identified that 40% of their scheduled labour inductions were indicated for 'postdate' even though 43% of these induced women were between 40 and 41 weeks gestation and not actually postdate according to clinical practice guidelines.

The hospital committee reviewed the latest clinical practice guidelines and identified a number of strategies that they felt would curb these high proportions of interventions and

reduce costs of care for the unit. At first, they decided to adopt the Canadian Joint Statement on Normal Birth as the unit's principle guideline to define and support normal birth (SOGC, 2008). They further connected with health researchers from the University of Ottawa and McMaster University to receive assistance in the identification of evidence based best practices and to have an evaluation of their intended change of practice. The development and implementation of the different components of the CAesarean section REduction (CARE) strategy occurred simultaneously with the collection of and verification with the evidence base, as the role of the research team was to inform intended changes but not to lead the strategy. Components of the CARE strategy were implemented in stages from April 2010 to January 2011 and the intervention is ongoing. Regular meetings were held between members of the hospital committee and the research team to discuss updates to the development and implementation of the strategy. The development of the CARE strategy was led by the hospital committee in collaboration with the research team because members felt it was imperative that any changes implemented in the hospital unit would be clinically relevant and would be able to be implemented with relative ease without an increase in resource allocation (see section Study Setting for a full description of the innovator and adopter hospitals).

During the implementation of the CARE strategy, the research team began to apply for funding from the Canadian Institutes of Health Research for an evaluation of the CARE strategy on proportions of interventions during labour and birth. The team obtained a Canadian Institutes of Health Research Partnership for Health System Improvement Planning Grant in spring 2010, which was used for the continuous development of the evidence base for the CARE strategy and to apply for further funding. The team further started to share the development of

the CARE strategy and its evidence base at conferences in Ontario to spread awareness of the strategy and to seek additional sources of funding. Other Ontario hospitals began contacting the innovator hospital to learn about the CARE strategy. In Fall, 2011, administrators and key stakeholders from the maternity unit of another urban level II community hospital in Ontario began regular meetings with the innovator hospital and the research team to discuss the adoption of the CARE strategy and to be included in the evaluation process. In spring 2012, the adopter hospital began to implement components of the CARE strategy in its maternity care unit.

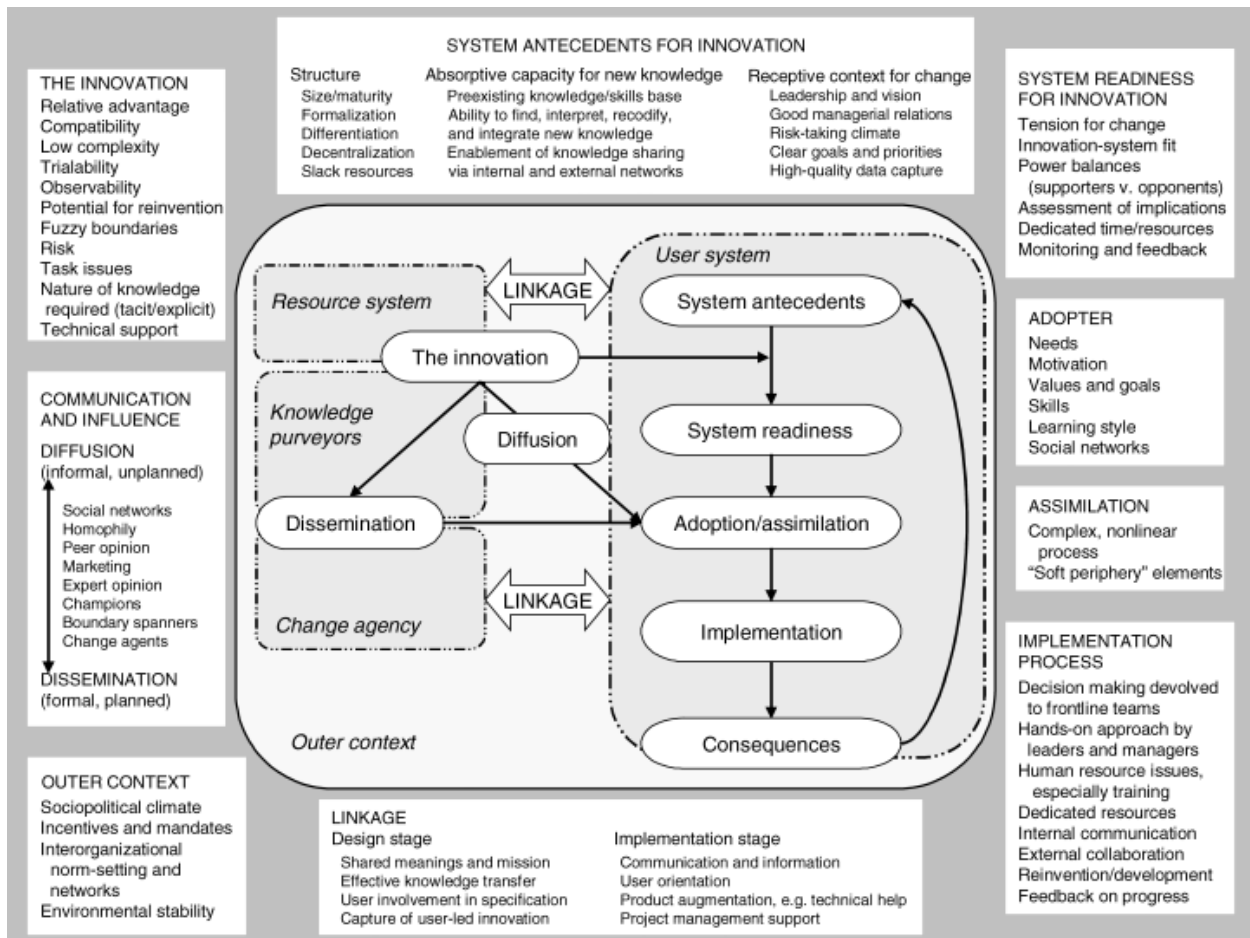
The research team used Greenhalgh's Conceptual Model for Considering the Determinants of Diffusion, Dissemination, and Implementation of Innovations in Health Service Delivery and Organization that is based on a large systematic review of the evidence regarding sustainability and scale up of health services innovations (Greenhalgh, 2004). The model guided the research team's involvement during the development of the CARE strategy and was used to design the evaluation of the scale up efforts from the innovator hospital to the adopter hospital. The research team did not request that either hospital modify their implementation schedule to allow for a more scientifically robust evaluation. Such a top down approach might have halted the units' desire for an optimization of their CS rate. The research team felt it was necessary to allow the teams of providers and unit administrators to decide when their unit was ready for each of the steps of the CARE strategy and also to adapt the intervention when certain strategies were found to become too complicated or to not fit well within the unit's overall structure.

Greenhalgh and colleagues (2004) describe the most relevant attributes that work coherently to impact the adoption rate of an innovation are (1) relative advantage (described as an advantage in the innovation's effectiveness or cost-effectiveness), (2) compatibility (being in line with current norms, values, perceived needs, and ways of working), (3) complexity (the innovation's structure is simple or easily broken down), (4) trialability (the adopters are able to use trial and error), (5) observability (the progress reached through the adoption of an innovation should be visible to adopters), (6) reinvention (the innovation must be flexible enough to be moldable to the adopter's needs), (7) fuzzy boundaries (the core elements of an innovation should be fixed, but the boundaries of how these elements are implemented need to be adoptable to the particular adopter), (8) risk (the risk level perceived by individual adopters must reflect the organization's power structure), (9) task issues (it is important that innovations are feasible, relevant to adopters' work, and improve task performance), (10) knowledge required to use it (the knowledge necessary to use the innovation must be easily adaptable across different contexts), and (11) augmentation/support (it is beneficial if support, customization and training are supplied with the introduction of an innovation).

The key attributes of adopters are: (1) need, (2) motivation, (3) values and goals, (4) skills, (5) learning styles, and (6) social networks. The CARE strategy had to be aligned with the individual traits of the adopter. It was relevant that the adopter hospital perceived a need for the innovation and had an internal or external motivation to use it and that it was able to use it based on its values, skills, and learning styles. Adopters tend to learn about and disseminate innovations through their social networks, which was the case for the CARE strategy. The hospital organization formed the context within which the CARE strategy was adopted. A

number of organizational factors intersect with the innovation and the adopter's attributes and can act as facilitators and barriers to an innovation's implementation. Greenhalgh and colleagues (2004) describe that an organization's structure, an absorptive capacity for new knowledge, and a receptive context for change are important system antecedents for an innovation. Simultaneously, the system must be ready to accept the innovation.

Figure 1.1. Conceptual model for considering the determinants of diffusion, dissemination, and implementation of innovations in health services delivery and organization.



Source: Greenhalgh *et al.* (2004).

Following the implementation of the CARE strategy at the adopter site in 2012, the research team obtained a one year bridge operating grant from the Institute of Gender and Health. The grant was used to: (1) evaluate one of the components of the CARE strategy, the birth options session (Rolfe *et al.*, 2013a) (see section Components of the CARE strategy for a full description of the birth options session), (2) to assess the experiences of health care providers with the CARE strategy at both hospitals (Rolfe *et al.*, 2013b), and (3) to obtain data from the Better Outcomes Registry and Networks (BORN Ontario) on the proportion of CS and other labour and birth interventions at the innovator hospital and an aggregate of level II community hospitals as the control group (see Chapter 4, Reducing CS among Low Risk Women with CARE).

Study setting

The research sites were two level II community hospitals in Ontario, which serve similar communities in urban settings and provide hospital privileges to midwives, family physicians, and obstetricians. Both hospitals have the physician and staff resources to safely offer trial of labour to women with a previous CS.

The innovator hospital is located in the Central LHIN in Ontario and a total of 3181 births took place at the hospital in 2009-10, before the start of the CARE strategy. During that year, 30.4% of births were by CS, and 14.4% of birthing mothers had experienced a previous CS. Most birthing women are between 25 and 34 years old (65.1%) and are in the care of an obstetricians (88.0%) (see Table 1.1 for a description of the innovator hospital).

The adopter hospital is located in the Champlain LHIN in Ontario. With an annual birth volume of 2627 births, slightly fewer women give birth at the adopter hospital than at the innovator hospital. The 31.1% proportion of CS and the 15.5% proportion of birthing women with a previous CS at the adopter hospital is very similar to the innovator hospital. Fewer women are under the care of a midwife (2.7% at the adopter hospital compared to 6.8% at the innovator hospital), while the majority of women also give birth with an obstetrician (94.5%) (see Table 1.1 for a description of the innovator and adopter hospitals).

Table 1.1. Description of study sites before the implementation of the CARE strategy 2009-2010.

Characteristic	Innovator Hospital	Adopter Hospital
Location	Ontario Central LHIN	Ontario Champlain LHIN
Setting	Urban	Urban
Type of Hospital	Community hospital	Community hospital
Care Level	Level II	Level II
Teaching Status	No	No
Annual Birth Rate	3181	2627
CS, n (%)	964 (30.4)	822 (31.3)
Age of Woman at birth, n (%)		
<25	157 (4.9)	260 (9.9)
25-34	2 069 (65.1)	1 731 (65.9)
≥35	955 (30.0)	636 (24.2)
Previous CS, n (%)	459 (14.4)	407 (15.5)
Gestational Diabetes, n (%)	210 (6.6)	107 (4.1)
Parity, n (%)		
0	1 559 (49.0)	1 148 (43.7)
1-3	1 593 (50.1)	1 428 (54.4)
≥4	29 (0.9)	51 (1.9)
Provider at Birth, n (%)		
Obstetrician	2 798 (88.0)	2 483 (94.5)
Midwife	216 (6.8)	72 (2.7)
Family Physician	93 (2.9)	68 (2.6)
Missing	74 (2.3)	4 (0.2)

Components of the CARE strategy targeted to optimize proportion of repeat CS

The complete CARE strategy is described in Chapter Four and a full overview is provided in table 4.1 (page 139). In the following section, the two components of the CARE strategy are described that were implemented to reduce the proportion of CS among low risk pregnant women with a previous CS. These were separately evaluated for this thesis.

Audit and feedback

The innovator hospital started an audit and feedback system to change the practices of health care providers. During monthly departmental meetings, obstetricians, family physicians, midwives, and nurses receive updates from their chief on the hospital's overall proportion of CS, VBAC, and labour induction and those of the other providers from the same discipline. Even though only obstetricians perform CS, the proportion of CS of other providers was associated with the clients they cared for and who gave birth with a CS. For the first three months, these audit reports were blinded and health care providers could only identify themselves by name within the reports. Afterwards and ongoing, the reports have been unblinded and all health care providers receive the rates for themselves and their colleagues with names identified. Health care providers are encouraged to discuss the rates among each other.

A strong evidence base exists for the usefulness of audit and feedback to change provider practice. For example, Naiden and Deshpande (2001) conducted a retrospective study in the United States over a ten year period (January 1989 to December 1998) including 27,780 births to assess the effects of different strategies on proportions of VBAC. They found a significant increase in proportions of VBAC in places where an individual audit and feedback

system was introduced for health care providers. VBAC proportions increased from 35% to 54% without changing rates of maternal and neonatal mortality. A meta-analysis from Canada by Chaillet and Dumont (2007) found the use of audit and feedback systems to have a positive effect on proportions of CS. When audit and feedback was part of a CS reduction strategy in randomized controlled trials, the proportion of CS decreased by 4.6%. An important feature of audit and feedback systems that were effective was that they did not only target a single professional group but included physicians and nurses. Lundgren and colleagues (2015) conducted a systematic review to assess the effectiveness of clinician-centred interventions to improve VBAC rates. They only found three studies that met their inclusion criteria, all of which took place in the 1990s. They argue that contemporary evaluation studies need to focus on strategies that target different professions of health care providers generally and local opinion leaders in different maternity care settings more specifically to find out which type of intervention can successfully improve VBAC rates (Lundgren *et al.*, 2015).

Brehaut and colleagues (2016) from the Centre for Practice Changing Research at the Ottawa Hospital Research Institute have recently published a list of suggestions that have the potential to improve the effectiveness of feedback interventions (see Table 1.2). These suggestions are applicable to the implementation of the audit and feedback that was implemented as part of the CARE strategy. Regarding the nature of the desired action, recommended targets were shared with providers together with the underlying research evidence. Providers were not prescribed how exactly they were to alter their clinical practice in order to improve their intervention rates, but they were encouraged to discuss the variability in rates and to make recommendations to their peers how the rates could be optimized.

Regarding the nature of the data that was available for feedback, providers received regular monthly updates of their rates, both for the whole unit and for individual care providers. The comparators were the rates of their colleagues. Regarding the display of the feedback, very few and only the most relevant targets were chosen to make the outcomes precise. However, feedback was not provided in graphical form. The audit and feedback system was further integrated into already existing departmental meetings, which included brief summaries of the overall findings and the rates were provided by their chief rather than by an outsider. Meaningful discussions were encouraged that allowed providers to justify outlier rates and also to share positive changes that have led to an improvement in the rates.

Table 1.2. 15 Suggestions for Designers of Practice Feedback.

Nature of the desired action
1. Recommend actions that are consistent with established goals and priorities
2. Recommend actions that can improve and are under the recipient's control
3. Recommend specific actions
Nature of the data available for feedback
4. Provide multiple instances of feedback
5. Provide feedback as soon as possible and at a frequency informed by the number of new client cases
6. Provide individual rather than general data
7. Choose comparators that reinforce desired behavior change
Feedback display
8. Closely link the visual display and summary message
9. Provide feedback in more than 1 way
10. Minimize extraneous cognitive load for feedback recipients
Delivering the feedback intervention
11. Address barriers to feedback use
12. Provide short, actionable messages followed by optional detail
13. Address credibility of the information
14. Prevent defensive reactions to feedback
15. Construct feedback through social interaction

Adapted from Brehaut *et al.*, 2016.

Birth options session

Pregnant women with a previous CS are targeted using a monthly client education session (called birth options session) that counsels women on their options for mode of birth after a previous CS. The sessions were run initially by a midwife and later by a hospital volunteer who is a retired nurse. Women who do not exhibit major contraindications at the beginning of their pregnancy are encouraged by their health care provider to attend the session together with their partners. The birth options session was developed to ensure that women receive consistent information about their options for mode of birth following a CS, regardless of their individual provider. The decision to have a repeat CS or VBAC is made in collaboration with their health care provider at their next visit following the birth options session. During the session, women have the opportunity to discuss the reasons for their previous CS and to explore options for their upcoming birth in a group session. A short presentation is given with content that is based on best practice guidelines by the SOGC (2005), and agreed upon by all maternity health care providers at the hospital. Risks and benefits of repeat CS and VBAC to mother and infant are discussed in a balanced fashion, as well as factors that influence the likelihood of either option. Factors influencing decision making, such as returning to children at home, future childbearing plans, and family influences are also discussed. A patient decision aid that was developed by the Ottawa Research Institute (Brownlee *et al.*, 2006) is used to guide group discussion to help women understand which factors are most relevant to them when making a decision regarding their upcoming birth (see Appendix I for the decision aid used at the innovator hospital).

The birth options session was intended to raise awareness among women with a previous CS that they have options for their mode of birth and to provide them with the knowledge of risks and benefits at multiple levels to help them make an informed mode of birth decision. A systematic review of 137 reports found involvement in decision making to be important to women's satisfaction with their birth experience (Hodnett, 2002). Catling-Paull and colleagues (2011) reviewed four studies, three randomized controlled trials (Fraser *et al.*, 1997; Shorten *et al.*, 2005; Montgomery *et al.*, 2007) and one prospective cohort study (Cleary-Goldman *et al.*, 2005) to assess the impact of providing VBAC information and decision aids to women on proportions of trial of labour for women with a previous CS. Trial of labour rates increased without being statistically significant in each of the settings (Canada, United States, United Kingdom, and Australia). Women who received additional information on mode of birth after previous CS had lower rates of decisional-conflict, and the authors conclude that the care of women with a prior CS should always include interventions that reduce decisional conflict and provide evidence based information about available mode of birth options.

The adopter hospital implemented the audit and feedback system using the same process as the innovator hospital. The adopter hospital, however, did not run the birth option session because administrators decided that the session would be too resource intensive to be run regularly by a staff member and they believed that clients would not be interested in attending. Maternity care providers at the adopter hospital decided to direct their pregnant clients with a previous CS to a patient decision aid on birth after CS that is different from the one used at the innovator site, and to evidence based information that is accessible at the

website of the power to push campaign by BC Women's Hospital (www.powertopush.ca) (see Appendix II for the decision aid used at the adopter hospital).

Participants were recruited from the innovator and adopter hospital of the CARE strategy and it is possible that their practices and decision making processes were affected by their involvement in the intervention.

Ethics and collaboration

Ethical approval was obtained from the University of Ottawa Health Sciences and Sciences Research Ethics Board, from the Research Ethics Board of the Children's Hospital of Eastern Ontario to obtain data from the Better Outcomes Registry and Network (BORN) Ontario, and from the Research Ethics Boards of the two hospitals involved in the study. Written informed consent was obtained from participants who were interviewed in person and verbal informed consent from participants who were interviewed over the phone. Names were changed and other personal identifiers were removed in the presentation of the data. Survey respondents were informed that submitting their answers would imply consent. Respondents were able to submit their responses anonymously because no personal identifiers were collected unless the respondent chose to share their contact information to participate in a follow up interview.

The following section outlines the theoretical framework that guided the research: the relevance of knowledge, power, and risk in mode of birth decision making

Conceptual frameworks guiding the research

Systems theory

The tenants of systems theory (Nelson, 2011) guided the design of the research through a holistic view of the factors that influence proportions of VBAC. The high use of repeat CS is a problem that is embedded in a complex health and social system, which consists of three levels: practice patterns of maternity care providers, decisions of pregnant women, and the organizational structure of the birthing unit. It was important that the research addressed the impact of each of these three levels as every one of them exists and operates in direct interaction with the others.

The attitudes, values, and perceptions that guide the practices of maternity care providers were explored in Chapter Two to research their role in the decision making processes regarding mode of birth after a previous CS. In Chapter Three, pregnant women with a previous CS themselves were surveyed and interviewed to learn how they make mode of birth decisions in the context of their care environment. The effectiveness of the CARE strategy, which is a hospital based innovation that was implemented by organizations to change their proportions of CS and repeat CS, was evaluated in Chapter Four. The research findings are integrated and discussed from both a health system and a theoretical perspective in Chapter Five. The theoretical discussion was guided by a feminist poststructuralist view of knowledge, power and risk, and their relevance to mode of birth after CS decision making. These theoretical concepts are introduced in the following section and are revisited in the integrative discussion chapter.

The relevance of knowledge, power, and risk in mode of birth decision making

Michel Foucault, who has shaped much of poststructuralist thought today, wrote extensively on the connection between power and knowledge within medical discourses. He describes discourses as bodies of knowledge, which are always linked to power because knowledge is an outcome of power, and power is important for authorizing what counts as knowledge (Jordan, 1995). For Foucault (1997), power is neither centralized, nor can it be possessed by any one individual, but it is a diffused and immanent relation. The relational aspect of power is very important and this view of power is helpful to disentangle the power relations between pregnant women and their providers. The person who is exercising power and the person on whom it is exercised are both subjected to the same technologies of power.

According to Foucault (1980), knowledge and power produce each other. They are created simultaneously and are therefore inseparable. "Power, when it is exercised through these subtle mechanisms, cannot but evolve, organise and put into circulation a knowledge, or rather apparatuses of knowledge, which are not ideological constructs" (Foucault, 1980, p.102). When knowledge is thus produced in the acceptable scientific form, it does not become an ideology, but it is instead considered evidence. Social discourse is directly related to the connection of power and knowledge by influencing knowledge and truth criteria. Knowledge is a social construct; it is a shared belief of a socio-cultural community. The standards used to assess the appropriateness of all knowledge are developed by experts and institutions, for example by doctors and hospitals, priests and churches, judges and courts (Foucault, 1980). These knowledge experts then determine which knowledge is privileged in public discourse.

Power determines how knowledge can be obtained properly and thereby what counts as truth. Indeed, Foucault (1980) argued that power can only be exercised through the production of knowledge and truth. In the establishment of knowledge in Western academic institutions, non-scientific discourses are excluded, thereby disqualifying all non-empirically established knowledges. Foucault referred to these other types of knowledges as subjugated knowledges. He explained that subjugated knowledges apply to historical events, which were “disguised within the body of functionalist and systematising theory” (Foucault, 1980, p.82), and to naïve knowledges; those kind of knowledges that are disqualified because they are not considered fully scientific and are “located down on the hierarchy, beneath the required level of cognition of scientificity” (Foucault, 1980, p.82). Scientific knowledge is widely accepted as having the capacity to determine all that can and will be known; therefore, it is directly related to power while subjugated knowledge is excluded as a result.

Our modern society has made it possible to constitute knowledge of the body through techniques of observation from the medical field. Foucault (1973) calls this medical form of observation *the medical gaze*, which has become the convention for the production of knowledge within the hospital. Technological interventions used during birth make it, for example, possible to gather a vast amount of medical knowledge surrounding birth. The practice of knowledge collection in turn shapes the type of knowledge available to pregnant women and maternity care providers, as well as more general discourses on birth. Discourses do not occur naturally or evolve on their own; rather, they are socially produced and reproduced, taught and learned, and they are directly linked to specific times and places in history (Foucault, 1978). For example, the knowledge that shaped much popular discourse in

medieval times would now be considered as superstition, while the knowledge established by modern scientific discourses would likely have been judged as blasphemy during medieval times.

Health care providers are able to obtain clinical knowledge of pregnancy, birth and the fetus using medical technologies rather than having to rely solely on an account from pregnant women. They determine the risk status of pregnancies and births through the observation of pregnant bodies using gazing instruments (Foucault, 1973). Thus, the provider holds the knowledge about the risk status and the health of the fetus and the woman has to rely on that outside knowledge to be informed about the state of her own body. Risk includes an element of uncertainty (Errington & Chruch, 2005), it can be considered as an expression of the probability that a dangerous event will occur (Ruhl, 1999). The concept of risk plays an important role in mode of birth after CS decision making. Health care providers and women balance the risk of uterine rupture and associated fetal complications after VBAC against the risks associated with repeat CS. Weir (2006) uses the term clinical risk for medically defined risk. It includes the judgment of risk using an epidemiological knowledge of risk in populations as well as the judgment of normal and pathological in the clinical care setting of a single individual. These two judgments of risk are not as easily compatible as it appears in clinical practice. While epidemiologists calculate risk through the study of a population, thereby allowing for the production of probability statistics, risk in the clinical setting only applies to single individuals, and is therefore not calculable. Thus, common risk factors that are determined through epidemiological studies and principles become equated with clinical signs, making it appear as though a disease is already present (Weir, 2006). It is further problematic to use population risk

statistics in clinical settings because most individuals have difficulty with the concept of probability. While individuals are expected to base their decision for or against a specific procedure on statistical information, most people tend to convert any risk statement into a binary statement. They tend to ignore the actual risk of the occurrence (Rowley, 1984).

Overview of thesis chapters

The overarching objective of this research was to explore influences on mode of birth after a previous CS at the provider, client and institutional level, and the corresponding decision making processes that takes place between women and their maternity care providers when making decisions regarding birth after a previous CS.

The results of the three studies are presented in Chapters Two, Three, and Four. Chapter Two is an exploration of the factors that influence the practices of obstetricians, family physicians, nurses, and midwives from the hospitals that implemented the CARE strategy regarding birth after previous CS. It answered the research question: What are the factors that influence the practices of maternity care providers (obstetricians, family physicians, midwives, and nurses) regarding mode of birth after a previous CS?

Chapter Three is an analysis of the decision making processes of pregnant women with a previous CS who are planning to give birth at one of the hospitals that implemented the CARE strategy. The study was guided by the research question: How do women eligible for a VBAC make decisions about their upcoming mode of birth?

Chapter Four was an investigation of the effect of the CARE strategy, which includes client education, health care provider audit and feedback, and unit policy updates on overall proportions of CS and repeat CS among low risk women. It answered the research questions:

- (1) Is the proportion of CS in the population of birthing women higher or lower in the 12 months following the complete implementation of the CARE strategy compared to the 12 months prior to the implementation period?
- (2) What is the cumulative effect of the CARE strategy on the proportion of CS in Robson groups 1, 2a, and 5?

Chapter Five is an integrated discussion of the results of the research using a feminist poststructuralist approach to interpret the collective findings and to answer the questions:

- (3) How and why are different types of knowledge applied during the decision making processes regarding mode of birth after a previous CS?
- (4) How is risk communicated and balanced in our society in relation to decisions regarding mode of birth after a previous CS?

For the studies in Chapter Two and Three, Esther Shoemaker conceived the research design, collected and analyzed the data, and wrote the research report under the supervision of Ivy Bourgeault. Ivy Bourgeault, Ian Graham, and Wendy Peterson made important revisions and provided feedback to each of the chapters. For the study in Chapter Four, Esther Shoemaker, Ivy Bourgeault, Eileen Hutton and Carol Cameron were responsible for the conception of the study and chose the research design. Esther Shoemaker obtained the data and conducted the

analysis under the supervision of Eileen Hutton. Esther Shoemaker wrote the research report and Ivy Bourgeault, Eileen Hutton and Ian Graham made critical revisions to the manuscript.

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CHAPTER 2

FACTORS INFLUENCING MATERNITY CARE PROVIDERS' PRACTICES REGARDING MODE OF BIRTH AFTER PREVIOUS CAESAREAN SECTION

Esther Susanna Shoemaker

Abstract

Background: An increasing proportion of Canadian women are having a repeat Caesarean section (CS). This study explores the factors that influence the practices of maternity care providers (obstetricians, family physicians, midwives, and nurses) regarding mode of birth after a previous CS.

Methods: A sequential mixed methods approach was used. Twenty-eight providers from different disciplinary backgrounds filled out an adapted form of the Maternity Care Providers' Attitudes Survey. The surveys were analyzed descriptively to explore the providers' practice patterns and perspectives regarding mode of birth after a previous CS. Interviews were conducted with eleven survey respondents, which were analyzed using an iterative deductive and inductive coding approach.

Results: Maternity care providers expressed positive attitudes towards vaginal birth and would recommend a vaginal birth after CS (VBAC) for healthy pregnant women with a history of CS. They had different perceptions of the safety of birth to the health of women and infants and different approaches to engage in decision making during consultation. Providers believed women make their decision about mode of birth outside of the clinical consultation and often prior to their subsequent pregnancy.

Conclusion: The study illustrates that providers from different maternity care disciplines share a preference for VBAC among healthy pregnant women with a previous CS but they have different perspectives on the levels of risks associated with birth. These differences have an

impact on the shared decision making processes that take place with their clients during consultation.

Introduction

An increasing number of women are pregnant with a scarred uterus after having previously experienced a caesarean section (CS) birth (Sprague *et al.*, 2013). While the proportion of mothers who had a repeat CS in Canada was 64.7% in 1995-1996 (Liu *et al.*, 2008) it has increased to 82.5% in 2011-2012 (CIHI, 2013). When deciding how to give birth, clients with a previous CS and their health care providers need to assess the risks and benefits of repeat CS or a vaginal birth after caesarean (VBAC). For women with a previous CS, the risk of uterine rupture that is associated with VBAC is of clinical significance because it can lead to maternal and infant morbidity and mortality (Grobman *et al.*, 2008). Based on a number of studies, the risk of uterine rupture for a woman with a single previous CS is approximately 0.5 to 1% (Shipp *et al.*, 2001; Hammoud *et al.*, 2004; Macones *et al.*, 2005; Grobman *et al.*, 2008). Having a repeat CS is associated with other health risks, such as increased rates of infection and hemorrhage (Lydon-Rochelle *et al.*, 2010). Repeat CS can also lead to problems in future pregnancies, such as placenta accreta, which is an abnormal attachment of the placenta to the wall of the uterus and can lead to hysterectomy or life threatening hemorrhage during birth (Cheng *et al.*, 2011; Belfort, 2010; Silver *et al.*, 2006).

Pregnant women rely on the expert knowledge of their maternity care providers to determine their risk status and to inform women's pregnancy and birth decisions (Heaman *et al.*, 2004). Previous studies have found that obstetricians, family physicians, midwives and nurses who practice maternity care have variable attitudes regarding pregnancy and birth care (Reime *et al.*, 2004; Ballen & Fulcher, 2006; Blix-Lindstrom, Johansson & Christensson, 2008;

Carlton *et al.*, 2009; Simpson & Lyndon, 2009), and that these attitudes of health care providers are related to their clinical decisions and practice patterns (Ajzen & Fishbein, 2005; Bohner & Wanke, 2002). Independent studies report that attitudes toward pregnancy and childbirth are influenced by the values and beliefs that are part of the culture of each maternity care discipline (Albarracin *et al.*, 2005; Thompson, 2003), and also by the providers' overall work environment (Smith & Hogg, 2008). It is not clear, however, if and how the attitudes of health care providers towards birth after a previous CS influence the decisions about mode of birth of pregnant women with a history of CS. The objective of this study was to explore the factors that shape the practices of maternity care providers regarding mode of birth after a previous CS using surveys and interviews. Comparisons were made between different disciplines of maternity care professions, obstetricians, midwives, family physicians and nurses.

Background

Several overlapping bodies of knowledge address the factors that influence providers' practices regarding mode of birth after a previous CS: the attitudes of maternity care providers regarding mode of birth and birth interventions, concerns of litigation in obstetrics, women's reliance on the expertise of their providers, and the distinction between and relevance of informed choice, shared decision making and informed consent.

Attitudes of maternity care providers

In an editorial in the *Lancet*, Graham (1996) reviewed the literature on physicians' use of episiotomies during birth and illustrates that their attitudes towards the episiotomies has

influenced their use of episiotomies throughout history. Klein and colleagues (2004, 2011) surveyed Canadian maternity care providers regarding their attitudes towards birth and birth interventions and they stipulate that provider attitudes can be at times even more important drivers of clinical practice patterns than research evidence. Thus, the attitudes of providers need to be assessed when researching the factors that influence their practices.

Only a limited number of studies have investigated the attitudes of health care providers on childbirth and birth interventions. An Italian study found that midwives tended to perceive CS as more risky than obstetricians, while obstetricians tended to overestimate the benefits of CS (Monari *et al.*, 2008). Reime and colleagues (2004) surveyed Canadian maternity care providers and found opposing views in relation to CS births. Half of the obstetricians in the study approved of elective CS without medical indications (52.9%), only 13.6% of family physicians and 14.6% midwives agreed. Compared to other types of maternity care providers, obstetricians also tend to favour repeat CS for women with a history of CS (Klein *et al.*, 2009). The attitudes of nurses toward vaginal birth and birth interventions are situated between those of obstetricians and midwives (Blais *et al.*, 1994; Klein *et al.*, 2009). The vast majority of Canadian providers prefer vaginal birth for themselves or their partner and there is a general agreement among the different professions regarding which approaches have the potential to improve CS rates (Klein *et al.*, 2009).

Concerns of litigation in obstetrics

A number of international studies have concluded over the years that the fear of litigation in obstetrics influences providers' practices and is an important driver of the high CS

rate (Lomas *et al.*, 1991; Rossignol *et al.*, 2013; Habiba *et al.*, 2006; Chandraharan & Arulkumaran, 2006) as it can lead providers to practice defensive medicine (Dalton *et al.*, 2008). The risk of litigation increases for the provider in cases of perinatal mortality, when an infant is born with lifelong impairments or when a relatively young and healthy women is harmed after birth (Sakala, Yang & Corry, 2013a). Performing an avoidable CS to demonstrate an effort to avoid any potential adverse outcome is called an “assurance practice” (Sakala, Yang & Corry, 2013a). Assurance practice suggests that a health care provider reduces his or her risk of being sued by practicing with caution, which means having tried everything *technologically* possible in a timely manner. When providers take their risk of litigation into account when making care decisions, they tend to overestimate the possibility of poor outcomes (Carrier *et al.*, 2010).

The National Institute of Health in the US had a consensus development conference on VBAC in 2010, and they found through panel discussions that concerns over liability risk have a major impact on the willingness of obstetricians and health care institutions to offer women a trial of labor after a previous CS. The panel was concerned that medical-legal considerations add to, and in many instances exacerbate, barriers to VBAC due to fear of a medical lawsuit (National Institute of Health, 2010). In the United States, the amount of a state’s malpractice premium has been found to be strongly related to rates of interventions during birth (Zwecker, Azoulay & Abenhaim, 2011). States with an average malpractice premium of more than \$100,000 had higher proportions of CS (odd ratio 1.17, 95% CI 1.02-1.35) and lower proportions of VBAC (odd ratio 0.60, 95% CI 0.37-0.98) compared to states with an average malpractice premium of less than \$50,000. Milne and Lalonde (2007) analyzed adverse events and their associated costs from Canadian hospitals for the Society of Obstetricians and Gynaecologists of

Canada. They reported that six percent of obstetricians faced litigation annually and that the majority of these cases involved low-risk pregnancies. Further, most cases of professional liability also included nurses. Studies have shown that providers can decrease the possibility of being sued for an undesired birth outcome when they engage in a “contractual relationship” with their clients (Monico, Calise & Calabro, 2008), that includes the practice of shared decision making and the proper documentation thereof.

Women rely on the expertise of their maternity care providers

Pregnant women value the expertise and opinion of their provider, in particular to ensure the best possible health outcome for their infants (Moore *et al.*, 2014). Women expect their health care provider to provide them with risk information and to assist them to interpret the information (Liu *et al.*, 2007). They also rely on their providers to help them determine their individual risk status and to provide measures to reduce risks (Heaman *et al.*, 2004). Women trust that their providers’ expert knowledge and applied medical technologies will provide security and protect them from risks during their pregnancy and birth (Kringeland & Moller, 2006).

The trust of women in the expertise of their providers makes them receptive to the providers’ clinical directions (Dahl *et al.*, 2006) and many women choose the birthing option that they perceive as their provider’s preferred decision. A study from the United States by Bernstein and colleagues (2012) reports 86% of women with a previous CS would choose a repeat CS if they believe their provider would prefer a CS, while 78% of women would choose a VBAC if they perceive their provider to prefer a VBAC. Many women indicate that they want to

understand what led to a CS in their previous birth and to place their past experience into the context of their current pregnancy. They find it most helpful if they are able to rely on their health care provider to guide them through the process of incorporating their past experience into their present situation (Shorten, Shorten & Kennedy, 2014). Maternity care providers from all disciplinary backgrounds are generally aware that their medical authority and the way they frame risk discussions has an impact on the decisions made by their clients (Van Wagner, 2016).

Informed choice, shared decision making, informed consent

While relying on the clinical expertise of their providers, most pregnant women with a previous CS prefer to be also directly involved when making decisions about their mode of birth (Liu *et al.*, 2007). This wish is supported by the first recommendation of the clinical practice guideline on vaginal birth after previous CS by the Society of Obstetricians and Gynaecologists of Canada (2005), which states that every woman should receive the best information available about her options for labour and childbirth, and that the final decision should rest with the woman informed by her health care provider regarding the safest option for the birth of the baby.

Faden and Beauchamp (1986) originally described informed choice to reach informed consent to be able to occur when a client is fully aware of the factors associated with the decision and he or she is not being coerced; thus is making a deliberate and autonomous decision. The decision making process regarding mode of birth after a previous CS intersects with the risk communication process during which pregnant women and their care providers exchange risk information. Risk can be considered as a function of the chance of exposure to an

undesired event and its expected outcomes (Arvai, 2007). Risks tend to invoke especially strong psychological reactions when children are potentially affected (Kasperson *et al.*, 1987).

Obstetricians are aware that many women will accept some level of risk to their own health to mitigate even smaller risks to their infants (Van Wager, 2016). In Canada, the probability of morbidity and mortality for a healthy pregnant woman with a history of a single CS and her infant is small in absolute terms, but it is real and each mode of birth options presents different risks to either mother or infant or both.

Shared decision making goes beyond informed choice, because in addition to the provision of balanced information of health care options and their associated risks and benefits, the client's personal values and preferences are being taken into account (Sakala, Yang & Corry, 2013b). Compared to informed choice, when providers and clients practice shared decision making, the client's autonomy, provider-client communication and the care quality improve, while providers face a decreased risk of lawsuits (Monico, Calise & Calabro, 2008).

Informed consent, which is the goal of informed choice and shared decision making, can be regarded either as a distinct event or as a process (Lidz, Appelbaum & Meisel, 1988). The latter is a more dynamic concept which acknowledges periods of informational input from the health care provider and the clients' reflections thereof in the context of their personal experiences. If informed consent is treated as a process for decision making regarding mode of birth after a previous CS, a relationship is required between the health care provider and the pregnant woman to allow for an exploration of all issues that might be relevant to informed decision making in her individual case. If informed consent is approached as a distinct event, it

becomes a rational choice that is made after the provision of unidirectional information (Press & Browner, 1995). In our current maternity care system, health care providers are pressured for time and explaining all risks and benefits of elective repeat CS and VBAC is time consuming. A number of studies on decision making in maternity care settings consistently raise concerns about the adequacy of the informed consent process (Akkad *et al.*, 2004; Dixon-Woods *et al.*, 2006; O’Cathain *et al.*, 2002) and a lack of time has been identified as the strongest barrier to the implementation of shared decision making (Légaré *et al.*, 2008).

Table 2.1. Summary table of state of knowledge.

What we know	Critical Knowledge Gaps
Maternity care providers from different disciplines prefer different birth options for women with a previous CS.	What shapes providers preferences for repeat CS or VBAC and do their attitudes influence their clinical consultation?
Providers from different disciplines have different perceptions of the risks and benefits of CS and vaginal birth for mothers and infants.	How do providers from different disciplines manage their level of risk tolerance towards mode of birth after a previous CS?
The risk of litigation in obstetrics for the provider has an impact on proportions of CS and repeat CS.	How do providers mitigate their risk of litigation?
Most women trust the opinion of their care provider and make decisions about mode of birth based on their perceived provider’s preference.	Are providers aware of the important role their attitudes have on women’s decisions about mode of birth?
Clinical practice guidelines recommend the involvement of pregnant women in making decisions about mode of birth.	Is shared decision making practiced by providers and how does it differ across disciplines?

Methods

Study objectives and research questions

The objective of this study was to explore the factors that influence the practices of maternity care providers regarding mode of birth after a previous CS. Comparisons were made between different disciplines (obstetricians, midwives, family physicians and nurses) to explore which elements of care the provider groups share a consensus and where there is disagreement.

The specific research question was: What are the factors that influence the practices of maternity care providers (obstetricians, family physicians, midwives, and nurses) regarding mode of birth after a previous CS?

A sequential mixed methods approach was employed (Creswell, 2009). First, a survey was implemented to explore the practice patterns and perspectives of maternity care providers regarding mode of birth after a previous CS. Second, in depth interviews were undertaken with a subset of 11 survey respondents to assess in greater detail the factors that influence providers' practices regarding mode of birth after a previous CS. The analysis of the survey data guided the subsequent analysis of the interviews.

Participant selection and inclusion

All obstetricians, family physicians, registered midwives and registered nurses who work in two large level II community hospitals in urban centres in Ontario, Canada were invited to participate in the study. The request for participation in the online survey was sent by hospital

administrators via email in November and December 2013 on three separate occasions.

Providers were asked in the survey if they were interested to participate in a follow up interview.

Data collection

Surveys

The survey instrument was used with permission from the “Maternity Care Providers’ Attitudes Survey” that had been developed and validated over a seven year period and implemented by researchers at the Child and Family Research Institute at the University of British Columbia (Klein *et al*, 2009). The demographic section was adapted to reflect the respondent population and the questions regarding the province and hospital of workplace were removed. In addition to demographic questions, the survey included statements related to (1) *self-reported practices*, such as “My proportion of Caesarean sections among all births I attended in the past three months was”; (2) *opinions on maternity care*, such as “It is a woman’s right to choose a Caesarean section for herself, even in the absence of medical indication”; (3) *personal preference for mode of birth*, such as “If my partner or I were pregnant with an apparently normal pregnancy, I would prefer an elective Caesarean section instead of a vaginal birth”; (4) *attitudes of reasons for rising CS rates*, such as “The perception of women that elective Caesarean section is less painful than vaginal birth”; and (5) *attitudes towards risk of birth*, such as “Considering maternity care in Canada, in general, what is the overall risk of childbirth to the health of the mother”. All Likert scale questions had a response range of one meaning strongly disagree to five meaning strongly agree. Questions 29 and 30, regarding the risk of childbirth to the health of the mother and to the health of the fetus, had a ten point

response range of one being completely safe and ten being completely dangerous (see appendix III for the health care provider survey).

Interviews

Health care providers were interviewed in person and over the phone, depending on the provider's preference. It was relevant to give providers an opportunity to talk about the issues related to mode of birth after a previous CS that they regarded as most relevant. Qualitative interviews are useful when exploring the meaning that individuals assign to a particular event or phenomenon (Kelly, 2010). Thus, using qualitative interviews as a follow up to the survey allowed for a more in depth exploration of the factors that influence providers' practices regarding mode of birth after a previous CS. Depending on the time availability of the participant, the interviews lasted between 20 and 45 minutes. The questions were structured to ask about providers' attitudes of current CS and VBAC rates, what they consider to be the reasons for the current rates, and their perceptions of strategies that might optimize the rates (see appendix IV for the interview guide).

Data analysis

Surveys

The survey data were analyzed using SPSS version 20. Univariate descriptive statistics (range, mean, standard deviation) were calculated for continuous variables and frequency distributions for categorical variables. Histograms and bar graphs were created for visual representation of the results. The surveys were analyzed for descriptive purposes and the results were used for triangulation with the findings from the interviews. High level statistical testing was not appropriate and not intended since the sample size was too small.

Interviews

The interviews were transcribed and coded by the primary author. The interview data was organized and managed in Atlas.ti version 7. An iterative deductive and an inductive coding approach was applied during the analysis as described by MacPherson and McKie (2010). During the first phase of analysis, a preliminary coding framework was developed based on the results of previous research studies and on the overview of factors that influence the practice of providers from different disciplines that were derived from the analysis of the surveys. The framework informed the interview guide and therefore the a priori coding scheme. The framework was then applied to the interview transcripts and the data from all interviews were analyzed across the different professional groups. Basing the structure of the preliminary coding framework on previous research findings is helpful to organize the interview data and to stimulate theoretical thinking (Layder, 1998). In the second phase, the interviews were categorized into their corresponding provider groups and they were analyzed inductively using the constant comparative method (Boeije, 2002). New codes emerged that appeared to be common and relevant within each of the disciplines.

Ethical implications

Approval was obtained from the University of Ottawa Health Sciences and Sciences Research Ethics Board and the Research Ethics Boards of each of the participating hospitals. Participants were able to answer the survey anonymously because submitting the survey responses online implied their consent to participate and no personal identifiers were collected. Providers who volunteered to be additionally interviewed shared their contact information and signed consent forms prior to the interviews.

Results

The findings from the analysis of the surveys and interviews are presented together. This section provides an overview of the study participants and the factors that they outlined to influence their practice regarding mode of birth after a previous CS, which include providers' attitudes towards mode of birth, their risk perception, and their perception of women's decisions.

All participants who volunteered to be interviewed and who shared their contact information were interviewed in person or over the phone depending on their preference between January and April 2014. Approximately 100 providers work in the maternity care unit of both hospitals. Twenty-eight providers submitted the survey (28% response rate) and a subset of 11 participated in an interview (a response rate of 39% among survey respondents, and a response rate of 11% among all maternity care providers in the recruitment hospitals).

Description of participants

Surveys

Surveys were undertaken with 28 health care providers. The majority of respondents were midwives (11) and nurses (10), five were obstetricians and two were family physicians. Obstetricians and family physicians were slightly older than midwives and nurses with respective age ranges from 38 to 59 years (mean of 47.4) and from 36 to 59 years (mean of 47.5). While the midwives' ages ranged from 23 to 53 years (mean of 40.1) and those of nurses ranged from 27 to 55 (mean of 39.7). The majority of participants were Caucasian and married

or in a common law relationship and only three obstetricians, one midwife and one nurse had not previously experienced birth themselves or with their partner (see Table 2.2).

The self-reported number of births attended over the three months period prior to answering the survey ranged significantly but was highest for obstetricians with a range of 68 to 280 births and the lowest for family physicians with a range of 20 to 30 births. The proportion of CS was highest for obstetricians (range of 12%-30%) and nurses (range of 0%-30%) than for family physicians (range of 10%-15%) and midwives (range of 0%-20%). Only obstetricians performed CS. The rate of CS for other providers reflects the clients they cared for during pregnancy and/or labour and who gave birth by CS. The proportion of trial of labour for women with a previous CS was reported to be highest for obstetricians (range of 10%-99%) and midwives (range of 0%-100%) than among nurses (range of 0%-60%), and none of the clients of family physicians had a trial of labour (for a full description of the demographic and professional background of participants refer to Table 2.2).

Table 2.2. Demographic and professional background of survey participants.

Characteristics	Obstetricians N=5 n (%)	Family Physicians N=2 n (%)	Midwives N=11 n (%)	Nurses N=10 n (%)
Gender				
Male	4 (80.0)	0	0	0
Female	1 (20.0)	2 (100)	11 (100)	10 (100)
Mean age	47.4	47.5	40.1	39.7
Marital Status				
Married/common law	5 (100)	2 (100)	8 (72.7)	9 (90.0)
Ethnic identity				
Caucasian	5 (100)	2 (100)	10 (90.9)	8 (80.0)
Given birth (self or partner)	2 (40.0)	2 (100)	10 (90.9)	9 (90.0)
Years providing intrapartum care	3-29	6-31	1-20	3-31
Births attended in past 3 months	68-280	20-30	20-80	2-400
% of CS in past 3 months	12-30	10-15	0-20	0-30
% of trial of labour in past 3 months	10-99	0	0-100	0-60

Interviews

In depth interviews were conducted with 11 of the survey respondents: four obstetricians, four midwives and three nurses. The initial plan was to interview six providers per discipline, but the number of providers who volunteered to be interviewed was too small to reach that goal. Unfortunately, none of the family physicians from the participating hospitals volunteered to be interviewed. Obstetricians were on average slightly older with an age range of 38 to 59 (mean of 48.8) than midwives, who had an age range of 23-48 (mean of 40.3) and nurses, who had an age range of 27 to 55 (mean of 39.3). The only three male participants were obstetricians. Two nurses were South Asian and all other participants identified as Caucasian. Two obstetricians, three midwives and two nurses have experienced birth themselves or with

their partner. Providers reported wide ranges in the number of births they had attended over the three month period prior to their participation in the study, which ranged from 15 to 80 for midwives to 68 to 280 for obstetricians and 15 to 400 for nurses. Nurses and obstetricians reported slightly higher proportions of CS for their clients (15%-30% for nurses and 12%-30% for obstetricians) than midwives (0%-20%). There were wide variations in the reported proportions of trial of labour among clients with a previous CS, specifically for obstetricians, with a range of 10% to 99%, and midwives with a range of 0%-100%, while all interviewed nurses reported a trial of labour rate of less than ten percent (see Table 2.3).

Table 2.3. Demographic and professional background of interview participants.

Characteristics	Obstetricians N=4 n (%)	Midwives N=4 n (%)	Nurses N=3 n (%)
Gender			
Male	3 (75.0)	0	0
Female	1 (20.0)	4 (100)	3 (100)
Mean age	48.8	40.3	39.3
Marital Status			
Married/common law	4 (100)	1 (25.0)	3 (90.0)
Ethnic identity			
Caucasian	4 (100)	4 (100)	2 (66.7)
Given birth (self or partner)	2 (50.0)	3 (75.0)	2 (66.7)
Years providing intrapartum care	3-29	1-20	1-31
Births attended in past 3 months	68-280	15-80	15-400
% of CS in past 3 months	12-30	0-20	15-30
% of trial of labour in past 3 months	10-99	0-100	2-10

Attitudes of healthcare providers regarding mode of birth

All survey respondents indicated not being fearful of vaginal birth for themselves or their partner in relation to compromised sexual functioning, urinary or fecal incontinence, unpredictability, and perineal and/or pelvic floor damage. No one would choose an elective CS for themselves or their partner in an uncomplicated pregnancy. Obstetricians and midwives would choose a provider from their own disciplinary background as a care provider for themselves or their partner while only one nurse would choose a midwife and all other nurses would want to be cared for by an obstetrician (see Table 2.4).

Table 2.4. Personal birth preferences with an uncomplicated pregnancy stratified by type of healthcare provider.

I would prefer...	Obstetricians (N=5) n (%)	Family Physicians (N=2) n (%)	Midwives (N=11) n (%)	Nurses (N=10) n (%)
An elective CS for myself or my partner	0	0	0	0
My baby be delivered by				
an obstetrician	5 (100)	1 (50.0)	0	9 (90.0)
a family physician	0	1 (50.0)	0	0
a midwife	0	0	11 (100)	1 (10.0)

Every provider agreed during the survey and the interviews that the current rate of CS in Canada is too high and that it is costly for the health care system, and 26 agreed that the VBAC rate is too low for optimal maternity care. While seven midwives (63.6%) and two nurses (20%) considered vaginal birth to be more empowering than CS birth for women, three obstetricians (60%), two family physicians (100%), seven midwives (63.6%) and four registered nurses (40%)

felt that women who birth with a CS miss an important life event. With the exception of one nurse and one obstetrician, providers agreed that it is important for women to develop a birth plan (for a full description of respondents' maternity care attitudes refer to Table 2.5).

Table 2.5. Maternity care providers' attitudes toward maternity care practices.

Attitudes	Obstetricians (N=5) n (%)	Family Physicians (N=2) n (%)	Midwives (N=11) n (%)	Nurses (N=10) n (%)
Current CS rate is too high	5 (100)	2 (100)	11 (100)	10 (100)
Current VBAC rate is too low	5 (100)	1 (50.0)	11 (100)	9 (90.0)
CS prevents urinary incontinence or sexual dysfunction	0	0	0	0
CS is more convenient for women	1 (20.0)	0	0	0
CS is more convenient for physicians	2 (40.0)	0	4 (36.4)	3 (30.0)
CS costs more for the health care system than vaginal birth	5 (100)	2 (100)	11 (100)	8 (80.0)
CS is safer for the baby than vaginal birth	1 (20.0)	1 (50.0)	0	0
CS is as safe as vaginal birth for women	1 (20.0)	1 (50.0)	1 (9.1)	2 (20.0)
CS is like any other birth	0	0	0	0
Repeat CS improves newborn outcome over VBAC	0	0	0	0
Women can choose a CS without medical indication	2 (40.0)	0	3 (27.3)	2 (20.0)
Vaginal birth is more empowering for women than CS birth	0	0	7 (63.6)	2 (20.0)
Women who birth with a CS miss an important life event	3 (60.0)	2 (100)	7 (63.6)	4 (40.0)
Obstetricians should restrict their care to high risk and complicated pregnancies	1 (20.0)	1 (50.0)	5 (45.5)	2 (20.0)
Women should be encouraged to develop a birth plan	4 (80.0)	2 (100)	11 (100)	9 (90.0)
Birth can only be considered normal in retrospect	0	0	0	0
Birth usually requires medical intervention	0	0	0	1 (10.0)

The providers' generally positive attitude towards vaginal birth is reflected in their preferred clinical approach for healthy pregnant women with a history of CS. If no recurring indications are present, none of the respondents would recommend a scheduled repeat CS (see Table 2.6). Midwives stated during the interviews that the best maternity care is women-centred care and that their clients need to be involved in every decision leading up to their birth and during their birth. While the obstetricians talked about low mortality and morbidity rates when discussing the Canadian maternity care system, midwives and nurses focused on women's birth experiences.

Table 2.6. Preferred clinical approach after previous CS stratified by type of healthcare provider.

Intervention	Obstetricians (N=5) n (%)	Family Physicians (N=2) n (%)	Midwife s (N=11) n (%)	Nurses (N=10) n (%)
Women with a previous CS without recurring indication:				
Recommend a VBAC	5 (100)	2 (100)	9 (81.8)	9 (90.0)
Recommend a scheduled CS	0	0	0	0
Follow the mother's request	0	0	2 (18.2)	1 (10.0)

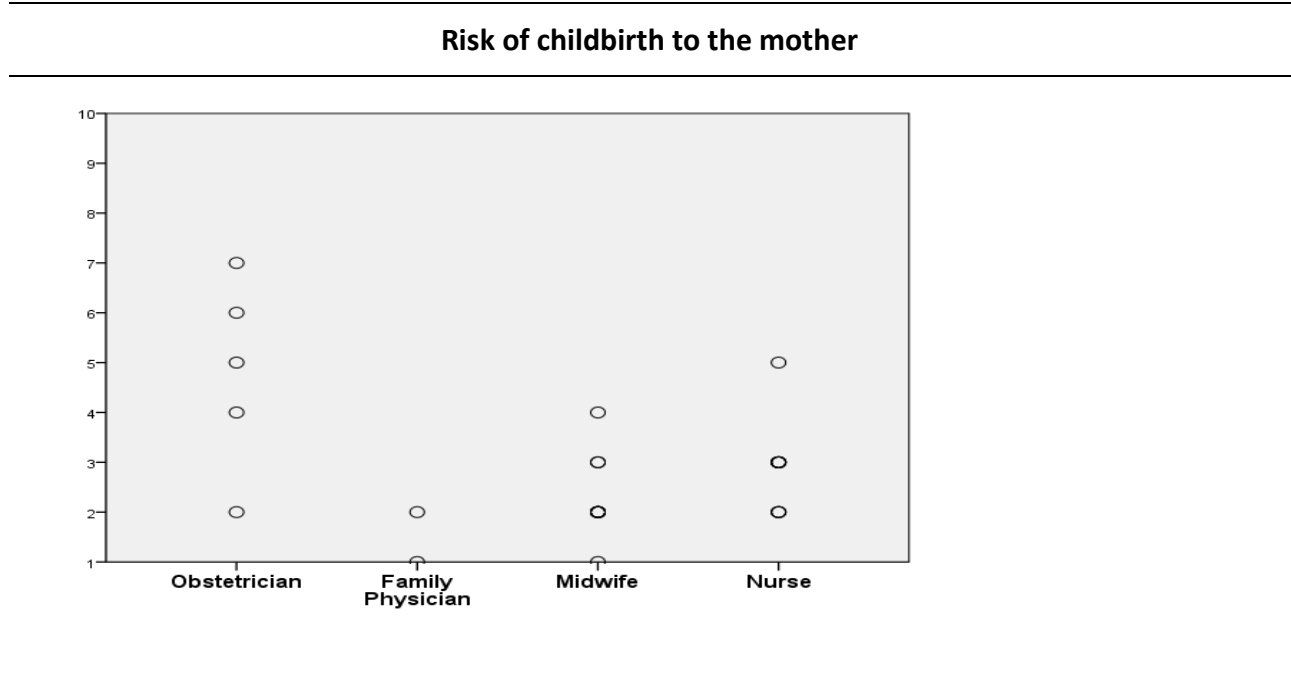
Risk perception of health care providers

A small number of providers from each maternity care discipline (1 obstetrician, 1 family physician, 1 midwife, and 2 nurses) considered CS as safe as vaginal birth for women, and only one obstetricians (20%) and one family physician (50%) perceived CS as safer than vaginal birth for the infant (see Table 2.5). Maternity care providers were further asked to rate the risk of

childbirth in Canada to the mother and the fetus numerically between one, completely safe and ten, completely dangerous. There was notable variability within the professional disciplines. The disagreement was strongest among obstetricians, with a range of responses from two to seven. In general, family physicians perceived birth to be very safe for both mother and fetus (mean 1.5, SD 0.7). Midwives and nurses shared very similar perceptions of safety, with nurses rating birth slightly more risky. Most obstetricians rated the safety of birth as more risky than providers from other disciplines, but they did not consider birth to be very risky either in absolute terms, with an average risk score for the mother of 4.8 (SD 1.9) and for the fetus of 5.0 (SD 2.0). Each maternity care provider considered the risk of birth to mother and fetus very similar and when individual providers chose different risk scores for mother and fetus, they tended to perceive birth slightly more risky to the fetus (see Figures 2.1 & 2.2).

The “outlier” obstetrician, who perceives the risk of birth to the mother and fetus much lower than his colleagues (rated 2) explained during the interview that the decision regarding mode of birth after a previous CS “is not a safety issue. You have to separate the safety issue from the success issue it’s safe to have a trial of labor almost all the time. Very few people nowadays should not have a trial of labour. It’s a question of whether or not it’s what the woman wants and if it’s the right thing for her.” The birth decision and corresponding risk was discussed similarly by midwives who said that most of their clients are VBAC candidates, but that their client population is typically of a lower risk status than the clients of obstetricians.

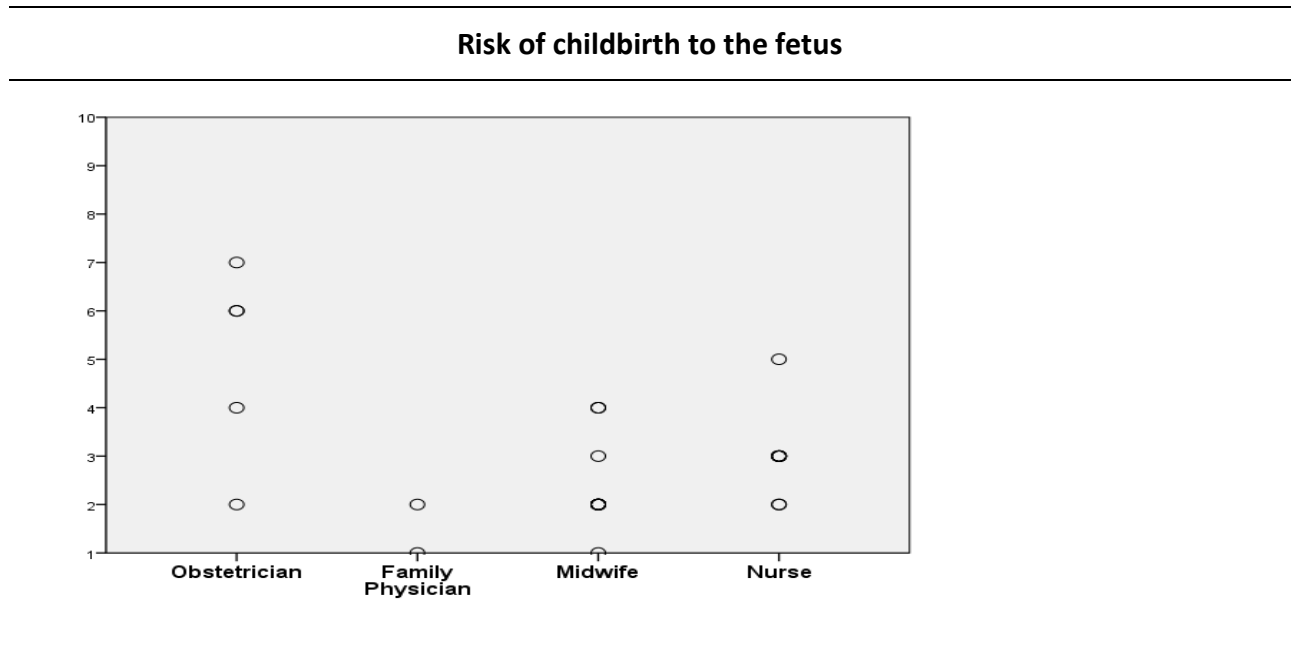
Figure 2.1. Maternity care providers' perceived risk of childbirth to the mother.



Notes

1=completely safe, 10=completely dangerous

Figure 2.2. Maternity care providers' perceived risk of childbirth to the fetus.



Notes

1=completely safe, 10=completely dangerous

Providers' perceptions of women's decisions

Women's fear of VBAC

Most obstetricians considered women's perception that CS would be safer for themselves and their infant to be an important reason for the current high CS and low VBAC rate in Canada (see Figure 2.3). Further, every obstetrician recalled during the interview that the majority of their clients with a previous CS would request a repeat CS regardless of her health status. One obstetrician stated, "Most women prefer it. They don't want to VBAC. Having had a C-section in the past is a good excuse to have another one." An obstetrician who has been providing intrapartum care for 20 years explained that women did not request CS in such high numbers in the past. "The other thing that has happened in the last ten years is that women, who have not had a previous Caesarean section, are requesting a Caesarean section. Women come and ask for a Caesarean section, mostly because they don't want to labour, they are afraid of labour or they are worried about the outcomes of labour." Obstetricians repeatedly mentioned that women considered labour too risky or too painful. A number of nurses were frustrated about healthy women who would choose a repeat CS because they felt that women were not making a truly informed decision. One nurse stated,

"because we can't call a C-section and we can't prevent a C-section of happening so I think at the end of the day, I mean, we can rally and advocate as much as we want but it doesn't, at the end of the day, it doesn't matter if you have five nurses standing against an OB if he says I'm doing a C-section, we're doing a C-section. Unless the nurses were able to, you know, talk to the patient and educate them, unless they're willing to come forth and say, no, I don't want a C-section, but that's hard when things are said to that patient that makes them very nervous about not wanting to have a C-section and that unfortunately happens."

A second nurse said she feels as an advocate for the women she cares for and that she and her colleagues are “trying to maintain the women’s right to a vaginal delivery or right to a delivery that they want.” But they only see the women with a scheduled repeat CS once they enter the hospital to have their baby.

Obstetricians said they analyze their clients’ birth file to understand the reason for the previous CS and the type of uterine scar and closure she has. Every obstetrician interviewed believed that if the woman has no reoccurring medical reason for a repeat CS, is generally healthy and has a well healed low segment scar, she can have a VBAC. Thus, from a medical perspective, the majority of their clients with a history of CS can safely have a VBAC. The obstetricians talked about women’s autonomy when making decisions about their own care and safety is often not the main decision making factor. An obstetrician with less than ten years of intrapartum care experience explained what happens during the consultation,

“I think the decisions that have to be made when you are sitting down with the woman who is facing the choice are, is it safe and is it wise. Because is it safe is really easy. Is it safe is, is she a candidate. So to make sure that she doesn’t have any contraindications basically. But is it wise includes many many other things. How likely are you to succeed, what the person’s choice is. I mean we have to give patients autonomy to make their own choices, and what their future plans are. Because if she is telling me that she wants eight more children, I’m going to tell her the importance of considering a vaginal birth. If she says to me this is it, I’m done, it’s actually quite hard nowadays to argue medically that it’s better to have a vaginal delivery. If it’s your last baby, it’s probably quite equivalent in terms of risk and outcome. It’s, in the end, we all have our bias.”

The integrity of the CS scar and the risk of uterine rupture during a VBAC were discussed by all providers as the main safety concern related to VBAC. Raising the possibility of a uterine rupture was considered a difficult conversation by obstetricians and midwives and all providers agreed that the way the discussion is framed can push the woman to make a certain kind of

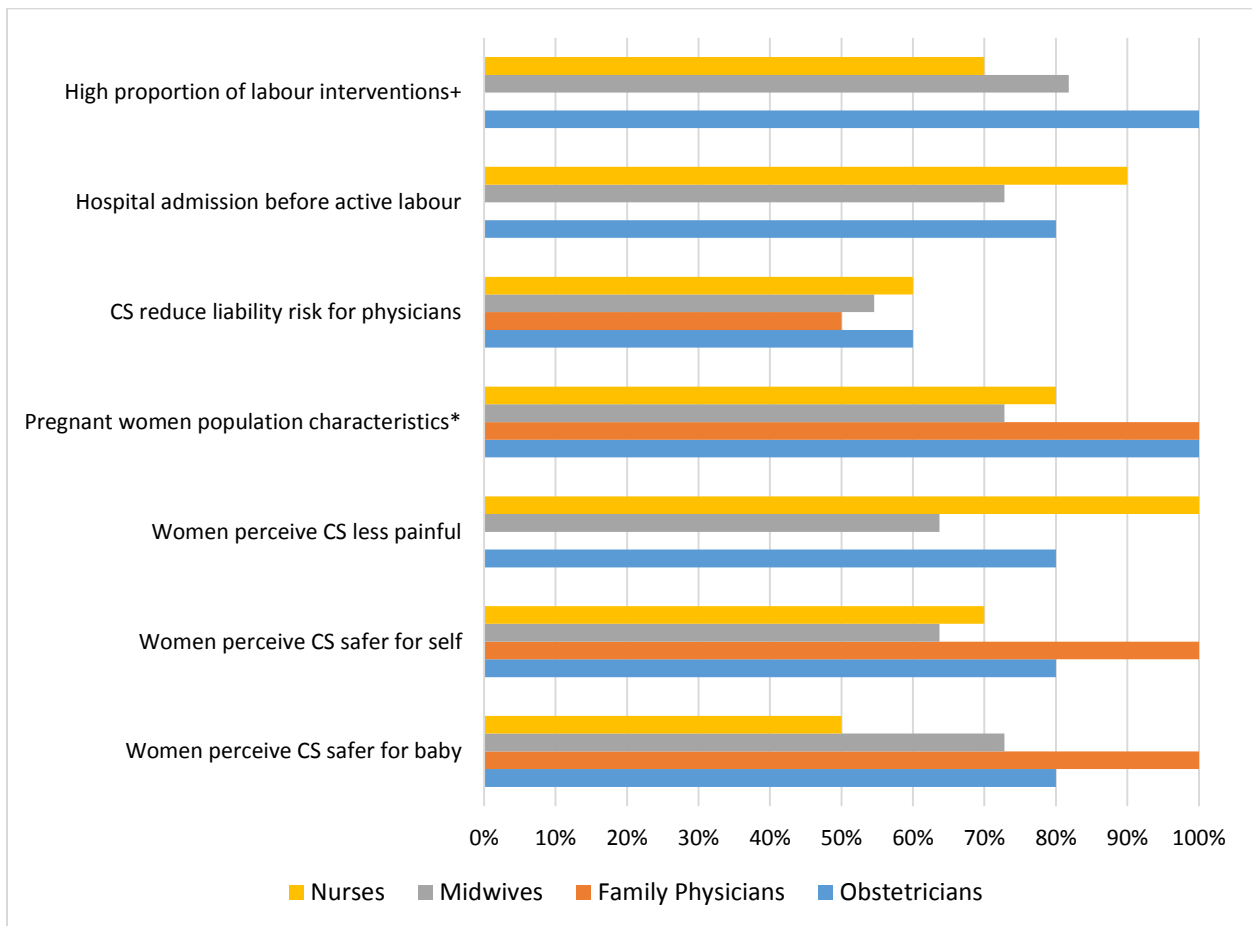
decision. A midwife said, “anybody can lean a patient generally speaking, one way or another based on how you present the data.” She mentioned that midwifery clients who are planning a VBAC in Ontario have a consultation with an obstetrician and that she and her colleagues choose obstetricians who will present risk information without scaring their clients. One obstetrician reported he has a higher number of women who will decide to have a VBAC than most of his peer and he summarized,

“It’s how you present it. If you are a positive influence on the patient and you tell them you think this is something you should do because it is good and likely to be successful. You will feel better after a vaginal delivery than you felt after you C-section when you were tired and in pain and you couldn’t walk. This is much better for you. You will be up the next day and home in two days or three. And you will be much better able to start looking after your baby and start breastfeeding, much faster and more comfortable. And you present it in such a way and you also make sure that you mention the risks of opening up of the scar but that it’s a very small chance of that happening.”

Providers did not want to influence the women’s mode of birth decisions but presented them with evidence based information to make the best decision for them. All obstetricians talked about trying to provide guidance to their clients, but that the ultimate decision rests with the client. As one obstetrician explained, “It’s really, it becomes part of that whole non-directed counselling thing, all you can do is to provide patients with the information and the pros and cons on each choice. You can’t force them to make the decision that you think is the best for them.” While another colleague stated, “I absolutely believe that women should have the autonomy to make choices.” Women’s autonomy in labour and birth decisions was similarly discussed by midwives, but instead of using the term “non-directive counselling,” they talked about “woman-centred care.” One midwife, for example, expressed, “You know, our ultimate

goal for every birth is to include that aspect of it, is that they look at their birth and feel like they had control over their choices and that it was a positive experience for them.” Presenting clients with absolute risk numbers rather than relative figures was stressed by midwives and obstetricians as an appropriate and non-directive way to discuss uterine rupture. And most providers agreed in the survey that women should be encouraged to develop a birth plan during their pregnancy.

Figure 2.3. Perceptions of reasons for high CS & low VBAC proportion in Canada.



Mode of birth decision made after first CS

Obstetricians agreed that most pregnant women know in advance of meeting with them how they plan to give birth to their next child, and they believe that the decision how to give birth is made immediately after their first CS. One obstetrician explained, "But you know the people who come and want it, they want it regardless of what I say." She outlined that she has a discussion with women who have had a CS before they leave the hospital to educate them about possible future pregnancies and births. "I try to make it a bit lighter and say I know you aren't thinking about this right now, but you will and you need to remember this conversation and discuss it before you get pregnant again." Two other obstetricians use this strategy to ensure that women know that having experienced a CS does not necessarily mean that she needs to have another one. The midwives also recalled their clients with a previous CS to be quite certain about their mode of birth decision already during the first consultation; however, midwifery clients preferred to have a VBAC. The midwives in this study said they do not frequently care for women with a previous CS, but they felt that those women chose them as their care provider to increase their chances of having a trial of VBAC and a successful VBAC. One midwife said, "People are coming to us saying we want a VBAC. So they may not be coming initially, you know, because they want midwifery care, it's, I want a VBAC and I hear this is the way I could get it." Midwives also educate women shortly after their first CS about their choices for subsequent births and they outlined that they explain to women how they can increase their chances to have a successful VBAC in the future, such as waiting at least 18 months before becoming pregnant again and remaining healthy with good nutrition and exercise.

The majority of providers were certain that their clients had made their decision before meeting with them. Two obstetricians talked about women listening more to the information they received from other people without a medical background than to the information from their care provider. One obstetrician mentioned, “there is no other place in medicine other than obstetrics where a patient takes medical advice from non-medical people. My mom said I should do this, my aunt said I should do this, my girlfriend said I should do this, and that actually that advice carries much more weight than anything I will ever say.” While the midwives claimed their clients wish to keep talking about their decision to have a VBAC throughout their entire pregnancy and that they have long conversation about it.

Infant weight prediction

Nurses discussed during the interviews that some women who had initially planned a VBAC will have a scheduled repeat CS because they were told that their baby would be large. One nurse explained that many of the clients she cares for have had an ultrasound late in their pregnancy to measure the size of the fetus and she explained that even though this appears to be a routine procedure it is not evidence based, but there is nothing she can do against it. Another nurse said, “a lot of women are being coached or fear of God being put into them often because you have a very large baby in there, where they’ve never even been given the chance of a trial of labour.” Only nurses mentioned that the size of the fetus can influence women’s decisions about mode of birth.

Discussion

The role of the maternity care provider

The finding that obstetricians rated birth as more risky to both mothers (mean 4.8, SD 1.9) and infants (mean 5.0, SD 2.0) than providers from other disciplines is notable. This difference in perception is possibly related to obstetricians experiencing labour and birth related morbidities and mortalities more frequently than midwives and family physicians (Turner *et al.*, 2008); indeed, they are trained and specialize in high risk pregnancies and birth. Future research needs to explore if and how providers' perceptions influence their presentation of risks and benefits during the consultation with their pregnant clients and how this consultation process might impact on women's decisions about mode of birth.

Providers can influence how women perceive the risks associated with VBAC and repeat CS through their presentation of risk information and their emphasis on certain outcomes and possible disregard of other outcomes. Moore and colleagues (2015) consider this framing effect intentional and that providers purposefully share information on risks and benefits to ensure that clients will choose the option that the provider prefers. Based on the findings from this study, it is argued that providers are aware that the way they present information to women can influence the women's perception of that information and their subsequent decisions about mode of birth, but providers try to educate women in a balanced fashion and they ensure to disclose scientific evidence on risks using absolute numbers. All providers stated that they would prefer a vaginal birth for themselves or their partners, and the majority considered

a VBAC as the most appropriate mode of birth for low risk women with a previous CS.

Regardless, they claim that many of their clients decided against a VBAC.

Congruently with other studies, nurses had attitude scores regarding birth and birth interventions that fell between the scores of midwives and obstetricians (Klein *et al.*, 2009), but the majority of nurses in this study would choose to give birth with an obstetrician for their own pregnancy. In Ontario, nurses rarely assist in the care of midwifery clients during labour and birth, and they predominately work with clients of obstetricians and family physicians. It has been hypothesized that the attitudes of nurses are influenced by the attitudes of providers with whom they predominately work (Liva *et al.*, 2012), which might explain why they would also prefer to be cared for by obstetricians. Nurses explained that they did not directly participate in the decision making processes regarding mode of birth after a previous CS since these discussions take place during the pregnancy. They are very involved in a woman's care and recovery at the hospital after a woman's first CS, and any comments nurses will make have the potential to shape future decisions about mode of birth.

Two obstetricians but none of the other maternity care providers stated in the survey that they have been named in a suit in the past by maternity clients, but nobody talked about their personal litigation experiences during the interviews. All obstetricians mentioned that the risk of litigation is a factor that they need to take into account during client consultation. Specifically, obstetricians described that they ensured proper documentation of having disclosed risks and benefits of repeat CS and VBAC to their clients and that they allowed their clients to make the final decision if no medical contraindications existed. A recent Canadian

study confirms that this disclosure, which is an important aspect of evidence based practice, is frequently guided by clinicians trying to minimize and manage their own litigation risks (Van Wager, 2016). According to Monico and colleagues (2008), full documentation of having engaged in shared decision making is a useful tool for clinicians to avoid potential law suits. Some obstetricians explained that the mode of birth decision was not a truly shared one as they experienced many of their clients wanting a repeat CS already prior to having listened to their professional opinion. Obstetricians displayed a level of frustration that a high number of women would base their decision on information they had received from non-medical lay people, such as friends or family members or even “strangers from the bus,” rather than including their maternity care provider in a meaningful way into the decision making process.

During a consultation early in the pregnancy, obstetricians explained they discuss with women their previous CS and counsel them on their options for their next birth. They frequently provided women with additional resources to review and after answering women’s question during their next prenatal appointment, a mode of birth decision would be made. Midwives recalled that women in their care do not experience informed consent as such a distinct event but rather as a process (Lidz, Appelbaum & Meisel, 1988), more akin to midwives’ informed choice principle. The mode of birth decision for women with a history of CS was discussed during every prenatal consultation in some cases, and women were able to obtain feedback from their midwives on information they received throughout pregnancy from other sources. Based on a survey study from the United States, prenatal consultation time is significantly shorter for women under the care of an obstetrician compared to a midwife (Declercq *et al.*, 2006), which could impact the way consent is obtained. In a systematic review

on facilitators and barriers to the clinical implementation of shared decision making, Légaré and colleagues (2008) describe that it is currently not known if shared decision making is actually more time consuming than usual clinical care. Thus, further research needs to be conducted as the difference of the decision making processes might be related to the characteristics of the different client populations who choose the care of midwives or obstetricians.

The role of the mother

Providers believed that mothers with a previous CS make their decisions about mode of birth predominately outside of the clinical care encounter and without consultation of their provider. Midwives explained that women would seek their care because they wanted to have a VBAC, while obstetricians recalled many women who would be good VBAC candidates request a repeat CS. A Canadian study by Van Wagner (2016) confirms that obstetricians perceive their clients wanting to use technology during pregnancy and birth to minimize risks. Obstetricians provided women with medical information on the risks and benefits of either mode of birth option and they directed them to further evidence-based information either in the form of a handout or through a website. Many perceived the women relying more on information from other sources and that they sometimes feel as though some women are not fully listening to their explanation of risks and benefits. Paradoxically, providers also outlined that the way they would frame the discussion on risks and benefits during the consultation would influence how women decided to give birth. Previous research has shown that women rely strongly on the clinical opinion and expertise of their health care providers to guide them through the many and often competing types of information available (Moore *et al.*, 2014). Women also need

their providers to contextualize their previous CS experience and how it relates to their upcoming birth (Shorten, Shorten & Kennedy, 2014). The obstetricians in this study discussed how women's CS experiences shape their future decisions about mode of birth, and they ensured to have a brief discussion with women on this subject shortly after their first CS.

Limitations

The survey tool had been validated over a seven year period on a large sample of Canadian maternity care providers (Klein *et al*, 2009), but this study was limited by its low sample size (28 survey respondents and a subset of 11 interview respondents) and low response rate of approximately 28% for the survey. It is not possible to know if the non-respondent maternity care providers would have discussed different factors as being more salient in shaping their practice regarding mode of birth after a previous CS. Participants were recruited for this study from hospitals that are urban level II community hospitals without teaching status. Providers who practice in hospitals that serve clients with a higher risk status or who practice in rural settings might have different perceptions of the risks and benefits of VBAC and repeat CS and different factors might influence their practice regarding mode of birth after a previous CS. The small number of survey respondents did not allow for a statistical comparison of the responses between the different types of care disciplines. However, it provided a meaningful overview of the factors that providers deemed important in influencing their practices and the results could be incorporated into the analysis of the interview data. Unfortunately, no family physicians participated in the interview component of the study and only four obstetricians agreed to be interviewed. Obstetricians provide counselling to the

majority of pregnant women with a previous CS and it is possible that obstetricians who chose not to participate in this study hold different perspectives on mode of birth after a previous CS. It was possible for providers to answer the survey anonymously to reduce the problem of social response bias, but providers who participated in the interviews might have talked about mode of birth after a previous CS in a way that they considered socially the most appropriate. The main author transcribed the interviews and coded the data. A code book was used for the different phases of coding and the themes and overall conclusions were discussed with her supervisor.

Key take home messages

- Providers generally preferred VBAC over repeat CS for healthy mothers regardless of their disciplinary background, but they had different perceptions of the risk of birth, with nurses perceiving birth slightly more risky than midwives, and obstetricians perceiving birth slightly more risky than nurses. Congruently, obstetricians and some nurses discussed predominately the risks of uterine rupture in relation to mode of birth after a previous CS, while midwives and a few other nurses focused stronger on the importance of the birth experience.
- Maternity care providers were aware that the way they approach the discussion of risks and benefits regarding mode of birth after a previous CS during the consultation process can influence women's decisions about mode of birth. Providers believed they can have the strongest influence on women's decisions about mode of birth directly after their first CS. During the subsequent pregnancy, women already held strong values and

attitudes towards VBAC and repeat CS and have frequently already made their decision how they plan to give birth, based on their experiential knowledge and the advice of non-medical sources.

- Shared decision making was explained to be practiced by all providers in this study but there were slight variations how providers from different disciplines defined shared decision making. Obstetricians stressed the importance of non-directive counselling to allow women to make autonomous decisions about mode of birth and of written informed consent. Midwives prioritized a client-centred care approach, which also encompassed non-directive counselling, but further included the integration of women's values and informed consent as a process that takes place throughout the whole pregnancy.

Conclusion

The results of the study illustrate that providers from different professional disciplines reported making decisions that they believe will have the greatest health benefits to their clients and that they try to practice non-directive counselling to allow women to make autonomous decision regarding mode of birth after a previous CS. Providers felt they could have the strongest influence on women's decisions about mode of birth during their consultation directly after the first CS because women's decisions about mode of birth would be made prior to a subsequent pregnancy. Paradoxically, providers were aware that their framing of the discussion regarding risks and benefits of repeat CS and VBAC could change women's decisions about mode of birth. Maternity care providers believed that their clients'

preference was the most important factor in determining their practices regarding mode of birth after a previous CS. The perception of the safety of birth was different between providers from various disciplinary background, as was their approach of engaging in shared decision making. Providers were careful to document the informed consent process as it was seen as an important tool to protect themselves from possible litigation.

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CHAPTER 3

MODE OF BIRTH AFTER CAESAREAN SECTION: DECISION MAKING PROCESSES OF MOTHERS

Esther Susanna Shoemaker

Abstract

Background: Healthy pregnant women with a previous Caesarean section (CS) have to make a mode of birth decision that is complex as the options involve different health implications and risks for mothers and infants. This study investigated the mode of birth decision making processes of women with a previous CS.

Methods: A total of 31 healthy pregnant women with a previous CS filled out surveys during their third trimester to assess their knowledge of mode of birth options, choice predisposition, decisional conflict, self-efficacy, preparation for decision making, values and expectation related to birth. The survey data was analyzed descriptively. The same cohort was surveyed six to eight weeks after having given birth to assess their birth outcome and their feelings about the enacted decisions. Twenty-two of the survey respondents additionally participated in interviews during their third trimester and after their birth to explore the factors that influenced their decisions in more detail and their answers were analyzed thematically.

Results: The main themes that emerged regarding the factors influencing decisions about mode of birth were mothers' experiential reasoning regarding mode of birth and recovery, experiential knowledge from significant others, scheduling of CS regardless of the mode of birth decision, rating and prioritizing risks, fear of risks, and decisional conflict. When women discussed the factors that impacted their decisions about mode of birth six to eight weeks after they had given birth, the main themes were the recovery experience and fear related to the mode of birth.

Conclusion: Complex factors intersect during mode of birth decision making processes and influence how women with a previous CS give birth, including experiential knowledge, providers' expertise, and routine clinical practices.

Introduction

Caesarean section (CS) is the most common type of surgery in Canadian hospitals (CIHI, 2014), and the proportion of CS has been increasing steadily in Canada (CIHI, 2009). Having experienced a previous CS is the primary indication for over 30% of all CS in Canada (CIHI, 2007), and correspondingly, the number of repeat CS has been increasing as well (CIHI, 2013). The decision to have an elective repeat CS or try to have a vaginal birth after CS (VBAC) is a complex one for mothers, their families and the health care system because both options have advantages and disadvantages on multiple levels. The decision directly implicates the pregnant woman and her infant, and there are different health implications and risks associated with either option for mothers and infant.

A number of researchers have highlighted the importance of shared decision making for improved experiences of maternity care and health outcomes (see for example Stacey *et al.*, 2011; Nieuwenhuijze *et al.*, 2014; Shafir, Rosenthal, 2012), but insufficient research exists on the factors that are most important to women when making decisions about mode of birth after a previous CS. Surveys and interviews during and after pregnancy were used in this cross sectional descriptive study to explore how the decision between having a repeat elective CS or a VBAC is made in a cohort of women who have had a CS in the past and who are experiencing a healthy pregnancy.

Background

Competing advantages and disadvantages exist between VBAC and elective repeat CS for the health and the birth experience of the mother and the infant. VBAC has the advantages of a shorter hospital stay and a faster postpartum recovery, but it carries a small risk of uterine rupture and tearing, which can lead to maternal and fetal mortality and morbidity (Lydon-Rochelle *et al.*, 2010). The rate of uterine rupture during a trial of labour after CS is between 0.5 and 1% (Grobman *et al.*, 2008; Macones *et al.*, 2005; Hammoud *et al.*, 2004; Shipp *et al.*, 2001). Uterine rupture during pregnancy and before the start of labour is a particularly rare event (Vaknin *et al.*, 2008) and the rupture of an unscarred uterus is very unlikely with 0.005% (Miller *et al.*, 1997). Vaknin and colleagues (2008) report that six women out of 120,636 singleton deliveries at a large teaching hospital in Israel, experienced a uterine rupture before the onset of labour between 1984 and 2007. In all six cases, the women had a history of a previous CS and had abnormal placentation in their current pregnancy, such as placenta previa or percreta.

A number of attempts have been made to determine the clinical factors associated with uterine rupture after a previous CS and to counsel women accordingly. The evidence supports that the risk of uterine rupture is greater if the pregnancy occurs less than 24 months after the previous CS (Bujold *et al.*, 2002), the infant is macrosomic (Jastrow *et al.*, 2010; Zelop *et al.*, 2001), labour is induced (Grobman *et al.*, 2007; Macones *et al.*, 2006), and the woman has never experienced a vaginal birth (Macones *et al.*, 2005; Zelop *et al.*, 2000). All of these risk factors are easily assessed, except fetal macrosomia. Hoopmann and colleagues (2010) conducted a review of clinical methods that are commonly used to predict birth weight and to

detect macrosomia. They concluded that it is currently not possible to make acceptable predictions that can be used for meaningful mode of birth recommendations. The risk of uterine rupture is reduced significantly during an elective repeat CS (Wen *et al.*, 2004), but a CS has risks associated with surgery, such as infection, scarring and thromboembolic events and also carries the risk of hysterectomy, and placental abnormalities in future pregnancies (Liu *et al.*, 2007; Smith, Pell, Bobbie, 2003; Hemminki, 1997). A trial of labour that ends up in an emergency CS has a higher rate of infection, hemorrhage and neonatal morbidity than a planned CS (Lydon-Rochelle *et al.*, 2010), which makes the decision even more complex.

VBAC and elective repeat CS also have advantages and disadvantages for the family dynamic. Scheduling is possible with a repeat CS, which makes it easier to line up care for older children. Previous qualitative work describes women perceiving recovery from a successful VBAC to be significantly faster and easier than from a CS (Meddings *et al.*, 2007), which allows the mother to lift and play with the older child(ren) sooner, and to participate in other family activities. It is not yet possible to predict with certainty how likely the possibility is that any one of these outcomes will occur for any particular woman. Planning a VBAC does not always end up with a vaginal birth and the risks associated with VBAC and elective repeat CS are very small but do occur.

Researchers have created models that allow providers to calculate a woman's individual risk status, rather than applying the population risk to every individual woman. Sharma and colleagues (2011), for example, used two different risk models to make recommendations regarding future mode of birth to 96 non-pregnant women with a previous CS. The first model

was a multi-attribute model that applied the Analytic Hierarchy Process method, which includes a decision goal, decision criteria and decision options. They tried to elicit the delivery decision that is best for each individual woman. The women were able to prioritize predetermined decision criteria by deeming them more or less important in a pairwise comparison. The second model combined the women's priorities for delivery experience with actual probabilities of the conditions associated with VBAC and repeat CS. Sharma and colleagues found that when women were asked to judge the importance of risks, most women were recommended to have a repeat CS (73%), while the second model favoured a VBAC for the majority of women (82%). The difference in recommendations occurred because women rated avoiding any risk to their infant significantly higher than any other decision criteria (Sharma *et al.*, 2011). In a study by Eden and colleagues (2009), women also prioritized different risk criteria using a decision aid to help them decide on their mode of birth after a previous CS. Women prioritized the safety to their infant four times higher than safety to themselves or any other decision criteria.

The first recommendation of the Society of Obstetricians and Gynecologists of Canada VBAC guideline states that every woman should receive the best information available about her options for labour and mode of birth. Further, the final mode of birth decision should be made by the pregnant woman together with her health care provider regarding the safest option for the birth of the baby (SOGC, 2005; Dahlgren, 2008). A pregnant woman and her providers have to decide if she is a potential candidate for a VBAC in terms of safety and success based on her clinical profile and the medical care that will be available to her during labour and birth. Ideally, health care providers use evidence, the risk statistics determined by the most up to date epidemiological studies, to counsel women on their mode of birth options.

The decision can be made more readily in cases where health conditions prevent one of the mode of birth options. But when pregnant women are generally healthy, both parties have to rely on studies that have assessed risks and benefits among similar populations.

When the relationship that has been established between clinical factors and health outcomes at the level of populations is directly applied as evidence to determine an individual pregnant woman's risk profile, ecological fallacy is likely (Robinson, 1950). An ecological fallacy develops because the majority of providers tend to rely on analytical reasoning to determine a client's individual risk (Collins, Street 2009), which is logical reasoning focused on empirical findings and statistical measures. The data, based on the latest research evidence available to and accepted by that provider, is shared with the women during the consultation to ideally help them make a mode of birth decision. In this process, health care providers aim at applying abstract knowledge obtained from similar groups of pregnant women, to the specific woman they are caring for.

To make informed choices, women need easy access to accurate and unbiased information and they have to be able to discuss their values and preferences with their provider (Romano, 2013). Maternity care providers might perceive that they fully engage in shared decision making when they share pertinent information on risks and benefits of the different care options with their clients and practice non-directive counselling. Many clients have difficulty participating meaningfully in their care decisions, regardless of their level of education (Frosch *et al.*, 2012). Robust and high quality patient decision aids are essential tools that promote and enable medical shared decision making (Sakala, Yang & Corry, 2013). When the

shared decision making process includes the provision of the options for intervention or non-intervention in a balanced fashion, an explanation of the important risks and benefits of either option, and the clients' values and personal preferences are also taken into account, the care experiences of clients improves and the risk of liability for health care provider is reduced (King & Moulton, 2006; Monico, Calise & Calabro, 2008). In our current maternity care system, healthcare providers are pressured for time and trying to assess the individual risk profile of pregnant women with a previous CS is time consuming. Using survey data from the United States, Declercq and colleagues (2006) explain how with prenatal visits with obstetricians being five to ten minutes long, many women end up relying on information obtained through books and the internet, which is of variable quality. The regular visits with obstetricians have also become more procedure intensive (MacDorman, Declercq & Menacker, 2011), and not enough time is available for questions and discussion. A number of studies on decision making in maternity care settings consistently raise concerns about the adequacy of the current informed consent process (e.g., Akkad et al., 2004; Dixon-Woods et al., 2006; O' Cathain et al., 2002).

In summary, pregnant women with a previous CS and their providers have to rely on population level data to try to predict their individual risk profile related to the different options for mode of birth. Clinical practice guidelines stipulate that it is important that women who are medically eligible for a VBAC are able to choose their preferred mode of birth (SOGC, 2005), and shared decision making is linked to improved experiences of maternity care and health outcomes (Nieuwenhuijze, 2014). The factors that are most relevant in women's decision making processes regarding mode of birth after a previous CS remain to be explored.

Methods

The research question guiding the study was: how do women eligible for a VBAC make decisions about their upcoming mode of birth? Surveys and interviews were conducted with pregnant women who have had a previous CS during their pregnancy and shortly after their birth.

Participants, selection & recruitment

Participants for the study were sampled from two large level II community hospitals, which provide hospital privileges to midwives, family physicians, and obstetricians. The hospitals are located in urban centres in Ontario, Canada. All pregnant women with a history of CS were invited to participate in the study when they registered during their third trimester at one of the two participating hospitals between March and June 2014. Flyers were placed at the registration desk to inform women of the study and to provide them with the researcher's contact information. Participation consisted of filling out a survey online or on paper and being interviewed in person or over the phone during their third trimester. Six to eight weeks after having given birth, the same women were invited to participate in a short follow-up survey and interview. In order to participate, women had to be pregnant, have had a single previous CS, be at least 18 years old, and have no medical contraindications to a VBAC at the time of recruitment, which was based on self-report.

Every month, approximately 25 women with a previous CS register to give birth at each of the hospitals. Thus, approximately 200 women would have seen the flyer invitation to participate over a four month period and 36 women answered the initial request for

participation (18% response rate). The data of five women was excluded; three women had more than one previous CS and two women indicated in the survey that they were no longer pregnant but had experienced a fetal loss. A total of 31 women answered the surveys before and after they gave birth. Qualitative interviews were conducted in addition to the surveys at both time points with 22 women (see Table 3.1 for an outline of the number of study participants). The results reflect the responses of all participating women, those who only answered the surveys (N=9) and those who participated in the interviews and surveys (N=22).

Table 3.1. Study participants.

	Hospital A	Hospital B
Participants	N=22	N=14
Excluded (n=5)		
>1 previous CS	1	2
Miscarriage	2	-
Surveys (n=31)	19	12
Interviews (n=22)	12	10

Data collection

Surveys

The questionnaires included scales that have been developed and validated to assess factors related to patient decision making (Stacey *et al.*, 2011; Scholl *et al.*, 2011). All participating women completed a 15 minute long baseline survey assessing their knowledge of

their options for mode of birth (15 questions) (O'Connor, 1995a), their mode of birth choice predisposition (2 questions) (O'Connor, 1996a), their level of decisional conflict (4 questions) (Légaré *et al.*, 2010), and their realistic expectations related to birth (20 questions) (O'Connor, 1995b). Completion of a five minute long follow-up survey was requested of all initial participants to assess their birth outcome (2 questions) and their feelings about the enacted decisions (5 questions) (O'Connor, 1996b, 1996c) (see the surveys in appendices V and VI).

Interviews

The semi-structured interviews were conducted by the primary author and lasted between 60-90 minutes. Depending on the woman's preference, the interviews during pregnancy took place in a public meeting place (n=2), in the woman's home (n=8), or over the phone (n=12), and the post birth interviews were conducted in the woman's home (n=8) or over the phone (n=14). Semi-structured interviews are a form of guided conversation with the goal to elicit rich and detailed data that can be analyzed qualitatively (Lofland & Lofland, 1995). Women were asked to describe their previous birth experience and their preferences for their upcoming birth, and to explain the decisions they have made. A form of probing was used that Campbell (2003) calls *posing the ideal*. It involved asking each woman to describe the most ideal birth that she could imagine in relation to her current position, how she considers her chances to have this ideal birth, how she prepares for it, and how she would feel if this ideal would not be met. The same women were interviewed a second time six to eight weeks after their birth to assess the factors that shaped their final decisions about mode of birth and mode of birth outcomes. Women reflected how they gave birth to their child, if and how their

expectations were met, and if the information, education, and support they received throughout their pregnancy were sufficient (refer to the interview guides in appendix VII).

Data analysis

Surveys

Data was analyzed in SAS Studio 3.5. Values for the scales were calculated based on each scale's guidebook and they were analyzed using descriptive statistics to compare the answers of women who were planning to have a VBAC to women who were planning a repeat CS. Survey answers were further used for triangulation with the interview data as they were applied to adapt the interview guide to individual women by including probing questions on issues that were particularly relevant to her. The combined analysis of the surveys and interviews provided a more complete and nuanced overview of the women's decision making processes.

Interviews

After approximately 15 interviews with pregnant women, saturation was reached, which means that no new information was added (Mason, 2010). It was not clear at this time that the same number of interviewees would be sufficient to reach saturation for the analysis of interviews after the birth; thus all women who volunteered were given the opportunity to share their experiences. All women who had participated in interviews during their pregnancy participated in the follow-up interview after the birth of their child.

The interviews were transcribed verbatim and Atlas.ti 7 was used to organize and manage the interview data. Women were given pseudonyms during the transcription, which are used when referring to individual interview participants in the reporting of the results. The transcribed interviews were analyzed using a framework approach to qualitative data analysis (Ritchie *et al.*, 2013). In the first phase, familiarization was achieved by selecting key and repeating codes while reading the transcripts multiple times. In the second phase, a thematic framework was constructed based on a priori codes that had been identified in the literature on decision making processes in maternity care, and on the codes that have been created during the first phase of analysis. Next, the thematic framework was applied to systematically code all interview transcripts. New codes emerged during that process and the themes were updated to include the new codes and the a priori codes. Finally, the thematic framework was applied to both the transcripts and the descriptive findings of the survey results. The themes were explored for associations between them and between the emerging themes and the survey results.

Research ethics

The study was approved by the University of Ottawa Health Sciences and Sciences Research Ethics Board and the Research Ethics Boards of each of the participating hospitals. Women could choose to answer the survey anonymously and personal identifiers were only collected from women who shared their contact information to participate in the follow-up survey after their birth and/or to participate in the interviews. Confidentiality was further ensured by using the online survey tool limesurvey, which has its servers located in Germany.

The data is protected under high European privacy laws, can remain anonymous and is not subjected to the United States Patriot Act.

Results

The answers of women from both hospitals were analyzed together while considering if the responses of mothers were given during their pregnancy or after they had given birth. The main themes that emerged regarding the factors influencing decisions about mode of birth were mothers' experiential reasoning regarding mode of birth and recovery, experiential knowledge from significant others, scheduling of CS regardless of the mode of birth decision, rating and prioritizing risks, fear of risks, and decisional conflict. When women discussed the factors that impacted their decisions about mode of birth six to eight weeks after they had given birth, the main themes were the recovery experience and fear related to the mode of birth.

Description of participants

The majority of participants were between 30 and 34 years old (51.6%), with the youngest woman being 28 and the oldest 42 years old. None of the women in this study had gestational diabetes and most rated their health as very good or excellent before and during their current pregnancy with 90.3% (n=28) and 80.7% (n=25) respectively. Most women were under the care of an obstetrician (77.4%, n=24) and seven women had a midwife as their primary care provider (22.6%) (see Table 3.2). Women were very similar to the client population at the participating hospitals in terms of age, health and socioeconomic status.

Fewer women in this study had an obstetrician as their care provider than the total client population (77.4 % versus 90.4%) and more participants were in the care of a midwife (22.6% versus 6.7%).

Table 3.2. Demographic characteristics of study participants.

Characteristics	Mothers N=31 n (%)
Age	
≤ 30	8 (25.8)
31-34	13 (41.9)
≥ 35	10 (32.3)
Canadian born	26 (83.9)
Health care provider	
Obstetrician	24 (77.4)
Midwife	7 (22.6)
Education	
Partial technical school, college, university	2 (6.5)
Technical school, college, university	20 (64.5)
Graduate degree	9 (29.0)
Employment Status	
Full-time or self-employed	23 (74.2)
Part-time or student	2 (6.5)
Stay-at-home parent	4 (12.9)
Household Income	
≥ 100,000	25 (80.6)
65,000-99,000	4 (12.9)
19,000-64,000	2 (6.5)

Plans and reality

During their pregnancy, eight women indicated to plan a CS birth and 23 planned to have a VBAC. In terms of birth outcomes, 19 women had a CS birth and 12 had a VBAC. All women who had planned to have a repeat CS gave birth by CS and 12 of the 23 women who had planned a VBAC gave birth that way. Among the participants who gave birth by CS, eight had made the decision to have a CS during their pregnancy, nine had planned a VBAC but had not given birth before the scheduled date and two attempted a VBAC that ended up in a CS because their labour did not progress fast enough. Thus, the VBAC success rate for trial of labour was very high with 12 successful VBACs out of 14 attempted. Fourteen women stated that their provider did not indicate a preference regarding their mode of birth. Among the nine women who believed their provider would prefer a repeat CS, seven ended up giving birth that way. An equal number of women had a VBAC and a repeat CS among the group of women whose providers had indicated a preference of a VBAC (see Table 3.3).

Table 3.3. Preferred and enacted mode of birth after previous CS.

Option	Actual mode of birth	
	VBAC N=12 n (%)	Repeat CS N=19 n (%)
Women's preferred choice		
VBAC	12 (100)	11 (57.9)
Repeat CS	-	8 (42.1)
Providers' preferred choice		
VBAC	4 (33.3)	4 (21.1)
Repeat CS	2 (16.7)	7 (36.8)
No preference	6 (50.0)	8 (42.1)

Factors influencing decisions mode of birth decisions

The influences that were most pertinent to women when making a decision regarding their mode of birth during their pregnancy are discussed in the following section: experiential knowledge related to prior birth experience, birth recovery, and from significant others, scheduled CS regardless of mode of birth decision, rating and prioritizing risks, fear and risks, and decisional conflict.

Experiential knowledge related to prior birth experience

All women in this study had already experienced a CS birth and 20 had gone through labour of varying lengths. The previous labour, birth and postpartum experience influenced the

decisions women had made about their upcoming mode of birth. All mothers recounted in detail the possible reasons that their first birth ended in a CS. Family history of CS was cited frequently either in relation to the size of their pelvis or their body's inability to give birth. Five participants mentioned that they had been born by CS themselves and three talked about their sisters' CS birth experiences. Julie said, "I find it a little bit discouraging that my mother wasn't able to have a natural birth. Maybe it is something genetic, like a narrow pelvis. But who knows" (hospital B, pre-birth). The narrow pelvis had not been confirmed by her physician, but she elected a repeat CS to avoid possible complications.

Two mothers stated they planned a repeat CS because they wanted to avoid a repetition of their previous labour experience, which they had described as traumatic. Julie, for example, explained,

"I have chosen to have a Caesarean section with my second child. My first labour was 44 hours long and I didn't dilate past 2cm. After being induced twice and having my water broken by the doctor, I still didn't progress and my cervix started to close up. It went down to 1.5cm. Also, the baby's heart rate started to drop and she was clearly in distress. While I know that the second labour is likely to be shorter, I'm not taking that chance after my experience the first time" (hospital B, pre-birth).

Other mothers felt they had a better chance to avoid their previous birth and recovery experience by planning a VBAC. Olivia, for example, recollected her long and difficult labour where forceps had to be used and she still had to have a CS in the end because her labour had stalled. She said,

"I was very, very, very disappointed about having that C-section. And it pretty much overshadowed everything else around it. And so then when I got pregnant with my second child, uh, I was really determined to not have another C-section

but, you know, I was concerned of course that there was a possibility that that would have to happen” (hospital B, pre-birth).

Olivia wondered if additional support from her provider throughout her labour might have prevented her first CS. France described that she was planning a VBAC and would request not to have any interventions, such as induction and epidural that she had during her first labour experience. She explained, “And the Caesarean happened just very shortly before my obstetrician’s shift ended. Of course I wonder what would have been if they would have let me go for a bit longer” (hospital A, pre-birth). She felt she could avoid a repetition of her first experience by avoiding any labour and birth interventions.

Experiential knowledge related to birth recovery

The most important reason given by women who planned a VBAC was to have a shorter and easier birth recovery. Many mothers expressed that the physical recovery after their first CS was unexpectedly long and difficult. They had felt unprepared for that experience. Rina stated, “I found myself to be totally surprised by how long the recovery was, uh, how much pain I was going through, like just the recovery of it all, I was totally surprised. Nobody prepped me for anything” (hospital A, pre-birth). Two mothers had planned a CS for their first birth because their baby was in a breech position while all other participants had not expected to delivery surgically. They had prepared for different methods of pain control during birth, but they did not feel informed regarding how to control their pain after the CS and during the long recovery. Irene outlined,

“It was just a shock I think as a first time mom to be going through a C-section and then not be told what to expect. Nobody ever talked about C-sections during the pregnancy, my obstetricians didn’t tell me about recovery and the pain, we

didn't talk about C-sections. So it wasn't a very good experience overall"
(hospital A, pre-birth).

After having experienced recovery from a CS, many women outlined in the survey and explained in the interviews that they believed the recovery from a second CS to be even more difficult, because they will have to take care of their older child in addition to their newborn. Many women made statements similar to Anna, who said, "I have heard the recovery time is easier after a VBAC and it would be very nice to not be bed-bound for so long and to move around. My son will be only 3 then, he is busy, I'm not sure how I will keep up with him if I have to stay in bed" (hospital B, pre-birth). Most women planned to stay at home with both of their children for a year after their birth; thus, being responsible for the care of the older child in addition to the infant played a role in their mode of birth decision.

The women who had decided to have a repeat CS were also hoping for a shorter and easier recovery than they had experienced after their first birth. They explained that they could recuperate better after a planned CS than an unsuccessful trial of labour that might end up in a repeat CS. Erin expressed her concerns, "I don't want to go through the long labour again and then just end up with another C-section in the end. If my chances for a VBAC are not very big, I rather schedule the C-section" (hospital B, pre-birth). A few women who chose a VBAC shared the concern to have to recover from both a long trial of labour and a CS. Naomi, for example, contemplated whether her first recovery would have been easier if the CS would have been scheduled in advance, "You know, I think if it was either the labour and that pain versus more like just a C-section, if it had been a planned C-section maybe I would have recovered faster

possibly from it" (hospital B, pre-birth). Most women in this study still planned a VBAC as they hoped for a shorter recovery.

Experiential knowledge from significant others

In addition to their own experiences, women also described the experiences of others as having an impact on their decisions about mode of birth. Women outlined that they have talked with friends about their birth plans. Seven women stated that they assume they might require a repeat CS because all of their friends have had CS births in the past. Rina stated, "My friends and colleagues think I'm crazy to even consider a VBAC. They all, really all of them had C-sections. The ones who had more babies had C-sections again and the others say they would surely have another C-section" (hospital A, pre-birth). Other mothers explained that they knew recovery from VBAC would be easier because they have witnessed their friends' recoveries either from VBAC or from a first vaginal birth, and they strived to achieve the same. After describing her first CS experience and her long recovery, Bonny said "one of my really good friends, she actually went into labour the same day, so her son was born the exact same day. I looked at her and she's like noticing the difference, the recovery, like she was, she recovered so much easier. Because it was a normal birth, vaginal" (hospital A, pre-birth). Hailey outlined that she was hoping to have a shorter recovery after a VBAC than she had after her first CS and she explained, "I have a number of friends that did the VBAC the second time and so they had all indicated that it was, you know, the recovery was easier" (hospital B, pre-birth). Only one participant had personally met somebody with an undesirable birth outcome during a VBAC. Linda said, "I met somebody that did, like a mom who ruptured, and, like well she's okay but,

you know, it would have been scary. She's okay. The baby's okay. But they said no more babies" (hospital B, pre-birth). She was sure about wanting a repeat CS to avoid such an experience.

Scheduled CS regardless of mode of birth decision

All women in the study described they had a scheduled date for a CS, regardless of their mode of birth decision. Women, who planned to have a VBAC, were further worried about labour not starting prior to their CS date. One mother felt knowing the date would put too much pressure on her to go into labour in time and she asked her provider not to share the date with her. She also did not like the idea of determining the birth date of a child. All other women knew the date of their scheduled CS. Some women described that knowing the date in advance is one of the best features of a repeat CS, because it would allow them to have care lined up for their older child. Most women were told by their providers that they would not be able to be induced as the risk of uterine rupture is greater after an induction. Labour not having started prior to the scheduled CS date was the main reason that women who had planned a VBAC ended up with a repeat CS. Anna explained, "my doctor kept pushing for the C-section and I kept saying, no, so, a VBAC and, like he even booked the C-section date for the week after. That was a bit stressful, cause you can't be induced because of the previous C-section" (hospital B, post-birth). Mothers repeatedly mentioned feeling pressured by the predetermined CS date and by not knowing how to avoid the date since medical induction was not a possibility.

Rating and prioritizing risks

Women's knowledge regarding the main benefits and risks of repeat CS and VBAC was consistently high, regardless of the hospital they were planning to give birth, their health care

provider, or their planned mode of birth. Women were very knowledgeable about the safety and clinical outcomes associated both types of births with scores over 80% (see Table 3.4). However, most women had difficulties identifying numerically the level of risk of VBAC and repeat CS on different health outcomes. Women consistently perceived the likelihood of a negative health outcome, such as uterine rupture, hysterectomy, or death of the mother or infant, to be significantly higher than is known from research evidence (see Table 3.5. Many women perceived the different types of risks much higher than they realistically are (see Tables 3.4 and 3.5). The problem of remembering accurate risk statistics was also mentioned frequently in the interviews. Linda, for example, explained during her pregnancy, “I don’t even remember what it is. It’s like, is it like five percent chance of a uterine rupture after? But like I’ve had a tubal pregnancy, that’s like a one percent chance [...], I know like whatever one or two percent chance is pretty low but I’ve been that one percent” (hospital B, pre-birth). Trying to assess the overall risk of an outcome, while applying that information to their own life, was difficult.

Table 3.4. Women’s level of knowledge, decisional conflict and realistic expectations by planned mode of birth.

Scale	VBAC (n=23)	Elective repeat CS (n=8)
Knowledge*	84.6% (0.084 SD)	92.3% (0.058 SD)
Decisional conflict**		
0 -2	3 (13.0%)	2 (25.0%)
3	6 (26.1%)	-
4	14 (60.9%)	6 (75.0%)
Realistic expectations***	23.0% (0.093 SD)	23.0% (0.149 SD)

* Mean percentage of correct responses

** SURE test, scores ≤ 3 indicate decisional conflict

*** Mean percentage of health outcomes that are realistic/accurate

Table 3.5. Women’s risk perception.

Risk of:	Perceived risk proportion Range n (%)	Actual proportion*
Uterine rupture during CS	0 to 199/1 000	0.25/1 000
Low	24 (77.4)	
Moderate	4 (12.9)	
High	3 (9.7)	
Infection, injury, blood clots during CS	1 to 299/1 000	20/1 000
Low	10 (32.3)	
Moderate	17 (54.8)	
High	4 (12.9)	
Hysterectomy during CS	0 to 299/1 000	7/1 000
Low	21 (67.7)	
Moderate	10 (32.3)	
High	-	
Chance of losing baby during CS	1/1 000 to 1/1 000 000	0.5/1 000
Low	31 (100)	
Moderate	-	
High	-	
Chance of dying during CS	1/1 000 to 1/500 000	0.1/1 000
Low	30 (96.8)	
Moderate	1 (3.2)	
High	-	
Uterine rupture during VBAC	1 to 199/1 000	5/1 000
Low	15 (48.4)	
Moderate	12 (38.7)	
High	4 (12.9)	
Infection, injury, blood clots during VBAC	0 to 199/1 000	8.5/1 000
Low	27 (87.1)	
Moderate	4 (12.9)	
High	-	
Hysterectomy during VBAC	0 to 49/1 000	6/1 000
Low	26 (83.9)	
Moderate	4 (12.9)	
High	1 (3.2)	
Chance of losing baby during VBAC	1/1 000 to 1/1 000 000	1.5/1 000
Low	23 (74.2)	

Moderate		7 (22.6)	
High		1 (3.2)	
Chance of dying during VBAC	1/1 000 to 1/1 000 000		0.02/1 000
Low		28 (90.3)	
Moderate		3 (9.7)	
High		-	

* based on Guise *et al.*, 2010

Fear of risks

The biggest fear of mothers in this study was related to the size of their baby. Women were told by their health care providers that they could only have the VBAC that they were hoping for if the baby would not become too large. Seventeen pregnant mothers talked about their baby's size during the interviews and how the size would impact their decisions about mode of birth. Sarah said, "My doctor, she says we have to keep a better eye on him, and on his weight and his size, because obviously, if they feel that he is going to be big, that's definitely a C-section" (hospital A, pre-birth). Bonny similarly explained that her baby's size was of concern to her and her provider, "I think a vaginal birth would be a bit easier because I would move around quicker afterwards. But I don't really think it will happen. It would be nice, I guess, but then, this baby is already very large, and my obstetrician told me that he wouldn't recommend a VBAC if the baby gets too big" (hospital A, pre-birth). Marie had stopped exploring any other options after she found out that her son would be large and decided to have a repeat CS, "my doctor insisted that she would not perform a natural birth on me. He is getting so big already" (hospital A, pre-birth).

Ultrasounds did not always predict the infant's size to be bigger than it really was, sometimes a larger infant was thought to be smaller during pregnancy. Julie was not confident about the ultrasound measurements after her experience during her first pregnancy. She said, "I had an ultrasound two weeks before she was born, and it said that she was gonna be seven pound three ounces, and she came out being like nine, eleven. So, they underestimated by quite a bit. So, I think if we would have known that at that time, we would have probably had a scheduled C-section" (hospital B, pre-birth). She did not want to take any chances with this second pregnancy and chose a repeat CS to minimize the risk of uterine rupture.

Decisional conflict

Decisional conflict was assessed during pregnancy using the four-item SURE test (Légaré et al., 2010). In this test, women were asked to indicate in relation to their mode of birth decision if they felt sure about the best choice for themselves, if they know the benefits and risks of each option, if they are clear about which benefits and risks matter most to them, and if they have enough support and advice to make a choice. Most participants had low decisional conflict. Twenty women planning a VBAC indicated being sure about their choice (87%) and six women planning a repeat CS (75%) (see Table 3.4).

Mode of birth considerations described after birth

Women reflected on the decision they made regarding mode of birth six to eight weeks after they had given birth. Their main focus was their recovery experience, which they compared to their previous one, and their fears regarding risk during birth.

Recovery experience

All women who had a planned VBAC found the recovery easier and quicker than after their previous CS birth. They used the terms “fortunate,” “lucky,” and “thankful” when talking about their recovery, even if they had endured a tear or an episiotomy during birth. Christine, for example, explained,

“My previous birth, I remember I had to stay at least two nights and then for a good six weeks I just, like I, I couldn’t lift and then even like my body, it took me so long, like I couldn’t walk up and down the stairs at all because of my C-section wound and just I felt so weak after giving birth. But this time around it’s so much better. I mean, obviously I felt, couldn’t sit because I had a tear, um, I had I think a second degree tear, so it wasn’t too bad. It wasn’t a third or fourth degree but sitting was difficult and nursing was a bit difficult but it’s nothing compared to a C-section recovery” (hospital B, post-birth).

Women with a repeat CS found it easier that they did not have to recover from a long labour in addition to a CS, but they described the challenges to have to care for a toddler and an infant after their surgery. Tara had initially planned a VBAC but had a repeat CS because her labour did not start before the scheduled date. She said, “the recovery was a bit more challenging this time just because I had a four year old home” (hospital A, post-birth). Hailey also delivered by CS after having initially planned a VBAC. After her second CS, she felt better prepared for the recovery but she also outlined why it is difficult to get the necessary rest with a toddler when she said, “I knew what to expect a little bit better. So it was easier that way. It just took a little bit longer, and I’ve seen it to be because I was moving a lot more and I still wanted to read books to my son and hug him you know, bend over and be in positions that I know I wasn’t in last time”(hospital B, post-birth).

Fear related to mode of birth

Many women expressed during the interviews that they were fearful while they were pregnant. Two mothers explained they were planning a repeat CS because they were too scared of the possible risks that are involved in a trial of labour. Julie said, “I was so scared that if something goes wrong. Like I think having a VBAC is just amazing, but I was just always scared what if something goes wrong” (hospital B, post-birth). Erin also stated that the risk of VBAC for her baby is too high, which is why she chose a repeat CS birth, “We scheduled the C-section. It was already scheduled anyways, but I didn’t want to try any other way. I just don’t understand why you would put your baby’s health or life at risk” (hospital B, post-birth). None of the participants mentioned being worried about the risks involved with a repeat CS on their own health or that of their infant; the risks were only associated in their mind with a VBAC option.

As described previously, many women were worried about the size of their infants and that they would not be able to have a VBAC if the predicted birth weight would be too large. During interviews after having given birth, mothers noted that size measurements during pregnancy were often inaccurate predictions of an infant’s birth weight. Rina chose to have a VBAC regardless of her baby’s size. She explained after having given birth “they were a little bit concerned because of her size. They had done a late ultrasound to check on her size and it showed that she was quite big. Well, when she was born she was 8’ 15” (hospital A, post-birth). Bonny wanted to have a VBAC. She had asked for the CS to be scheduled as close to her due date as possible to increase her chances of labour starting before the scheduled day. Similar to

most mothers in this study, Bonny had an ultrasound two weeks before her due date. After her second CS birth, she said,

“They estimated his weight at ten and a half pounds. But he wasn’t, but he was eight eleven, so he was still big. The doctor who had reviewed my ultrasound, who said the baby was ten and a half pounds, he looked at me, like when he told me that, he looked at me and said, how tall are you and I told him like, you know, five, six. He said, it’s a good thing you have a C-section planned because the baby’s ten and a half pounds” (hospital A, post-birth).

Bonny was not unhappy with the birth outcome because she and her baby were feeling well, but she had not expected that the size predictions would be unreliable.

Discussion

Experiential knowledge and mode of birth decisions

The majority of participants had planned to have a VBAC regardless of their hospital or type of health care provider. Women relied strongly on experiential reasoning to make their mode of birth decision, which included their personal experiences and those of their friends and family. A study assessing factors that influence providers’ practices regarding mode of birth after a previous CS found that providers are aware of the important role that experiential knowledge plays in women’s decisions about mode of birth (Shoemaker, 2016). Listening to the stories of other mothers who had to make similar decisions helped them feel more comfortable with their own decision. Women explained that they found it important to know the statistical risks associated with different modes of birth after CS, but they stressed that they found it most helpful to hear the stories of other mothers in similar situations. Through the experiences of others they learned how others approached their decisions, the challenges they faced and the

outcomes they have had. This finding is confirmed by previous studies where clients tended to use personal experience, emotions and social references to assess their risk status (Collins & Street, 2009) and clients' decisions were often influenced primarily by personal narratives and anecdotes than by statistical evidence (Fagerlin, Wang & Ubel, 2005). The risk statistics available to mothers and care providers regarding mode of birth after a previous CS are currently not sufficient to provide women with individualized certainty about outcomes. In cases of medical uncertainty it is common for clients to disregard medical evidence and to prefer other forms of knowledge that are more subjective and based on experience (Burton-Jeangros *et al.*, 2013). It might be relevant for providers to acknowledge, that while they discuss medical evidence during a consultation, pregnant women's experiential knowledge might have a greater influence on their final decision.

The majority of mothers indicated during pregnancy that they expected recovery from a VBAC to be easier than from a repeat CS and for many women this possibility of a shorter and easier recovery was an important reason why they wanted to attempt a trial of labour. Women who experienced a VBAC confirmed in interviews after their birth that their recovery was both quicker and easier than it was after their previous CS. In a study from Australia, the majority of pregnant women with a previous CS believed their recovery would be easier after a repeat CS than after a VBAC (Shorten, Shorten & Kariminia, 2004). The authors explain that women perceived recovery from labour to be more difficult because of their previous experience, during which many women had a long labour that ended up in a CS. Interestingly, the women I surveyed and interviewed recalled similar experiences, but they associated the difficulties they

endured during their recovery predominately with the CS rather than the labour that was also part of their birth experience.

Pressure, fear and mode of birth decisions

From a medical perspective, uterine rupture is the biggest risk associated with birth after previous CS (Grobman *et al.*, 2008). Only four women in this study talked about being fearful of a possible rupture, and they all planned a repeat CS. Women who chose a trial of labour were also aware of the risk of uterine rupture, but it did not worry them as much as the possibility of having to have a repeat CS. Studies confirm the increased risk of uterine rupture with a macrosomic fetus, which is defined as having a birth weight greater than 4500 grams or 10 pounds (Barger *et al.*, 2011). All women recalled they had ultrasounds throughout their pregnancy to measure the fetus' size and to estimate its birth weight. Women planning a VBAC were quite concerned about their infant becoming too large in addition to their already scheduled CS date. All women recalled that they were reminded by their provider that the size of their infant would impact if they were able to have a trial of labour and that a large infant would increase their risk of uterine rupture during a trial of labour. Many women recalled the inaccuracy of the size estimation after the birth of their child. This finding is in line with the results of a large survey study by Cheng and colleagues (2015), where a prediction of infant macrosomia during pregnancy was accurate in only 20% of mothers. Despite a lack of clinical evidence (Hoopmann *et al.*, 2010), fetal birth weights were estimated using third trimester ultrasounds and women used the obtained information to guide their mode of birth decision.

It became further evident that the women in this study had to make an active decision to have a trial of labour, while having a repeat CS was the default option. Most women did not feel pressured by their health care provider to choose either VBAC or CS, but every woman recounted that she was given a CS date close to the time of her due date, regardless of her mode of birth decision. Women felt distraught about the possibility that their labour would not start on its own prior to the scheduled date to be able to have a trial of labour. Clinical practice patterns, which include scheduling a CS date for women planning to have a VBAC, was also described by Shorten and colleagues (2005) as a barrier to improving VBAC rates for low risk pregnant women. They conducted a randomized controlled trial in Australia to evaluate the effectiveness of a decision aid for women with a previous CS. The use of the decision aid improved women's knowledge regarding risk and benefits of mode of birth, the mean knowledge score increased by 2.17 points in the intervention group compared to 0.42 in the control group who received usual prenatal care ($p < 0.001$, 95% CI for difference 1.15-2.35). However, women's mode of birth after CS decisions and their actual mode of birth were found to be related to the hospital site, rather than the decision aid, which indicates the potential role of clinical practice patterns on women's choices (Shorten *et al.*, 2005). Clinical practices that are routine in some hospitals appear to have a strong influence on decisions about mode of birth and outcomes. Regardless of a lack of evidence base for these practices, it is possible that these practices influence the risk perceptions of providers and women and appear to create a barrier to improve proportions of VBAC among low risk women.

Participants shared a clear understanding of the clinical differences in risks between VBAC and elective repeat CS and they were able to accurately identify which procedure is more

risky in relation to uterine rupture, infection, hysterectomy or neonatal mortality. However, most of the women had problems identifying numerically the level of risk of either mode of birth on health outcomes. Women tended to perceive the risks associated with VBAC and repeat CS higher than they realistically are and they knew the accurate probability of an outcome on average 23% of the time. Studies have found the perception of an increased risk during pregnancy to be significantly associated with psychological distress and an increased uncertainty about what outcome to expect (Stahl & Hundley, 2003; Gray, 2001). This cohort of pregnant women with a previous CS is correctly aware that statistically, they have a greater risk of morbidity during both a trial of labour and a repeat CS than healthy first time mothers. They were not fully aware how small these risks actually were. This finding is in line with previous research, which showed that pregnant women tend to perceive themselves to be more at risk for different health outcomes than they actually are (Darbyshire *et al.*, 2003; Searle, 1996).

Based on available data on immediate health outcomes after birth, not including longitudinal studies, infants have slightly better health outcomes after a repeat CS and mothers have slightly better health outcomes with a VBAC. As described previously, the probability of morbidity and mortality is very small in both cases, and the risk probabilities for infants are numerically between 100 and 1000 times smaller than the risk probabilities for the women (Mankuta *et al.*, 2003). But when women are asked to directly prioritize possible risk outcomes, most women rate avoiding mortality or morbidity of their infant much higher than all other decision criteria (Sharma *et al.*, 2011). The participants in this study similarly described the safety of their infant as a very important decision making factor and they prioritized their infants' health over their own.

Study limitations

The survey tools used for the data collection have been tested for validity and reliability in different client populations, but they were not specifically developed for maternity care clients with a history of CS. The response rate for the surveys was low with approximately 18%, but for privacy concerns it was not possible to verify that every potentially eligible woman would have had access to the study invitation. It is possible that women who did not participate in the study had different perspectives regarding the factors that shaped their decisions on mode of birth after CS than the study participants. Participants shared similarities with the general client population of the participating hospitals in terms of age, socioeconomic status and overall health, but a higher proportion of midwifery clients participated in the study than are represented at these hospitals. The socioeconomic status of study participants in terms of household income and level of education is high, which might limit the applicability of the findings to other populations.

Social response bias might have also occurred during the survey and interviews because it is possible that participants answered questions in ways that they perceived to be socially appropriate. Survey responses were not compared statistically between women who decided to have a VBAC and women who decided to have a repeat CS due to the small sample size. Women were given the opportunity to answer the survey anonymously to reduce the effect of this effect, but the majority of participants volunteered to share their contact information and to additionally participate in the interviews. The interviews were transcribed by a professional transcriber and verified for accuracy by the main author who also conducted the analysis. A

code book was used with a thematic approach based on previous research in the field for the analysis and the themes were discussed with her supervisor.

Conclusion

Based on the narratives of pregnant women who have had a previous CS, a number of complex factors intersected during their decision making processes regarding mode of birth and influenced how women ended up giving birth. Women formed decisions based on experiential knowledge related to their personal birth history and that of others, but they also strongly valued their provider's opinion. Sufficient space and time should be created during clinical consultations after the first CS birth and during the subsequent pregnancy to enable women to discuss their experiential knowledge and related fears and expectations. A number of mothers shared that they found the meeting times with their providers too short to meaningfully discuss their previous birth experience, and that their clinical encounters were predominantly related to physical check-ups. Participants recollected receiving advice on the risk statistics from their providers, but consultations rarely addressed the women's perceptions of their previous experiences. Risk does not hold a normative judgement in medicine as it only represents a likelihood that an outcome may occur. But women interpret these likelihoods based on various personal narratives. Further, when women made the decision to have a VBAC, they felt pressured to have a CS by routine clinical practices that lack an evidence base.

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CHAPTER 4

REDUCING CAESAREAN SECTIONS AMONG LOW RISK WOMEN WITH CARE: A PROSPECTIVE COHORT STUDY

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Abstract

Background: In 2010, a Canadian hospital in collaboration with health researchers developed and implemented the CARE (CAesarean REduction) strategy to reduce proportions of Caesarean section (CS) among low risk women. The strategy targets health care providers, pregnant women, and hospital policies.

Methods: A prospective pre-post cohort study with control group was used to examine changes in the overall proportions of CS and within Robson groups 1, 2a, and 5 for 12 months before initiation of the CARE strategy compared to 12 months after its full implementation. The intervention hospital is a Canadian urban level II community hospital with a birth volume of approximately 3000 births annually. The control group is an aggregate of all level II hospitals located in the same Canadian province with an annual birth volume of approximately 84,000 births. Data were obtained from the Better Outcomes Registry and Network (“BORN”) Ontario.

Results: Proportions of CS decreased at the intervention hospital by 3.9% ($p=0.0006$), from 30.3% ($n=964$) in 2009/10 to 26.4% ($n=803$) in 2012/13. During the same time frame, proportions of CS in the control group were stable with 28.1% ($n=23,694$) in 2009/10 and 28.2% ($n=23,683$) in 2012/13. Applying the Robson classification system, the CS rate of women with a previous CS as a proportion of all women with a previous CS decreased at the intervention hospital by 5.6% ($p=0.0044$) from 84.3% to 78.7%. In the control group, also fewer women had a repeat CS over the study period, but the decrease was smaller with 3.9% ($p<0.0001$) from 84.5% to 80.6%.

Interpretation: The intervention hospital has been able to reduce its proportion of CS by 3.9% since the implementation of the CARE strategy, while the proportion of CS did not improve in the control group. The strategy appeared to have had the strongest effect on CS in Robson group 1 (Nulliparous, singleton, cephalic, ≥ 37 weeks, spontaneous labour) with a reduction of 3.3%, Robson group 2a (Nulliparous, singleton, cephalic, ≥ 37 weeks, induced labour) with a reduction of 2.8%, and Robson group 5 (Multiparous, singleton, cephalic, ≥ 37 weeks, previous CS) with a reduction of 5.6%.

Introduction

The majority of Canadian women experience pregnancy and childbirth, and most remain healthy and require little medical intervention during this normal life process. Paradoxically, proportions of medical interventions during birth have been increasing. Except for a slight dip in the early 1990s, the Caesarean section (CS) rate in Canada (including both primary/first and repeat CS) has increased steadily over the past two decades from 17.6% in 1992/93 to a current 26.8% (CIHI, 2010; CIHI, 2007). Variation exists among Canadian provinces, such that Ontario's CS rate (28.3%) is higher than the national average, and substantially higher than other provinces, such as Manitoba (20.2%) (CIHI, 2009).

Recognising that CS can be a lifesaving and necessary method of birth for women and infants in emergency situations, it is also important to acknowledge that the procedure is not benign. CS birth impacts the health of women and their babies, leads to longer hospital stays and is economically more costly than vaginal birth (Liston *et al.*, 2007; NIH, 2010; Lui *et al.*, 2007). Although there is a lack of consensus regarding an optimal proportion of CS, there is national and international agreement that the current rate of surgical birth is of major concern and requires further investigation. The US Agency for Healthcare Research and Quality (AHRQ), for example, has proposed a protocol to review clinical and organizational strategies to reduce CS (AHRQ, 2011). A number of maternal factors related to the changing population of childbearing women in Canada, such as higher rates of obesity and older maternal age contribute to increases in CS births (Joseph *et al.*, 2003), while maternal request accounts for less than two percent (Shoemaker, 2012; Bourgeault *et al.*, 2009). Researchers further attribute

high numbers of CS to clinical policies and practices that involve medical interventions (McDermott, 2010; Chalmers *et al.*, 2009; Green & Baston, 2007). The study's objective was to evaluate if the proportion of CS changed after the implementation of the CARE strategy in comparison to other hospitals that care for similar clients in Ontario.

Methods

Setting and intervention

In April 2010, a level II community hospital with an annual birth volume of approximately 3000 births, located in the Greater Toronto Area in Ontario, Canada, began to develop and implement the CAesarean section REduction strategy (referred to herein as the CARE strategy). In the previous 10 years, the hospital's birthing unit experienced an increase in birth volume, and an increase in the proportion of births by CS. To ensure that funding was used efficiently for the higher number of births, the CARE strategy was developed by an interdisciplinary team of maternity care providers (including midwives, nurses, obstetricians, anaesthesiologists, paediatricians and administrators) in collaboration with health researchers. The strategy is comprised of a number of individual, evidence-based interventions, which promote and support normal birth among low risk pregnant women by influencing client and healthcare provider behaviour, and institutional policies related to interventions in labour and birth. Pregnant women are informed through posters, handbooks and information sessions that most women can give birth without multiple medical interventions, and women are encouraged to be active decision makers in their care. Patient education on its own has not

been found to be highly effective to change clinical practice (Catling-Paull *et al.*, 2011); however, it provides pregnant women with the knowledge required to actively participate in their labour and birth care and to make informed decisions. Maternity care providers are regularly reminded through department meetings and posters about the benefits of normal birth for mothers and children, and providers are encouraged to question their use of interventions during labour and birth. Interventions using audit and feedback have been found to have strong effects on clinical practice change (Chaillet & Dumont, 2007) and it is an important element of the CARE strategy. Maternity care policies were developed to provide an environment that is conducive to the implementation of evidence based practices (see Table 4.1 for an overview of the CARE strategy).

The initial goal of the CARE strategy was to reduce the proportion of CS births at the intervention hospital by 5%, from a starting rate of 30.3%. Another key outcome identified by members of the interdisciplinary hospital committee was to affect the use of interventions during labour and birth when considered inappropriate by clinical practice guidelines, including induction of labour prior to 41³ weeks gestation and planned repeat CS for women who are eligible for a trial of labour. The interdisciplinary developers of the CARE strategy considered the use of interventions during labour and birth a contributing factor in the increased use of CS at the hospital. Components of the CARE strategy were implemented in stages from April 2010 to January 2011 and the strategy is ongoing.

Table 4.1. Overview of the CARE strategy.

Target Population	Components
Pregnant woman	<p>Client Education</p> <ul style="list-style-type: none"> (a) Public Education Campaign to increase public awareness of the CS reduction initiative through posters located in the maternity care unit. CS, VBAC and induction rates are posted monthly on a large board in the unit's entrance (Coulter & Ellins, 2007). (b) Review of prenatal class content to ensure it is evidence based and supports normal birth. (c) Review of client education booklet (provided to all women at 16-20 weeks gestation) to ensure it is evidence based and supports normal birth. (d) Options for Birth after CS information session counsels low risk women with a previous CS in a group setting on their options and risks and benefits of either choice. A presentation on the evidence and a patient decision aid is used to guide discussion (Stacey <i>et al.</i>, 2011; Chaillet & Dumont, 2007).
Health care provider* (HCP)	<p>Audit and Feedback</p> <ul style="list-style-type: none"> (a) The chief of obstetrics updates HCPs on the start of the initiative, baseline rates and targets. (b) Every month, HCPs are provided with the unit's overall and each HCP's CS, VBAC and induction rates (blinded for the first three months, then unblinded among peers) (Hartmann <i>et al.</i>, 2012; Van Dillen <i>et al.</i>, 2008; Chaillet & Dumont, 2007; Naiden & Deshpande, 2001). <p>Supportive Care in Labour</p> <ul style="list-style-type: none"> (a) HCPs receive education on benefits of supportive care. (b) HCPs are verbally encouraged to use auscultation instead of electronic fetal monitoring (Alfirevic <i>et al.</i>, 2013; Anderson, 1994). (c) Women receive 1:1 nursing care at least 80% of the time during active labour (Hodnett <i>et al.</i>, 2011; Hodnett <i>et al.</i>, 2005).
Maternity care unit	<p>Supportive Care in Labour</p> <ul style="list-style-type: none"> (a) A desk and chair is placed in every labour and delivery room to encourage nurses to remain close to labouring women while doing chart work. (b) HCPs are given a nurse call system to be able to locate peers while they are in a client's room.

Unit Policies

- (a) The Canadian Joint Statement on Normal Birth is adopted as a principle guideline to define and support normal birth (SOGC, 2008).
- (b) Labour induction policies are updated to ensure that post-date inductions only happen starting at 41³ weeks gestation (Jonsson *et al.*, 2013; Jaquemyn *et al.*, 2012; Laughon *et al.*, 2012). All induction requests are reviewed by the on-call physician and facilitating nurse prior to booking the client.
- (c) Admission policy changed to ensure only women >4 cm dilated with regular contractions are fully admitted (Janssen *et al.*, 2006; McNiven *et al.*, 1998). A comfortable space is provided in the triage area for women who are not yet in full labour but who wish to remain at the hospital.

*Obstetricians, family physicians, nurses, and midwives

Study design and data source

We applied a prospective pre-post cohort study with control group to examine the cumulative effect of the CARE strategy on proportions of CS. We further examined the effects of the intervention on proportions of CS using the Robson classification system (MFMC, 2012) to explore the effects of the CARE strategy on subgroups of low risk pregnant women. Using the Robson groups makes the findings of the study of greater relevance to maternity care clinicians and administrators because it allows them to know which groups of clients can benefit most from the CARE strategy. Kelly and colleagues (2013) illustrated that Robson groups 1, 2 and 5 are the biggest contributors to CS in Canada. The CARE strategy is intended to optimize proportions of CS for the greatest number of low risk women possible; thus, factors that affect type of birth for those three groups became the main focus of the strategy. The study used data from the Better Outcomes Registry and Network (BORN) Ontario, which collects pregnancy, birth and newborn records of each birth in the province of Ontario, including home and hospital births.

We obtained ethical permission for the study from the ethical review boards of the University of Ottawa, the intervention hospital and the Children's Hospital of Eastern Ontario, which houses the BORN Ontario database.

Definitions

From the BORN Ontario database, we extracted records of women who gave birth in Ontario between April 2009 and March 2013. The intervention group included women who gave birth at the hospital that implemented the CARE strategy. The control group was comprised of women who gave birth at all other level II hospitals in Ontario, which is the same level of care as the intervention hospital. Level II hospitals care for women, who experience low to moderate maternal risk. Induction and augmentation of labour is available at all times and the possibility of an assessment by obstetrics, anaesthesia and paediatrics is available within 30 minutes (PCMCH, 2011). Women whose pregnancy is classified as high risk do not deliver in level II hospitals.

The primary outcome was CS as a proportion of all births, including live births and stillbirths, at ≥ 20 weeks' gestational age (BORN code M512). Groups 1, 2a and 5 of the modified Robson classification system (MFMC, 2012) were used to further analyze the data. The modified Robson criteria are a ten group (plus 2 sub-groups) classification system based on a woman's current and previous obstetric records and it accounts for plurality, fetal presentation, parity, gestational age and type of labour and birth (Allen, Scott & Baskett, 2012). The Robson classification system presents the proportion of CS for each group, a composite score of the group rates that represents the overall proportion of CS, and the relative size of each group to outline each group's contribution to the overall proportion of CS (Robson, 2011).

We used three of the Robson group classifications in our analyses as follows. Robson group 1, which includes the proportion of CS birth among nulliparous women (first time mothers) whose labour was spontaneous with a singleton fetus, cephalic (head down) and at term ≥ 37 weeks gestation. Robson group 2a, which includes CS for nulliparous women whose labour was induced, and who gave birth to a singleton fetus who was cephalic at ≥ 37 weeks gestation. Robson group 5, which consists of CS among multiparous women (have already given birth at least once) with a previous CS, a singleton fetus, cephalic at ≥ 37 weeks gestation.

Statistical analysis

Absolute differences in proportions of CS and other interventions during labour and birth in the intervention and control groups across the study period were tabulated in percentages. Z-scores were calculated to test the null hypothesis that there was no change in proportions of CS among the intervention and control groups at the two time points measured. To explore CS trends further, we applied the Robson classification system to the data from the intervention hospital. We further calculated z-scores to test if the proportion of CS for the intervention hospital before and after the implementation of the CARE strategy was significantly different from the proportion of CS for the control group. Data was analyzed in SAS Studio 3.5.

Results

The change in the proportion of CS examined in 168,256 births that took place in level II hospitals in Ontario between April 2009 to March 2010 and April 2012 to March 2013, which

corresponds to 60% of all births in the province of Ontario. At the intervention hospital 6,226 births occurred during that time frame. The majority of women were between 25 and 34 years old (64.6% in the intervention group vs. 63.1% in the control group). In the intervention group, more women were over the age of 35 (31.1%) than in the control group (22.1%), and slightly more women had an epidural (67.8% at the intervention hospital versus 58.1% at control hospitals). Obstetricians cared for the majority (almost 90%) of births in this study, but more women chose midwifery care at the intervention hospital (8.6% at the intervention hospital versus 5.1% at the control hospitals), and more women chose care from a family physician at the control hospitals (2.7% at the intervention hospital versus 6.2% at control hospitals) (see Table 4.2 for a description of the demographic and obstetric characteristics of the study population).

Table 4.2. Distribution of demographic and obstetric characteristics of women in the intervention and control groups.

Characteristics	Pre-Intervention Period 2009/10		Post-Intervention Period 2012/13	
	Intervention Hospital n (%)	Level 2 Hospitals in Ontario (n=36) n (%)	Intervention Hospital n (%)	Level 2 Hospitals in Ontario (n=36) n (%)
Age				
<25	157 (4.94)	13 244 (15.70)	116 (3.81)	11 823 (14.09)
25-34	2 069 (65.04)	52 810 (62.60)	1 952 (64.11)	53 291 (63.52)
≥35	955 (30.02)	18 306 (21.70)	977 (32.08)	18 781 (22.39)
Gestational age				
<37	216 (6.79)	6 336 (7.51)	216 (7.09)	6261 (7.46)
37-41	2 959 (93.02)	77 653 (92.05)	2 818 (92.55)	77 242 (92.07)
>41	6 (0.19)	260 (0.31)	11 (0.36)	392 (0.47)
missing	-	111 (0.13)	-	-
Parity				
0	1 559 (49.01)	36 542 (43.32)	1 334 (43.81)	35 148 (41.90)
≥1	1 622 (50.99)	47 722 (56.57)	1 710 (56.16)	45 926 (54.74)
missing	-	97 (0.11)	1 (0.03)	2 821 (3.36)
Gestational diabetes	210 (6.60)	4 601 (5.45)	217 (7.13)	4 673 (5.57)
Care Provider				
Obstetrician	2 798 (87.96)	74 821 (88.69)	2 649 (87.00)	72 762 (86.73)
Midwife	216 (6.79)	3 460 (4.10)	313 (10.28)	5 052 (6.02)
Physician	93 (2.92)	5 188 (6.15)	72 (2.36)	5 107 (6.09)
unknown	74 (2.33)	891 (1.06)	11 (0.36)	974 (1.16)

In 2009/10, before the start of the CARE strategy, 30.3% of all births at the intervention hospital were CS (see Table 4.3). We observed a 3.9% absolute difference in the proportion of CS with a decrease to 26.4% ($p=0.0006$) after the CARE strategy had been fully implemented in 2012/13. The proportion of primary CS decreased by 3.4% ($p=0.0003$) from 17.9% to 14.5%. The proportion of repeat CS among all women with a previous CS decreased by 0.6% from 12.5% to

11.9% ($p=0.4965$). During the same time period, proportions of overall and primary CS in the control group were stable, with a non-significant 0.1% increase in CS from 28.1% to 28.2% ($p=0.5157$) and a 0.6% increase in primary CS from 15.9% to 16.5%. The proportion of CS at the intervention hospital was higher than in the control group before the start of the CARE strategy (30.3 % vs. 28.1%, $p=0.00634$) but it was 1.8% smaller after the full implementation (26.4% vs. 28.2%, $p=0.0251$) (see Table 4.3 for an outline of the proportions of CS and other labour and birth interventions in the study groups).

While the CS rate at the intervention hospital decreased over the study period, proportions of assisted births (the use of forceps and/or vacuum) did not change in either intervention or control hospitals (see Table 4.3). During the time of the intervention, the rate of labour inductions decreased by 4.6% from 22.5% to 17.9% ($p<0.0001$) at the intervention hospital. A small 1.5% decrease in labour inductions from 23.7% to 22.2% ($p<0.0001$) occurred in the control group, but the decrease in inductions for that group was only significant for births during and after 41 week gestation (-1.1%, $p<0.0001$). At the intervention hospital, the decrease in inductions was greatest among women who birthed at 37 to 39 weeks gestation (-1.8%, $p=0.0108$) and at 40 weeks gestation (-2.6%, $p<0.0001$).

Table 4.3. Proportions of interventions during labour and birth in the intervention and control groups.

Intervention	Intervention Hospital				Level 2 Hospitals in Ontario (n=36)			
	2009/10 n (%)	2012/13 n (%)	Differ ence %	z-score (p-value)	2009/10 n (%)	2012/13 n (%)	Differ ence %	z-score (p-value)
Total # of births	3 181	3 045			84 361	83 895		
CS	964 (30.3)	803 (26.4)	-3.9	3.4416 (0.0006)	23 694 (28.1)	23 683 (28.2)	0.1	0.6516 (0.5157)
Primary CS	568 (17.9)	441 (14.5)	-3.4	3.6106 (0.0003)	13 443 (15.9)	13 812 (16.5)	0.6	-2.9411 (0.0033)
Repeat CS	396 (12.5)	362 (11.9)	-0.6	0.6762 (0.4965)	10 139 (12.0)	9 282 (11.1)	-0.9	6.1281 (<0.0001)
Labour induction	715 (22.5)	545 (17.9)	-4.6	4.4953 (<0.0001)	20 017 (23.7)	18 657 (22.2)	-1.5	7.2597 (<0.0001)
<37	33 (1.0)	52 (1.7)	0.7	-2.2784 (0.0226)	1 195 (1.4)	1 158 (1.4)	0.0	0.6329 (0.5287)
37 – 39	316 (9.9)	246 (8.1)	-1.8	2.5535 (0.0108)	8 086 (9.6)	7 960 (9.5)	-0.1	0.6769 (0.4965)
40	184 (5.8)	97 (3.2)	-2.6	4.9377 (<0.0001)	4 325 (5.1)	4 084 (4.9)	-0.2	2.4358 (0.0147)
≥41	182 (5.7)	150 (4.9)	-0.8	1.3963 (0.1615)	6 411 (7.6)	5 455 (6.5)	-1.1	8.7901 (<0.0001)
Assisted births	414 (13.0)	374 (12.3)	-0.7	0.8688 (0.3843)	9 063 (10.7)	8 570 (10.2)	-0.5	3.5353 (0.0004)
Forceps	18 (0.6)	17 (0.6)	0.0	0.0399 (0.9681)	1 811 (2.1)	1 698 (2.0)	-0.1	1.762 (0.0784)
Vacuum	350 (11.0)	327 (10.7)	-0.3	0.3344 (0.7414)	5 512 (6.5)	5 498 (6.6)	0.1	-0.1626 (0.8729)
Vacuum + Forceps	7 (0.2)	4 (0.1)	-0.1	0.833 (0.4066)	304 (0.4)	249 (0.3)	-0.1	2.2775 (0.0226)
Assisted births + CS	39 (1.2)	26 (0.9)	-0.3	1.4442 (0.1499)	1 436 (1.7)	1 125 (1.3)	-0.4	6.0516 (<0.0001)
Epidural	1 892 (59.5)	1 647 (54.1)	-5.4	4.2919 (<0.0001)	44 931 (53.3)	37 941 (45.2)	-8.1	32.9665 (<0.0001)

When modified Robson criteria were included in the analyses to better understand changes in the proportions of CS, a significant decrease in CS in the intervention group in

Robson group 5 was observed (see Table 4.4 and Figures 4.1, 4.2). The proportion of CS for women in Robson group 5 out of all women with a CS was comparable in the intervention and the control group before the start of the CARE strategy, but the decrease by 5.6% after full implementation of the CARE strategy was larger in the intervention group from 84.3% to 78.7% ($p=0.0455$) compared to a 3.9% reduction in the control group from 84.5% to 80.6% ($p<0.0001$). In Robson groups 1 and 2a, proportions of CS declined at the intervention hospital at 3.3% and 2.8% respectively, but this change was not found to be statistically significant. In the control group, CS rates increased; in Robson group 1 by 2.1% from 14.0% to 16.1% ($p<0.0001$) and in Robson group 2a by 2.7% from 30.4% to 33.1% ($p<0.0001$).

Table 4.4. Proportion of caesarean section by Robson classification groups 1, 2a, 5.

Robson Group		Intervention Hospital n/N (%)	Level II Hospitals in Ontario (n=36) n/N (%)
Robson 1	2009/10	171/901 (19.0%)	2 798/20 037 (14.0%)
Nulliparous, singleton, cephalic, ≥37 weeks, spontaneous labour	2012/13	127/808 (15.7%)	3 116/19 344 (16.1%)
	Absolute difference	-3.3%	2.1%
	z-score (p-value)	1.7739 (0.0767)	-5.9545 (<0.0001)
Robson 2a	2009/10	108/361 (29.9%)	2 887/9 504 (30.4%)
Nulliparous, singleton, cephalic, ≥37 weeks, labour induced	2012/13	76/281 (27.1%)	2 776/8 380 (33.1%)
	Absolute difference	-2.8%	2.7%
	z-score (p-value)	0.798 (0.4237)	-3.9449 (<0.0001)
Robson 5	2009/10	312/370 (84.3%)	7 853/9 293 (84.5%)
Multiparous, singleton, cephalic, ≥37 weeks, previous Caesarean section	2012/13	306/389 (78.7%)	6 849/8 502 (80.6%)
	Absolute difference	-5.6%	-3.9%
	z-score (p-value)	2.0044 (0.0455)	6.9402 (<0.0001)

Figure 4.1. Change in proportion of caesarean section by Robson classification groups 1, 2a, 5.

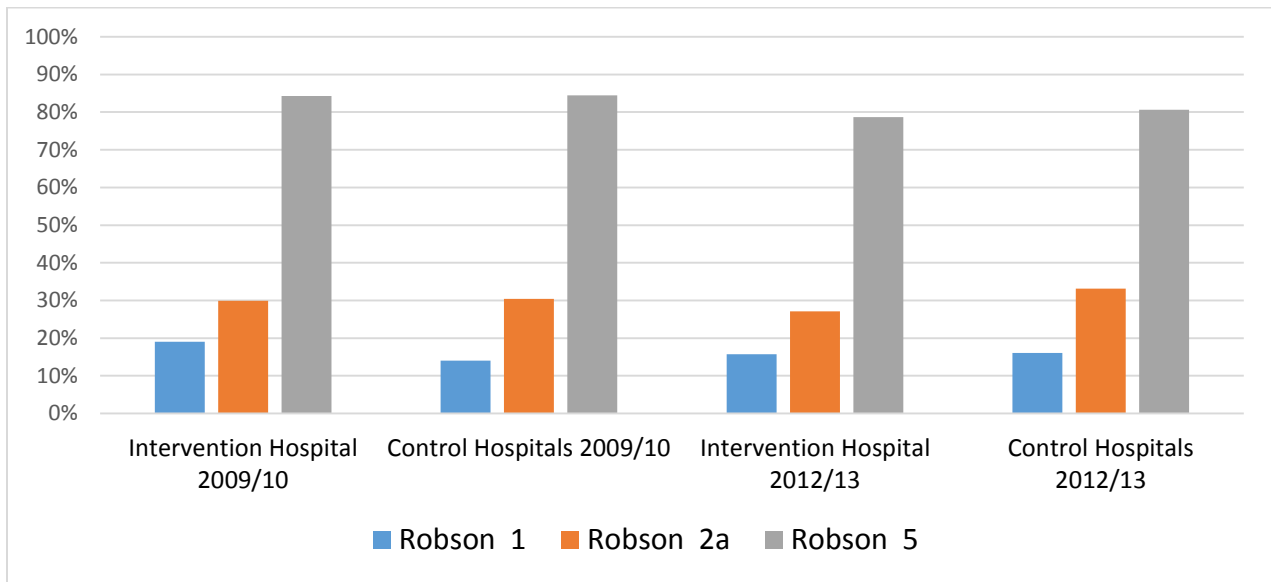
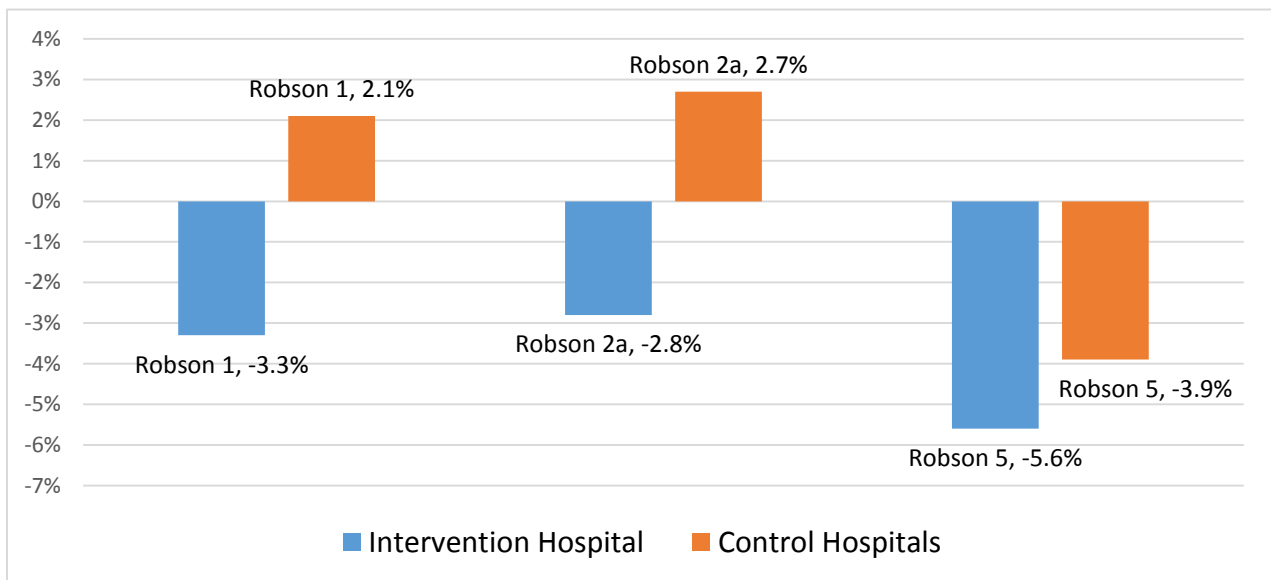


Figure 4.2. Change in proportion of caesarean section by Robson classification groups 1, 2a, 5.



Interpretation

CS can be a lifesaving procedure for women and their newborns, but compared to spontaneous vaginal birth, it is associated with increased medical risks (Witt *et al.*, 2015; Souza *et al.*, 2010) and higher costs to the health care system (NIH, 2010). Proportions of CS have increased significantly over the last decades (CIHI, 2010), raising questions whether some CS are unnecessary and avoidable (Coulm *et al.*, 2014). Recurring controversy about the fiscal feasibility of the high and rising rates of CS demonstrates the need to implement evidence based strategies, such as the CARE strategy, in maternity care units. Overall proportions of CS decreased by 3.9% ($p=0.0006$) at the intervention hospital after the full implementation of the CARE strategy, while no change occurred in the aggregate outcomes of level II hospitals in Ontario during the same time period. Level II hospitals in Ontario experienced a small but significant increase in primary CS by 0.6% ($p=0.0033$) from 15.9% to 16.5% while primary CS decreased by 3.4% ($p=0.0003$) at the intervention hospital from 17.9% to 14.5%. In Canada, women who are eligible for vaginal birth after CS (VBAC) (in Robson group 5) are a large group contributing to the overall CS rate (Kelly *et al.*, 2013). Good evidence suggests that the practice of routine, repeat CS is often not necessary and appears to be often not driven by factors related to the clinical profile of pregnant women (Denk, Kruse & Jain, 2006). A systematic review by Catling-Paull and colleagues (2011) of quantitative studies including five randomized controlled trials, ten cohort studies, one case-control and eleven before and after studies evaluated the effectiveness of non-clinical intervention to increase VBAC uptake and success. Non-clinical interventions refer to interventions that affect the organizational structure and/or decision making practices, while clinical interventions impact how providers perform a

procedure, such as CS. They found updates to guidelines to reflect evidence based practices, audit and feedback systems and local opinion leaders had the greatest impact on improving VBAC rates. Hartman and colleagues (2012) came to the same conclusions after their systematic review of strategies to reduce proportions of CS among low risk women within the context of the United States. With the introduction of the CARE strategy, which encompasses these non-clinical interventions, the intervention hospital decreased the proportion of CS among all low risk women with a previous CS by 5.6% ($p=0.0455$) from 84.3% to 78.7%. In the control group, the proportion of CS among these women also decreased by 3.9% ($p<0.0001$), which suggests that the decrease that took place at the intervention hospital must be partly attributed to other factors.

Evidence suggests that labour induction before 41³ weeks gestation is associated with an increased risk of CS depending on parity, cervical status and gestational age (Jonsson *et al.*, 2013; Jacquemyn, Michiels & Martens, 2012; Laughon *et al.*, 2012), while postdate inductions (after 41³ weeks gestation) are in line with clinical practice guidelines and are not associated with higher rates of CS (Gulmezoglu *et al.*, 2012). In an effort to safely reduce CS, the intervention hospital changed their labour induction policy to ensure that inductions for postdate were only booked when the postdate criteria were met. Proportions of labour inductions dropped by 2.6% ($p<0.001$) at the intervention hospital for women who gave birth at 40 weeks gestation, while only dropping by 0.2% ($p<0.05$) in the control group. The new policy was successful in reducing labour induction rates for low risk women before their pregnancy was full term. The simultaneous reduction in primary CS and CS in Robson group 1 at the intervention hospital, while these CS rates increased in the control group, suggests an

important association between lowering labour inductions before 41³ weeks gestation and lowering CS for low risk women.

The number of women birthing at the intervention hospital was not large enough to statistically analyze potential changes in rates of maternal and infant health. Hospital administrators were diligent to review any adverse health outcomes during the implementation of the intervention and no changes were reported compared to the time prior to the intervention. Studies have shown that CS can be safely reduced for low risk women in developing countries without affecting maternal and infant health (Ye *et al.*, 2012; Laye & Dellinger, 2006; Alhabe *et al.*, 2004; Lomas *et al.*, 1991). Several European countries, such as the Netherlands, Finland and Sweden have CS rates between 14% and 17% while having very low rates of perinatal mortality with 4 to 7 deaths per 1000 births (OECD, 2011). The focus of the study was not to illustrate that CS rates could be lowered without putting mothers and infants at risk, which has been already established in the literature. Our research provides an example of an innovative strategy that is associated with lower CS rates and other rates of interventions during birth for healthy pregnant women.

Limitations

A randomized control trial would have been the most appropriate method to evaluate the effectiveness of the CARE strategy. To maximize sustainability of the intervention, it was important that providers and administrators working in the hospital unit were able to shape the individual components of the strategy, to start each of the components when it appeared most appropriate, and to alter aspects of the strategy when they did not fit with the everyday

working procedures of the unit. Since the CARE strategy was evaluated as prospective pre-post cohort study with control group, it is not possible for us to make causal statements about the effects of CARE on CS rates. We have tracked the changes in proportions of CS over the study period and have consistently found an improvement in rates of interventions during birth compared to hospitals that care for a similar patient population in the same province. Our findings are limited to low risk pregnant women who gave birth at level II hospitals in Ontario. A further limitation is that any observed changes in proportions of CS and other labour and birth interventions cannot be attributed to particular components of CARE because the CARE strategy was evaluated as a bundle. We used administrative data for the analysis of the study, which introduces potential reliability concerns. It is possible that the coding and recording of the data was not consistent across the hospitals involved in the study.

Conclusion

We examined the effects of the CARE strategy using the modified Robson classification system because the findings from our study are of greater relevance to maternity care providers and administrators if they know which groups of clients can benefit most from the CARE strategy. Proportions of CS at the intervention hospital improved significantly for Robson groups 1, 2a, and 5, which correspond to the biggest contributors of CS in Canada (Kelly *et al*, 2013). Implementing strategies, such as the CARE strategy, to reduce CS for healthy pregnant women who fall into these categories is an important first step to optimize maternity care for a large proportion of women. The hospital did not achieve the 5% reduction in the proportion of CS over the study period that they strived for before the implementation of the CARE strategy,

but they successfully reduced their rate by 3.9% while the control group did not experience a change in their proportion of CS.

The significant decrease of labour inductions prior to 41³ weeks gestation at the hospital that implemented the CARE strategy is correlated to the implementation of a postdates induction policy, which states that only pregnant women who are truly postdates can be induced unless other medical reasons indicate the need for induction. Beyond the effect of the postdates induction policy on rates of labour induction, we recognize that this evaluation of the CARE strategy cannot attribute the change in proportions of CS to individual components of the CARE strategy. Based on the findings of this study and the results of the systematic review by Catling-Paull and colleagues (2011), combining multiple concurrent client, health care provider, and policy-focused interventions appears to be crucial to improve CS rates among low risk pregnant women. The incorporation of multifaceted evidence based practices in CARE and the involvement of key decision makers in all aspects of the implementation might have contributed to the decrease in CS that was experienced.

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Conflict of interest

The authors have no conflicts of interest to declare.

Author contributions

Esther Shoemaker, Ivy Bourgeault, Eileen Hutton and Carol Cameron were responsible for the conception of the study and the research design, and they applied for the research funding.

Esther Shoemaker obtained the data. Esther Shoemaker and Eileen Hutton performed the data analysis. Carol Cameron provided clinical expertise for the analysis. Esther Shoemaker drafted the research report and Ivy Bourgeault, Eileen Hutton and Ian Graham made critical revisions to the manuscript for important intellectual content. Ivy Bourgeault and Eileen Hutton supervised the study.

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CHAPTER 5

INTEGRATED DISCUSSION AND CONCLUSION

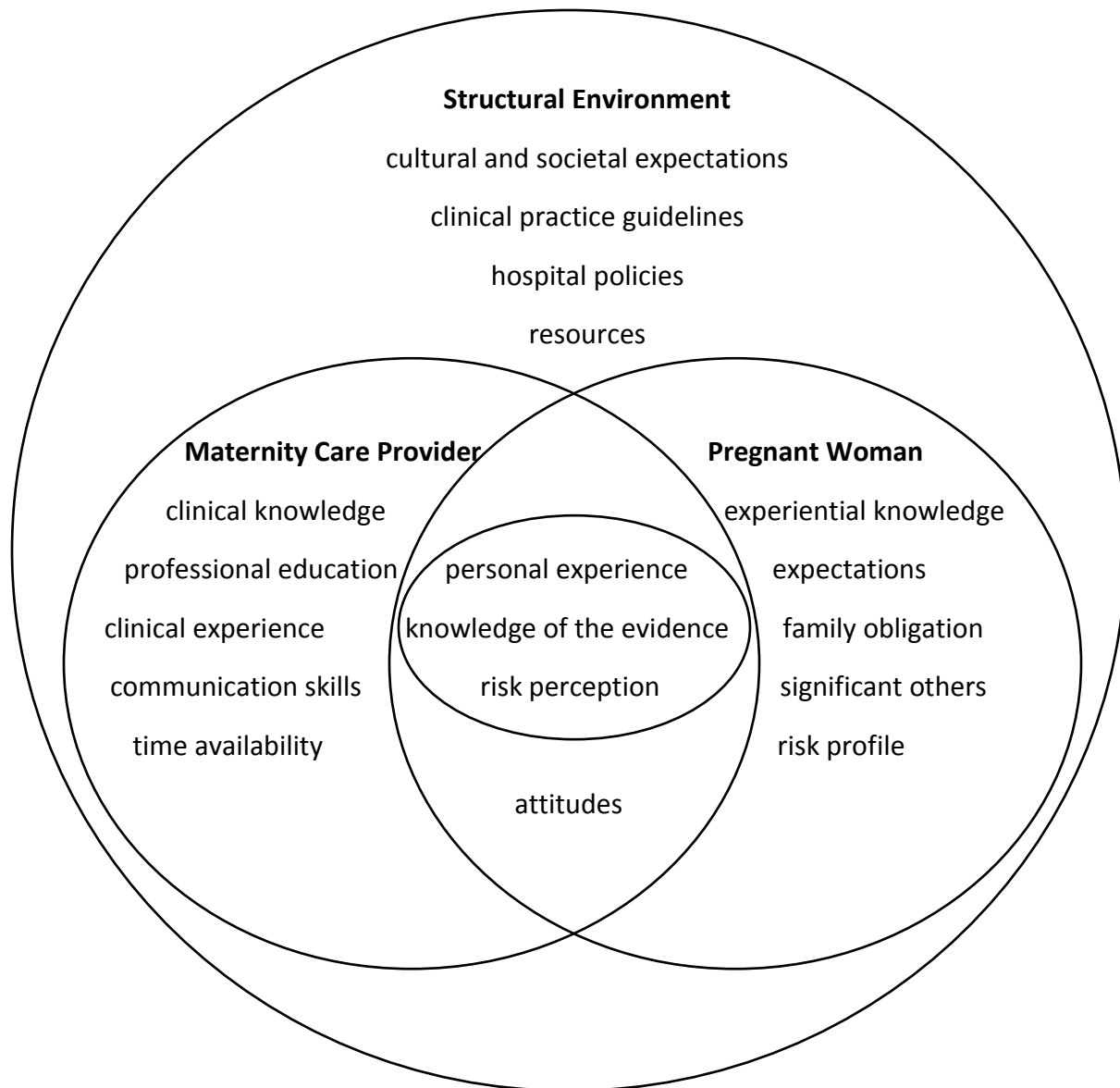
Introduction

In this research, the decision making processes in relation to mode of birth after previous Caesarean section (CS) were studied within a health services perspective; thus, with implications and relevance to Canadian maternity care services. The factors that influence the practices of maternity care providers regarding mode of birth after previous CS were assessed and interpreted in Chapter Two. Depending on their disciplinary background, providers had different perceptions of the safety of birth and different approaches to engage in shared decision making. Providers believed that their client's preference for mode of birth after a previous CS was the most important determinant for the final decision about mode of birth. They remarked that these preferences were influenced by non-medical sources and were often formed prior to their client's pregnancy. In Chapter Three, the decision making processes of pregnant women with a previous CS were explored. Women shared in interviews and surveys during their pregnancy and after their birth that they relied on their experiential knowledge and their provider's clinical expertise to make decisions about mode of birth, which concurs with the assumptions made by some providers in Chapter Two. Women also expressed feeling pressured by obstetrical policies that are not evidence based, such as a scheduled CS date even if they had chosen a vaginal birth after CS (VBAC). In Chapter Four, the CARE strategy, which was intended to decrease proportions of CS and repeat CS was outlined and evaluated and the strategy was found to be associated with a small but significant reduction in proportions of CS.

This chapter introduces and outlines a model for shared decision making regarding mode of birth after a previous CS, which is based on the research findings from the three

inquiries undertaken for the thesis. In addition to the applicability of these findings to health services and policy, the integrated analysis raises sociological questions at a theoretical level: (1) how and why are different types of knowledge applied during the mode of birth after a previous CS decision making processes? and (2) how is risk communicated and balanced in our society in relation to decisions regarding mode of birth after a previous CS? These questions are discussed using a feminist poststructuralist approach that was outlined in Chapter One.

Figure 5.1. Mode of birth after CS shared decision making model.



Integrated discussion

Mode of birth after CS decision

The integrated findings of the research revealed the factors that are ideally taken into consideration during shared decision making and that influence the decision making process regarding mode of birth after a previous CS (see figure 5.1). The shared decision making model that is based on the findings does not only include the interaction between pregnant women and providers but also the structural environment. The context within which the interactions take place can influence the ability and willingness to practice shared decision making (DeMeester *et al.*, 2016). Maternity care providers and pregnant women with a previous CS make decisions within a structural environment that consists of resources, policies, guidelines and expectation of hospitals, professional organizations, and society at large. If and how evidence based practices are implemented is influenced by this structural environment (Moore *et al.*, 2015). At the hospital level, structural factors consist of hospital policies, the institutional practice culture including peer influence, quality improvement strategies such as audit and feedback systems, and the physical environment. The provider-client dyad within the institutional setting of a particular hospital influence how birth is managed and which labour and birth interventions are or are not being implemented (Martin & Kasperski, 2010). Cultural and societal expectations determine how women behave in clinical consultations as a disciplined client and they influence women's acceptance of birth interventions and their risk perceptions (Moore *et al.*, 2014). Pregnant women in this research indicated blogs, websites and discussion groups on the internet as important sources of information about risks and

benefits of VBAC and repeat CS. They were aware of the variable quality of the evidence in these forums, but they learned from it how others in society made similar care decisions and they incorporated the information into their mode of birth considerations. These cultural influences can therefore not be disregarded but ideally must be incorporated into the shared decision making process.

Maternity care providers bring a wealth of clinical experience to the consultation with their pregnant clients (Kaimal & Kuppermann, 2010) in addition to their clinical knowledge that is related to their disciplinary background and the status resulting from their professional education. The time that providers made available for the consultation had an impact. It influenced whether providers and women engaged in a shared decision making process or whether the mode of birth was decided after a one-directional type of information sharing. Ideally, information is shared and discussed bidirectionally and the final decision is made collectively (Moore *et al.*, 2015). Both providers and pregnant women described their attitudes and risk perceptions regarding birth and mode of birth after CS, which appeared to influence the final decisions about mode of birth. Providers were generally in favour of VBAC, but obstetricians perceived birth as more dangerous to mothers and infants than nurses, midwives and family physicians. Women's attitudes were related to participants' personal experiences with birth, their knowledge and interpretation of the evidence, and their risk perception.

The research illustrated the importance of women's experiential knowledge and the influence of significant others when making decisions about mode of birth after a previous CS. Women seek narratives of the experiences and decision strategies of other women with similar

birth histories to navigate their own decisions and to assess their personal risk status, a findings that is supported by research from Collins and Street (2009). Women further described that their decisions about mode of birth were influenced by their personal expectations about their birth experience, their family obligations specifically toward their older child(ren), and their risk profile. All of the women who participated in the research had low risk pregnancies and were deemed to be eligible for a VBAC. Providers revised women's risk profiles upward which resulted in favoring repeat CS when their infants were estimated to be larger towards the end of pregnancy, or when labour had not started on its own prior to the scheduled CS date.

Policy/service implications

Despite high quality practice guidelines advising VBAC for most low risk women, I found that obstetricians, family physicians, midwives and nurses share a preference for VBAC among healthy pregnant women with a previous CS but they have different perspectives on the levels of risks associated with mode of birth. These differences influenced the decision making processes that took place with their clients during consultation. To decrease women's decisional conflict, women ideally receive evidence based and consistent information regarding the benefits and risks of both modes of birth. The CARE strategy used high quality decision aids and the birth options session (see Chapter One for a detailed description) to provide women with this information during their pregnancy. Providers would benefit if such tools were more widely available and women would benefit if they would have access to these tools already immediately after their first CS as their preference for their mode of birth is often already formed before their subsequent pregnancy.

Women have experiential expertise based on their own experiences and those of significant others, which they rely on, in addition to their providers' clinical expertise, to make decisions about mode of birth. Providers believed their clinical expertise is most relevant to women's decisions about mode of birth if it is shared directly after the first CS because during the subsequent pregnancy, many women have already made their decision about how they plan to give birth. Ideally, providers would create space with their clients to discuss their options for future mode of birth after the first CS, while allowing women to discuss their personal experience. To save time and resources, it would be beneficial to create a hospital based online discussion forum where women could receive evidence based information about mode of birth after their first CS, while being able to discuss their questions with other women who share similar experiences and providers.

The high rate of repeat CS in this research appeared to be primarily related to routine clinical practices: newborn weight predictions and scheduled repeat CS for all women. Relying on third trimester ultrasound to predict the weight of the newborn was associated with women having a repeat CS even though it is not an evidence based practice. Strategies to decrease the practice need to be developed after the reasons for the use of these practices has been properly explored. Providers might consider it important to reserve the operating room before 41³ weeks gestation for a woman with a previous CS, but a hospital policy could be implemented that women who decided to have a VBAC are not told a specific CS date until they reach their due date. Further, CS due to suspected fetal macrosomia including the newborns' actual weight could be audited and regularly reported to providers during departmental meetings to raise awareness of the problem among providers and potentially influence

practice. Having a repeat CS was the default mode of birth option, which was a barrier for women to choose a VBAC and to be able to have a trial of VBAC. A repeat CS was scheduled for every woman regardless of her preferred mode of birth, which is not evidence based as it caused anxiety and concerns for women throughout their pregnancy.

In addition to the practical and policy implications of these research findings, they have important theoretical insights. Chapter One outlined the theoretical discussion of knowledge and its connection to power and risk that guided my research interest of mode in birth after a previous CS decision making. This feminist poststructuralist approach is applied to the integrated research findings in the following sections, and it informs the discussions regarding whose knowledge is power, risk perceptions and communication, and control in the face of uncertainty.

Whose knowledge is power

Women are disciplined from an early age how to interact with providers and how to follow their advice (Ells, 2003). Foucault (1977, 1980) referred to discipline as the modern type of power that arose in the beginning of the nineteenth century during a time of intense demographic, social, economic and juridical-political change. Disciplinary power is not attached to any specific institution, but it is comprised of multiple different procedure, instruments, techniques and targets (Foucault, 1977). Its primary function is to train people through a type of surveillance that has become internalized by a specific individual or group. With this internalized set of rules or actions, people do not have to be regulated by an external authority to act appropriately. Instead, people learn to regulate themselves. Pregnant women seek a care

provider for their expertise to improve their chances of a healthy pregnancy and a positive birth outcome. They are disciplined to make decisions in an order that is decided by the provider over the course of the pregnancy. According to Foucault (1977), the medical surveillance that is applied to pregnant women during every clinical encounter can be envisioned as an instrument of disciplinary power.

Women who participated in this research indicated in surveys and interviews during their pregnancy that their health care provider was the most important influence on their decision regarding mode of birth. Other studies have also found that pregnant women rely on their providers to determine their risk status and are receptive to clinical recommendations to reduce any risks (Dahl *et al.*, 2006; Heaman, Gupton & Gregory, 2004). Providers noted that they did not appreciate if their clients included suggestions from non-clinical others about their decisions about mode of birth. Adams and colleagues (2012) found that the majority of clients would ask questions during health care consultation (93.1%), but only few clients (14.0%) would openly disagree with their provider if their personal care preferences conflicted with their provider's recommendation. The study did not solely include maternity care clients, but it illustrated that many clients are worried their provider might regard them as difficult clients if they disagreed, or that the provider-client relationship might be damaged as a result (Adams *et al.*, 2012). If clients are worried to openly communicate their preferred care options, the shared decision making process is compromised.

Health care providers ideally share all important information with their clients to enable them to be active participants in the decision making process. Knowledge of risks and benefits

of different treatment options is a requirement for shared decision making, but it is insufficient informed consent (Stacey *et al.*, 2014; Stacey *et al.*, 2012). While clients themselves often do not recognize the unique expertise that they hold based on personal experiences and those of significant others (Joseph-Williams, Edwards & Elwyn, 2014), many providers in this research tended to disregard the clients' expertise. The interviews with maternity care providers illustrated that they are aware of the important influence women's experiential knowledge has on women's decisions about mode of birth after a previous CS. Rather than incorporating this knowledge into their counselling, they are frustrated by women considering non-medical factors during shared decision making. It is important to recognize that the provision and acquisition of knowledge and the "expectation to contribute personal preferences occur in the context of a power imbalance between the clinician and the patient" (Joseph-Williams, Edwards & Elwyn, 2014: g3178). Foucault (1973) argues that the medical profession monopolizes authoritative knowledge over the birthing process in applying medical intervention. The majority of providers in this research deemed the technological knowledge relevant to decision making while largely ignoring the pregnant woman's experiential knowledge.

Risk perception and communication

Clinical knowledge is used to determine the risk status of a woman's pregnancy and the risk that an undesired outcome might occur. However, a divide exists between the way levels of risk are presented by the experts and how levels of risk are perceived by the public (Leiss, 2004). Good risk communication is intended to reduce that gap. Leiss (2004) proposes that good risk communication includes an interpretation of scientific risk assessments in ways that

are appropriate for non-expert audiences and an understanding of the basis of the non-experts' risk perceptions. I argue in this research that this process requires time because it involves an actual dialogue. While the provider interprets the research evidence for his or her pregnant client and shares the relevant information in a language that is understandable to women who are not clinicians themselves, the women need to be given the possibility to explain their risk perception and the possible sources of their perceptions. Effective risk communication and a true shared decision making can only take place when the consultation incorporates women's perceived risk status both in terms of chances of a successful VBAC and of the risks to herself and her infant after a vaginal birth or a repeat CS. The very small differences in the risks of maternal and neonatal morbidity and mortality between healthy women who plan a VBAC and those who plan a repeat CS becomes clearer when the risks are presented in absolute numbers rather than using ratios (Bickford & Janssen, 2015). Researchers argue that women ideally receive absolute rather than relative risk figures during clinical counselling (Clark et al., 2012), and the majority of Canadian maternity care providers follow this practice (Van Wagner, 2016).

While risk to pregnant women is mainly related to maternal and infant health outcomes, risk for providers also includes the risk of being held liable for undesired outcomes. Physicians in the field of obstetrics and gynaecology are sued more frequently than physicians from other areas (Kane, 2010). They have a higher risk than other kinds of physicians to ever experience being sued and to being sued at least two or more times. They also have the highest number of legal claims per 100 physicians and the highest levels and rates of payouts as client compensations, which include trial awards and payouts as settlements before a trial award (Kane, 2010; Yates, 2012).

Women place great trust in their providers' expert knowledge and the medical technologies available to their providers as protection from risks of undesirable health and birth outcomes during pregnancy and birth (Kringeland & Moller, 2006). From the interviews with women it became apparent that midwifery clients had discussions on the risks and benefits of repeat CS and VBAC at multiple consultations with their providers, while the clients of obstetricians were given the information once during one of the first consultations and then made a decision during that or the subsequent meeting how they plan to give birth. Regardless, all women were knowledgeable of the main benefits and risks related to mode of birth after previous CS. Most women also perceived their individual risk of negative health outcomes, such as uterine rupture, hysterectomy, or death of the mother or infant, to be significantly higher than is known from research evidence. These findings are not paradoxical because women were able to correctly identify the associations between specific health outcomes and mode of birth, but they had problems in identifying numerically the levels of risk and rating their personal risk status for any of the outcomes. Searle (1996) has similarly found that women perceive themselves to be at risk during pregnancy to a degree that is out of proportion to their actual risk.

Health care providers and pregnant women have very different experiences with birth and associated risks. Women have the knowledge of their own birth experience(s) and often those that significant others have shared with them, but that they have likely not observed the risks directly, while care providers have been part of the birth experiences of many women with different outcomes. Information is incorporated differently into the decision making process if it has been experienced by the decision maker directly or has been described by an outsider

(Hertwig *et al.*, 2004). The research findings show that risk statistics are likely judged and interpreted differently by pregnant women and their care providers. Even when providers try to refrain from framing risk information and to present the information without introducing their personal bias and preferences, the way information is presented can impact the final decision (Kaimal & Kuppermann, 2010).

Providers in this research tended to share risk information using pamphlets, or by posting it to the website of their clinic or other web-based resources. They would also either hand their clients decision aids or direct them to a web-based decision aid, and they instructed their clients to bring their questions to their next consultation if questions were to arise. In a systematic review of facilitators and barriers to the clinical implementation of shared decision making, Légaré and colleagues (2008) describe that it is currently not known if shared decision making is actually more time consuming than usual clinical care. However, women under the care of obstetricians described their clinical consultations to have lasted between five and 15 minutes and most of the consultation time was spent with physical check-ups, such as fundal height measurement and listening to the fetal heart. It is likely not possible during such a limited time to have a meaningful dialogue about the women's values regarding risks and birth or the experiences of significant others that might influence her decision. I consider a lack of time to be a major barrier to good risk discussions during consultations. Edwards and Elwyn (2004) found physicians to be very favourable toward learning new and effective risk communication techniques, but they expressed concerns about being able to apply these techniques during the short client consultations. Insufficient consultation time is also cited as a barrier to using decision aids that are intended to improve shared decision making (Edwards *et*

al., 1998). Conversely, longer consultation times improve shared decision making and the satisfaction of clients with the health care decisions made (Edwards *et al.*, 2004).

Control in the face of uncertainty

Another facet that cuts across the chapters was the need for pregnant women and their providers to make care decisions that would provide them with a sense of control. For the women, control was related to their decisions about mode of birth, while providers used ultrasounds to remain in control of women's risk status. In a qualitative study from Australia, women with a previous CS often chose a repeat CS to remain in control in a situation that is otherwise filled with uncertainty, anxiety and fear (Shorten, Shorten, Kennedy, 2014). In this research, the women who chose a CS during their pregnancy also recalled that their decision provided them with some level of certainty that they would not be able to have with a VBAC. Choosing a repeat CS allowed them to know the exact date of the birth and they would know what to expect to happen. The sense of knowing made them feel more in control of the situation and thereby reduced their anxiety. Paradoxically, many women who chose to have a VBAC also appeared to gain control by having made that decision. For them being in control was related to actively giving birth themselves and to being able to recover from birth more quickly and with less pain, which would allow them to return to their own home and their older child(ren) sooner.

Providers scheduled ultrasounds during the third trimester for women who had decided to have a VBAC early in their pregnancy to make predictions on the infants' birth weight. If an infant had a large size estimate, a repeat CS, which represented a change in mode of birth plan,

was recommended to control for an increased risk of uterine rupture and unsuccessful VBAC associated with macrosomic infants. In older studies on women with a previous CS, there were no differences in rates of VBAC success, uterine rupture or maternal and neonatal morbidity between women whose infants were macrosomic at birth and those whose infants were not (Phelan *et al.*, 1984; Flamm & Goings, 1989). More recent studies have come to a different conclusion and found the risk of uterine rupture to be increased with a macrosomic infant (Jastrow *et al.*, 2010; Zelop *et al.*, 2001). However, an infant's predicted weight estimates can be highly inaccurate (Hoopmann *et al.*, 2010); thus, telling pregnant women that their infants might be large increases their anxiety levels unnecessarily. Foucault (1973) teaches us that technologies of power, such as technologies used when establishing the medical gaze, have the potential to influence clients' decisions. Whenever providers use some gazing instrument, such as an ultrasound, some form of diagnosis or treatment follows. Women and infants can be exposed to unnecessary risks through a high use of perinatal interventions when the baby is suspected to be large (Cheng *et al.*, 2015) and expected fetal macrosomia should not be used as a contraindication to a VBAC (SOGC, 2005). The women in this research shared that their providers advised them against a VBAC when their fetus would be potentially larger, which is a practice that is not evidence based and might be a contributing factor to the overall low proportion of VBAC. The difficulty to accurately predict an infant's birth weight needs to be part of the informed choice discussion during clinical consultations (Reid *et al.*, 2014).

Strengths and limitations

A strength of this research was the use of a mixed methods approach to explore the factors that influence proportions of VBAC and decision making processes regarding mode of birth after CS. A systems theory approach was used to develop the research, which allowed for a holistic exploration of the topic and a discussion with relevance and applicability to health services. Further, despite a growing body of knowledge about the efficacy of individual interventions to improve proportions of CS and VBAC for low risk pregnant women (Catling-Paull *et al.*, 2011), the evaluation of the CARE strategy adds to the more limited knowledge of the combined effect of a multifaceted strategy, involving the multiple, concurrent and long-term application of client, care provider and policy focused interventions to curb the use of CS and repeat CS. The involvement of multiple stakeholders during development and implementation was further useful to ensure that the chosen interventions would be well supported by the different maternity care providers. The integrated research results led to recommendations for health policy and services. The discussion of the theoretical issues related to the research findings illustrates the complexity of decisions about mode of birth after a previous CS and highlights reasons for the persistence of high proportions of repeat CS.

There are a number of limitations that have affected this research. First, the hospitals for the research were purposefully sampled and are trying to optimize their proportions of CS and repeat CS. This allowed for an assessment of the CARE strategy and the factors that influenced the decision making processes of maternity care providers and pregnant women within a real practice environment. The hospitals provide privileges to obstetricians, family

physicians, and midwives and the research findings reflect the voices of the research participants working in and being cared for in these hospitals. The findings do not apply with certainty to other providers and clients.

Second, the participants for each of the studies were predominately of higher socioeconomic status, which was related to the communities that the hospitals included in the study serve. The type of engagement and communication between health care providers and clients is potentially influenced by women's educational level, socioeconomic status, values, beliefs and their cultural background (Moore *et al.*, 2015). Therefore, different factors might influence care practices of providers who care for women with a different socioeconomic background. The decision making processes of women who are less affluent or have different educational levels are also potentially different from the sample of women in this research.

Third, the evaluation of the CARE strategy is unable to attribute the changes in the proportions of CS and VBAC among low risk pregnant women to particular components of the CARE strategy because they were not assessed separately.

Fourth, prior to the development and implementation of the CARE strategy, the barriers that prevent providers from adhering to clinical practice guidelines recommendations regarding mode of birth after a previous CS and to practicing evidence based maternity care were not assessed at the innovator hospital, as recommended by Harrison and colleagues (2010) or Gifford and colleagues (2013), who are Canadian experts in knowledge translation and implementation research. A formal audit was conducted by administrators at the hospital to find out which care practices are linked to high proportions of CS. All stakeholders working at

the hospital (administrators, obstetricians, family physicians, midwives, nurses, and pediatricians) were involved in choosing the interventions that constituted the CARE strategy and health researchers were consulted to ensure that the chosen interventions had an evidence base. An assessment of barriers faced by each of the provider groups and pregnant women would have been useful to find out the possible reasons of the high proportions of CS.

Applicability to population health

The quality and safety of maternity care services has an impact on the whole population at the beginning of life. Further, most women will give birth at least once throughout their lifetime (Martinez, Daniels & Chandra, 2012) and their birth experiences can have lasting effects on their health and wellbeing. As outlined in Chapter One, CS are an important intervention that can save lives of mothers and infants, but the use of repeat CS without medical indication can put the health of mothers and their infants at risk. High rates of CS further introduce substantial costs to the health care system. The Agency for Healthcare Research and Quality (2015) reports the costs for maternity care services, which includes the care for women during pregnancy and birth and their newborns, to be the most costly hospital condition. A study by the World Health Organization concluded that for every one percent increase in CS in a developed country, there is an increase of about US\$9.5 million in overall health care expenditures (Villar *et al.*, 2006). The clinical risks associated with high rates of repeat CS and the increased economic burden on the healthcare system represent a population health problem that is socially important and timely.

Future research

A number of questions emerged from this research, which could be applied to future research projects. First, maternity care providers from different disciplines (obstetricians, family physicians, midwives, and nurses) had different perception of the risk of birth to women and infants. Future research should explore if and how providers' perceptions influence their presentation of risks and benefits during the consultation with their pregnant clients and how this consultation process might influence women's decisions about mode of birth. Observations of the consultations would be useful in combination with surveys at multiple time points throughout pregnancy and after birth to assess providers' and clients' risk perceptions and preferences for mode of birth.

Second, health care providers identified that many pregnant women with a previous CS have already decided on their mode of birth prior to their first consultation. A future research project could study the implementation of a policy that all women are debriefed with consistent and evidence based information on their future options for mode of birth after their first CS and before they leave the hospital. It would be interesting to follow the women longitudinally to explore if and how such a debriefing process influences their decisions about mode of birth.

Third, I identified two barriers to women choosing a VBAC and being able to have a trial of VBAC and their effect on proportions of VBAC remains to be explored in future research projects. A policy could be implemented and evaluated to find out if eliminating the practice of scheduling a repeat CS for low risk pregnant woman who have chosen a VBAC has an impact on

proportions of VBAC. Further, it remains to be explored at a larger scale if proportions of VBAC could be improved by eliminating routine third trimester newborn weight predictions.

Fourth, the CARE strategy produced a small improvement in proportions of CS in Robson groups 1, 2a, and 5. It remains to be evaluated whether the strategy can be sustained over a longer time period, which can be assessed in regular intervals using data from the BORN database to track the proportion of CS, and by interviewing providers about which components of the strategy remain in place. Future research could also evaluate whether the strategy can be successfully adopted by different types of hospitals with and without privileges for midwives, by randomly assigning hospitals to adopt the CARE strategy and evaluating the effect on proportions of CS. A cost effectiveness analysis would be also useful to study whether the implementation of the CARE strategy led to significant cost savings for the hospital.

Conclusion

The surveys and interviews with maternity care providers and pregnant women illustrate an intent by both parties to participate in decision making. A lack of time during consultation was identified as a major barrier inhibiting shared decision making, specifically among clients of obstetricians. Other barriers included obstetric reliance on processes such as fetal weight predictions in the third trimester and scheduling a CS regardless of the mode of birth decision. The birth attitudes and risk perceptions of maternity care providers and pregnant women play important roles in the decision making processes regarding mode of birth after previous CS. Ideally, providers acknowledge that they have a strong influence on women's

decisions, even if women appear to have made a decision prior to their first consultation. A true shared decision making process addresses the power imbalance between providers and women through an incorporation of the clinical expertise of providers and the experiential expertise of pregnant women before reaching a decision about mode of birth. The findings further reveal that a multi-level hospital based strategy is associated with improvements in proportions of CS and VBAC among low risk women.

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Appendix A

Patient Decision Aid for Birth after Previous CS

If you had a cesarean birth before...

Should you plan a cesarean birth or a vaginal birth?

A decision aid to prepare you to discuss the options with your health care team

This decision aid is for you if:

- You had a cesarean birth before
- For this pregnancy, your doctor thinks that either cesarean birth or vaginal birth are medically reasonable options

What are the options?

- **Plan a Cesarean birth.** You and your doctor agree that you will have an operation (surgery) that removes the baby from the uterus (womb) through an incision (cut) in your abdomen.
- **Plan a vaginal birth.** You and your doctor agree that you will try going into labour and giving birth to the baby through your vagina (vaginal birth).

Are there other things about you that may affect your options?

How many cesarean births have you had?

- one
- two or more → normally not advised to have a vaginal birth

Do you plan to have more children in the future?

- unsure
- no
- yes → how many? _____

Discuss with your doctor:

- The reasons why you had a previous cesarean
- How your answers to these questions affect your options and the benefits/risks that are presented on the next page.

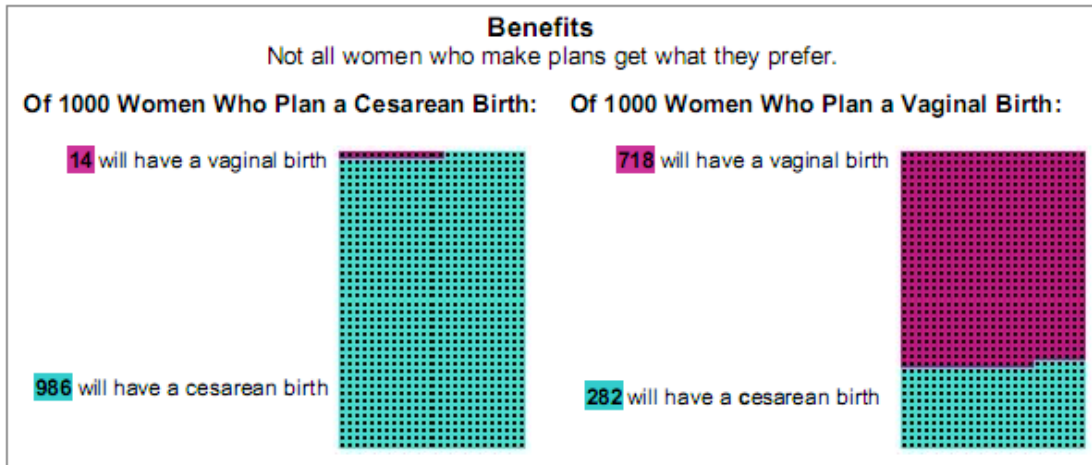
Working through the 3 steps of this decision aid may help you decide.

- Step 1: Think about the benefits and risks of each option.
- Step 2: Find out what else you need to prepare for decision-making.
- Step 3: Plan the next steps.

Step 1: Think about the benefits and risks of each option.

What does the research show?

Blocks of 1000 dots show the 'best estimate' of what happens in **1000 births** when different options are chosen. Each dot (•) stands for one birth. There is no way of knowing what will happen to you.



<p>Other very small risks 2 out of 20,000 mothers die 19,998 out of 20,000 mothers live</p>	<p>Other very small risks 1 out of 20,000 mothers die 19,999 out of 20,000 mothers live</p>
<p>*Note 10 out of 20,000 babies die</p>	<p>29 out of 20,000 babies die</p>

In the balance scale below, think about the benefits and risks of each option.

Review the common reasons to choose each option. Add any other reasons that matter to you. Show how much each reason matters to you. Circle one (★) star if it matters a little and up to five (★★★★★) stars if it matters a lot. Circle no stars if it does not matter.

Reasons to...			
Plan a Cesarean birth	How much does it matter to you?	Plan a vaginal birth	How much does it matter to you?
You have a <u>smaller</u> chance of having a <u>tear in the uterus</u> , resulting in an urgent cesarean birth.	★★★★★	You have a <u>bigger</u> chance of having a <u>vaginal birth</u> .	★★★★★
You have a <u>smaller</u> chance of losing the baby.	★★★★★	You may have an easier recovery, have less pain after the birth, and shorter stay in the hospital.	★★★★★
You know the date the baby will be born.	★★★★★	You have a <u>smaller</u> chance of complications such as infection, injury, blood clots, needing a hysterectomy, and death.	★★★★★
Other reasons:	★★★★★	Other reasons:	★★★★★

Which option do you prefer? Check one.

- I prefer to **plan a Cesarean birth**. The reasons to choose this option are more important to me than the other option.
 I'm not sure
 I prefer to **plan a vaginal birth**. The reasons to choose this option are more important to me than the other option.

Step 2: Find out what else you need to prepare you for decision making.

Knowledge



Find out how well this decision aid helped you learn the key facts.

Check the best answer. See how you did by checking answers at bottom of page.

	Vaginal Birth	Cesarean Birth	Both are equal	I am unsure
1. Which option has a higher chance of <u>tearing the uterus</u> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Which option has a higher chance of <u>infection, injury, blood clots, or hysterectomy</u> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Which option has a higher chance of <u>shorter recovery with less pain after the birth</u> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Which option has a higher chance of <u>losing the baby</u> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you know which options are available to you? Yes No

Do you know **both** the benefits and risks of each option? Yes No

Values



Are you clear about which benefits and risks **matter most** to you? Yes No

Support



Do you have enough support and advice from others to make a choice? Yes No

Are you choosing without pressure from others? Yes No

Certainty



Do you feel sure about the best choice for you? Yes No

Step 3: Plan the next steps

List your plans, for example, show your balance scale to your doctor and family; learn more about the options.

This information is not intended to replace the advice of a doctor.

Answers to questions about key facts 1. Vaginal birth 2. Cesarean birth 3. Vaginal birth 4. Vaginal birth

Authors and Editors: J Brownlee, M Walker, C Nimrod, Q Yang, S Wen, S Caughey, L Oppenheimer, K Eden & OHSU Evidence-based Practice Center, A O'Connor, S Khangura, C Bennett, A Saarimaki

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For more information on this and other decision aids, visit <http://decisionaid.ohri.ca>

HEALTH CARE PROVIDER SURVEY

Hospital Site: XXX XXX

Date of Survey Completion: _____ (day/month/year)

Study Information

Principal Investigators: Esther Shoemaker, University of Ottawa

 Dr. Ivy Bourgeault, University of Ottawa

We are asking for your voluntary participation in this survey, which is part of a larger study at XXX Hospital and XXX Hospital. Our study explores the influences on decisions about labour and birth for women who have given birth at XXX Hospital or XXX Hospital. If you agree to participate, we would be grateful if you would take the time to complete the following questionnaire, which will take approximately fifteen minutes. Your participation is entirely voluntary, and there will be no impact on your professional status at your workplace if you choose not to participate. Your confidentiality will be maintained by the research team at all times.

If you have any questions or concerns about the project please contact:

Esther Shoemaker (Principal Investigator); (xxx) xxx-xxxx; xxx@uottawa.ca **OR**

Ivy Bourgeault (PhD supervisor); (xxx)xxx-xxxx x.xxxx; xxx@uOttawa.ca

By completing this survey you agree that you understand the information in the attached consent form and that you agree to participate in this study.

This section pertains to demographic information.

1) **Name:** _____

2) **Gender:**

- Male
- Female

3) Age: _____ years old

4) I practice as:

- An obstetrician
- A family physician
- A midwife
- A nurse

5) I am married or in a common-law relationship.

- Yes
- No

6) My ethnicity (e.g. Chinese, Caucasian, East Indian) is:

7) I or my partner (present or previous) have ever given birth.

- Yes
- No

8) I have been working in my profession for: _____ years

9) Currently, I provide the following maternity care services: (Check all that apply)

- Antenatal care
- Intrapartum care
- Postnatal care
- None

10) Regarding intrapartum care, my status is:

- I see myself continuing to provide intrapartum care during the next five years.
- I see myself stopping the provision of intrapartum care during the next five years.

11) I have been providing or did provide intrapartum care for: _____ years

12) I have been motivated to provide intrapartum care by the following factors: (Check all that apply)

- I value(d) the particular relationships that develop(ed) with patient/family around birth.
- I have/had managed the balance between providing intrapartum care and my personal life.
- I feel/felt committed to provide this service to my community.
- In my setting/situation, it is/was not possible to practice without attending deliveries.

- If I give/gave up intrapartum maternity care, I would feel/have felt that I have abandoned my patients.
- I believe(d) attending births is/was a rare privilege.
- I enjoy(ed) the challenge of maternity care.
- Attending births is/was a central part of who I am.
- I enjoy(ed) supporting women in labour.
- I believe(d) that rescuing a fetus in a crisis is one of the most satisfying things that I do/did.
- I like(d) dealing with the unexpected.
- I feel/felt strongly motivated to work in Women's Health.
- I like(d) providing service to healthy young people.
- It is/was an important way of building my practice.
- Other; please specify:
-

13) I am paid for my clinical practice:

- Predominately fee-for-service
- Predominately other arrangements

14) Approximately how many births did I attend in the last 3 months?

_____ births

15) My proportion of Caesarean sections among all births I attended in the past three months were approximately (in %):

_____ %

16) My proportion of trial of labour among all births of women with a previous Caesarean section I attended in the past three months were (in %):

_____ %

17) I have been sued by a patient (or her family) in the past?

- Yes
- NO

18) If I or my partner were pregnant today, with an apparently normal pregnancy, who would you prefer to deliver my baby? (Check only one)

- An obstetrician
- A family physician
- A midwife

This section contains questions pertaining to your opinions/beliefs about maternity care. Make your choice by selecting the box from the scale that most accurately represents your opinion.

(The scale ranges from strongly disagree to strongly agree).

19) General opinions

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	If a woman has had a previous Caesarean section, a scheduled repeat Caesarean section can improve newborn outcome.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	If a woman has had a previous Caesarean section, a scheduled repeat Caesarean section reduces the chance of litigation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	For health care providers, a full discussion with a woman about the risks and benefits of vaginal birth after Caesarean section (VBAC) versus elective Caesarean section is too time-consuming during an office visit(s).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Childbirth can only be considered normal in retrospect.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	The most important determinant of a successful birth is the woman's own confidence in her ability to give birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f.	Home birth is more dangerous than hospital birth, even in an uncomplicated pregnancy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g.	If available, for women at no apparent risk, out-of-hospital birth centres can provide safe maternity care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h.	Obstetricians should restrict their care only to high risk or complicated pregnancies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i.	I support licensed/regulated midwifery services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j.	A woman's history of sexual abuse can have an important impact on the course of her labour and birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k.	Childbirth usually requires medical intervention.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l.	Women who want a Caesarean section in the absence of a medical indication should have to pay for it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m.	For a woman, having a vaginal birth is a more empowering experience than delivering by Caesarean section.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n.	It is a woman's right to choose a Caesarean section for herself, even in the absence of medical indication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o.	Where feasible, the head of maternity care services should be an obstetrician.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
p.	The long-term pelvic floor outcomes of physiologically managed birth (for example use of non-lithotomy positions, avoidance of prolonged closed-glottis pushing in the second stage, and limiting episiotomy) will likely be better than elective Caesarean section.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

q.	For singleton term frank breech, women should be offered the choice of a vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
r.	Attempted external cephalic version for a breech presentation near term should be the norm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
s.	When a woman is in labour, the safest place for her to be is in the hospital.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
t.	“Active management of labour” improves birth outcomes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
u.	Women who deliver their baby by Caesarean section miss an important life experience.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v.	Women should be encouraged to develop a birth plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
w.	Vaginal birth enhances child brain development.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
x.	There is a need for doula services in maternity care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
y.	In my practice, doulas are welcome.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20) Routine use of continuous fetal monitoring (EFM):

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	Provides important benefits for the fetus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Reduces the chance of litigation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Is a good strategy for reducing obstetrician workload.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21) Caesarean Section:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	Prevents urinary incontinence.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Prevents sexual dysfunction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Is more convenient for women.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Is more convenient for physicians.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Is more convenient for nurses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f.	Helps women to regain their pre-pregnancy shape.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g.	Costs more for the health care system than vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h.	Is safer for the baby than vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i.	Is as safe as vaginal birth for women.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j.	Is like any other birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22) Mode of birth:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	If my partner or I were pregnant with an apparently normal pregnancy, I would prefer an elective Caesarean section instead of a vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	I fear vaginal birth for myself or my partner as it may compromise sexual functioning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	I fear vaginal birth for myself or my partner as it may lead to urinary incontinence.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	I fear vaginal birth for myself or my partner as it may lead to fecal or flatal incontinence.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

e.	Because of the unpredictability of vaginal birth, I would prefer a scheduled Caesarean section for myself or my partner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f.	I fear vaginal birth for myself or my partner as it could lead to perineal and/or pelvic floor damage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23) Important reasons for the rising Caesarean section rate in Canada include:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	The perception of women that elective Caesarean section is safer for the baby than planned vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	The perception of women that elective caesarean section is safer for themselves than planned vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	The perception of physicians that elective Caesarean section reduces liability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	The perception of women that elective Caesarean section is less painful than vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Changing population characteristics (such as increases in mother's age and increases in obesity) among pregnant women.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f.	Early hospital admissions before the start of the active phase of labour.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g.	Increasing interventions by professionals (e.g. induction, continuous electronic fetal monitoring, etc).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Any other reason(s) for the rising Caesarean section rate in Canada:

24) Important approaches to reducing the Caesarean section rate include:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	Changing medical and nursing education to encourage more positive attitudes toward vaginal birth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Increasing the use of oxytocin to augment labour dystocia.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Organized pre-Caesarean section peer review of all elective Caesarean sections.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Organized "after the fact" formal peer review of all Caesarean sections.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Monthly reporting of all providers' Caesarean section rates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g.	Reducing the use of routine electronic fetal monitoring (EFM).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h.	Encouraging trial of labour for women with a previous Caesarean section.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

i.	Reducing the number of inductions of labour for non-compelling reasons.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j.	Increasing the number of nursing staff in order to provide one to one care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k.	Using decision trees/check lists when caring for women during the second stage of labour.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l.	Admitting women to the unit only in active labour.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m.	Encouraging more family physicians to provide intrapartum maternity care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Any other approach(es):

25) When a woman has had a previous Caesarean section and has no recurring indication, most of the time, my preferred approach is to: (Check only one)

- Recommend a vaginal birth after caesarean section (VBAC).
- Recommend a scheduled caesarean section..
- Follow the mother's request.

26) In the management of an uncomplicated post term pregnancy (e.g. normal amniotic fluid) at or after 41 and 3/7 weeks, most of the time, I prefer: (Check only one)

- Expectant management (wait for spontaneous onset of labour while providing antenatal fetal surveillance).
- Elective induction.
- Following the mother's request.

27) Overall, I think the current Caesarean section rate in Canada is: (Check only one)

- About right
- Low
- High

28) Overall, I think the current vaginal birth after Caesarean (VBAC) rate in Canada is:

(Check only one)

- About right
- Low
- High

29) Considering maternity care in Canada, in general, what is the overall risk of childbirth to the health of the mother?
(Given the scale below, check one box: one as completely safe and ten as completely dangerous)

1 2 3 4 5 6 7 8 9 10

30) Considering maternity care in Canada, in general, what is the overall risk of childbirth to the health of the fetus?
(Given the scale below, check one box: one as completely safe and ten as completely dangerous)

1 2 3 4 5 6 7 8 9 10

31) We will be conducting interviews with patients from XXX Hospital and XXX Hospital. We would like to be able to link the responses you have provided us with in this survey with patients' responses. During the patient interviews, we will ask patients for the name of their care provider(s) during labour and birth. We will not share any of your responses with patients, and we will not share patients' responses with care providers. We will protect your confidentiality at all times.

Yes, I consent to have my responses confidentially linked to those of my patients.

Name: _____

No, please do not link my responses.

32) I am willing to be contacted by Esther Shoemaker to ask me if I am interested in participating in a brief interview. The interview will be conducted over the phone (if possible) and will last approximately 15 to 30 minutes during which I would be asked questions about my experiences counselling women who have had a Caesarean section in the past. I will be provided with further information about the study and the interview before scheduling an appointment.

Yes, I consent to be contacted by Esther Shoemaker. I understand that I may revoke this consent to be contacted at any time.

Name: _____

Telephone: _____ E-mail: _____

No, please do not contact me.

Appendix C

Interview Guide (Health Care Providers)

Introduction

Thank you for having answered the online survey and for agreeing to participate in this interview.

In 2010, XXX Hospital started to implement a range of evidence-based interventions, with the long term goals of reducing their C-section rate by 5%. The strategy has been called CARE. Important components of the strategy are the audit and feedback system and the Birth Options after Caesarean Section session that runs monthly and informs women who are eligible for VBAC about the evidence on VBAC and on elective repeat CS.

For the implementation hospital: A slight modification of this strategy is currently being implemented at XXX Hospital.

The purpose of this interview is to hear your opinion and thoughts about the audit and feedback system and the Birth Options sessions, the need for these sessions, and the impact of the intervention on your clinical practice.

Please be advised that you may choose not to answer questions and you may withdraw from the study at any point. Your participation in this interview will not affect your work at XXX/XXX in any way and any answers you provide will be held strictly confidential. If you have any questions or concerns, please do not hesitate to ask as we go along.

Background Information

- 1) What is your occupational role at the hospital?
- 2) What is your role within the CARE strategy, if at all?

VBAC

- 3) Do you believe that increasing VBAC rates is a necessity? Please explain.
- 4) What do you believe would be an appropriate target for the VBAC attempt rate?
 - a. For your hospital
 - b. For the province
- 5) What influences do you feel are responsible for the low VBAC rates?
 - a. Pregnant women's demographics (age, weight)

- b. Legal
 - c. Risk for mother
 - d. Risk for newborn
 - e. Pay structure
 - f. Controlled environment
- 6) How do you and your patients, who have had a CS in the past, make decisions about their birth?
- 7) What is your opinion about the audit and feedback system?
- 8) How do you feel about the Birth Options after CS sessions? Please explain.
- 9) Do you think that the sessions have a positive influence on VBAC rates?
- 10) Do you send your patients to these sessions? Please share your reasons for (not) sending them.
- 11) If sending patients, how do your patients react to the sessions?
- 12) Do the sessions affect your clinical practice? Please explain.
- a. Do you feel that your patients are better informed?
- 13) How could the sessions be improved, if at all?
- a. Offered by a different provider
 - b. Offered in a different format
 - c. Offered at a different time of the day
 - d. Offered at a different place
- 14) How are the sessions perceived within the unit?
- 15) These were all of my questions, thank you very much for having taken the time to talk to me! Is there anything else you would like to add that I didn't ask?

Appendix D

Knowledge

What I know about options for the upcoming birth of my child

We would like to know how much you know about your options regarding the upcoming birth of your child. This is not intended as a quiz, but is meant to assess your level of knowledge about the options available to you when planning the birth.

Below are some statements about options for your birth plans. Please mark if you think they are true, false, or you are not sure by circling your answer.

- 1 Do you know what options are available to you regarding your plans for the birth of your child?**
- No Yes
- 2 Do you know both the benefits and risks of each option?** Yes No
- 3 Planning a vaginal birth involves:**
- | | | | |
|--|------|-------|--------|
| Having a discussion with your health care provider | True | False | Unsure |
| Scheduling the day that your baby will be born | True | False | |
| Unsure | | | |
| Giving birth to the baby through your vagina | True | False | |
| Unsure | | | |
- 4. Planning a cesarean birth involves:**
- | | | | |
|--|------|-------|--------|
| Having a discussion with your health care provider | True | False | Unsure |
| Scheduling the day that your baby will be born | True | False | |
| Unsure | | | |
| An operation (abdominal surgery) | True | False | Unsure |

5. Check the best answer in response to the following questions:

	Vaginal birth	Cesarean birth	Both are equal	I am unsure
Which option has a higher chance of tearing the uterus?				
Which option has a higher chance of infection, injury, or blood clots?				
Which option has a higher chance of hysterectomy (surgery to remove the uterus)?				
Which option has a higher chance of losing the baby?				
Which option has a higher chance of shorter recovery after the birth?				
Which option has a lower chance of pain after the birth?				
Which option allows you to schedule the day your baby is born?				

Choice Predisposition and Decision

A My opinion about birth options after cesarean

We would like to know what your opinion is about your birth options at present.

If your health care provider asked you right now to make a choice about your plan for the birth of your child, please show where you would be on the scale below by placing a check mark in

one of the boxes. Show how strongly you feel about your choice by where you place the check mark.

- If you definitely prefer to plan a cesarean birth, check the box far to the right.
- If you definitely prefer to plan a vaginal birth, check the box far to the left.
- If you are uncertain, check the centre box

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

I prefer to plan a vaginal birth

I am uncertain

I prefer to plan a cesarean birth

B Now that you have had a chance to consider your options for your plans for the birth of your baby, which choice looks the best to you?

I prefer to plan a vaginal birth

Why did you make this choice?

I prefer to plan a cesarean birth

Why did you make this choice?

I'm not sure

Why did you make this choice?

Decisional Conflict

Decisional Conflict Scale - SURE Test

Regarding your choice about planning a vaginal or cesarean birth, please respond to the following questions:

		Yes	No
Sure of myself	Do you feel SURE about the best choice for you?		
Understanding information	Do you know the benefits and risks of each option?		
Risk-benefit ratio	Are you clear about which benefits and risks matter most to you?		
Encouragement	Do you have enough support and advice to make a choice?		

The SURE Test © O'Connor and Légaré, 2008

Self-Efficacy

My confidence in making an informed choice

Below are listed some things involved in making an informed choice about your options for birth. Please show how confident you feel in doing these things by circling the number from 0 (not at all confident) to 4 (very confident) for each item listed below.

I feel **confident** that I can:

- | | | | | | | | |
|--|-----------------------------|---|---|---|---|---|-----------------------|
| 1. Get the facts about the birth options available to me | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 2. Get the facts about the benefits of each option | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 3. Get the facts about the risks and side effects of each option | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 4. Understand the information enough to be able to make a choice | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 5. Ask questions without feeling dumb | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 6. Express my concerns about each option | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 7. Ask for advice | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 8. Figure out the choice that best suits me | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 9. Handle unwanted pressure from others in making my choice | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |
| 10. Let my health care provider know what's best for me | not at all confident | 0 | 1 | 2 | 3 | 4 | very confident |

Preparation for decision making

Please indicate your opinion about the effect of the Birth Options After Cesarean Session by circling the appropriate number to show the extent to which you agree with each statement regarding your decision to plan a vaginal or cesarean birth.

		Not at all	A little	Some- what	Quite a bit	A great deal
Did this session . . .						
1.	Help you recognize that a decision needs to be made?	1	2	3	4	5
2.	Prepare you to make a better decision?	1	2	3	4	5
3.	Help you think about the pros and cons of each option?	1	2	3	4	5
4.	Help you think about which pros and cons are most important?	1	2	3	4	5
5.	Help you know that the decision depends on what matters most to you?	1	2	3	4	5
6.	Help you organize your own thoughts about the decision?	1	2	3	4	5
7.	Help you think about how involved you want to be in this decision?	1	2	3	4	5
8.	Help you identify questions you want to ask your health care provider?	1	2	3	4	5
9.	Prepare you to talk to your health care provider about what matters most to you?	1	2	3	4	5
10.	Prepare you for a follow-up visit with your health care provider?	1	2	3	4	5

Preparation for Decision Making Scale © ID Graham, AM O'Connor 1996, revised 2005 University of Ottawa

10. How important is the benefit (pro) of lowering the risk of losing your baby by planning a cesarean birth?

0	1	2	3	4	5	6	7	8	9	10
not at all								extremely		
important to me								important to me		

11. How important is the risk (con) of having a longer recovery and more pain after birth by planning a cesarean birth?

0	1	2	3	4	5	6	7	8	9	10
not at all								extremely		
important to me								important to me		

12. How important is the risk (con) of experiencing complications such as infection, injury, blood clots, needing a hysterectomy, and death, by planning a cesarean birth?

0	1	2	3	4	5	6	7	8	9	10
not at all								extremely		
important to me								important to me		

13. What other reasons are important to you when thinking about planning a repeat cesarean birth? (please specify any factors you have considered and rate their importance to you)

a) _____	0	1	2	3	4	5	6	7	8	9	10
b) _____	0	1	2	3	4	5	6	7	8	9	10
c) _____	0	1	2	3	4	5	6	7	8	9	10
not at all								extremely			
important to me								important to me			

Realistic Expectations

A. My chances of negative health effects when having a repeat Cesarean birth

We are interested in your opinion about your chances of negative health effects when having a repeat Cesarean (C-section) birth.

1. Uterine Rupture (a tearing uterus)

1. Do you consider yourself to be: (Check one box)

- lower risk** for uterine rupture during repeat Cesarean birth?
- moderate risk** for uterine rupture during repeat Cesarean birth?
- higher risk** for uterine rupture during repeat Cesarean birth?

2. Out of **1000** women like you, how many will have uterine rupture during repeat Cesarean birth? Check one box:

- I don't know
- 0** women out of **1000** Nobody like me will have uterine rupture during repeat Cesarean birth
- 1-10** women out of **1000**
- 10-19** women out of **1000**
- 20-29** women out of **1000**
- 30-39** women out of **1000**
- 40-49** women out of **1000**
- 50-99** women out of **1000**
- 100-149** women out of **1000**
- 150-199** women out of **1000**
- 200-249** women out of **1000**
- 250-299** women out of **1000** One quarter of women like me will have uterine rupture during repeat Cesarean birth
- 300-399** women out of **1000**
- 400-499** women out of **1000**
- 500-599** women out of **1000** Half of women like me will have uterine rupture during repeat Cesarean birth
- 600-699** women out of **1000**
- 700-799** women out of **1000** Three quarters of women like me will have uterine rupture during repeat Cesarean birth
- 800-899** women out of **1000**
- 900-999** women out of **1000**
- 1000** women out of **1000** Everybody like me will have uterine rupture during repeat Cesarean birth

2. Infection, injury, or blood clots

1. Do you consider yourself to be: (Check one box)
 - lower risk** for infection, injury, or blood clots during repeat Cesarean birth?
 - moderate risk** for infection, injury, or blood clots during repeat Cesarean birth?
 - higher risk** for infection, injury, or blood clots during repeat Cesarean birth?
2. Out of **1000** women like you, how many will have infection, injury, or blood clots during repeat Cesarean birth? Check one box:
 - I don't know
 - 0** women out of **1000** Nobody like me will have infection, injury, or blood clots during repeat Cesarean birth
 - 1-10** women out of **1000**
 - 10-19** women out of **1000**
 - 20-29** women out of **1000**
 - 30-39** women out of **1000**
 - 40-49** women out of **1000**
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 - 800-899** women out of **1000**
 - 900-999** women out of **1000**
 - 1000** women out of **1000** Everybody like me will have infection, injury, or blood clots during repeat Cesarean birth

3. Hysterectomy (surgery to remove the uterus)

1. Do you consider yourself to be: (Check one box)
 - lower risk** for hysterectomy during repeat Cesarean birth?
 - moderate risk** for hysterectomy during repeat Cesarean birth?
 - higher risk** for hysterectomy during repeat Cesarean birth?

2. Out of **1000** women like you, how many will have for hysterectomy during repeat Cesarean birth? Check one box:
 - I don't know
 - 0** women out of **1000** Nobody like me will have for hysterectomy during repeat Cesarean birth
 - 1-10** women out of **1000**
 - 10-19** women out of **1000**
 - 20-29** women out of **1000**
 - 30-39** women out of **1000**
 - 40-49** women out of **1000**
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 - 900-999** women out of **1000**
 - 1000** women out of **1000** Everybody like me will have for hysterectomy during repeat Cesarean birth

Thinking about chances, what do the numbers mean?

In the following questions, you will be asked to give your opinion about the chances of death during repeat Cesarean section birth. We are considering the chance of death out of a specific number of women having repeat Cesarean section births.

For example:

Chance of death ----- For comparison, this is like one women having a repeat Cesarean birth in a place the size of:

- One in ten million women ----- Ontario (**extremely small chance**)
- One in a million women ----- Ottawa-Gatineau
- One in five hundred thousand women----- All Anglophones in Ottawa
- One in a hundred thousand women ----- A large city such as Kanata
- One in fifty thousand women ----- A city such as Gloucester
- One in twenty-five thousand women ----- A large sports stadium
- One in ten thousand women ----- A town such as Carleton Place
- One in a thousand women ----- A village such as Carp
- One in a hundred women ----- A movie theatre crowd
- One in ten women ----- A sports team (**very large chance**)

In other words:

“one in a million” is a **very low chance** (it is not very likely to happen)
and
“one in ten” is a **very high chance** (it is very likely to happen)

4. Losing the baby

Considering the examples listed above, please **write in your answer** and **place a check** in the box next to the closet category

1. If I choose to have a repeat Cesarean section birth, my chance of losing the baby is:

_____ (Please fill in.)

2. This is closet to (check one box):

- one in ten million Extremely small chance
- one in a million
- one in five hundred thousand
- one in one hundred thousand
- one in fifty thousand
- one in ten thousand
- one in a thousand

- one in a hundred
- one in ten Very large chance
- I have no idea of the chance

4. Mother dies during childbirth

Considering the examples listed above, please **write in your answer** and **place a check** in the box next to the closest category

1. If I choose to have a repeat Cesarean section birth, my chance of dying is:

_____ (Please fill in.)

2. This is closest to (check one box):

- one in ten million Extremely small chance
- one in a million
- one in five hundred thousand
- one in one hundred thousand
- one in fifty thousand
- one in ten thousand
- one in a thousand
- one in a hundred
- one in ten Very large chance
- I have no idea of the chance

B. My chances of negative health effects when having a vaginal birth (VBAC)

We are interested in your opinion about your chances of negative health effects when having a vaginal birth after having experienced a previous Cesarean section birth (VBAC).

1. Uterine Rupture (a tearing uterus)

1. Do you consider yourself to be: (Check one box)

- lower risk** for uterine rupture during vaginal birth?
- moderate risk** for uterine rupture during vaginal birth?
- higher risk** for uterine rupture during vaginal birth?

2. Out of **1000** women like you, how many will have uterine rupture during vaginal birth?

Check one box:

- I don't know
- 0** women out of **1000** Nobody like me will have uterine rupture during vaginal birth
- 1-10** women out of **1000**
- 10-19** women out of **1000**
- 20-29** women out of **1000**
- 30-39** women out of **1000**
- 40-49** women out of **1000**
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- 700-799** women out of **1000** Three quarters of women like me will have uterine rupture during vaginal birth
- 800-899** women out of **1000**
- 900-999** women out of **1000**
- 1000** women out of **1000** Everybody like me will have uterine rupture during vaginal birth

2. Infection, injury, or blood clots

1. Do you consider yourself to be: (Check one box)
 - lower risk** for infection, injury, or blood clots during vaginal birth?
 - moderate risk** for infection, injury, or blood clots during vaginal birth?
 - higher risk** for infection, injury, or blood clots during vaginal birth?

2. Out of **1000** women like you, how many will have infection, injury, or blood clots during vaginal birth? Check one box:
 - I don't know
 - 0** women out of **1000** Nobody like me will have infection, injury, or blood clots during vaginal birth
 - 1-10** women out of **1000**
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 - 1000** women out of **1000** Everybody like me will have infection, injury, or blood clots during vaginal birth

3. Hysterectomy (surgery to remove the uterus)

1. Do you consider yourself to be: (Check one box)

- lower risk** for hysterectomy during vaginal birth?
- moderate risk** for hysterectomy during vaginal birth?
- higher risk** for hysterectomy during vaginal birth?

2. Out of **1000** women like you, how many will have for hysterectomy during vaginal birth?

Check one box:

- I don't know
- 0** women out of **1000** Nobody like me will have for hysterectomy during vaginal birth
- 1-10** women out of **1000**
- 10-19** women out of **1000**
- 20-29** women out of **1000**
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- 800-899** women out of **1000**
- 900-999** women out of **1000**
- 1000** women out of **1000** Everybody like me will have for hysterectomy during vaginal birth

Thinking about chances, what do the numbers mean?

In the following questions, you will be asked to give your opinion about the chances of death during repeat Cesarean section birth. We are considering the chance of death out of a specific number of women having repeat Cesarean section births.

For example:

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- One in a hundred women ----- A movie theatre crowd
- One in ten women ----- A sports team (**very large chance**)

In other words:

“one in a million” is a **very low chance** (it is not very likely to happen)
and
“one in ten” is a **very high chance** (it is very likely to happen)

4. Losing the baby

Considering the examples listed above, please **write in your answer** and **place a check** in the box next to the closet category

1. If I choose to have a vaginal birth, my chance of losing the baby is:

_____ (Please fill in.)

2. This is closet to (check one box):

- one in ten million Extremely small chance
- one in a million
- one in five hundred thousand
- one in one hundred thousand
- one in fifty thousand
- one in ten thousand
- one in a thousand
- one in a hundred

Acceptability

My thoughts on the Birth Options After Cesarean Session

We would like to know what you think about the Birth Options After Cesarean Session that you have just attended.

- 1 Please rate each section, by circling 'poor', 'fair', 'good', or 'excellent' to show what you think about the way the information was presented on:

<i>Review of the options</i> (repeat cesarean or VBAC)	poor	fair	good	excellent
Discussion of the risks/benefits of both options for mother/baby	poor	fair	good	excellent
Likelihood of success of VBAC	poor	fair	good	excellent
Factors that influence success or failure of VBAC	poor	fair	good	excellent
Hospital policies about repeat cesarean and VBAC	poor	fair	good	excellent
Knowing that the information was evidence-based	poor	fair	good	excellent
Gaining confidence to discuss options with my health care provider	poor	fair	good	excellent
Interactions with others in the same situation	poor	fair	good	excellent
Opportunity to ask questions	poor	fair	good	excellent

- 2 The length of the session was (*check one*)

too long
 too short
 just right

- 3 The amount of information was (*check one*)

too much information
 too little information
 just right

- 4 I found the session (*check one*)

slanted towards planning a vaginal birth
 slanted towards planning a repeat cesarean birth
 balanced

5 What did you think of the way to calculate your chance of giving birth as you have planned?
Was it

easy to find your chance of giving birth as you have planned, or
 difficult?

Comments:

6 What did you think of the rest of the decision aid?
Did it make the decision

easy, or
 more difficult?

Comments:

7 Do you think we included enough information to help a woman decide on planning a birth
after a previous cesarean birth?

Yes
 No

Comments:

8 What did you like about the decision aid and information session?

9 What suggestions do you have to improve the decision aid or information session?

Enacted Decision

My decision about birth

How did you give birth?

- I had a vaginal birth I had a cesarean birth

Was this a change from your original plan to give birth?

- No
- Yes → **What was the reason for the change (e.g., early labour, went past my due date, concerns about my health, concerns for the baby)?**

Decision Regret

Decision Regret Scale

Please reflect on the decision you made during your pregnancy about your planned vaginal or cesarean birth after talking with your health care provider. Please show how strongly you agree or disagree with these statements by circling a number from 1 (strongly agree) to 5 (strongly disagree) which best fits your views about your decision. I feel **confident** that I can:

- | | | | | | |
|--|-------------------|-------|----------------------------------|----------|----------------------|
| 1. It was the right decision | 1 | 2 | 3 | 4 | 5 |
| | Strongly
Agree | Agree | Neither
Agree Nor
Disagree | Disagree | Strongly
Disagree |
| 2. I regret the choice that was made | 1 | 2 | 3 | 4 | 5 |
| | Strongly
Agree | Agree | Neither
Agree Nor
Disagree | Disagree | Strongly
Disagree |
| 3. I would go for the same choice if I had to do it over again | 1 | 2 | 3 | 4 | 5 |
| | Strongly
Agree | Agree | Neither
Agree Nor
Disagree | Disagree | Strongly
Disagree |
| 4. The choice did me a lot of harm | 1 | 2 | 3 | 4 | 5 |
| | Strongly
Agree | Agree | Neither
Agree Nor
Disagree | Disagree | Strongly
Disagree |
| 5. The decision was a wise one | 1 | 2 | 3 | 4 | 5 |
| | Strongly
Agree | Agree | Neither
Agree Nor
Disagree | Disagree | Strongly
Disagree |

Interview Guide Pre-Birth (healthy pregnant women, previous CS)

Introduction

Thank you for agreeing to participate in this study examining the decision-making process regarding your upcoming birth. Please be advised that you may choose not to answer questions and you may withdraw from the study at any point. Your participation in this interview will not affect the care that you receive as a current or future patient at XXX or XXX and any answers you provide will be held strictly confidential. If you have any questions or concerns, please do not hesitate to ask as we go along.

Previous Birth History

- 1) Can you please tell me about your previous birth experiences?
 - a. Who was/were your healthcare provider(s) for the previous birth?
 - b. Can you recall why you had a C-section?
 - c. How did you feel about the experience?
 - d. Was the decision made before you went into labour?
 - e. Who participated in the decision making?
 - f. What information was provided to you about the C-section?
 - g. What information was provided to you about becoming pregnant after having had a C-section?

Current Pregnancy and Birth

- 1) How are you feeling with your pregnancy?
 - a. How is your health?
- 2) Have you changed healthcare providers?
 - a. What type of healthcare provider do you currently have?
 - b. Could you please tell me why you changed providers?
- 3) Have you started to think about how you would like to give birth to your baby this time?
 - a. What would be your ideal birth at this point? What makes it ideal to you?
 - b. Do you feel optimistic about having this kind of birth?
- 4) From your perspective, what are the biggest benefits of having an elective repeat C-section?
- 5) What are the biggest benefits in your opinion of having a vaginal birth after caesarean?
- 6) Have you spoken with your obstetrician/midwife/family physician about the type of birth you would like to have?
 - a. Have you made a decision already?
 - b. Did you already sign any consent forms?

- c. Did you feel supported by your obstetrician/midwife/family physician in making your decision?
 - d. What type of information and support do you receive from your healthcare provider?
- 7) What type of birth did your obstetrician/midwife/family physician suggest you to have?
- 8) What is your partner's preference for your birth? Could you please elaborate why?
- 9) Have you heard about the Birth after C-section education sessions that are offered every month at XXX/XXX?
- a. How did you find out about the session?
 - b. Did you attend?
 - c. What were your reasons to (not) go?
 - d. Was the session informative?
 - e. Which component(s), if any, did you like the best, the presentation, the time for discussion, the decision aid, or meeting other women with similar birth experiences?
 - f. Could you please elaborate why this was (not) helpful for you?
- 10) Which other sources of information are you/have you been relying on to make a decision for your birth?
- a. Books (titles)
 - b. Internet/Blogs (which websites)
 - c. Prenatal education classes
- 11) These were all of my questions, thank you very much for having taken the time to talk to me! Is there anything else regarding the birth of your baby that you would like to talk about that we have not yet discussed?

Interview Guide Post-Birth

Introduction

Congratulations on your new baby! Thank you for agreeing to continue to participate in this study examining the decision-making process around childbirth after previous CS. Please be advised that you may choose not to answer questions and you may withdraw from the study at any point. Your participation in this interview will not affect the care that you receive as a current or future patient at XXX or XXX and any answers you provide will be held strictly confidential. If you have any questions or concerns, please do not hesitate to ask as we go along.

Birth

- 1) Please tell me about the birth of your baby.
- 2) Which healthcare provider(s) were with you for your labour and birth (obstetrician, nurse, midwife, family physician, doula)?
 - a. Were they with you throughout the duration of your labour and birth?
- 3) Did you have a C-section or did you have a vaginal birth?
 - a. Did you plan to deliver this way?
 - b. If not, please tell me the reasons for the change in plans.
- 4) When was the decision made to have a C-section/vaginal birth?
 - a. Was your partner involved in the decision?
 - b. Was your obstetrician/midwife/family physician involved in the decision?
 - c. Was there anything else that influenced your decision? Please explain.
- 5) If attempted a VBAC:
 - a. Was your labour spontaneous or induced? Please tell me more about the process (how and why).
 - b. If your labour was induced, when was the decision made?
 - c. Did you have an epidural or another form of pain relief? Please tell me about that experience.
 - d. Did your provider do an episiotomy, use forceps, or use a vacuum pump? Where you included in that decision?
- 6) How do you feel about your birth experience?
- 7) How could your experience have been improved, if at all?
- 8) Did you feel supported throughout your birth? Please explain.
- 9) Would you attempt a(nother) vaginal birth in the future? Please explain.
- 10) These were all of my questions, thank you very much for having taken the time to talk to me! Is there anything else regarding the birth of your baby that you would like to talk about that we have not yet discussed?

Birth after Caesarean Section Decision Making Consent Form

Researcher:

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This research is supported by the Social Sciences and Humanities Research Council of Canada.

Invitation to Participate in a Research Study: I am invited to participate in the research study entitled, “Birth after Caesarean Section Decision Making.”

The objective of the study is to learn how women who have had a Caesarean section in the past decide between having a repeat elective Caesarean section or a vaginal birth after Caesarean section.

What is involved if I choose to participate: My participation in the study involves the participation in two interviews, which will be audio-recorded if I consent, and surveys. The first interview and survey will take place during my second or third trimester and will last approximately 60 minutes. I will be asked to reflect on my previous birth experience and the status of my current decision. The final interview and survey will take place 2 to 8 weeks after the birth of my child and will last no longer than 30 minutes. I will be asked to describe my birth experience.

Risks and Benefits of Participation: I am invited to talk about my very personal experience of labour and birth during the interviews and surveys. This reflection could cause me to feel distressed and I will receive a list of resources if I feel distressed. My participation will allow me to reflect on my experience of pregnancy, labour and birth, and may contribute to the advancement of the state of knowledge about maternity care best practices.

Confidentiality: I have received assurance from Esther Shoemaker that the information I share will remain strictly confidential. I understand that the information collected during my participation in the study will be used to learn about women’s decision making regarding birth after previous Caesarean section and to evaluate and shape maternity care practices. I understand that my confidentiality will be protected at all times. All data will be coded numerically and kept in a secure and locked file cabinet and on a password protected file on Esther Shoemaker’s computer. If interview quotes are used for the writing of reports, all names will be changed, and she will not use quotes that might reveal my identity.

Conservation of data: The data collected (tape recordings, transcripts, notes and all other relevant forms) will be kept in a locked and secure file cabinet in Esther Shoemaker's office and on a password protected file on the computer. Data will be stored for the duration of the study and a minimum of 5 years and can only be accessed by Esther Shoemaker and her supervisor, Dr. Ivy Bourgeault. Following the conservation period, all paper-based data will be shredded and digital recording and data-files will be securely deleted.

Voluntary Participation: I understand that I am under no obligation to participate and my decision regarding participation will not affect the care that I receive at the hospital. If I choose to participate, I can withdraw from the study at any time, and/or refuse to answer any questions. If I choose to withdraw from the study, all data gathered until the time of withdrawal will be destroyed if that is my wish.

If I have any questions about the study, I may contact:

Esther Shoemaker
Telephone: (xxx) xxx-xxxx
Email: xxx@uottawa.ca

Or her PhD supervisor:

Dr. Ivy Lynn Bourgeault
1 Stewart, Room 203, University of Ottawa
Ottawa, ON, K1N 6N5
Telephone: (xxx) xxx-xxxx
Email: xxx@uottawa.ca

If I have any questions regarding the ethical conduct of this study, I may contact:

Protocol Officer for Ethics in Research
Tabaret Hall, 550 Cumberland Street, Room 154, University of Ottawa
Ottawa, ON, K1N 6N5
Telephone: (xxx) xxx-xxxx
E-mail: ethics@uottawa.ca

I, _____, hereby certify that I have explained the nature of this study, the known risks involved in participating in this study, and that the participant has the option to refuse or consent to participate in this study and may withdraw at any time without penalty.

Researcher's signature

Date

Acceptance: I, _____, agree to participate in the above research study conducted by Esther Shoemaker.

Participant's signature Date

There are two copies of the consent form, one of which is mine to keep.

VBAC Decision Making – Health Care Provider Interview

Consent Form

Researcher:

Esther Shoemaker, University of Ottawa, PhD Candidate Population Health

Telephone: (xxx) xxx-xxxx

Email: xxx@uottawa.ca

PhD Supervisor:

Dr. Ivy Lynn Bourgeault, University of Ottawa, Faculty of Health Sciences

Telephone: (xxx) xxx-xxxx ext.xxxx

Email: xxx@uOttawa.ca

This research is supported by the Social Sciences and Humanities Research Council of Canada.

Invitation to Participate in a Research Study: I am invited to participate in the research study entitled, “VBAC Decision Making.”

The objective of the study is to learn about the counseling practices of health care providers regarding trial of labour after cesarean section.

What is involved if I choose to participate: My participation in the study involves the participation in an English interview of approximately 30 minutes in duration. I will be asked to talk about my opinions and practice patterns regarding trial of labour after cesarean section. I will be invited to discuss my opinions regarding the Options after Cesarean birth sessions, and the impact of the sessions on the system, on my work as a health professional and that of my colleagues, and on the patients.

Risks and Benefits of Participation: There are no known risks involved in my participation in the study.

My participation in this study will allow me to reflect on my professional experiences while potentially contributing to the advancement of the state of knowledge about maternity care best practices. My answers will potentially have a direct impact on my work environment because my answers will influence the individual intervention strategies.

Confidentiality: I have received assurance from Esther Shoemaker that the information I share will remain strictly confidential. I understand that the information collected during my participation in the study will be used to learn about health care professional’s opinions towards VBAC and to evaluate and shape the care practices at my hospital. I understand that

my confidentiality will be protected at all times. All data will be coded numerically and kept in a secure and locked file cabinet and on a password protected file on Esther Shoemaker's computer. If interview quotes are used for the writing of reports, all names will be changed, and she will not use quotes that might reveal my identity.

Conservation of data: The data collected (tape recordings, transcripts, notes and all other relevant forms) will be kept in a locked and secure file cabinet in Esther Shoemaker's office and on a password protected file on the computer. Data will be stored for a minimum of 5 years and can only be accessed by Esther Shoemaker and her supervisor, Dr. Ivy Bourgeault.

Voluntary Participation: I understand that I am under no obligation to participate and my decision regarding participation will not affect my professional work status. If I choose to participate, I can withdraw from the study at any time, and/or refuse to answer any questions. If I choose to withdraw from the study, all data gathered until the time of withdrawal will be destroyed if that is my wish.

If I have any questions about the study, I may contact:

Esther Shoemaker

Telephone: (xxx) xxx-xxxx; Email: xxx@uottawa.ca

Or her PhD supervisor:

Dr. Ivy Lynn Bourgeault

1 Stewart, Room 203, University of Ottawa

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I, _____, hereby certify that I have explained the nature of this study, the known risks involved in participating in this study, and that the participant has the option to refuse or consent to participate in this study and may withdraw at any time without penalty.

Researcher's signature _____ Date _____

Acceptance: I, _____, agree to participate in the above research study conducted by Esther Shoemaker.

Participant's signature _____ Date _____

There are two copies of the consent form, one of which is mine to keep.