
ARTICLE

Maternal and Newborn Outcomes in a Rural Midwifery-Led Maternity Service in British Columbia: A Retrospective Chart Review

by Jude Kornelsen, PhD, and Maggie Ramsey, RN, RM

ABSTRACT

Background: Maternity services in rural British Columbia have undergone significant changes in the past decade, most notably marked by service closures in over 20 rural services. A potential solution to this rural maternity service delivery challenge is a shift towards midwife-led or interprofessional models of maternity care. However, little is known about the safety of such services, particularly in Canada.

Methods: A five-year retrospective chart audit of a midwifery-led practice in British Columbia. Findings are compared to recently published outcomes of all primary care rural maternity services in British Columbia.

Findings: The practice cared for 71.9% of the population and had lower rates of cesarean section, induction, and episiotomy when compared to provincial averages. When compared to published data on outcomes of other primary care maternity services in British Columbia, women in the case study practice were less likely to have an intrapartum cesarean section, induction or augmentation of labour, episiotomy, or epidural. They were more likely to have an assisted delivery and an elective cesarean section. The practice had a 36% transfer rate.

Conclusion: This case study midwifery service is able to meet the maternity care needs of the community in a safe and effective way, facilitating local birth for low-risk women.

KEYWORDS

rural maternity care, midwifery, retrospective chart review

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ARTICLE

Issues maternelles et néonatales au sein d'un service de soins de maternité mené par des sages-femmes dans une région rurale de la Colombie-Britannique : Examen de dossiers rétrospectif

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RÉSUMÉ :

Contexte : Les soins de maternité dans les régions rurales de la Colombie-Britannique ont évolué de façon importante au cours des dix dernières années, lesquelles ont été plus particulièrement marquées par la fermeture de plus de vingt services de soins en région rurale. Une solution possible à ce problème de prestation de soins de maternité en région rurale serait le passage à un modèle de soins de maternité prodigués par des sages-femmes ou par un ensemble de professionnels de la santé. Toutefois, il existe peu de données quant à l'innocuité de ce type de service, surtout au Canada.

Méthodes : Un audit de dossiers rétrospectif de cinq ans a été mis en œuvre au sein d'un cabinet mené par des sages-femmes en Colombie-Britannique. Les résultats ont été comparés aux issues récemment publiées qui ont été constatées au sein de tous les services de soins de maternité primaires des régions rurales de la Colombie-Britannique.

Résultats : Le cabinet desservait 71,9 % de la population et présentait des taux plus faibles de césarienne, de déclenchement du travail et d'épisiotomie que la moyenne provinciale. Par comparaison avec les données publiées sur les issues constatées au sein d'autres services de soins de maternité primaires en Colombie-Britannique, les femmes desservies par le cabinet étudié étaient moins susceptibles d'avoir subi une césarienne intrapartum, un déclenchement du travail, une stimulation du travail, une épisiotomie ou une péridurale. Cependant, elles étaient plus susceptibles d'avoir connu un accouchement assisté et une césarienne planifiée. Le cabinet présentait un taux de transfert de 36 %.

Conclusion : Ce service de soins de maternité mené par des sages-femmes est en mesure de répondre aux besoins de la collectivité en matière de soins de maternité, et ce, de façon sûre et efficace, ce qui facilite l'accouchement à l'échelle locale pour les femmes qui présentent peu de risques.

MOTS-CLÉS

soins de maternité en région rurale, pratique sage-femme, examen de dossiers rétrospectif

L'article a été soumis à l'examen collégial

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INTRODUCTION

In the past decade, maternity services in rural British Columbia have undergone significant changes, most notably service closures in over 20 rural centres¹ because of a constellation of issues, including difficulty in recruiting and retaining care providers and the increasing regional centralization of services.² A potential solution to this rural health service delivery challenge is a shift towards midwife-led or interprofessional models of maternity care. However, in the current context of perinatal health care delivery, with the growing trend of specialist-led hospital births as the norm,³ there are often concerns regarding the safety of midwife-led maternity care models, particularly when care is provided in the absence of on-site cesarean section capacity. However, little is known about the outcomes of such services, particularly in Canada, with its rugged geography, weather patterns, and emerging role of midwifery in the health care system. This five-year retrospective chart audit of a midwife-led practice in British Columbia seeks to contribute to the growing understanding of the safety and efficacy of rural midwife-led services.

BACKGROUND

The emergence of regulated midwifery in Canada, as in other Western countries, has been initiated by consumer demand and spurred on by the recognition among health planners that Canada faces a shortage of maternity care providers.⁴ With the increasing contribution of midwives to the provision of maternity care in many countries,⁵⁻⁷ there is a growing body of research documenting maternal and newborn outcomes of midwife care although most of this research is in urban settings.⁸⁻¹² An exception to this is the substantial contribution researchers in Canada's far north have made through the study of the Inuulitsivik midwifery service in the Nunavik region of northern Quebec. A retrospective review of perinatal outcomes between 2000 and 2007 revealed low intervention rates and safe outcomes with a 97% rate of spontaneous vaginal delivery.¹³ Ongoing research has illustrated low rates of perinatal mortality and morbidity, low intervention rates, and significant decreases in unnecessary patient transfers; one study reported that 72.5% of women were able to deliver in their home community.¹³⁻¹⁶ The Inuulitsivik midwifery program has made a significant positive impact on women and families living in remote areas of northern Canada. One study's authors note that "the success of the Inuulitsivik midwifery service rests on the knowledge and skills of the Inuit midwives, and support of an interprofessional health

team. Our study points to the potential for safe, culturally competent local care in remote communities without cesarean section capacity."¹³ As the authors note, however, these findings cannot be directly applied to southern Canada due to the disparate qualities of the respective cohorts. For example, the northern study cohort was young and had a disproportionate number of multiparous women in a population that had lower rates of gestational diabetes and large-for-gestational-age babies than did southern First Nations communities. To this end, location-specific studies of rural midwifery services will add to the emerging literature on the efficacy of midwifery as part of the solution to diminishing rural maternity care services.

There have been previous practice- and facilities-based studies of obstetrical outcomes for rural Canada although they have not been midwifery focused. Thommasen et al. undertook a retrospective cohort study of maternal outcomes in Bella Coola Hospital in British Columbia from 1940 to 2001 and found relatively low rates of obstetrical procedures leading to excellent maternal outcomes.¹⁷ In a companion study, the same authors looked at perinatal outcomes for the same time period and concluded that trends in perinatal mortality, morbidity, and low birth weight match those across the province and the country.¹⁸ As there has been a marked change in practice styles and in expectations regarding birth practices since the time period of this study, the results are not comparable with current data. In a 1988 article, Spooner and Gorman reviewed the outcomes of a rural Saskatchewan obstetrical service from 1980 to 1985. They found a 10.6% transfer rate, an overall cesarean section rate of 4.7%, and an 11.7% induction/augmentation rate. They concluded that "safe and effective obstetrical services can be provided in small rural hospitals with proper pre-screening of patients."¹⁹ Likewise, a descriptive analysis of the reorganization of a maternity service on Manitoulin Island, Ontario, to encourage sustainability and care provider retention found a 15.5% episiotomy rate, a 12% forceps/vacuum extraction rate, and an 8.6% transfer rate,²⁰ all comparable to other published data.

According to the Midwives Association of British Columbia (2013 Aug 28), British Columbia has had regulated and publicly funded midwifery since 1998, and approximately 196 midwives were practicing there in 2013; demand for midwifery care in urban centres has been high, and many practices report wait-lists. There has also been a slow but consistently growing presence of midwifery in rural communities; 30% of British Columbia's midwives

currently identify themselves as “rural practitioners.”²¹ Several of these rural settings, such as the Kootenays and the northern and southern Gulf Islands, have a long history of community-driven midwifery that extends back to the 1970s—almost three decades before regulated practice—and have thriving contemporary practices post regulation. Salt Spring Island, less than five kilometres off the southern coast of Vancouver Island, is one such location where midwives coexisted with physicians providing maternity care prior to regulation. After 1998, however, all local physicians ceased providing intrapartum care, leaving the local midwives to care for parturient women who chose to stay in their community to give birth. Although there is a local hospital, there is no capacity for operative delivery on Salt Spring Island. The island’s population is approximately 10,000. According to BC Statistics, Salt Spring Island, as part of the Gulf Islands Local Health Area, has a high socio-economic status based on low rates of economic hardship and crime alongside high measures of education and health.²² There are approximately 84 pregnancies per year on the island,²³ not enough to sustain two full-time midwives in a fee-for-course-of-care setting, given outflow to higher levels of care, but difficult for one midwife to manage. The midwife currently practicing on the island began her practice in 1984; although she has had practice partners in the past, she is currently a solo midwife with locum support when needed. The island is approximately

two hours by ferry and ground transport from the nearest cesarean section service, assuming the ferries are running. (The last ferry leaves the island at 8:30 pm on weekdays and 9:30 pm on weekends. See Figure 1 for map.)

The unique circumstances of this community—including isolation due to water, the lack of immediate access to cesarean sections, and a history of community-based midwifery—provide a rich setting for a case study of a rural midwifery-led primary maternity service. Although good outcomes of midwifery care have been demonstrated in Aboriginal communities,¹³ this is the first review of outcomes of rural midwifery-only care for a non-Aboriginal population.

METHODS

This study is a descriptive analysis of data collected through a comprehensive chart review of the maternal and newborn outcomes of all clients of the midwifery practice between January 1, 2004, and December 31, 2008. Charts included all parturient women who received prenatal care from the practice regardless of their eventual place of delivery. All charts were reviewed by the practice midwife, and data were anonymously recorded onto a data extraction form. The data extraction forms were cross-checked by a research assistant, and a select sample was reviewed by the contributing investigator. Fields reviewed included client demographics (maternal age, first-time mothers, education,

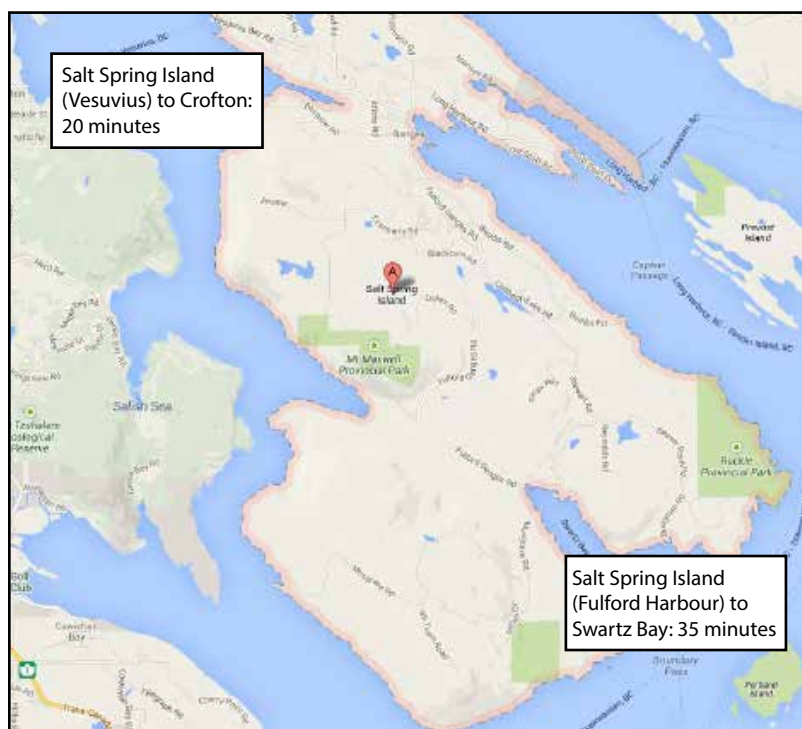


Figure 1. Salt Spring Island Ferry transport map. (Map data ©2013 Google)

prior preterm births), patterns of maternity care access (place of birth, intrapartum transfer, indications for cesarean section), and maternal and newborn outcomes (delivery care provider, birth type, induction, augmentation, episiotomy, epidural, postpartum hemorrhage, admission to special-care neonatal wards).

Descriptive analysis was undertaken. Outcomes were compared to provincial averages to compare maternal and newborn outcomes of clients served through the Salt Spring Midwifery Practice. In addition, findings were compared to published maternal and newborn outcomes of other providers in similar rural practices—namely, practices with primary maternity care without local access to cesarean sections. Rates for patterns of maternity care access were calculated.

RESULTS

In total, 302 charts were reported by the Salt Spring Midwifery Practice (SSMP) during the study period and were reviewed by the research team. Of 420 total births reported in the Local Health Area,²³ the midwifery practice cared for 71.9% of the population of women giving birth. Fewer than four parturient women entered the practice from outside of Salt Spring Island during this study period. SSMP saw a high proportion of first-time mothers and had a low rate of cesarean sections (intrapartum and elective), inductions, and episiotomies in comparison with provincial averages.

Chart audit outcomes were also compared with all provincial primary care (no local cesarean section) service outcomes across the province as per data reported by Grzybowski et al.²⁴ SSMP chart audit data revealed

Table 1. Case Demographics of the Salt Spring Midwifery Practice (2004 to 2008), Perinatal Services BC Provincial Averages (2003/2004 to 2007/2008), and Primary Maternity Services in British Columbia (2000/2001 to 2006–2007).

	Salt Spring Midwifery Practice	Provincial Averages	Primary Maternity Services*
No. of cases included	302		4,569
Average births per year	60	41,402	653
Maternal age at delivery (years)	30.0	30.4	27.9
Percent of maternal age at delivery ≥ 35 years	21.9	21.5	n/a
Education (%)			
Less than high school	4.0	6.6	n/a
High school diploma	42.4	31.1	
Postsecondary education	44.0	62.3	
Don't know	9.6	n/a†	
Alcohol concerns‡			
No	290	n/a	n/a
Yes			
Missing			
Nutritional concerns			
No	286	n/a	n/a
Yes			
Missing			
Mental health concerns			
No	284	n/a	n/a
Yes			
Missing			
Housing concerns			
No	272	n/a	n/a
Yes			
Missing			

n/a = not available.

*Source: Grzybowski S, Stoll K, Kornelsen J. The outcomes of rural perinatal surgical services in BC: a population-based study. *Can J Rural Med.* 2013;18(4):123–9.

†Source: Statistics Canada [Internet]. Canada: Statistics Canada Labour Force Survey; 2009.

‡Missing cases; not available

further insights into the client population and practice. Clients were likely to be highly educated and to have no alcohol, nutrition, or mental health concerns (Table 1). The majority of clients were likely to have more than 10 prenatal visits (the number recommended by Perinatal Services BC is 10 to 15;25 see Table 2). The practice had an overall rate of 34.1% for transfers; 26.5% occurred prior to the onset of labour, and 7.6% occurred in the intrapartum period (Table 3). Most transfers prior to the onset of labour were due to booked cesarean sections that were predominantly for repeat cesarean sections and breech presentations. The majority of women who were transferred in labour were transferred because of failure to progress (82.6%). The Salt Spring midwifery practice had a higher rate of spontaneous vaginal delivery than provincial averages (75.5% versus 60.4%) and lower rates of assisted delivery, induction, augmentation, episiotomy, epidurals and post-partum hemorrhage. The higher rate of elective cesarean section (11.9% versus 11.1 provincially and 9.7% for other primary care services) may account for the lower rate of intrapartum cesarean sections (7.6% versus 18.1 and 13.7, respectively).

DISCUSSION

Primary maternity care in isolated, rural settings demands an approach different from care in tertiary settings or even care in rural settings with access to cesarean sections. Key attributes include appropriate risk screening for local delivery, anticipatory thinking during labour, and established relationships with referral colleagues.

Transfer from the home community, particularly during the course of labour and delivery, incurs significant stress for the parturient woman and her family,²⁶ due in part to the urgency of the situation, the lack of time to make relocation plans, and the limits of who can accompany the parturient woman. Data from this study revealed a low emergency intrapartum transfer rate in favour of most women leaving the community by private vehicle prior to the onset of labour, reducing the additional stress inherent in a “lights-and-siren” transfer. This was corroborated by the higher rates of assisted delivery and elective cesarean section shown for women from the Local Health Area (Table 4). The low rate of intrapartum transfer indicates a successful screening protocol for identifying women who are not suited to deliver in a low-resource setting, the cornerstone of good maternal and newborn outcomes in rural settings.

Appropriate transfer levels from an isolated primary maternity service are hard to determine for a specific

community and can range from 24%¹³ to 33.9%,²⁷ similar to the 34% rate of transfer for the SSMP. Leeman and Leeman found a 25.6% transfer rate prior to the onset of labour and a 9.5% intrapartum transfer rate.²⁸ This is consistent with the findings in this study (26.5% and 7.6%, respectively). The majority of women in this study who transferred prior to the onset of labour did so due to a previous cesarean section and a concomitant plan to either attempt a VBAC or have another cesarean section. The safety of attempting a VBAC in the absence of immediate access to cesarean section is currently under debate. In a rural setting, however, such decisions are made not only on the basis of clinical evidence but also on the basis of the social context, including the response of other providers both in the local community and in the referral setting. To this end, the increasing rate

The low rate of intrapartum transfer indicates a successful screening protocol...the cornerstone of good maternal and newborn outcomes in rural settings.

of cesarean sections in British Columbia has implications for rural women and practitioners.

Efficient transfers depend on established relationships with referral colleagues. When a transfer from the SSMP is necessary, a referral centre midwifery practice will take on the in-hospital delivery if appropriate, providing continuity of midwifery care. Solid relationships have been built with obstetrical specialists in two communities, allowing for ease of contact, communication, and follow-up. These successful relationships have been built partly on the SSMP's recognition that individual decisions regarding on-island births are not just clinical decisions affecting the parturient women but also social decisions that play out both with local care providers and with specialist colleagues in the referral communities. Recognition of the importance of maintaining interprofessional respect through observing common criteria for local birth based on collective risk tolerance maintains these relationships.

An additional attribute of the service reported here is the overlap in responsibility assumed by second attendants, who are required at any home birth. Due to the lack of other midwives in the community, the SSMP relies on registered

Table 2. Maternal and Newborn Outcomes Comparing the Salt Spring Midwifery Practice (2004 to 2008) to Perinatal Services BC Provincial Averages (2003/2004 to 2007–2008) and to Primary Maternity Services in British Columbia (2000/2001 to 2006–2007)

	Salt Spring Midwifery Practice (n = 302)	Provincial Averages (n = 205,212)	Primary Maternity Services* (n = 4,569)
Delivery care provider (%)			
Midwife	70.2	5.3	n/a
Obstetrician	22.2	50.4	
GP	1.3	40.5	
Other	5.6	3.7	
Type of birth (rate per 100 deliveries)			
SVD	75.5	60.4	n/a
Assisted (vacuum and forceps)	3.3	n/a	2.1
Intrapartum CS	7.6	18.1	13.7
Elective CS	11.9	11.1	9.7
Induction (rate per 100 deliveries)	9.3	21.1	21.7
Augmentation (rate per 100 deliveries, booked CS removed)	21.4	n/a	38.7
Episiotomy (rate per 100 vaginal deliveries)	2.5	14.6	12.0
Epidural (rate per 100, booked CS removed)	9.1	n/a	14.8
Postpartum hemorrhage (rate per 100 deliveries)	1.7	n/a	6.5
Admission to SCN (rate per 100 deliveries)	4.0	n/a	4.2

Notes:

CS = cesarean section

GP = general practitioner

n/a = not available

SCN =

SVD =

*Source: Grzybowski, Stoll, Kornelsen.²⁴

Table 3. *Place of Birth, Prenatal Visits, Transfers, and Intrapartum Transfers (Salt Spring Midwifery Practice Only, 2004 to 2008)*

Actual place of birth* (n = 301)	
Home birth	81 (26.9%)
Lady Minto Hospital	108 (35.9%)
Victoria General Hospital	95 (31.6%)
Other (Women's, CDH, Comox)	17 (5.6%)
Prenatal visits (n = 302)	
< 5 visits	20 (6.6%)
6–9 visits	55 (18.2%)
> 10 visits	203 (67.2%)
Missing	24 (7.9%)
Transfers by labour state (n = 302)	
Not transferred	196 (64.9%)
Pre-labour	80 (26.5%)
Intrapartum	23 (7.6%)
Missing	3 (1.0%)
Reasons for pre-labour transfers (n = 80)	
Planned CS/breech	16 (20.0%)
VBAC	13 (16.3%)
Induction (medical, postdate, other planned)	12 (15.0%)
Planned CS, repeat	11 (13.8%)
Access to epidural	10 (12.5%)
Pre-PROM	5 (6.3%)
Elective delivery (breech, medical, location)	5 (6.3%)
Planned CS, other	4 (5.0%)
Symptoms of preterm labour	2 (2.5%)
Other	2 (2.5%)
Reasons for intrapartum transfers (n = 23)	
Failure to progress	19 (82.6%)
Preterm placenta abruption	2 (8.7%)
Other (meconium, undiagnosed breech)	2 (8.7%)

Notes:

CDH = CS = cesarean section
 PROM = VBAC = vaginal birth after cesarean section

*One case missing.

nurses (RNs) as second attendants. If a transfer to the local hospital is necessary, continuity is afforded with all attendants as the second attendants assume the role of RNs, once in the hospital. This continuity was recognized as a significant benefit of the service.

The most significant contribution of this service, however, is its ability to respond to the maternity care needs of the community in a safe and effective way. Without the midwifery service, women (and their families) would likely have to leave the community to give birth, incurring the attendant social challenges. The integration of the service into the community contributes to the overall strength of social ties and community cohesion that exceed the benefits received by the families of women giving birth.

LIMITATIONS

The data presented are the result of a case study of one rural midwifery practice and the practice in question serves a relatively advantaged community. Given this, results are not necessarily generalizable to other midwifery-led services. Further limitations of chart audits include the potential for incomplete documentation, information that is unrecorded, difficulty in interpreting information, and variation in the quality of information recorded.²⁹ These limitations were mitigated in this study because one of the study authors was the practicing midwife who had filled in the majority of the charts and was thus able to clarify any questions about the information presented. Cross-checking for accuracy was done by other team members.

Table 4. *Indications for Cesarean Section (Salt Spring Midwifery Practice Only, 2004 to 2008)*

Indications for intrapartum CS only (n = 22) Failure to progress Failure to progress and non-reassuring fetal heart rate Other	17 (77.3%) 3 (13.6%) 2 (9.1%)
Indications for booked CS only (n = 36) Breech Repeat CS Other Breech and other Repeat and other Repeat and breech	15 (41.7%) 9 (25.0%) 8 (22.2%) 2 (5.6%) 1 (2.8%) 1 (2.8%)

CS = cesarean section.

CONCLUSION

Building on rural midwifery practice outcome findings in Aboriginal communities, the outcomes of this chart audit are encouraging and suggest that a rural midwifery practice in the absence of immediate access to cesarean section can lead to good outcomes for non-Aboriginal communities. This practice-based chart audit is an important addition to the literature reporting outcomes for a midwifery-only rural primary care unit. As the number of rural midwifery practices in British Columbia and across Canada increases, practice evaluations are crucial and will contribute to rural health planning. Further population-based comparisons of outcomes for rural midwifery services are needed, particularly across a range of populations to capture diversity in rural setting.

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