



Rural Obstetric Care

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This Rapid Evidence Report was prepared by the Newfoundland & Labrador Centre for Applied Health Research (NLCAHR), Memorial University. It was developed through the analysis, interpretation and synthesis of scientific research and/or health technology assessments conducted by other parties. It also incorporates selected information provided by expert consultants in the subject area. This document may not fully reflect all the scientific evidence available at the time this report was prepared. Other relevant scientific findings may have been reported since completion of this synthesis report.

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About This Report

About NLCAHR

The Newfoundland and Labrador Centre for Applied Health Research, established in 1999, contributes to the effectiveness of health and community services in Newfoundland and Labrador and to the physical, social, and psychological wellbeing of its population. NLCAHR accomplishes this mandate by building capacity in applied health research, supporting high-quality research, and fostering the effective use of research evidence by decision makers and policy makers in the provincial healthcare system.

About *Rapid Evidence Reports*

NLCAHR designed *Rapid Evidence Reports* to provide support for evidence-based decision making in the Newfoundland and Labrador healthcare system on an expedited basis as compared to the lengthier '*Evidence in Context*' reports issued through the Contextualized Health Research Synthesis Program (CHRSP). Through these expedited reports, NLCAHR provides a succinct review of recent research evidence on a high-priority research topic selected by decision makers in the province.

Rapid Evidence Reports include:

- A clear statement of the issue and the background to the issue/problem;
- A description of the scope and nature of the pertinent English-language scientific literature from the past five years;
- A summary of the principal features of the available evidence – assessment of quality, points of consensus, points of disagreement, areas of uncertainty or silence on some or all of the following issues: effectiveness of interventions, potential benefits and harms, risks, costs, and cost-effectiveness; and
- A brief analysis of the types of issues that might affect the applicability of the evidence to the local context.

It is important to note that, unlike our other decision-support product, the '*Evidence in Context*' report, a *Rapid Evidence Report* is **not** a comprehensive and systematic synthesis of the literature on the topic. This report does not provide a full analysis of the contextual issues involved in applying evidence to the Newfoundland and Labrador healthcare setting. Rather, a *Rapid Evidence Report* provides decision makers with a summary of the scope and nature of the recent scientific literature on the topic in question, an initial assessment of the strengths and gaps in this literature, and a review of the key points of agreement and disagreement among researchers.

Researchers and Consultants

For this report, researchers from the Newfoundland and Labrador Centre for Applied Health Research were CHRSP Research Officers Colin Walsh and Keihan Power, and the CHRSP Program Director, Dr. Stephen Bornstein. Our team benefited from the advice and expertise of Dr. Jude Kornelsen, Associate Professor in the Department of Family Practice and co-Director of the Centre for Rural Health Research at the University of British Columbia, and an Honorary Professor at the Sydney Medical School. For more information about our Subject Expert, please refer to Appendix A.

Background

Regional centralization, a Canadian policy initiative, was designed to address inefficient and costly services across health sectors. The policy also led to the closure or reduction of maternity services in many rural communities, which has tended to produce worsening population health outcomes and a reduction in the quality of care for rural populations (1,2). While not completely reversing the initial policy initiative, Canadian health system decision makers are currently re-considering ways to provide rural health services, including maternity services, closer to home in response to community pressures for enhanced rural services. They are also seeking ways to provide improved services to Indigenous populations as called for in the report of Canada's Truth and Reconciliation Commission and included in Canada's commitments as a signatory to the *United Nations Declaration on the Rights of Indigenous Peoples* (1–3).

Not surprisingly, decision makers in Newfoundland and Labrador (NL) are especially concerned about improving the quality of care for people in rural locations, given the province's significant rural geography. The majority of municipalities in NL have fewer than 1,000 people (4). Small communities in the province are also dispersed over a vast geography, posing unique transportation and access challenges for people seeking healthcare services.

Defining "rurality" in Newfoundland and Labrador

In the research literature, definitions of "rurality" vary considerably. For example, researchers in a large urban centre in one jurisdiction may identify nearby communities as being rural, even though the same communities would be considered as urban in other jurisdictions. Statistics Canada defines "rural" as any territory outside urban areas with a population of at least 1,000 and a population density of 400 or more per square kilometer (5). Unfortunately, because of the size and dispersal of NL communities, definitions based on size and density do not present an accurate picture of rural Newfoundland and Labrador. For this reason, we felt it was important to provide our own definition, specific to rurality, as it interacts with obstetrics.

To arrive at a useful definition for "rural" in the NL obstetrics context, one should take into account the volume of births that a medical professional will perform in the area, the

province's population, aging demographics, women's comfort during the birthing process, the way communities are dispersed, potential travel difficulties, the availability of health human resources, and the travel distance to larger and more advanced care centres. All of these factors have been studied as potentially affecting the health of mothers and babies—all will affect care for people in rural communities, especially those in Newfoundland and Labrador.

For the purposes of clarity, this report will define “rural Newfoundland and Labrador” as any location in the province that requires people to drive an hour or more to get to a hospital with specialists and a neonatal intensive care unit (NICU).

Given that St. John's is the only city in the province with such services, our definition of rural Newfoundland and Labrador therefore extends to all communities in the province that are located a driving distance of one hour or more from St. John's. While this definition of rurality may appear to be overly broad, it serves to highlight the unique challenges that our provincial population faces when seeking access to obstetric care.

Considerations when applying the evidence

Our health system partners asked CHRSP to review the evidence on sustainable models of rural maternity care. While the literature describes a variety of care models for obstetric services in rural communities, the research tends to focus on the skills and effectiveness of various provider groups rather than on how obstetric services are organized and utilized. In addition, applying the evidence within Newfoundland and Labrador can be quite challenging: contextual differences include not only our province's geography and transportation issues, but also health human resource factors, including: training models for maternity care providers, the number of International Medical Graduates working in the healthcare system, restrictions to licensure, system and provider endorsement of midwifery, and the like. There are also medico-cultural issues to consider, such as the relationship of specialist obstetricians to family doctors. Exacerbating these challenges are the province's small population, low population density, and low birthrate – all factors that make it difficult to assess the potential effectiveness of service models that have been developed elsewhere and that may be based on a higher demand for services and a higher volume of deliveries.

Refining the research question

Given the overall lack of systematic review literature on the topic of rural obstetrics, our CHRSP team determined that a *Rapid Evidence Report* would be the most appropriate methodology for this study. As we considered the scope of this report, we were also compelled by the evidence to adjust its focus: although our health system partners had initially asked for evidence about strategies to maintain provider skills in low-volume rural areas, the lack of evidence on such strategies required us to adjust the scope of this report

to focus on *models of care* for rural obstetric services. The research question initially posed by Eastern Health was therefore reframed.

Being unable to examine the finer points of how obstetric services are best organized in rural areas, we focused instead on models of care in which various professional service providers take the lead in providing care throughout the birth process (e.g. obstetricians, midwives, general practitioners, etc.). Ultimately, after we reviewed the evidence and consulted with provincial healthcare stakeholders, we arrived at the following research question:

“What models of obstetric care have been shown to increase safety and promote patient satisfaction in rural areas?”

Scope and Nature of the Scientific Literature

For this *Rapid Evidence Report*, we searched for articles within the health databases PubMed, Embase, and CINAHL. Our aim was to locate systematic review and primary research evidence published in English since 2005. To avoid the double-counting of evidence, any primary studies that were also included in the systematic reviews were not given separate consideration. Throughout this process, we sought guidance from Kristen Romme, a health sciences librarian at Memorial University, to develop a comprehensive list of search terms that reflected the various descriptors used in the literature and that aligned with the nature of our research question.

We found additional articles by screening the reference lists of two unpublished reviews that were provided to us by our Subject Expert, Dr. Jude Kornelsen. We also included a Joint Position Paper from the Society of Obstetricians and Gynecologists of Canada (SOGC) that was recommended by our Subject Expert.

Inclusion Criteria

This topic required us to establish a very broad set of research parameters to optimize the inclusion of whatever limited literature was available in this subject area. In fact, our Subject Expert advised us not to place too many restrictions on the inclusion criteria for our search so that we could retrieve an optimal number of studies. We define the parameters of our search below and include a summary of our inclusion criteria in Table 1.

For the population, we looked for studies that focused on patients requiring obstetric care. Recognizing the unique needs of Indigenous populations within the province, we regret that the timing and scope of this report did not allow us to give Indigenous health the investigative attention it deserves. Complicating this issue, the research evidence that we rely upon for these reports – systematic reviews and meta-analyses – is lacking in the area

of Indigenous healthcare. As a result, we strongly suggest that further research and a more focused review be completed before applying the findings of this study to Indigenous populations in Newfoundland and Labrador.

We searched for models of rural obstetric care that included staffing models, birth settings, and any other approaches explicitly identified as models of care. Our comparator was the standard model of care for urban centres, which tends to be obstetrician/specialist-led. We kept our search open to all relevant maternal and safety outcomes. The setting of interest was rural or remote areas that had similar characteristics to rural Newfoundland and Labrador.

Table 1: Inclusion criteria for evidence in this report

Parameter	Inclusion Criteria
Population	<ul style="list-style-type: none"> Patients requiring obstetric care
Intervention	<ul style="list-style-type: none"> Models of rural obstetric care
Comparator	<ul style="list-style-type: none"> Standard care in urban centres
Outcome	<ul style="list-style-type: none"> Patient/birth outcomes, safety, patient satisfaction
Setting	<ul style="list-style-type: none"> Rural areas (ideally similar numbers to NL rural communities)

Research evidence included in this report

In total, this report covers four systematic reviews, five primary studies, and one Joint Position Paper.

Of the systematic reviews:

- one was a systematic review of qualitative evidence on models of care in rural areas (6);
- one was a realist review of the evidence of safety for general practitioners with enhanced surgical skills (GPESS) (1);
- one was a ‘review of reviews’ or meta-review of midwifery-led care compared to physician-led care (7); and
- one was a meta-analysis of midwifery care compared to all other models of care (8).

Of the primary studies:

- three were qualitative studies involving surveys/questionnaires (9–11); and
- two were retrospective descriptive studies (12,13).

We critically appraised all articles included in this report. Our critical appraisal tool for systematic reviews was a measurement tool specifically designed for the assessment of systematic reviews known as the AMSTAR instrument (14). The AMSTAR uses eleven scales to rate the quality of systematic reviews as Low, Moderate, High, or Very High. For primary articles, our critical appraisal tool was the Downs and Black checklist which rates the quality of evidence as being Poor, Fair, Good, or Excellent (15).

Characterizing the research evidence

Below, we provide a summary of the available research evidence on models of obstetric care in rural areas. Although there appears to be consistent research output in the field of obstetrics, narrowing the field to *rural* obstetrics reduced the number of pertinent studies considerably. The quality of the relevant evidence was also compromised by the lack of randomized controlled trials, systematic reviews, and other reliable research methods in these studies. Despite these caveats, the research we found on rural obstetric services made good (and creative) use of the methods and data available in order to provide the highest quality of evidence that could be expected for studies of this nature, given the inherent limitations in the subject area.

For this *Rapid Evidence Report*, the findings in the literature were organized into the following categories:

- Specialist-led models of care
- General Practitioner-led models of care
- Midwifery-led models of care
- Other models

Findings for each category are provided in detail below.

Specialist-led models of care

Specialist-led models of maternity care encompass the use of specialists, most notably obstetricians, in the delivery of babies and the care of parturient women (i.e., women who are in labour or who are about to give birth). We found only one systematic review that examined this model in rural areas, most likely because the specialist-led model is more typically found in urban centres that have more resources and a higher volume of patients.

In their moderate-quality systematic review, Hoang et al. found that the majority of rural women in the reviewed studies trusted the specialist model, felt the hospital was the best place to give birth, and believed specialist-led obstetrical care to be the safer choice (6). The reader should note that the women in this study did self-select into a specialist model of care, which may bias the results. Comments from the women in the review noted that safety was the main reason for them to choose specialist-led care and that patients felt this model “covered every eventuality,” included “having everything there,” and provided the “ultimate safety net” (6, p. 239).

GP-led models of care

Two systematic reviews looked at the use of General Practitioners/General Physicians (GP) or family physicians in the care of parturient women and their babies (1,6). This research also looked at the effectiveness of an enhanced surgical skillset for GPs that qualifies them

to perform Caesarean sections (C-sections). These GPs are referred to as General Practitioners with Enhanced Surgical Skills (GPESS).

The literature indicates that GPs are considered to be informative care providers (able to provide a wide range of information on services and opportunities to their patients) and are associated with personalized care and the continuity of care (care provided by the same carer throughout the medical process). GPESS were generally rated as being comparable to specialists on many variables, most notably surgical errors. GPESS were also more likely than specialists to refer women to acute care. Higher referral rates indicate a clear awareness of scope (low acuity) and lead to optimal population-level outcomes.

Hoang et al. examined GP-led models of care with a specific focus on rural areas (6). The authors found that GP-led care models were common across rural Canada and Australia, that they are associated with personalized care and continuity of care, and that GPs are effective at informing rural women about the maternity choices available to them. GPESS-led care is not mentioned in this systematic review.

A moderate-quality review by Kornelsen et al. examines GPESS, noting that GPESS-led care resulted in the same rate of surgical errors as specialist-led care (1). The GPESS model also had higher rates of referral to acute care with patients having longer post-surgical hospital stays when compared to rural obstetricians. No difference was found in intraoperative or infectious complications, nor was there any difference in neonatal outcomes. When comparing GPESS-led models that included capacity for performing C-section and those that did not, the authors noted a 20 percent increase in births in units with C-section capacity, which may suggest increased service volume and a preference for units with C-section capacity. It should be noted that this systematic review included only studies on low-risk pregnancies in which patients in high-risk situations would be transferred out. Kornelsen et al. do note that C-section capability is likely an important factor for delivering close to home.

Midwifery-led models of care

We examined three systematic reviews and two primary studies describing models of care in which midwives provide primary care for parturient women, delivering their babies and leading their post-natal care (6–10). We also explored studies on a subgroup within midwifery called “midwifery group practice” which was described in two primary research studies (12,13). Within this model, specialists become involved only when complications arise.

When examining the systematic review evidence on midwifery-led models of care, we found that, in terms of population health outcomes and patient satisfaction measures, this model was considered to be as effective as physician-led models of care, if not considered to be superior. However, we noted that two of the three reviews of this model of care presented evidence on outcomes only for women in urban areas (7,8). While the service setting in

these reviews may hinder the relevance of their findings to rural locations, it is noteworthy that midwifery practices and skills appear to lend themselves well to low-resource environments, both urban and rural.

In one review, Hoang et al. showcased how adeptly midwives support the birthing process in rural communities (6). The researchers looked only at rural communities in developed countries, which tend to be similar in terms of their health workforce challenges and local closures and to have more comparable healthcare systems. The authors found a correlation between rural women receiving midwife-led care and their preference to give birth close to home, ideally in their local communities. For these women, the midwife-led model was realistic, acceptable, and appropriate for their circumstances in rural places. These perceptions are important, given that most midwives practice in rural and remote communities where there is a lack of physician-led care or clinical obstetric services. Midwives help rural women to overcome these challenges by providing them with choice in place of birth, a maternal competence that allows women to make an informed choice, and by offering continuity of care and adaptability to low-resource settings—core tenets that are embedded in the midwifery model of care. With a clearly-delineated scope of practice limited to ‘normal births,’ midwives are also trained to call for obstetrical help if procedures exceed their scope of practice. Likewise, the review noted that midwives were reported to be best suited for providing personal care to women.

A very high-quality systematic review by Sandall et al. found that many adverse clinical outcomes were less likely with midwives than with other care models, including: regional analgesia, amniotomy (in which the amniotic sac is deliberately ruptured to induce labour), preterm births of less than 37 weeks, fetal loss before and after 24 weeks, and neonatal death (8). As well, the midwife-led model of care was associated with more spontaneous vaginal births, fewer episiotomies, and fewer instrumental vaginal births. The researchers also found no difference between midwife-led and physician-led care in Caesarean section birth rates or in the presence of an intact perineum after labour.

In another very high-quality systematic review, Sutcliffe et al. compared midwife-led care to physician-led care and found that midwives used fewer procedures in labour, that patients were more satisfied with care, that spontaneous vaginal births were more likely, and that there was a reduced need for pain relief interventions such as vacuum extraction/forceps deliveries, episiotomies, and analgesia/anesthesia (7). The reviewers also found no evidence of differences in some maternal, fetal, and neonatal outcomes: Caesarean section, antepartum hemorrhage, postpartum hemorrhage, induction of labour, augmentation/oxytocin during labour, mean length of labour, manual removal of the placenta, use of intravenous fluids, and malpresentation (i.e., breech birth, shoulder presentation, or face and brow presentation). While there were inconclusive results for hypertension, use of amniotomy and perineal injuries, there were no adverse outcomes clearly associated with midwife-led care. Patients were more satisfied with midwives in terms of getting their

questions answered and of having a higher perception of control, and they were generally more confident in midwife-led care.

These findings are interesting given that the majority of women in the Hoang et al. study believed that a specialist-led model of care, provided in a hospital setting, would be their safest, most preferred choice (6). While the evidence supporting midwife-led care may appear to contradict this finding, it is hard to compare the findings relative to midwifery against those on specialist-led care for a variety of reasons:

- Firstly, there is a difference in the focus of each study: one is focused on health outcomes while the other examines perceptions and opinions.
- Secondly, the care approaches being compared are inherently different. For example, midwifery training teaches midwives to work in low-resource environments and helps them determine when a pregnancy is high-risk and when the patient needs to see a specialist. By comparison, the specialist-led model is intentionally designed to support high-risk populations; indeed, specialists are usually only called upon for higher-risk pregnancies.
- Lastly, women in the Hoang et al. study had self-selected into the specialist-led model of care, which could bias the results.

In addition to the foregoing systematic reviews, we also considered four primary studies that investigated the use of midwives during pregnancy and birth. This literature was, however, characterized as being of lower quality than the systematic reviews, with studies scoring in the poor (9,13) or fair (10,12) quality ranges. It is noteworthy that all four studies had results similar to those of the systematic reviews we examined, noting patient satisfaction with having midwives present. One additional finding from this literature indicated the benefits of limiting the number of midwives to one or two, as opposed to having more than two midwives providing care.

O'Brien et al. compared women's experiences with midwives against the experiences of those who received care from other healthcare providers (10). These authors found that women attended by midwives were most likely to have five or more prenatal visits, to report receiving care as early as they wanted it, were more likely to attend prenatal classes, were more likely to report a very positive experience, and were less likely to receive epidural analgesia than with obstetricians, general practitioners or nurse practitioners (NP). Women were more likely to experience vaginal birth when attended by midwives than when attended by an obstetrician, but no difference on this measure was noted when midwives were compared to GPs or NPs. Midwives who tried for vaginal births were also less likely to induce labor than obstetricians, GPs, or NPs.

Fontein et al. examined midwifery practices of varying scales and found that small practices (i.e., one to two midwives) had more home births and fewer referrals during the birth process compared to practices with more than two midwives; moreover, births among

patients using smaller practice models were less likely to require the administration of pethidine or cardiotocography (CTG) monitoring, or to undergo unplanned Caesarean sections. In small practices with only one or two midwives, women were more likely to know or have a relationship with their midwives (9). Furthermore, these women noted that having a midwife present at their birth gave extra value to the birth experience – even those that did not have a midwife present believed that doing so would have provided extra value.

Midwifery group practice

Midwifery group practices are defined as being small groups of midwives that offer continuity of care and carers (16). In looking at midwifery models in general, we found that midwifery group practice did not receive as much research attention as other models but we have included the evidence about group practice from two studies to provide readers with a wider range of care models to consider (12,13). It is important to note the questionable relevance of midwifery group practice for rural areas given that group practice requires a particular minimum number of deliveries in order to be sustainable.

Durst et al. examined midwifery group practices and found that, following a transition from a GP-led service to a midwifery group practice, women were less likely to require analgesia, nearly all babies were born at full term, there were no differences in Apgar scores at five minutes, nor were there any differences in the use of resuscitation or transfer to high-level care nurseries (12). However, the researchers also found that midwifery group practices had higher rates of first-degree tears while having no increase in higher-level tears (i.e., injuries to the perineal skin) (12).

Lack et al. also examined a midwifery group practice, noting that more than two-thirds of women had a spontaneous onset of labor, and 74% had spontaneous vaginal birth (20% C-section). As well, perinatal mortality was 11.8 per 1000 births, which was seen as an improvement (13).

Other Models

Group practice in rural areas

Orrantia et al. studied an obstetric care model created by a group of GPs in a rural centre in Marathon, Ontario (11). The GPs in this region were having a difficult time balancing their private practices with their work in obstetric care. Under this model, each GP would take a month to be the maternity caregiver for the area, leaving the other GPs time to focus on their private practices. The research team surveyed patients who received care and delivered their babies in Marathon, patients who received care in Marathon and delivered their babies outside the town, and the physicians involved in the program. The survey results indicated that 97% of respondents (n = 40) reported their obstetric care expectations were met, if not surpassed; all agreed they were satisfied with the experience; 55% of those who delivered elsewhere said they would deliver in the town in future; and 90% who delivered locally said they would do so again.

While the survey results indicated high satisfaction rates, readers are cautioned that the study was of poor methodological quality and that it was carried out in a single small town, making it challenging to generalize the results (11). Although the researchers used a validated questionnaire, the findings look only at patient experience but at no other outcome variables (such as mortality and morbidity), nor is there any comparison group. There is also the question of how such a group practice approach might be affected by the volume of deliveries. Overall, this group practice model may have similar sustainability issues to this issues faced in other rural obstetric care models.

Contextual Issues

The following contextual issues should be considered when assessing the evidence for use in Newfoundland and Labrador. We acknowledge support from the following consultants who provided important perspectives on the contextual issues that may pertain to rural obstetric care in Newfoundland and Labrador:

- Elaine Warren, Vice President and Chief Information Officer, Eastern Health;
- Arlene Scott, Director of the Women’s Health Program, Eastern Health; and
- Dr. Robert Kennedy, Clinical Chief of the Women’s Health Program, Eastern Health.

We also thank our Subject Expert, Dr. Jude Kornelsen, for providing her perspectives on broader contextual issues to consider when interpreting the findings of this study.

Defining “rural” Newfoundland and Labrador

This report defines “rural” as any location in Newfoundland and Labrador with an hour or more commute to a major hospital with specialists and neonatal intensive care units (NICU) which means all communities in the province that are an hour or more away from St. John’s.

Obstetric volume in Eastern Health

The population in NL is aging, decreasing, and becoming more urbanized. As a result, fewer births are taking place in rural communities.

In the research literature, “low volume” typically refers to fewer than 1,000 annual births per hospital (17–21). Table 2 below summarizes the number of obstetricians and the number of births that took place in areas of eastern Newfoundland under the jurisdiction of Eastern Health (2018 data). Each area outlined in the Table has one labour and delivery unit. With the exception of urban St. John’s, it is noteworthy that each unit has *far* fewer than 1,000 annual births (2018 data). Rural areas in Eastern Health can therefore be characterized as having *very low* birth volumes.

It has been suggested that a very low volume of deliveries can make it challenging for medical professionals to maintain their obstetric skills.

Table 2: Number of obstetricians / number of births in Eastern Health

Location	Number of obstetricians	Number of births
Burin	1	93
Carbonear	2	194
Clareville	3	137
St. John's	12	2274
Eastern Health Region (Total)	18	2698

The unique context of Newfoundland and Labrador

Rural areas of Newfoundland and Labrador (for example, Grand Falls-Windsor and Goose Bay) are served by obstetricians and by general practitioners trained in obstetrics. While there has been a push to add more midwifery services within the province, such initiatives have been challenged by current requirements for corresponding coverage by obstetricians. For example, Eastern Health currently requires an obstetrician to act as a back-up for midwifery services; the availability of such obstetricians varies within the region.

It has been noted by our Subject Expert that obstetrical services in rural Newfoundland and Labrador differ from those offered in other jurisdictions. While very small communities in Newfoundland and Labrador are staffed by obstetricians who are involved in primary maternity care, in places like British Columbia and Australia, for example, obstetricians primarily see only women at higher risk of complications and do not serve such small communities as the result of unsustainable service volumes. Our Subject Expert has suggested that staffing rural communities with one or two obstetricians is an inefficient model that may be difficult to sustain.

As suggested by our Subject Expert, another contextual factor to consider is the prevalence of internationally-trained medical graduates in Newfoundland and Labrador—a factor that both delimits the number of GPs that can provide maternity care and may also result in having internationally-trained obstetricians who do not qualify to register as a board-certified obstetricians in Newfoundland and Labrador, but may be granted privileges to do C-sections. We could not find any research literature or data on this issue and would suggest that future research, perhaps with more contextualization for NL, may be required to look into the implications of having internationally-trained medical graduates provide obstetric services in our province.

Lack of a provincial rural maternity care strategy

To our knowledge, Newfoundland and Labrador does not currently have a rural maternity care strategy (nor does the province of British Columbia, according to our Subject Expert). Decision makers may wish to consider how developing a comprehensive strategy could help guide the planning of rural maternity services across the province. To support strategic

planning, our Subject Expert suggests that NL healthcare decision makers look into what has been done in other jurisdictions, including Ontario, Australia, and New Zealand, for guidance on developing a maternity care strategy for use in Newfoundland and Labrador (22–24).

Researchers in rural obstetrics acknowledge the importance of obtaining appropriate metrics for determining the locations and levels of service when developing a provincial rural maternity care strategy. They suggest tracking outcomes at the service catchment level and using population data, as opposed to using facility-utilization data (25,26). Future work should include an effort to develop such metrics for use in Newfoundland and Labrador.

Challenges in obstetric research

The lack of high-quality research on rural obstetrics makes it difficult to draw firm conclusions about all potential models available for rural obstetric care. The difficulty in gathering such evidence results partially from ethical considerations: it is unethical to randomly assign expectant mothers to different obstetric care models delivered in different locations with different travel distances. Most obstetric care research is therefore conducted retrospectively or when service programs are undergoing change. As a result, research findings may be biased because no blinding can be involved. Moreover, as with most research involving follow-up, participant attrition tends to pose problems for researchers.

Another challenge in research on obstetric care is the setting for such studies, most of which are performed in academic or tertiary settings by researchers without real-world experience in rural settings. This limitation can also result in bias in the research approach, analysis and in the interpretation of results.

The lack of robust evidence, however, should not impede the determination of decision makers in Newfoundland and Labrador to implement appropriate models of maternity care for rural women. To this end, it is essential that current models of care and proposed future changes in service delivery levels or obstetric care models be carried out within a robust and comprehensive evaluation framework that includes measures for maternal-newborn outcomes, measures for the satisfaction of providers and patients, and measures for cost-effectiveness (Dr. Jude Kornelsen, August 5th, 2019).

Joint Position Paper on Rural Maternity Care

Typically, CHRSP does not report on position papers in *Rapid Evidence Reports*. However, in light of the paucity of available research literature and the unique safety elements required when providing rural obstetric care, we decided to include the recommendations of the Society of Obstetricians and Gynaecologists of Canada's Joint Position Paper to provide important expert and professional perspectives on various aspects of rural maternity care that are not typically available from other sources of research evidence. While it is

important to point out that a Joint Position Paper does not constitute scientific evidence, strictly speaking, our Subject Expert suggested that its findings may have value for healthcare decision makers in Newfoundland and Labrador. We ask readers to refer directly to this document for more information regarding these recommendations (3).

The paper was prepared in Canada by a Joint Position Paper Working Group involving various national organizations:

- Society of Obstetricians and Gynaecologists of Canada (SOGC)
- Canadian Association of Midwives (CAM ACSF)
- Canadian Association of Perinatal and Women's Health Nurses (CAPWHN)
- College of Family Physicians of Canada (CFPC)
- Society of Rural Physicians of Canada (SRPC)

The authors conducted a MEDLINE search for articles about rural maternity care between 1995 and 2012 and provided recommendations based on the available evidence. Their key recommendations are summarized as follows:

- Maternity care should be provided as close to home as possible. Care should be patient-centered, culturally-sensitive, and respectful. Active policies should guide and support the provision of rural maternity care.
- An integrated perinatal system should be provided when local surgical and anaesthetic services are not available.
- Services should address the social and emotional needs of women. This is particularly important when women are required to leave their local communities.
- Inter-professional models (these consist of physicians, nurses and midwives) are an important component of rural maternity care. Compensation of healthcare providers should reflect the unique challenges and responsibilities in rural maternity care.
- Healthcare providers who are skilled in neonatal resuscitation and newborn care are necessary for rural maternity care.
- Training programs for healthcare providers should reflect all skills and competencies required for rural maternity care. This would include generalist training in maternity care, surgery and anaesthesia.
- Support should be provided for continuing education and patient safety programs.

Summary of Key Points

- Evidence-informed decision making on rural obstetric care is challenged by the lack of robust research evidence on this topic. Being unable to provide a comprehensive guideline for the delivery of rural obstetric services, this report focused instead on the issue that is most often highlighted in the literature—the skills and effectiveness of the various professionals who provide obstetric services for women in rural areas.
- Evidence from two high-quality systematic reviews suggests that, when compared to other models of care, midwifery models of care are associated with improved outcomes, fewer interventions, and increased patient satisfaction.
- Evidence from a moderate-quality review suggests that outcomes of perinatal surgical care by General Practitioners with Enhanced Surgical Skills (GPESS) and by specialists are comparable.
- The Joint Position Paper on Rural Maternity Care provides a series of recommendations regarding the provision of obstetric care in rural areas. In terms of service models, inter-professional models of care are recommended.
- Numerous contextual issues will have an impact on the applicability of the research findings to rural communities in Newfoundland and Labrador, including: geography, population size, population density, service demand, and health human resources/workforce models. The unique characteristics and challenges of healthcare delivery in rural Newfoundland and Labrador should be considered when developing strategies or designing obstetric service models for rural women.

Articles included in this report

1. Kornelsen J, McCartney K, Williams K. Centralized or decentralized perinatal surgical care for rural women: a realist review of the evidence on safety. *BMC Health Serv Res*. 2016 Aug 13;16(1):381.
2. Grzybowski S, Stoll K, Kornelsen J. Distance matters: a population based study examining access to maternity services for rural women. *BMC Health Serv Res*. 2011 Jun 10;11(1):147.
3. Miller KJ, Couchie C, Ehman W, Graves L, Grzybowski S, Medves J, et al. Rural Maternity Care. *J Obstet Gynaecol Can*. 2012 Oct;34(10):984–91.
4. Government of Canada SC. Population and dwelling counts, for Canada, provinces and territories, and census subdivisions (municipalities), 2011 and 2006 censuses [Internet]. 2011 [cited 2019 Jul 2]. Available from: <https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/hlt-fst/pd-pl/Table-Tableau.cfm?LANG=Eng&T=302&SR=1&S=3&O=D&RPP=9999&PR=10&CMA=0>
5. Government of Canada SC. Population Centre and Rural Area Classification 2016 [Internet]. 2017 [cited 2019 Jun 27]. Available from: <https://www.statcan.gc.ca/eng/subjects/standard/pcrac/2016/introduction>
6. Hoang H, Le Q, Ogden K. Women’s maternity care needs and related service models in rural areas: A comprehensive systematic review of qualitative evidence. *Women Birth*. 2014 Dec 1;27(4):233–41.
7. Sutcliffe K, Caird J, Kavanagh J, Rees R, Oliver K, Dickson K, et al. Comparing midwife-led and doctor-led maternity care: a systematic review of reviews. *J Adv Nurs*. 2012;68(11):2376–86.
8. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database Syst Rev* [Internet]. 2016 [cited 2019 May 13];(4). Available from: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD004667.pub5/full>
9. Yvonne Fontein JACA. The comparison of birth outcomes and birth experiences of low-risk women in different sized midwifery practices in the Netherlands. *Women Birth*. 2010 Sep 1;23(3):103–10.
10. O’Brien B, Chalmers B, Fell D, Heaman M, Darling EK, Herbert P. The Experience of Pregnancy and Birth with Midwives: Results from the Canadian Maternity Experiences Survey. *Birth*. 2011;38(3):207–15.
11. Orrantia E, Poole H, Strike J, Zelek B. Evaluation of a novel model for rural obstetric care. *Can J Rural Med Joule Inc*. 2010 Winter;15(1):14–8.

12. Durst M, Rolfe M, Longman J, Robin S, Dharam B, Mullany K, et al. Local birthing services for rural women: Adaptation of a rural New South Wales maternity service. *Aust J Rural Health*. 2016 Dec;24(6):385–91.
13. Lack BM, Smith RM, Arundell MJ, Homer CSE. Narrowing the Gap? Describing women's outcomes in Midwifery Group Practice in remote Australia. *Women Birth*. 2016 Oct 1;29(5):465–70.
14. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*. 2017 Sep 21;j4008.
15. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health*. 1998 Jun;52(6):377–84.
16. Gao Y, Gold L, Josif C, Bar-Zeev S, Steenkamp M, Barclay L, et al. A cost-consequences analysis of a Midwifery Group Practice for Aboriginal mothers and infants in the Top End of the Northern Territory, Australia. *Midwifery*. 2014 Apr;30(4):447–55.
17. Friedman AM, Ananth CV, Huang Y, D'Alton ME, Wright JD. Hospital delivery volume, severe obstetrical morbidity, and failure to rescue. *Am J Obstet Gynecol*. 2016 Dec;215(6):795.e1-795.e14.
18. Hehir MP, Ananth CV, Wright JD, Siddiq Z, D'Alton ME, Friedman AM. Severe maternal morbidity and comorbid risk in hospitals performing <1000 deliveries per year. *Am J Obstet Gynecol*. 2017 Feb;216(2):179.e1-179.e12.
19. Karalis E, Gissler M, Tapper A-M, Ulander V-M. Effect of hospital size and on-call arrangements on intrapartum and early neonatal mortality among low-risk newborns in Finland. *Eur J Obstet Gynecol Reprod Biol*. 2016 Mar;198:116–9.
20. Merriam AA, Wright JD, Siddiq Z, D'Alton ME, Friedman AM, Ananth CV, et al. Risk for postpartum hemorrhage, transfusion, and hemorrhage-related morbidity at low, moderate, and high volume hospitals. *J Matern Fetal Neonatal Med*. 2018 Apr 18;31(8):1025–34.
21. Pyykönen A, Gissler M, Jakobsson M, Petäjä J, Tapper A-M. Determining obstetric patient safety indicators: the differences in neonatal outcome measures between different-sized delivery units. *BJOG Int J Obstet Gynaecol*. 2014 Mar;121(4):430–7.
22. Hames K, Australian Health Ministers' Conference. National maternity services plan 2010. 2011.
23. Jaakkimainen L, Institute for Clinical Evaluative Sciences in Ontario. Primary care in Ontario: ICES Atlas [Internet]. Toronto, Ont.: Institute for Clinical Evaluative Sciences; 2006 [cited 2019 Aug 28]. Available from: <http://ra.oclsc.ca/ra/login.aspx?inst=centennial&url=https://www.deslibris.ca/ID/206238>

24. Raisler J, Kennedy H. Midwifery care of poor and vulnerable women, 1925–2003. *J Midwifery Womens Health*. 2005 Mar 1;50(2):113–21.
25. Grzybowski S, Kornelsen J, Schuurman N. Planning the optimal level of local maternity service for small rural communities: A systems study in British Columbia. *Health Policy*. 2009 Oct 1;92(2):149–57.
26. Grzybowski S, Kornelsen J. Rural Health Services: Finding the Light at the End of the Tunnel. *Health Policy Polit Santé*. 2013 Feb 20;8(3):10–6.

Appendix A: Our Consultant

Dr. Jude Kornelsen



Jude Kornelsen, PhD, is an Associate Professor in the Department of Family Practice at the University of British Columbia, co-Director of the Centre for Rural Health Research, and an Honorary Professor at the Sydney Medical School. For the past 15 years, she has worked towards creating, examining and sharing comprehensive evidence to support rural health planning, particularly in the area of rural maternity care. Key values that underlie this work include recognizing the centrality

of citizen patients in the planning process; privileging an expansive definition of evidence from individual, key stakeholder, and community experience, to scientific evidence and approaching research from an integrated perspective with a strong focus on knowledge translation.

Dr. Kornelsen has received over \$3,500,000 in tri-council funding, authored over 60 peer-reviewed, academic papers, additional community reports and policy briefs and works closely with the Ministry of Health, Health Authorities and the Joint Clinical Committees on policy-relevant research. Her research in the past decade has focused on the social and cultural consequence of lack of access to rural maternity and surgical care and then the ensuing health outcomes research prompted by the findings. In 2015, she was seconded to the Ministry of Health as a Special Advisor on Rural Issues and since then as participated in several provincial-level health care planning committees.

The Centre for Rural Health Research has just completed a study of the 'building blocks' needed to sustain maternity services in rural sites without local access to Caesarean section, is working on a province-wide evaluation of rural surgical programs funded through the Rural Surgical and Obstetrical Networks program and a SPOR-funded initiative in partnership with the Rural Coordination Centre of British Columbia called the Rural Evidence Review, with the objective of having citizen-patients articulate local evidence needs.