CHAPTER 8

ORGANIZATION OF SERVICES

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Canada

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Également disponible en français sous le titre :
Chapitre 8 : Organisation des services

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Publication date: July 2022

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PRINT Cat.: HP15-30/8-2022E
ISBN: 978-0-660-42967-0

PDF Cat.: HP15-30/8-2022E-PDF
ISBN: 978-0-660-42966-3

Pub.: 220022

CHAPTER 8

ORGANIZATION OF SERVICES

FAMILY-CENTRED FOCUS TO ORGANIZATION OF SERVICES IN MATERNITY AND NEWBORN CARE

Family-centred maternity and newborn care (FCMNC) begins with attitudes and practices that value and respect women and trans or non-binary people, and their families, and focuses on the many environments influencing the family, including the social, psychological, spiritual, and physical environments.

Achieving the goals of FCMNC is based on an organization of services that considers:

- All stakeholders when planning and providing care, including parents/families, community groups and agencies, home and community care, health care providers (HCPs), governments, and health care administrators and management;
- Provision of accessible care, with consideration given to the family's geographical, demographic, and cultural conditions;
- Keeping families together to whatever extent possible, if separation becomes necessary enabling communication between family members;
- Collaboration and communication among all participants, parents, and caregivers with regard to consultation, transport, and referral;
- The design of facilities and equipment required taking into account the needs of women and families;
- Provision of education for women, families, and HCPs;
- Coordination of services and supports within a community to ensure continuity of care;
- Common frameworks to quality of care, and ongoing evaluation of outcomes;
- Efficient and ethical use of personnel, facilities, and resources.

While also taking into account:

- Canada's size and low population density;
- The different needs of Indigenous communities;
- The shift in maternity HCPs—the attrition of family physicians providing maternity care and the growing contribution of midwives.

For references consult **Chapter 8: Organization of Services** in: Public Health Agency of Canada. Family-Centred Maternity and Newborn Care: National Guidelines. Ottawa (ON): PHAC; 2022.

ACKNOWLEDGMENTS

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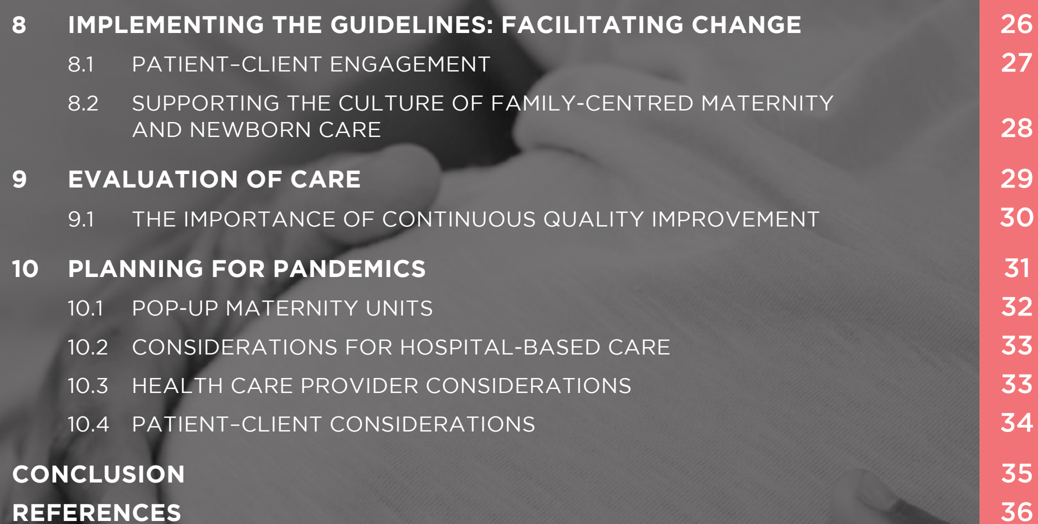

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The guiding principles of family-centred maternity and newborn care (FCMNC) provide the basis for national, provincial, regional, and local planning and organizing of maternal and newborn services. These principles state that pregnancy and birth are normal, healthy life events and family support, participation, and informed decision-making are central to all care. Care is organized in such a way that it responds to the physical, emotional, psychosocial, and spiritual needs of the woman, the newborn, and the family.

Care begins with attitudes and practices that value and respect women and trans or non-binary people, children, and families, and focuses on the many environments influencing the family, including the social, psychological, spiritual, and physical environments. Family-centred maternity and newborn care (FCMNC):

- Applies to all care environments;
- Recommends and enables care as close to home as possible;
- Encourages early parent–infant attachment as this is critical for newborn and child development and the growth of healthy families;
- Cares for the psychological needs of women and their families;
- Respects the diversity of people's lives and experiences;
- Recognizes the impact of racism on health and health care;
- Recognizes that discrimination against vulnerable families occurs;
- Incorporates informed decision-making;
- Functions within a system that incorporates ongoing evaluation.

To achieve these goals, the organization of services can take into account:

- All stakeholders when planning and providing care, including parents, community groups, community agencies, health care providers (HCPs), public health units, and hospitals;
- The pregnant women's health status (prior to and during pregnancy), and referral to the appropriate resources for care;
- Provision of accessible care, with consideration given to the family's geographical, demographic, and cultural conditions.

Responding to population needs, as informed by best available evidence, is vital in the planning and organization of care. Planning and organizing maternal and newborn services requires taking into account:

- Canada's size and low population density;
- The different needs of Indigenous communities;
- The shifting HCP mix through the attrition of family physicians providing maternity care and the growing contribution of midwives.

1 REGIONALIZATION OF MATERNITY SERVICES

The regionalization of health services in Canada took place in response to the persistent need to contain costs, a changing health care workforce, continued demands for services, and an aging population. Through regionalized health care, health planners anticipated meeting the more complex health care needs of rural residents in geographically proximal communities (regional referral centres) as opposed to large urban tertiary centres. The aim of this is to reduce the need to travel long distances and the associated disruptions. In addition, the policy objective of maternity care *closer to home* can be maximized for all aspects of care including preconception, the prenatal period, labour and birth, and the postpartum and newborn periods.

It is important to organize regionalized perinatal care so that women and families can access appropriate, safe and quality care as close to home as possible. The guiding imperatives behind regionalized perinatal care are decentralized services overseen by regionally defined governing bodies embedded in tiers of service that correspond to population needs. In this model, perinatal services without access to local caesarean birth function well in communities with a small number of births per year. In these communities, pregnant women are supported by both family physicians and midwives, and most of whom have uncomplicated pregnancies allowing for local birth. Also, in many rural settings in western and northern Canada, family physicians with enhanced surgical skills perform caesarean births, with the support of specialists in regional referral centres. Specialist involvement is required in larger populations where the absolute number of caesarean births is higher and complexity of care is also greater.

In a healthy, well-balanced system, the capacity of the maternity services aligns with the capacity of the site to appropriately care for the newborn. Case selection based on local resources is core to regionalized perinatal care, assuming that risk-associated triage is performed. Pregnant women with maternal or fetal risk factors are referred to facilities with more resources.

From a family-centred perspective, regionalized health care reduces the stress of having to relocate to a referral community for low-risk vaginal birth, improves outcomes, and begins to address the calls to action of the *Truth and Reconciliation Commission*. These calls to action have paved the way for actioning local birth as a cultural mandate and a part of the reconciliation process.[1]

Although the benefits of regionalized maternity care are built on the assumption that primary maternity care is available in or close to rural communities, the lack of stability of smaller maternity sites has made this difficult to achieve. This instability has been precipitated by difficulties in recruiting and retaining HCPs to work in low-volume sites that often have no local access to caesarean birth. Although maternity

services without local access to caesarean birth are safe—assuming appropriate case selection for local birth, regional support of rural HCPs, and access to efficient transport, should it be needed—the last two decades have seen a worldwide lack of provider sustainability in low-volume sites.[2–4] A notable exception to this in Canada are services in the North, where provider levels have been maintained over many decades.[5]

Effective and efficient transportation is essential in those instances when greater levels of care are needed in a timely way. The Society of Obstetricians and Gynaecologists of Canada (SOGC) *Maternal Transport Policy* describes regional transport systems, including the equipment and personnel to facilitate safe and effective transfer if required, and the need for 24-hour availability of transport systems and reliable and accurate communication between referring hospitals and transport teams. [6]

Although clear transport protocols are relevant through all levels of tiers of service, the need is greatest for transport from sites with low levels of resources (e.g., without local access to caesarean birth or on-site specialist care). Across Canada, 40.5% of rural women experienced travel time to a hospital longer than an hour. [7]

Effective transport planning and implementation requires a holistic perspective, one that takes into account the health consequences of delayed access to appropriate levels of care and the impact of transport out of a local community or away from an expected location on the birthing family. Such transport often results in increased stress and anxiety, particularly when it is urgent and leads to separation of the family at a time of heightened vulnerability. When pregnant women need to leave their community prior to the onset of labour, they are often separated from partners and family for extended periods. This may be due to the limited capacity of emergency transport to accommodate a woman's chosen support and lack of financial resources for family members to travel privately. In some instances, family members may need to stay behind to work or look after other family members.

Transport with a supportive family member is both clinically and psychologically optimal for the birthing woman. A family-centred planning paradigm works to put in place structures that mitigate the effect of required travel from the home community (e.g., subsidized accommodation in the referral centre that can support family members; travel subsidies beyond those available through Indigenous Services Canada's Non-Insured Health Benefits Medical Transportation Policy Framework for eligible registered First Nations and recognized Inuit clients), keep families together, and facilitate timely return to their home environment.[8]

Planning regionalized maternity care is based on unique community needs and geography to reduce pregnancy complications that may occur due to travel when relocating for access to care services. Health care resources can be directed in ways that are most productive, under the organization and guidance of provincial and territorial ministries and departments of health. Well-functioning regional maternity care also promotes the participation of the community in making health services–related decisions.

1.1 IMPORTANCE OF LOCAL CARE

Regionalized perinatal care, underscored by the importance of responsiveness to community need, has not played out in all jurisdictions across Canada as originally intended. Many rural areas have seen maternity services centralized, as opposed to regionalized, and the dissolution of low-volume services in their community. *High outflow* maternity services, where more than two-thirds of the population leave the community for care, may lead to:[9–12]

- The damaging cycle of fewer local births in an already low-volume setting, either because of clinical indications or because of maternal or family preferences;
- Diminished confidence of HCPs, which may reflect back to communities as lack of support for local birth, further encouraging patient–family outflow and challenging sustainability;

- A relationship between adverse maternal and newborn outcomes and distance to services;
- Health and psychosocial effects on pregnant women and their families, including in Indigenous communities where birthing on traditional land supported by extended family and community can be essential to care.

Appropriate care in the prenatal and postpartum periods also requires careful planning through a regional lens to ensure appropriate screening and triage for birthing women and newborns. Women with no complications of pregnancy can be comprehensively cared for by local HCPs or visiting primary care physicians or midwives. Referral to a specialist, if needed, can be facilitated through virtual care. But it is vital that women in communities without antepartum care have a plan to relocate either before or at the onset of labour and that they and their newborns have appropriate care in the postpartum period. All birthing families also need access to prenatal information and education. When in-person prenatal classes are not possible, virtual classes and written material can enhance family learning.

1.2 OUT-OF-HOSPITAL BIRTH

An essential part of regionalized maternal and newborn care is support for out-of-hospital births attended by registered midwives. The SOGC recommends risk assessment using established criteria in either a home setting or a birthing centre, as both locations are suited for birthing women likely to proceed with a normal vaginal birth.[13] Recognizing and supporting out-of-hospital birth with a regulated HCP ensures that triage, referral, and transportation to a greater level of care are in place across the regionalized system should transfer be necessary.[6]

1.3 INTEGRATION OF SUPPORT

A key determinant of safety in regionalized maternal and newborn care is the support for primary HCPs by other providers, such as specialists or sub-specialists.[4] Well-functioning, integrated tiers of services may be conceptualized as relationships, with sites with fewer resources depending on the backup and support of sites with more resources. The sites with more resources, in turn, offer support because they trust in the judgment of the services with fewer resources.[14]

Virtual communication has become increasingly important in health care with HCPs accessing on-demand consultation with other centres. For example, in British Columbia, four real-time virtual support (RTVS) pathways have been established using Zoom for Healthcare licences. One of the four pathways, MaBAL, for rural physicians with expertise in maternal and newborn care can be reached “24/7 through Zoom and by phone to provide guidance on urgent and non-urgent preconception, prenatal, antenatal, intrapartum, and postpartum presentations, for both moms and newborns”.[15]

The concept of these networks is not new. They have historically characterized triage across rural Canada, but are now intentionally implemented to formalize and optimize referral and support pathways.[16]

1.4 TIERS OF SERVICE

Although maternity care is similar across many jurisdictions in Canada, the provincial/territorial mandate for health service delivery means that developing a national classification system for tiers of service is a challenge. The SOGC recently recommended "the adoption of one national standardized set of definitions to encompass all facilities providing maternity care for different levels of anticipated risk."[17] Currently, only British Columbia and Ontario have developed tiers of service for maternity care in Canada.[18,19] The American College of Obstetricians and Gynecologists (ACOG) have refreshed their consensus statements on *Levels of Maternal Care*, and this framework could have applications to the Canadian context.[20]

Following the philosophical foundation of advancing tiers of service corresponding to population complexity, the SOGC consensus statement *Attendance at and Resources for Delivery of Optimal Maternity Care* describes levels of service and criteria of the various levels of care.[17]

British Columbia's *Tiers of Service* and Ontario's *Standardized Maternal and Newborn Levels of Care Definitions* further explain the levels of acuity and complexity that each level of service can safely support.[18,19] Expanding capacity to support complex perinatal needs through generalist, specialist, and sub-specialist care maximizes efficiency in meeting anticipated local needs while centralized sub-specialist care aligns resources most effectively to address less common complexities. Research has shown that sub-specialist centres are not optimal for the care of birthing mothers who are at low risk.[21]

2 IMPROVING THE SYSTEM

2.1 POLICIES AND PROCEDURES

An effective response to changing circumstances and emerging evidence is best achieved when policies and procedures towards a safe birthing environment are written, then regularly reviewed and updated. At a local level, all facility staff members should be able to easily refer to and provide input to these policies and procedures.

Written policies and procedures can be about:

- Communication about the care and support of women, infants, and families;
- Referral practices between agencies/services;
- Admission of women, infants, and families to hospitals and birthing centres;
- Assessment and criteria for discharge of women and babies from hospitals and birthing centres;

- Criteria for home birth;
- Referral to community services/supports;
- Identification and referral of women and/or infants in current or potentially abusive situations;
- Emergency transfer of mothers, babies, and support people, where possible, including the requirement for prior arrangements with a receiving health facility in the event of an emergency;
- Newborn resuscitation;
- Breastfeeding promotion, protection, and support;
- Maintenance of health records;
- Infection control and biohazard precautions including Level 4 pathogen and pandemic plans and responses;
- Storage of medications and emergency drugs;
- Hazardous materials and workplace safety practices;
- Responses to maternal/newborn emergencies;
- Evaluation of care and quality improvement;
- Internal disaster procedures, including in the case of fire;
- Cultural safety and health equity, including anti-racism and the elimination of discrimination against marginalized and vulnerable groups and people.

In addition, Accreditation Canada has developed Obstetrics Services standards to help organizations assess quality at the point of service delivery.[22] These standards are based on a culture of quality, safety, and family-centred care.

> **Optimal learning opportunities are multidisciplinary, with all care team members participating.**

2.2 EDUCATION FOR HEALTH CARE PROVIDERS

Ongoing learning by HCPs is essential as new evidence for best practices continues to emerge. Oversight of professional development and skills maintenance is generally the combined responsibility of professional colleges and individual practitioners. Whereas some of the specific competencies and behaviours needed are delineated by professional colleges, others reflect the needs and standards of the clinical care unit or agency.

Optimal learning opportunities are multidisciplinary, with all care team members participating—that is, physicians, midwives, nurses, social workers, nutritionists, lactation consultants, respiratory therapists, perinatal psychologists, and others. Three principles outlined in Chapter 1 are important components of education for all health care professionals delivering FCMNC:[23]

- A holistic approach to maternal and newborn care (Principle 6);
- Collaboration between care providers (Principle 7);
- Consideration of maternal and newborn care best practices from global settings that may be relevant to a Canadian context (Principle 17).

Education topics—ideally identified at the team level—may include:

- New treatments;
- Clinical concerns;
- Research evidence or emergent situations that affect care;
- Cultural safety, anti-racism, and non-discriminatory, respectful, and psychosocially sensitive care education.

Opportunities for learning may include interdisciplinary rounds, workshops, conferences, learning packages, formal undergraduate and graduate education programs, distance learning, self-study, or participation on new committees or in new projects or research. Regional administrators will want to consider the challenges that rural and remote HCPs may face if travel out of their community is difficult. Coordination of educational efforts through organized regional programs ensures consistency of information and reduces duplication of efforts. Increasingly, facilities and agencies are using virtual learning through online classes, conferences, and meetings.

2.3 BEST EVIDENCE AND CLINICAL PRACTICE GUIDELINES

HCPs can tailor guidelines to the needs of individual patient–clients.[23] Deciding about transport and referral is ideally based on “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.”[24] In this way, care achieves the Institute for Healthcare Improvement Quadruple Aim: optimal patient–client outcomes, patient–client satisfaction, provider satisfaction with care, and cost efficiency.[25]

Beyond improving clinical quality, guidelines are an effective way to organize and present the increasing volume of evidence HCPs face.

3 SERVICE DELIVERY LEVEL ACCOUNTABILITIES

Although facility standards are provincially and territorially regulated across Canada, researchers and health planners increasingly recognize the need for a common framework to ensure quality of care and facilitate evaluation.[26] However, only British Columbia and Ontario have published expectations for capabilities in maternal–newborn care. These publications include guidelines defining maternal and newborn levels of care, human resource requirements, and diagnostic tests and treatments.[27,28]

The commonalities between jurisdictional models align with consensus definitions such as those of the American College of Obstetricians and Gynecologists (ACOG) *Standards of Obstetric-Gynecologic Services*.[29] Recognizing the competencies required to safely support birth at home and in rural centres without local access to caesarean birth varies across Canada. Support for both these models of care is based on evidence on safety of care, an appreciation of Canada’s vast geography and the recognition of the psychosocial consequences of relocating for birth.

The SOGC supports women with low-risk pregnancies giving birth in rural and remote communities. The Society states that "risk assessment is not a once-only measure but a process continuing throughout pregnancy and birth. Referral of the woman to a higher level of care may be required when signs of complications become apparent".[30] Despite a national endorsement of such services, rural Canada has seen a precipitous decline in local health care due to resourcing challenges.

Perinatal care in Canada is based on a regionalized system of service delivery for both maternal and newborn care. Hospitals with local caesarean birth capacity provide referral backup for those without such capacity, and larger centres provide increasingly specialized care based on population needs. In facilities that do not offer caesarean birth (that is, birth centres and level I hospitals), key preconditions to care include informed discussions about the limitations in emergency situations; transport and other potential consequences of limitations in emergency situations; established obstetrical backup should it be necessary; on-site availability of medications to manage obstetrical emergencies; and medication to treat postpartum hemorrhage.[13] Refer to the SOGC consensus statement *Attendance at and Resources for Delivery of Optimal Maternity* for expected capabilities by level of service.[17]

4 PERSONNEL REQUIREMENTS

Families in Canada receive intrapartum care from a variety of health practitioners, including obstetrician–gynecologists, family doctors, nurses or nurse practitioners, and midwives. According to the Vanier Institute, nurses make up the largest group of maternity care providers in Canada.[31] The 2018 *Perinatal Nursing Standards in Canada* articulated four standards to which perinatal nurses are expected to adhere.[32] These standards support and endorse the principles of FCMNC, including relationship-based care, interprofessional collaboration, quality and safety, and evidence-informed practice.

Staffing decisions affect clinical outcomes as well as provider satisfaction and retention.[33,34] Evaluation of the impact of nurse staffing mandates on patient–client outcomes in California and on hospital outcomes in 15 European countries shows that lower nurse-to-patient ratios significantly affect surgical mortality and failure-to-rescue rates.[35,36] However, models of staffing for surgical units may not be appropriate for perinatal units, as their staff-to-patient ratios are based on the different care needs.

Recommendations on minimum staffing levels are generally based on new mother–newborn care being without complications, but all mother–baby dyads do not need the same level of nursing care. Postpartum ratios in particular can range from 1:1 to 9:1, depending on the level of care required for any complications[37]. The Association of Women's Health, Obstetric and Neonatal Nurses recommends the following patient-to-nurse ratios for perinatal care for healthy mother–newborn dyads:[38]

- One nurse to one woman for women labouring with minimal to no pharmacological pain relief or medical interventions;
- One nurse to one woman for women receiving oxytocin;
- One nurse to one woman with labour complications;
- Two nurses to one woman for vaginal and caesarean birth—one nurse for the mother and one nurse (with newborn resuscitation capabilities) for the baby;
- Two nurses up to 2 hours postpartum—one nurse for the mother and one nurse for the baby, or in the case of multiples, one nurse for each baby.

An indicator comparing nurse-to-patient ratios across Canada is currently not available. The Canadian Institute for Health Information (CIHI) is working to fill this gap by developing a nationally comparable, systematic method of measuring the number of patient–clients cared for per staff member.[39]

In addition to provider-to-patient ratios, the experience and skill mix of nurses is a key factor in perinatal staffing. Standardizing nurse-to-patient ratios in Canada might protect nurses from excessive workloads, but it might also prevent departments making independent decisions about staffing based on factors such as the availability of human resources and individual nursing skill and comfort levels.[40] In predicting personnel needs for births and postpartum care, factors to consider include different staffing models and patient–client needs in urban and rural hospitals. As noted earlier, mother–baby dyads in tertiary hospitals in urban centres are more likely to require higher levels of care than their counterparts in low-risk only birthing centres.[37] In small rural hospitals where resources are limited, the need for flexible staffing may not allow for the same nurse-to-patient ratios as implemented in higher-resource settings.[41]

Midwives are playing an increasingly important role in maternity care in Canada, offering a wide range of services and working with other medical professionals as needed. Care by a midwife of mothers and babies at low risk is cost effective and associated with shorter hospital stays and fewer interventions.[42] Also, midwifery-led care may improve birth outcomes for vulnerable women with low socioeconomic status.[43,44]

Midwifery regulation and health care delivery vary significantly between jurisdictions in Canada.[45] Some provinces and territories have been regulating and funding midwifery for over 20 years, with the colleges of midwives the regulatory bodies that provide standards and guidelines for the profession.[46] In other jurisdictions, the profession remains unregulated and unfunded.[46]

Given that the perinatal period is characterized by significant biological and psychosocial changes, administrators will want to consider how staffing and coordinating allied health professionals and ancillary personnel can complement the work of primary HCPs to provide comprehensive and integrated family-centred care. The SOGC's *Attendance at and Resources for Delivery of Optimal Maternity Care* identifies appropriate resources, personnel, and facilities to encourage safe physiological birth in a family-centred environment in rural and urban communities. This consensus statement is built on an appreciation of birthing women's autonomy in making informed decisions "even in difficult situations when health care providers disagree with the choice."[17]

The consensus statement also recognizes the adverse psychological and sociocultural consequences of requiring birthing mothers to leave their community.[17] It urges HCPs to consider not only the health of the women and their babies but the psychosocial risks when selecting appropriate locations for birth. In addition, the statement calls for adopting a national, standardized set of definitions for all facilities providing maternity care based on their capacity to care for varying levels of risk. This would allow for a national framework for evaluation.

5 INTERPROFESSIONAL CARE

Multidisciplinary collaborative maternity care teams are important in sustaining the overall availability of HCPs and improving access to and choice in maternity care in Canada.[47]

In 2006, the SOGC led the Multidisciplinary Collaborative Primary Maternity Care Project with the objective of developing guidelines, determining national standards, and increasing collaboration between professionals.[48] Recommendations included that decision makers and other key stakeholders commit to developing coordinated care, advocate for the resources required to support appropriate care, and reach a consensus on key strategies to establish, retain, or expand multidisciplinary collaborative maternity services.[48]

The project identified key principles to a collaborative model:[48]

- Quality, woman-centred maternity care, based on equity of access to and integration of services;
- Based on best evidence and practice guidelines;
- Professional competence with commitment to the collaborative model and mutual trust and respect;
- Shared values, goals, and visions, with honest, open, and continuous communication;

- Responsibility and accountability including the acceptance of the need to discuss financial issues;
- Effective, integrated regional provision of services to include locally based care with knowledge of available services.

This model aligns closely with FCMNC through common, articulated principles and through recognition of the importance of community consultation in developing locally-responsive models of care. The principles note specifically the unique challenges in low-volume rural settings: "In rural areas the challenge is less one of size and inter-relationships and more the enduring questions regarding access to and availability of care, and who provides that care. It is well known that the rural hospital closures and downsizing occurring across the country is placing new challenges on maternity care providers."[48,p.26]

Since access to perinatal services varies across communities, many jurisdictions do not have standard protocols for sharing information about patient–clients with providers. This can result in missed referrals, inconsistent messaging, and a lack of coordinated care.

Two pilot communities in the Northern Health authority in British Columbia have established an integrated service model using practice support coaches and care process coaches to help bridge primary care practice with other services in the health authority. These communities have reported increased and improved access to primary care for prenatal service, including for vulnerable pregnant populations who subsequently receive evidence-based care for the remainder of their pregnancies and onwards.[49]

Other studies that evaluated integrated hospital and community models of perinatal care have reported increased screening for and treatment of perinatal mood and anxiety disorders (PMADs).[50,51] Standardization of processes related to the coordination of perinatal care led to a reduction in risk factors across the social determinants of health and overall improved quality of care through clinical and professional integration.

The SOGC consensus statement *The Roles of Multidisciplinary Team Members in the Care of Pregnant Women* (2016) prioritizes the safety and interests of the patient–client while respecting their autonomy and maintaining respect for all team members.[52] The consensus statement highlights the importance of defined roles and responsibilities within teams and the importance of addressing barriers to successful collaborative care.

6 TRANSPORT

The process of evacuating pregnant or birthing women from rural and remote areas was developed through the 1960s and 1970s, in response to a perceived lack of safety in low-resource settings. Efficient and timely access to emergency transport for women and their newborns is essential for safe regionalized care. However, the stress of separating from family and losing community connections and the potential for financial hardship on leaving the community can have deleterious effects.[5] The trauma of relocation has led to some women concealing pregnancy until they are in labour, often at the cost of access to prenatal care and screening.

Sensitivity to the family's view of transport together with strategies to meet acute clinical needs can lead to improved care. In many rural Indigenous communities, local birth has been reclaimed through community midwifery programs.[53,54] Nevertheless, there are instances when higher levels of care are necessary, requiring culturally safe transportation.[55] In 2017, Indigenous Services Canada instituted funding for escorts for rural Indigenous birthing women, mitigating some of the effects of isolation due to relocation.[56]

> **Sensitivity to the family's view of transport together with strategies to meet acute clinical needs can lead to improved care.**

If the health of the newborn is a concern, outcomes are better if the transport occurs during pregnancy.[57–60] Despite the clinical advantages of caring for high-risk cases in appropriately resourced centres, the effect of transport on the family needs to be considered.[61] The stress of relocating from familiar settings, the loss of a known care provider, separation from supportive family and community members, and the financial costs of accommodation and travel are additional stresses for both the birthing mother and her family.[62] To this end, the most effective mitigation strategy is for HCPs to try to identify high-risk pregnancies and births early enough in the prenatal period to avoid urgent transport.

There are also times when, because of work or the need to care for other children, family escorts may not be available. This can result in the birthing mother feeling isolated and alone, which can further exacerbate her concerns for the health of her baby. The principles of FCMNC that underscore best practices are grounded in the importance of keeping families together through accompanied transport. Recognizing that there will be times when this is not possible, HCPs and administrators can work to mitigate the consequences of this stress.

Essential components of effective family-centred transport include:[59]

- Clear and honest communication about the health status, prognosis and anticipated interventions required to optimize the health of the birthing mother and her newborn;
- Presence of family members during stabilization and transport (if possible);
- Continuous, professional support given to the family;
- Including the family in care planning and decision-making;
- Ongoing communication from the referral site on the status of the mother and baby if the family is separated.

6.1 REGIONALIZATION AND TRANSPORT SYSTEM STRUCTURE

The regionalization of maternal and newborn care is based on maximizing access to and capacity of neonatal intensive care units (NICUs).[61] Two related goals of regionalized perinatal care include:

- Expedient identification of high-risk pregnancies to ensure birth at a hospital with the appropriate level of care;
- Speedy recognition of high risk not identified during prenatal care in order to efficiently transport infants to a more appropriate level of care.[63]

The key to successful regionalized perinatal care is therefore the identification and timely transport of at-risk pregnant women.

Best practices for efficient transport include a single access point and provincial/territorial coordination to prioritize needs based on clinical acuity and the integration of transport modalities (air and ground).[64] Single-call dispatch within a formalized network of patient–client transfer also increases provider satisfaction.[65,66] In addition to streamlined access, transport systems need to be able to offer medical advice, rapidly dispatch transport teams, and identify a receiving hospital.[59] In line with FCMNC, after the necessary care in a tertiary centre, maternal transport services also repatriate the mother and newborn, and families to sites close to home, as soon as possible.

6.2 ESSENTIAL COMPONENTS OF A REGIONAL REFERRAL AND TRANSPORT PROGRAM

The first component of an effective transport system is to avoid unanticipated or urgent transport. Ideally, high-risk pregnancies are identified before the onset of labour and the optimal place of birth is chosen based on anticipated resource needs. This is predicated on comprehensive care during the prenatal period and the full inclusion of birthing mothers and families in decision making. Despite efforts to mitigate the need for perinatal transport, there will be instances when unanticipated and urgent transport is required.

Because of the jurisdictional nature of Canadian health care, emergency transport mechanisms vary widely in terms of processes and infrastructure. Minimum criteria start with a well-resourced system with the sustained investment in regional health authorities.[67] Standardization of equipment, education, clinical competencies, and quality indicators is also necessary.[59,68]

Adverse outcome mitigation strategies for reducing non-tertiary deliveries include a perinatal telephone advice line to optimize in utero transfers, and perinatal outreach education to providers at non-specialty perinatal centers.[68–70]

> The first component of an effective transport system is to avoid unanticipated or urgent transport.

Designated emergency medical service (EMS) vehicles may need to be specialized. For example, use of dedicated vehicles by the four specialized transport teams across Ontario have been shown to decrease complications and optimize the quality of care for sick newborn babies.[71] Transport equipment should meet occupational health and safety standards for crew and the communications infrastructure used in smart phone, satellite phone, or webcam communication should be encrypted.[72]

At a systems level, the value of a *no refusal policy* is identified as a key intervention for improving care. A "no refusal policy" means a facility cannot refuse or deny the transfer of a patient–client needing critical care. Although the policy was developed based on trauma care, this mechanism of enabling timely triage is transferable to maternity care.[73]

6.3 DECISION MAKING FOR MATERNAL TRANSPORT

Maternal transport can occur for many reasons: preterm labour; preterm rupture of membranes; severe gestational hypertension or other hypertensive disorder; antepartum hemorrhage; intrauterine growth restriction; inadequate progress in labour; malpresentation; and maternal trauma.

Transport is contraindicated if:

- The mother's condition is insufficiently stable;
- The fetus' condition is unstable and threatening to deteriorate rapidly;
- Birth is imminent; or
- Weather conditions are hazardous for transport.

Canada's vast area and varied climate means that urgent transport from a rural community may not be feasible and that the dangers of immediate transport outweigh expected benefits. Situational assessment is a key part of the decision-making process. Such assessment requires attention to weather and road or flight conditions, the health status of the mother and baby, her stage in pregnancy, the likelihood of imminent birth, and the availability of skilled HCPs.[72]

The key principles that underscore transport decisions include:[67,72]

- The need to consult with specialists to determine whether transport is indicated for a high-risk pregnancy or birth based on risk factors for the birthing mother, the baby, the stage and progress of labour, and potential conditions en route;
- Communication between all team members including the sending and receiving HCPs;
- Supporting rural sites that may not have the resources to stabilize infants for long periods;
- Minimizing the number of transfers for the birthing mother or her baby;
- Avoiding transfers that separate the mother and her baby;
- The family's preference for relocation given the loss of existing social support networks.

While no national guides exist to help in obstetrical and neonatal transport decisions, Alberta Health Services have developed an "Obstetrical Transport Decision Tree" as part of their guideline *Criteria to Support Appropriate Level of Obstetrical Care*.[72]

6.4 MATERNAL TRANSPORT POLICIES AND PROCEDURES

Maternal transport plays an important role in ensuring that mothers in all regions have equitable access to the appropriate level of care for best mother and baby outcomes.[68] Barriers to successful transport of pregnant women include:[68]

- Lack of expertise in triaging pregnant women at high risk;
- Limitations of screening in populations at low risk;
- Lack of maternal transport capacity;
- Inflexibility in the criteria applied to assess referrals.

There are no Canadian national guidelines specific to maternal transport, which emphasizes the need for institutions to have written policies to follow when transferring and receiving a pregnant woman. The policies should describe:[72]

- Transport team members, skills required and responsibilities of both the sending and receiving sites;
- Transportation and equipment requirements;
- Mechanisms to measure quality assurance and system improvements;
- Communication and record sharing protocols.

Effective policies also emphasize a family-centred approach and include:

- Ongoing and open communication with the woman and her family about their circumstances so that they can actively participate in decision making;
- Continuous, supportive care from qualified personnel;
- Effort to keep family members together, with mechanisms in place for them to communicate with each other if they do have to be separated.

6.5 NEONATAL TRANSPORT POLICIES AND PROCEDURES

Although best outcomes are achieved when transport occurs antenatally, some infants will inevitably need to be transported. As with maternal transport, it is critical that both the sending and receiving sites have in place policies and procedures to do with the transfer of a newborn. These would include describing the necessary personnel and equipment, communication, documentation, and sharing of medical documents (records, ultrasounds, blood tests). Having dedicated neonatal retrieval teams for transfer improves outcomes.[59]

Whenever possible, the newborn should be stabilized in the referring hospital prior to transport.[74] For neonatal stabilization, the Canadian Paediatric Society recommends that providers use Acute Care of At-Risk Newborns (ACoRN), an eight-step clinically oriented framework to gather and organize information, establish priorities, and intervene appropriately.[75] When deciding on a mode of transport, it is important to consider the physical stressors on the newborn. Newborns are particularly vulnerable to vibrations, and these need to be minimized during transportation to reduce further stress.[76]

THE CANADIAN PAEDIATRIC SOCIETY RECOMMENDS THE FOLLOWING TOOLS TO USE WHEN MAKING DECISIONS ABOUT NEONATAL TRANSPORT:[59]

Tool	Purpose
Mortality Index for Neonatal Transportation (MINT)	• Produces a mortality prediction score for infants based on the information given to a retrieval service
Transport Risk Index of Physiological Stability (TRIPS)	• Used to predict mortality at 7 days and overall using four weighted items: temperature, blood pressure, respiratory status, and response to noxious stimuli
Risk Score for Transport Patients (RSTP)	• Differentiates infants requiring interventions en route from those who do not need these • Has been proposed to aid triage
Situation, Background, Assessment, Recommendations, Read-back (SBARR)	• Enhances communication and reduces errors • Intended for use in hand-overs
Transport metrics recommended by the American Academy of Pediatrics and a Canadian initiative	• Proposes expected transport times (mobilization, response, stabilization), noting that transport time depends on weather, distance, and mode of transportation, factors that are often out of the control of the transport team

The Canadian Paediatric Society's position Statement, *The Interfacility Transport of Critically Ill Newborns,* identifies components of a neonatal transport team, skills and training, equipment and vehicles, and systems and processes, emphasizing the importance of a family-centred approach to transfer. Refer to *The Interfacility Transport of Critically Ill Newborns* for recommendations on the personnel, equipment and vehicles, systems and processes, and quality assurance required to transfer newborns.[59]

6.6 TRANSPORT PERSONNEL

Transport personnel require the collective expertise, technical skills, and clinical judgment to provide supportive care for the wide variety of emergencies that can occur during transport. Team members can include physicians, nurses, respiratory therapists, and emergency medical services (EMS), consistent with the expected level of need of the woman or newborn being transported.

Alberta Health Services *Criteria to Support Appropriate Level of Obstetrical Care* and the Canadian Paediatric Society's *Interfacility Transport of Critically Ill Newborns* position paper outline core competencies of HCPs in maternal and newborn transport:[59,72]

- Ability to monitor women, fetuses and neonatal vital signs, and infants, and to assess and respond to changing conditions;
- Ability to perform neonatal resuscitation and cardiopulmonary resuscitation (CPR);
- Ability to initiate and administer intravenous (IV) therapy;
- Ability to conduct an emergency birth;
- Flexibility, critical thinking, timely judgment, and problem-solving skills;
- Independent thinking;
- Good leadership and interpersonal communication skills, and appropriate crisis resource management skills.

For most transfers between hospitals, paramedics are the appropriate clinical care provider, but there are scenarios where, for clinical, logistical, and/or general supportive reasons, a midwife, physician, or nurse should travel with the patient–client.

In the case of neonatal transport, members of the transportation team require additional training to be able to stabilize the infant. If the infant has significant life-threatening instability, a neonatologist may accompany the transport team to help stabilize the infant.[77] The Canadian Association of Pediatric Health Care Centres (CAPHC) *Competencies Profile—Interfacility Critical Care Transport of Maternal, Neonatal, and Paediatric Patients* lists detailed competencies that cover a broad spectrum of requirements for clinicians engaged in transport.[78]

6.7 TELEMEDICINE

Within a regionalized model of care, telemedicine can help reduce avoidable transfers by connecting specialists with patient–clients.[79–81] For example, telemedicine has been used to assess retinopathy of prematurity in very low birth-weight newborns; for fetal ultrasonography and echocardiography; and to support families and provide education.[82] Neonatologist consultations via telemedicine have resulted in fewer interfacility transfers compared to telephone consultations.[80] A majority (93%) of providers who piloted telemedicine technology reported improved patient–client safety or quality of care.[83]

These findings are particularly important for rural and remote community residents who may be able to avoid long distance transports to tertiary care centres as a result of increased integration of telemedicine into networks of care.

7 FACILITIES AND EQUIPMENT

Although there are many ways to support FCMNC, the physical design of birthing facilities plays a key role. Birthing environments designed through a family-centred lens take into account the experiences and preferences of mothers and families. Facilities can meet the needs of women and families while achieving the overriding objective of safety for families and staff.

It is important to ensure, however, that the philosophy of care is primarily supported by the people who provide care. If changes to the physical facility are desired, they are best accompanied by efforts to support and sustain the practice of HCPs. Design decisions can impact teamwork in the context of care. The physical setting is as important as technology in facilitating communication. The culture of communication is supported by spatial transparency (the importance of seeing other employees); the creation of a collaborative and/or shared workspace; and *neutral zones*, that is, spaces that belong to everyone and neither create nor reinforce hierarchies (as is the case in doctors' rooms vs nurses' rooms).[84]

> **Birthing environments designed through a family-centred lens take into account the experiences and preferences of mothers and families.**

FCMNC principles are critical to consider when planning and organizing the physical facility. These principles recognize that birth is a celebration and, in most situations, a normal, healthy process. Women and families can be supported in a friendly, comfortable single-room environment, where they labour, give birth, spend time with their babies, and are cared for, together, without the disruption of moving from place to place or being separated from their newborn (known as single room maternity care, or SRMC).

The focus on maternal and newborn care has shifted towards improving quality of care.[85] This takes into account respectful and appropriate care and considers the family's satisfaction with their experience.[85–87] The provision of respectful maternity care is in accordance with a human rights–based approach to reducing maternal and neonatal morbidity and mortality. The World Health Organization (WHO) recommends:[88]

- Effective communication and engagement of all HCPs and administrators in response to women's needs and preferences;
- Interventions that aim to contribute to a respectful and dignified birthing experience.

This approach to dignified maternity care recognizes that:

- The central objective of care for women, babies, and families is to assist women in giving birth to healthy babies, with appropriate facilities and equipment;
- Caring for women is best done in the context of their families, and families can be comfortably accommodated in the environment and feel part of the process;
- When difficulties arise, a critical objective is to help families be together as much as possible;
- Technology needs to be used appropriately.

An integrated design process means involving the facility community in making decisions so that the priorities of the people using the facility—HCPs, staff, patient–clients—are at the centre of planning. This process is referred to as *social design*. Social design recognizes that families have diverse sociocultural needs, depending on the characteristics of the community and of the individual family.[89] Attention to diversity, through direct input, can lead to a tailored approach to the needs of the community. For many Indigenous communities, for example, birth is a collective experience supported by Elders and other family and community members during labour and after the birth. This requires enough space in the birthing room to respectfully welcome the woman's support people alongside HCPs.

Changing population characteristics can also factor into design decisions. A salient example is the rise in obesity rates in industrialized countries.[90] Design decisions that accommodate this trend include making sure an adequate number of beds, chairs, examination tables, blood pressure cuffs, and specialized equipment such as lifts are available to accommodate women living with obesity. Design should also consider the space required for women and their HCPs to navigate comfortably and safely and to accommodate other family members.

Ultimately, patient–clients value being met by "a welcoming homely space for themselves and their visitors that promotes health and wellbeing."[91]

Changing patterns in access to health care, namely the decreased length of hospital stay, also need to be taken into account when planning FCMNC.[92,93] Design should reflect increased needs for antepartum and postpartum outpatient spaces. This may include private consultation or infant feeding locations near labour and birth units.

Although periods of new construction or major renovation are opportune for integrating family-centred processes and refreshing dated-looking facilities, existing spaces can also be improved using fewer resources. Examples include:

- Having showers for pain management instead of renovating to install birthing tubs;
- Using conventional hospital beds if no funds are available for special birthing beds;
- Using labour rooms for labour, birthing, and recovery;
- Expanding unit boundaries for walking during labour.

Other items, such as birthing balls, birth stools, rockers, sleeping chairs for partners, and decorative items that soften the environment, can be purchased at minimal expense. But design considerations extend beyond the birthing room to include continuous care, beginning with the birthing woman and family entering the facility.

Recognizing that FCMNC applies to all care environments, it is important to integrate family-centred design principles into all perinatal environments, including NICUs. In addition to meeting the newborn's physical needs, NICUs can support the psychosocial needs of the infant and their family.[94] In particular, design principles can help HCPs and families share the decision making and enable parents to be their baby's primary caregiver.[95] Single-family NICU rooms have a number of benefits, supporting families to make choices in the environment (by, for example, adjusting lighting, temperature, noise); improving rates of breastfeeding; and reducing parental stress and anxiety, particularly for those families that may be far from home for a prolonged hospital stay.[95]

Best practice standards for the design of a NICU also recommend a family library or education area, with information about NICU procedures, infant loss and grieving, and local resources.[96]

7.1 PHASES OF CARE

Comprehensive maternal and newborn care encompasses a number of different phases. Facilities that incorporate such care can include a triage area for women who are not yet in active labour or are being observed to determine whether labour has begun. Some facilities will provide care for women requiring hospitalization during pregnancy, usually referred to as an antenatal unit.

According to guidelines established by Perinatal Services BC, the labour, birthing, and postpartum space is designed to avoid relocating the mother, utilizing SRMC. SRMC increases patient–client satisfaction, and can reduce infection rates, length of hospital stays, the number of staff positions, and direct costs.[97–99] Nurses have also expressed greater preference for single-room maternity care in terms of the physical settings, their ability to respond to family needs and teach families, the nursing practice environment, peer support, and perceived level of competency.[100] Their satisfaction was significantly higher than that of their colleagues in standard room settings.

Although the goal of a complete hospital stay in a single room may not be possible for some existing buildings, reducing the number of relocations during a course of care could be achieved without infrastructural change.

If a caesarean birth is necessary, the woman is transferred to an operating room, and then returns to the same maternity/newborn unit.[101] Ideally, the operating room and recovery area are both within the maternal and newborn care area.

In the context of the COVID-19 pandemic, having a large number of single-family rooms in a NICU decreases the need for more restrictive parental presence policies, allowing families to stay together.[102]

7.2 DESIGN PRINCIPLES AND DESIGN PROCESS

The functionality of space is determined by users or occupiers of that space. To enhance FCMNC, it is key to think about how women and families will experience the space. The following points are useful to consider:

- How do families find their way to the unit?
- What are the first impressions of families arriving at the hospital and on the unit?
- Is there adequate affordable parking next to the entrance? Is the walk-in entrance clearly marked?
- Does the unit have private areas where families can talk to staff, talk on the phone, or be together?
- Are there play areas for children?
- Is there a secure storage area for the family's belongings and dietary supplements (fridges, coffee/tea facilities)?
- Are there conference rooms, work areas, and lounges available for staff members?
- Are the surroundings warm and inviting? Is it clear that this is a place for families?

HSC WINNIPEG WOMEN'S HOSPITAL

The HSC Winnipeg Women's Hospital opened in December 2019 with a vision "to serve the unique and diverse health care needs of women through the life cycle, newborns and families on their journey of health, hope and healing." It also set out to "advance care through excellence in research and education to enable and support caregivers in their quest for safe, effective, innovative, compassionate and holistic care while being sensitive to women's lived experience" and to be a place "that is welcoming, respectful, calming and peaceful."[104]

Guiding principles included striving for safety, prioritizing patient–client experience, engaging in consultation, ensuring staff involvement, and striving for a high quality and healthy indoor environment and positive neighbourhood integration. Women and family-centred care were key guiding principles, with family-centred care emphasizing a "model that is about providing respectful, compassionate, culturally responsive care that meets the needs, values, and preferences of patients and their family members."[104]

The design process was an integrated one, based on collaboration and communication with a wide range of key stakeholders. This resulted in ensuring places for family respite, places for family at the bedside, places to gather and spiritual spaces.

Mapping tools and three-dimensional (3D) modelling can maximize efficiencies in the design phase. Making a facility more family-centred without capital expenditure can be accomplished by carefully selecting interior colours, furnishings, finishes, and lighting to contribute to the comfort of the environment. In addition, facilities can incorporate relevant art work, murals, quilt work, and other decorative features that depict culturally diverse and inclusive representations of families. They may also offer services that promote FCMNC principles such as sibling tours and activities, nourishing snacks or meals as alternatives to food from the hospital kitchen, and personalized messages in families' rooms.[103]

Closely associated with a process for space design is the need for a *change management plan* to guide the transition from the existing space to the new environment and to encourage positive models of interaction between personnel and families in a new context. Although the physical layout of antenatal wards can encourage or hinder FCMNC, it is essential to recognize the influence of *culture* on such care and the importance of relationships as building blocks to a culture that encourages placing the birthing woman and her family at the centre of care.

7.3 HOSPITAL BIRTHS: PRENATAL, ANTEPARTUM, BIRTH, AND POSTPARTUM FACILITIES

Facilities that are 'patient-friendly' have easily accessible and usable layouts that allow for movement, communication, and connection between family members.[91] It is important to have adequate planning and space for independent and assisted wheelchair users throughout each of the antenatal, birth, and postpartum facilities.[105] Adequate storage space for handling aids, such as lifts and wheelchairs, is also needed.[106] Privacy is a very important aspect of care; it can be established and maintained through high levels of sound isolation and window drapes in all facilities.[106]

The International Health Facility Guidelines and the Canadian Health Care Facilities *CSA Z8000-18: Planning, Design and Construction* and other guidelines provide recommended actions for the design and equipment in labour and birth units.[106,107]

RECOMMENDATIONS FOR DESIGN AND EQUIPMENT

Antepartum Inpatient Units and Home Care

Women who need to be hospitalized during their pregnancy because of complications related to themselves or their babies are cared for in antepartum units.

Design recommendations for antepartum inpatient units include interventions to reduce sleep disturbance, for example, using a laminated door sign with sticky notes to write the mother's preferred wake time; and providing white noise machines, eye masks and ear plugs to facilitate sleep.[108]

Some jurisdictions provide antepartum home care for women with certain complications of pregnancy. A home care nurse visits regularly to conduct assessments and provide education based on the mother's needs. The goal of antepartum home care is to support families at home and reduce the number of hospital admissions.[109] Research out of BC Women's Hospital has shown that antepartum home care results in improved psychosocial outcomes and reduced costs for the system.[110]

Entry/Reception Area

An entry/reception area with a welcoming and informal atmosphere, public amenities and waiting areas for families is ideal. Clear access to admitting personnel is important.[111] The area should be monitored to prevent unrestricted access and to optimize safety.

Triage/Early Labour Lounge

WHO recommends delaying admission to a labour ward until active first stage. Such a delay decreases the likelihood of intervention to accelerate labour.[112] However, there may be instances when the risks of return travel outweigh the benefits of being at home, for example, if the labouring mother has far to go to get home and back again or if the weather makes travel unsafe. An early labour lounge provides a safe space for women and their families to be comfortable.

Design considerations for early labour lounges include handwashing stations, showers, areas for exercise and walking, a separate quiet lounge, and a nutrition station with light snacks and beverages.[106,113]

Operative Birth Room

The operative birth room is used for caesarean births, for situations of risk to the mother or baby, or when a complication is expected or in process. In keeping with infection control guidelines, operative birth rooms should be in a restricted area near to birthing rooms. Operative rooms should also be in close proximity to the NICU.[119] *CSA Z8000 Canadian Health Care Facilities—Planning, Design and Construction* includes a list of the equipment needed for an operative birth room, for example:[106]

- Each operative birth room should be at least 60 m^2 in size, with an adjacent scrub area.
- Space for resuscitation and other care of the baby should be in a separate part of the operative birth room or in a room immediately adjacent (see "Infant Resuscitation Area").
- Any room functioning as an operative birth room should contain or have immediately available all the equipment necessary for the birth area.
- The room may have a bed with stirrups and retractable base, or a birthing bed.
- There should be separate wall suction and oxygen for mother and baby.

Labour/Birthing/Postpartum Room, or Single-room Maternity Care

Ideally, women labour, birth, and stay in one room after the birth. This space may have multiple functions, for example, resuscitation, stabilization, observation, examination, etc., depending on the infant or mother's needs.

Regardless of the size of the room, the birthing mother should be supported in her choice of labouring position and mobility. A non-clinical ambience promotes relaxation, with the surroundings playing an important role in helping produce oxytocin during labour.[106,114] Ideally, each room is equipped with a private toilet, shower/tub, and a window with an outside view.

The birth environment not only impacts the woman's birthing experience and her and her newborn's outcomes, it also affects the woman's birth supporters and maternity care staff.[114–117] Control over the environment of the room (e.g., the lighting, temperature, freedom to close or open the door) and freedom of movement, in particular, promote the woman's and her family's overall comfort, suggesting that families could benefit from having a variety of options in how their room is set up and bring additional supplies from home to improve overall comfort.[118]

CSA Z8000 Canadian Health Care Facilities—Planning, Design and Construction includes a list of the equipment recommended for SRMC. Each birthing room needs:[106]

- Separate oxygen, air, and suctioning facilities; easily accessible gas outlets (which may include nitrous oxide); and wall-mounted equipment, although this may be covered;
- Natural and/or indirect lighting for labour and an adequate light source for medical procedures;
- An emergency power source;
- Smoke detectors;
- A telephone with an outside line;
- A nursing call system with data outlets and call buzzers near the bed and in the bathroom.

Postpartum Mother/Baby Rooms

If single-room care is not available, the mother and infant should still stay together after the birth. Design requirements for postpartum FCMNC include:

- A comfortable bed for the mother and a self-contained bassinet for her baby with capacity for a 24-hour supply of infant needs;
- A sleeping surface for a support person;[106]
- Handwashing facilities in each room, and a toilet and shower in or next to each room;
- A refrigerator and freezer to store expressed breastmilk;[103]
- An over-bed table and light, and a bedside cabinet;
- Storage space for supplies and laundry;
- A rocking chair;
- A telephone with an outside line;
- A television/monitor for educational purposes.[103]

Infant Resuscitation Area

A resuscitation area may be needed if a baby requires medical intervention or monitoring, as the importance of not separating mothers and babies is well established (WHO, 2018) and the mother and/or her partner should remain at the baby's side.[112]

While there are no Canadian guidelines, the American *Recommended Standards for Newborn ICU Design* recommends a resuscitation area of 13.0 m^2 for each bassinet to accommodate the staff and equipment necessary for resuscitation and stabilization. A resuscitation area for two babies (at minimum) should be considered in order to accommodate multiple births.

Each resuscitation area requires the following:[119]

- A handwashing facility;
- A counter/workspace;
- Medical gas supply;
- Lights on separate switches;
- Privacy for each mother–baby dyad or family;
- Supplies and resuscitation equipment (these may be stored nearby);
- An overhead infant warmer.

Neonatal Intensive Care Units (NICUs)

Single-unit NICUs are optimal for providing families with the privacy and support they need.[96,120] Separating mothers and babies is often the result of space limitations and habitual hospital practices. NICUs are increasingly being redesigned to move away from the open bay concept and towards single-room care with space to accommodate the parent(s) 24/7; this also lets parents provide a significant amount of care for their baby.

While there are no Canadian guidelines on NICUs, the American *Recommended Standards for Newborn ICU Design* recommends:[119]

- No less than 13.9 m^2 [150 square feet] of clear floor area, excluding handwashing stations, columns, and aisles;
- A hands-free handwashing station;
- A design that gives the family privacy;
- An unobstructed adjacent aisle not less than 2.4 m (8 feet) wide for passage of personnel and movement of equipment;
- At minimum, a comfortable reclining chair to promote skin-to-skin contact, a desk or surface for writing or for a laptop, and no less than 0.17m^3 (6 ft^3) of storage space;
- Low sound levels in infant rooms.

7.4 HOME BIRTHS AND BIRTHING CENTRES

Increasing access to midwifery care across Canada since 1992 has led to an increase in the number of home or out-of-hospital births attended by registered midwives. Home birth is safe for low-risk women likely to have uncomplicated vaginal birth.[121,122] For some women, birthing at home may be the epitome of FCMNC, as labour and birth occur in a familiar and intimate environment attuned to the needs of the woman and her family.

Although each jurisdictional midwifery association has requirements, set in guidelines, for a safe home birth, there are few restrictions on the size of the home beyond having enough room for the birthing woman to lie down and for midwives to be able to assist her and set up their equipment.[123] A midwife will visit the home during the prenatal period to make sure it is suitable for a home birth and to determine the distance to hospital services and the best access for emergency medical services (EMS).

In some jurisdictions, out-of-hospital births can take place at birthing centres. These regulated community-based health care facilities support birthing for women at low risk of needing specialist support. Birthing centres may be free-standing or part of a larger health care facility. They are generally staffed by midwives, although in some jurisdictions physicians may also play a role. Many birthing centres are designed with open or multi-use spaces to facilitate labour and birth as well as individual and group prenatal care and postpartum, breastfeeding, and educational groups.

Birthing room décor may vary from home-like environments with wood furniture and standard double beds to a more institutional style that has hospital-grade furniture and beds. Many birth centres offer water birth. The design of birth centres is specifically targeted to be a counter-point to institutional settings or traditional hospital care.

7.5 METRICS FOR FACILITY DESIGN EVALUATION

Design decisions affect costs, operations, and performance, and effective design of health care facilities incorporates a sociotechnical approach; that is, one that combines human with technical elements.[124,125] In recent years, Lean principles have been adopted widely in hospital design in order to reduce waste and fully utilize the capabilities of personnel.[124,126] The “Lean 3P” (production, preparation, process) takes into account people, products, and processes in the design of facilities.[124] Lean principles include “understanding user value, mapping value-streams, creating flow, developing pull processes and continuous improvement.”[84, p.1] Two recent studies out of England applied these principles to the design of a new endoscopy unit and a new maternity ward.[124,127] Both research teams found that 3P is an effective tool for developing facility designs that meet the requirements of multiple stakeholders.[124,127]

The move towards evidence-based environmental design requires establishing metrics to evaluate the design. This includes tracking and evaluating the role of the physical design in clinical outcomes and improvements in indicators such as economic performance, employee productivity, and family satisfaction.[128] In addition to site-specific metrics, post-occupancy evaluations provide useful data to iteratively adapt the design to meet the needs of women and families.

Some jurisdictions are now mandating that health care redevelopment projects include a post-occupancy evaluation. Although such projects vary in terms of size, scale, location, and purpose, relevant evaluations can be standardized using toolkits.[129]

8 IMPLEMENTING THE GUIDELINES: FACILITATING CHANGE

Jurisdictions across Canada have shifted towards patient- and family-centred care as a way of increasing responsiveness to community needs in health care. Intended effects include improving measurable health outcomes, such as access to primary care; improving patient–client satisfaction with the care they receive; and reducing hospital wait times.[130–132] Explicit jurisdictional commitments to family-centred care is also taking place internationally.[133] These changes are supported by a restructuring process that prioritizes adapting the health care system to individuals' and communities' needs and preferences, rather than requiring people to adapt to the system. The core tenant is respect for people's values, preferences, and expressed needs.[134]

The following principles of family-centred care are particularly important to maternity care:

- Education and knowledge, on which care decisions can be made;
- Commitment to the family's full participation in decision making and in advocating for the birthing woman;
- Collaboration and team management to foster continuity through the care pathway;
- Sensitivity to cultural and spiritual dimensions of birth;
- Respect for patient–client needs and preferences to recognize individual values and beliefs;
- Access to information so that patient–clients participate in informed decision making;[135]
- An understanding that pregnancy and birth are normal physiological events that have the potential for pathologies and unexpected events;
- Recognition of the importance of meeting the psychological needs of women and their families throughout the childbearing year.

A culturally competent, family-centred care framework applies to three levels: the individual level, the hospital level, and the health care system level. The SRMC approach, for example, reflects best practices from the perspective of the mother and family. Prioritizing such *process* measures when evaluating care reinforces a family-centred perspective by re-framing the care pathway through the eyes of the mother and family.

8.1 PATIENT–CLIENT ENGAGEMENT

Public engagement rooted in respect for patient–client voices in health care design and planning is one way to achieve family-centred care. Such engagement extends beyond capturing patient–clients' perceptions of care and involves the input of members of the public in strategic decisions about health services and policies.[136] Clear operational definitions of *public* and their role remains unclear. The public "wants input particularly in prioritisation processes across broad service areas, including development of the criteria on which funding decisions will ultimately be based", but there is a lack of a clarity of how citizens and patient–clients can contribute to this prioritization process and to transforming health care and improving maternity care.[93,137,138]

The widely used *IAP2 Spectrum of Public Participation* was developed to help define the public's role in any public participation process.[139] The continuum, representing categories of increasing impact on decision making, moves between activities to inform, consult, involve, collaborate, and empower citizens.

IAP2'S SPECTRUM OF PUBLIC PARTICIPATION[139]

	Inform	Consult	Involve	Collaborate	Empower
Public participation goal	To provide the public with balanced and objective information to help them understand the problem, the alternatives, the opportunities, and/or the solutions.	To obtain public feedback on analysis alternatives and/or decisions.	To work directly with the public throughout the process to make sure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision making, including developing alternatives and choosing the preferred solution.	To place decision making in the hands of the public.
Examples of methods of engagement	• News releases • Fact sheets • Websites • Open houses • Ads/flyers • Info hotlines • Talk shows	• Websites • Focus groups • Surveys • Public/ small groups meetings	• Workshops • Roundtables • Deliberative polling • Public/ small group meetings	• Advisory committees • Partnerships • Consensus building • Participatory decision making	• Citizen juries • Ballots • Delegated decisions • Service contracts

Enhanced care and improved service delivery occur when the public is effectively engaged.[140,141] The success of patient–client engagement processes relies in a large part on the effectiveness of the health care culture in shifting from a largely hierarchical and top-down model to one where power is shared or is neutral across patient–clients and providers.[142] Since such a shift requires considerable energy and time to implement, success also relies on it being well-supported within the organizational structure and culture of the health care setting.

8.2 SUPPORTING THE CULTURE OF FAMILY-CENTRED MATERNITY AND NEWBORN CARE

A supportive organizational culture is key to transforming a system.[143] Establishing and supporting a new paradigm for maternity care requires the sustained application of FCMNC principles and building on any initial structural changes made to the health care system. Once areas for positive change have been identified, the following strategies will help to create and sustain cultural and organizational change:

- Aligning vision and action: Connecting the vision and the action requires structural change through all levels of an organization (resource allocation plans, budget decisions).[144]
- Making incremental changes: Although system and policy-driven change provides the necessary framework to support widespread changes, small and incremental shifts can accrue, leading to significant, overarching improvements.[145]
- Fostering distributed leadership: System- or hospital-wide change is a "wicked problem," that is, a problem characterized as having no single solution or resisting resolution due to incomplete or contradictory viewpoints.[146] Practically, this means that health care system change is a problem that cannot be solved in organizational isolation, but requires shared leadership and responsibility and the commitment to shared decision models to reduce organizational fragmentation.[147]
- Promoting staff engagement: Sharing in the decision making by involving all levels of personnel through focus groups, unit-level improvement teams, brainstorming sessions, rapid results feedback of completed small-scale projects, on-site visits, teleconferences, and individual consultations.[147] Although time intensive, authentic outreach underscores meaningful solutions.
- Creating and fostering collaborative interpersonal relationships: At a hospital level, mechanisms to encourage collaboration among members of the health care team with different roles and responsibilities facilitate a culture of collaboration essential to sustaining necessary structural changes. Collaborative relationships are supported in many ways, such as "through the creation of task forces, problem-specific committees or learning groups that support collaborative action, with time allocation and reward structures that encourage participation from a broad range of stakeholders."
- Paying attention to context: System changes can elicit concern and even anxiety about professional livelihood. Processes are needed to support staff and sustain engagement in iterative feedback about the consequences of change, some of which may be unintended. It is essential to ensure policies are in place to respond to workers' concerns.[148]

9 EVALUATION OF CARE

The lack of consensus definitions and the organizational differences across provinces and territories have hindered pan-Canadian data analysis. While collecting national data is difficult, its dissemination and utilization can also be problematic. In particular, privacy concerns may constrain the analysis of subgroups of databases (for example, mothers requiring specialized or intensive care or NICU admissions). But such analyses are crucial towards effectively understanding the personal and clinical needs of higher-risk segments of the population. A balance needs to be achieved between privacy considerations and the effective provision of maternal and newborn care services (e.g., access to anonymous or aggregated data).

Successful implementation of FCMNC calls for an efficient, reliable and timely system that evaluates clinical care outcomes and also learns how women and their families perceive their maternity experiences.

Evaluation of care involves carefully documenting both process and outcome indicators. It also involves thoughtful review and analysis of the information within an anonymous reporting structure to ensure full disclosure in order to actualize improved care.

Evaluating maternal and newborn care is often considered the responsibility of regional and national organizations. Each unit and service provider, however, should participate in the evaluation to determine success in ensuring accessible, appropriate, and affordable care for mothers, babies, and families. Local multidisciplinary maternal and newborn committees fulfill this function. High-reliability organizations (HROs) are those that "achieve safety quality and efficiency goals by employing five central principles:

1. sensitivity to operations (i.e., heightened awareness of the state of relevant systems and processes);
2. reluctance to simplify (i.e., the acceptance that work is complex, with the potential to fail in new and unexpected ways);
3. preoccupation with failure (i.e., to view near misses as opportunities to improve, rather than proof of success);
4. deference to expertise (i.e., to value insights from staff with the most pertinent safety knowledge over those with greater seniority); and
5. practicing resilience (i.e., to prioritize emergency training for many unlikely, but possible, system failures)".[149]

EVALUATION OF CARE CAN INCLUDE:

- Continuous quality improvement (CQI), which involves feedback and audit activities including goal-setting, determining appropriate measurement of goals, identifying gaps in care, incorporating patient–client feedback, and undertaking regular practice audits;
- Regularly reviewing policies and procedures based on current information;
- Staff training and education and parents' education and learning;
- Assessing outcomes, including reviewing maternal and newborn mortality, major morbidity, and significant incidents; and conducting epidemiologic analyses;
- Assessing use of hospital services and resources;
- Assessing the mother's and baby's integration into the community, including breastfeeding support;
- Requesting mothers' and families' feedback and assessing their satisfaction with their perinatal care;
- Assessing commonly used investigations or treatments and investigating the mechanisms of disease and/or prevention.

Each unit should have in place a written policy that describes the evaluation methods currently in use and a mechanism by which new evaluations may be approved for use.

9.1 THE IMPORTANCE OF CONTINUOUS QUALITY IMPROVEMENT

CQI in health care is a mechanism for thinking about the processes and outcomes of comprehensively assessed quality. A key attribute of CQI for FCMNC is the development of indicators or measures that are important to all key stakeholders—including women and families. Ensuring that these shared measures are valid and the outcomes useful for improving health care requires active engagement with women and families to learn about their experiences. CQI or evaluation frameworks can be developed on the basis of HCPs documenting these experiences of care.

> **"Successful implementation of FCMNC calls for an efficient, reliable and timely system that evaluates clinical care outcomes and also learns how women and their families perceive their maternity experiences.**

Ideally, the process evolves iteratively as new data and new models of care are implemented, enabling system course correction as parts of the care pathway require adjustment. Since one size does not fit all, decision-makers will want to build flexibility into their CQI and evaluation frameworks, respecting the contextual differences between settings in terms of how FCMNC is implemented. The systematic application of site-specific, relevant, and family-informed measures leads to quality improvement processes that will guide the maturation of FCMNC in Canada.

Achieving family-centred care depends on authentically involving women and families who receive such care, and asking them to articulate what care is like and how to measure success in care. The resurgence of midwifery in Canada is an example of responding to patient–client care preferences—it attests to the fundamental tenet of informed decision-making and to the capacity of clients to create an environment that directly reflects their needs through home birth. In the hospital setting, the commitment to implementing FCMNC principles is growing, along with an openness towards this care being directed by those receiving it.

As a measure of quality of health care services, indicators can help to support improvement and accountability.[150,151] A systematic literature review evaluating the provision of maternal and child health internationally identified 87 key indicators in categories such as preventive activities, diagnostic and/or screening tools, treatment activities, maternal mortality, maternal morbidity, child mortality, and child morbidity.[151] In Canada, perinatal health indicators (PHI) are grouped into four key health domains: health behaviours and practices, health services, maternal outcomes, and infant outcomes.[152]

The range of indicators applied both nationally and internationally underscores the contextual nature of markers of quality and safety in maternity care and emphasizes the importance of applying a nuanced approach when considering the social determinants of access to family-centred perinatal care. Furthermore, the broad range of maternal and health indicators in the literature underscores the importance of well-integrated, interprofessional collaboration including with those with expertise in mental health and diet/nutrition. This conclusion is supported by the Global Affairs Canada *Evaluation of the Maternal, Newborn and Child Health Initiative (2010–11 to 2017–18)*. This 2019 evaluation found that there is a need for “more emphasis on an integrated, multi-sectoral approach to further address determinants of health…”.[153]

10 PLANNING FOR PANDEMICS

The principles of FCMNC can help inform decision making, practice, and policies during a pandemic. Adhering to the values of FCMNC is even more important when stressors are intensified and the need to feel connected and supported increases. However, certain pandemic-related hospital protocols, such as restricted access to visitation, pose barriers to family involvement during hospitalization. To address these challenges, it is essential to clearly explain the policies and mechanisms for nonphysical communication between family members.[154] The Institute for Patient- and Family-Centered Care recommends describing changes to policies using patient- and family-centred language. The language of partnership—including the tone, words used, and messages provided—helps communicate the essential role family members play.

If isolation becomes essential during labour and birth, hospitals can use virtual platforms to keep families informed about the mother and baby’s progress. An impediment to this is a lack of adequate Internet access or the tools or resources for videoconferencing or long-distance calling. A workaround might be to issue patient–clients with a smartphone with low-cost or free Internet or prepaid calling cards. This would also allow patient–clients and family members to access

translation services virtually.[154] At the same time, it is important to recognize the available capacity of HCPs to implement new tools/technology and to distribute limited resources.

In the past two decades alone, jurisdictions around the globe have contended with Severe Acute Respiratory Syndrome (SARS, 2003), novel H1N1 influenza virus (H1N1, 2009), Middle East Respiratory Syndrome coronavirus (MERS-CoV, 2013), the Ebola outbreak (2014–15), and the COVID-19 pandemics.[155] Global ecological conditions will give rise to more pandemics.[156] Common to all outbreaks is a surge in cases that require coordinated public health measures to reduce the burden of morbidity and mortality and avoid overwhelming health care resources.

Pandemics have implications across all population segments, including pregnant women and families, and a coordinated approach requires evidence-based planning.[157–161] Fundamental to any response is the development of clinical service models based on containing cross-infection.[159,160,162–165] In maternity care, this can be accomplished in existing maternity wards and through temporary auxiliary maternity units to address hospital surge capacity.

> **Adhering to the values of FCMNC is even more important when stressors are intensified and the need to feel connected and supported increases.**

Within the context of pandemic response, the psychological needs of the birthing mother and her family take on heightened importance. Isolation measures may increase the potential for intervention in labour and separation of newborns from their mothers (providing significant challenges to establishing breastfeeding). Potential effects on patient–client and family care can be mitigated by improving the focus on family supports during birth. This includes increasing the use of and access to midwives, allowing for even more women to give birth at home, away from hospital settings where such extreme restrictions are more likely to occur. As pandemics are predicted to be increasingly common in future, planning for them now is essential.

10.1 POP-UP MATERNITY UNITS

Although there are no Canadian guidelines on the use of pop-up maternity hospitals, the *Guidelines for Auxiliary Maternity Units* from the USA recommend expanding midwifery units (both in and out of hospital) to mitigate potential overloads in hospital capacity. The guidelines describe the scope of services that such units could offer.[162] The *pop-up* units can be efficiently constructed to meet the needs of low-risk pregnant and labouring women who remain supported by a multidisciplinary leadership team (midwifery, obstetrics, neonatology and nursing).

Patient–client inclusion criteria are as follows:[162]

- Gestational age limited to between $36^{+0/7}$ and $42^{+0/7}$ weeks;
- Singleton pregnancy;
- Cephalic presentation;
- No hypertensive disorders, even if characterized as mild or controlled;
- No maternal or fetal/neonatal conditions that would exceed the capacities of the unit;
- Identification of patient–clients prior to the onset of birth.

In case patient–clients need greater levels of care, there should be in place:[162]

- A pre-arranged plan for the availability of obstetrical and neonatal telephone consultation and acute care services, 24/7;
- A pre-arranged plan for the emergent and non-emergent transfer of the mother and/or her newborn, 24/7.

Refer to the *Guidelines for Auxiliary Maternity Units* for specific requirements of temporary maternity units.[162]

10.2 CONSIDERATIONS FOR HOSPITAL-BASED CARE

In terms of pandemic preparation, the most common challenges in maternity units tend to be high patient–client turnover, coordination of staff and supplies, ethical distribution of limited medical resources, and coordination with government agencies.[158,164] All hospitals can plan for future pandemics and other emergencies by optimizing backup communications and their response to surge capacity, preparing for potential service degradation, and stockpiling and supply-line planning.[158] Other important considerations for hospital-based care include early identification of cases in the community to allow for isolation at home and appropriate triage to hospital care when necessary.[159] Whenever possible, hospital stays should be shortened and postpartum appointments offered by way of telemedicine[158].

Guidelines and recommendations during a pandemic are quick to change as patterns of infectious disease transmission evolve and research-based knowledge becomes available.[166] The public requires and deserves that new information about best practices for containment and treatment be provided as it becomes available to increase their awareness and change their behaviours and help prevent disease spread.[167]

10.3 HEALTH CARE PROVIDER CONSIDERATIONS

It is particularly difficult for maternity care providers to prevent the spread of contagions because of their close contact with women in labour.[161] This may affect providers' mental wellbeing—along with the potentially increased workload despite reduced contact with patient–clients (because of shortened antenatal visits, increased use of virtual care, and reduced non-urgent consultation); shortages of personal protective equipment (PPE); and the physical discomfort of using such equipment.[168] HCPs may also experience increased emotional output because of their role in supporting labouring women in the absence of partners or other support people as a result of hospital restrictions. In addition, providers may feel anxious about spreading infection to their own family members and choose to self-isolate while in clinical practice. They may also be feeling the mental distress of emotionally and ethically fraught decision-making around resource allocation.[169]

Data from the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak and early research from the COVID-19 pandemic support the claim of increased anxiety, stress, and fear among HCPs.[168] No doubt, supporting providers during a pandemic is vital for sustaining a healthy workforce. Ways to reduce burnout and support providers experiencing emotional distress include:

- Having psychologists on staff to mitigate stress and reduce burnout;
- Screening for mental health problems and providing psychoeducation[169];
- Leveraging technology for the delivery of psychosocial supports;[168]
- Amending policies to facilitate healthier lifestyles (getting enough sleep, exercise and eating a healthy diet);
- Facility-level supports for decompression (for example, on-site exercise rooms and self-care stations along with opportunities for debriefing).

10.4 PATIENT–CLIENT CONSIDERATIONS

Understanding the complex ways in which pandemics shape the experience of pregnancy, birth, and the postpartum period is fundamental to providing appropriate family-centred care. Larger society-wide stresses may be easily magnified for the birthing family. The fear of contracting the virus and what that would mean for the health of the mother, baby, and family, of potential separation of family members, of the mother labouring alone or of partner's grief about missing their child's birth affect the birthing experience. Early data from the COVID-19 pandemic point to high levels of stress and anxiety causing or amplifying mental health concerns because of the fear of contracting the disease and the impact of physical isolation on birth plans and the birthing experience.[169,170]One-on-one, continuous support during labour can mitigate the stress and its effect on the health of mothers and babies.[171]

Reducing time in the hospital (extending early labouring at home) and the number of support people are strategies that could be adopted in the development and planning of care in future pandemics.

Finding a new provider proximal to where the family lives to minimize potential travel-related exposure would also be a consideration.[172] Women and their families need to understand all the options where they can give birth, and the risks and benefits associated with each given their specific circumstances. Keeping women and families safe during a pandemic is best achieved by balancing public health protocols with quality evidence-informed care and human rights agendas that adequately consider the concerns of the birthing mother and family.[173]

The autonomy of birthing women is the highest ethical principal in childbirth and fundamental to actualizing FCMNC.[174] This includes autonomy in decisions about where to give birth and choice of provider and supports. This core principle is challenged when public health emergencies make individual choice subservient to the safety of the population. In these instances, decision making is guided by the harm principle, or "the justification for a government, or government agency, to take action to restrict the liberty of an individual or group" to protect others.[175] Restricting liberties, when applied to maternity and newborn care in a pandemic, may include limiting support people in the birthing room, restricting ambulation in labour to a confined area, or unintentionally depersonalizing providers due to the need for PPE. Despite the difficulty of maintaining a family-centred focus while observing public health restrictions, reinforcing the normalcy of birth is essential. This involves ongoing, transparent communication with the birthing mother and family about protocols that may seem constricting, with an emphasis on the goal of a healthy mother, baby, and family.

CONCLUSION

Over the past several decades, patient- and family-centred values and preferences have emerged as a guiding principle in maternity care and all health care in Canada. Organizing patient-centred care means health planners and providers can be more responsive by working in partnership with those they serve. This can be done at the individual level where birth is low risk, during acute situations where emergency protocols are in place to address an immediate clinical risk to the mother or baby, or where a larger societal risk exists, such as in a pandemic.

Such patient-centred thinking can be carried through the care pathway to mitigate the stress families in rural and remote areas may feel if they need emergency transport from their communities to a larger centre. Similarly, patient-centred care enhances the experience of Indigenous women and families by safely supporting the cultural practices of their choosing.

Patient-centred care can also be applied at the level of a facility by planning a physical environment that enhances principles of patient–client and family choice, autonomy, and respect. This can include, for example, single-room maternity care, the support of a partner's full involvement, and awareness of cultural inclusion in the surroundings. Introducing structural changes is only effective when these changes are also managed at a social level, by providing support for patient–clients, providers, and administrators when new practices are adopted.

At a psychological level, perinatal psychology as a profession could be developed to care for women and their families through normal pregnancies as well as when complications arise, and to support caregivers.

Health service planners can ensure that their institution's care delivery frameworks incorporate guidelines and protocols that reflect inclusivity and allow flexible application of FMCNC to safely meet the social and geographical needs of their patient-clients. At a society level, FCMNC requires that we foster a mindset based on partnerships between patient–clients, providers, and administrators in planning and evaluation, with evaluation using patient-identified metrics of quality care. Achieving a consensus that the right things are being measured is essential to success.

As reflected in many of the FCMNC principles outlined in the Preface and considered throughout the chapters, family-centered care requires that we consider all experiences of maternity care, including those of racialized and immigrant women and families, those who are gender non-conforming, those who have mental health concerns, and those who are disenfranchised through lack of stable housing or substance use. Their voices, and those of other vulnerable women such as those with chronic health conditions including obesity, are essential to include in service planning if we are to reduce health disparities. The principles of FCMNC may be particularly difficult to implement under extreme circumstances, but reconciling them with safe, culturally, and psychologically sensitive practices will enhance the care provided.

REFERENCES

1. Truth and Reconciliation Commission of Canada. Honouring the truth, reconciling for the future: the final report of the Truth and Reconciliation Commission of Canada [Internet]. Winnipeg (MB): TRC; 2015 [cited 2021 June 17]. Available from: www.trc.ca/assets/pdf/Executive_Summary_English_Web.pdf
2. Cameron PJ, Este DC, Worthington CA. Professional, personal and community: 3 domains of physician retention in rural communities. Can J Rural Med. 2012;17(2):47–55.
3. Dolea C, Stormont L, Braichet J. Evaluated strategies to increase attraction and retention of health workers in remote and rural areas. Bull World Health Organ. 2010;88(5):379–85.
4. Kornelsen J, McCartney K. The safety of rural maternity services without local access to cesarean section: an applied policy research unit review [Internet]. Vancouver (BC): Perinatal Services BC, BC Women's Hospital and Health Centre, University Centre for Rural Health, Australia; 2015 [cited 2021 June 17]. Available from: https://med-fom-crhr.sites.olt.ubc.ca/files/2015/11/apru_the-safety-of-rural-maternity-services-without-local-access-to-c-section_2015.pdf
5. Van Wagner V, Osepchook C, Harney E, Crosbie C, Tulugak M. Remote midwifery in Nunavik, Québec, Canada: outcomes of perinatal care for the Inuulitsivik Health Centre, 2000–2007. Birth. 2012;39(3):230–7.
6. Wilson AK, Martel M, Arsenault M, Cargill YM, Delaney M, Daniels S, et al. Maternal transport policy. J Obstet Gynaecol Can. 2005;27(10):956–63.
7. Canadian Institute for Health Information. Hospital births in Canada: a focus on women living in rural and remote areas. Ottawa (ON): CIHI; 2013.
8. Indigenous Services Canada. Non-insured health benefits (NIHB) medical transportation policy framework (Interim) [Internet]. Ottawa (ON): Government of Canada; 2019 [cited 2021 June 17]. Available from: https://www.sac-isc.gc.ca/eng/1579891130443/1579891286837
9. Nesbitt TS, Connell FA, Hart LG, Rosenblatt RA. Access to obstetric care in rural areas: effect on brith outcomes. Am J Public Health. 1990;80(7):814–8.
10. 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;11(1):147.
11. Grzybowski S, Fahey J, Lai B, Zhang S, Aelicks N, Leung BM, et al. The safety of Canadian rural maternity services: a multi-jurisdictional cohort analysis. BMC Health Serv Res. 2015;15(1):410.
12. Kornelsen J, Grzybowski S. Safety and community: the maternity care needs of rural parturient women. J Obstet Gynaecol Can. 2005;27(6):554–61.
13. Campbell K, Carson G, Azzam H, Hutton E. No.372-Statement on planned homebirth. J Obstet Gynaecol Can. 2019;41(2):223–7.
14. Iglesias S, Kornelsen J, Woollard R, Caron N, Warnock G, Friesen R, et al. Joint position paper on rural surgery and operative delivery. Can J Rural Med. 2015;20(4):129–38.
15. Rural Coordination Centre of BC. MaBAL (Maternity and babies advice line) [Internet]. Vancouver (BC): RCCBC; 2021 [cited 2021 June 17]. Available from: https://rccbc.ca/rtvs/mabal
16. Kornelsen J, Friesen R. Building rural surgical networks: an evidence-based approach to service delivery and evaluation. Healthcare policy. 2016;12(1):37–42.
17. Stirk L, Kornelsen J. No.379-Attendance at and resources for delivery of optimal maternity care. J Obstet Gynaecol Can. 2019;41(5):688–96.e4.
18. Perinatal Services BC. Maternal/fetal and neonatal services: setting the stage [Internet]. Vancouver (BC): Provincial Health Services Authority; 2020 [cited 2021 June 17]. Available from: www.perinatalservicesbc.ca/Documents/Resources/SystemPlanning/TiersOfService/Tier-of-service-setting-the-stage.pdf
19. Provincial Council for Maternal and Child Health. Standardized maternal and newborn levels of care definitions [Internet]. Ottawa (ON): PCMC; 2013 [cited 2021 June 17]. Available from: https://www.pcmch.on.ca/wp-content/uploads/2015/07/Level-of-Care-Guidelines-2011-Updated-August1-20131.pdf
20. Kilpatrick SJ, Menard MK, Zahn CM, Callaghan WM. Obstetric care consensus #9: levels of maternal care. Obstet Gynecol. 2019;221(6):B19–30.
21. Hemminki E, Heino A, Gissler M. Should births be centralised in higher level hospitals? Experiences from regionalised health care in Finland: should births be centralised in higher level hospitals? BJOG. 2011;118(10):1186–95.
22. Accreditation Canada. Obstetrics services [Internet]. Ottawa (ON): Accreditation Canada; 2021 [cited 2021 June 18]. Available from: https://store.accreditation.ca/products/obstetrics-services
23. Public Health Agency of Canada. Chapter 1: Family-centred maternity and newborn care in Canada: underlying philosophy and principles [Internet]. Ottawa (ON): PHAC; 2017 [cited 2021 June 18]. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/maternity-newborn-care-guidelines-chapter-1.html
24. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. It's about integrating individual clinical expertise and the best external evidence. BMJ. 1996;312(7023):71–2.
25. Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. Ann Fam Med. 2014;12(6):573–6.
26. World Health Organization. Standards for improving quality of maternal and newborn care in health facilities [Internet]. Geneva (CH): WHO; 2016 [cited 2021 June 18]. Available from: https://www.who.int/docs/default-source/mca-documents/advisory-groups/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf

27. Perinatal Services BC. Guidelines and standards [Internet]. Vancouver (BC): Provincial Health Services Authority; 2021 [cited 2021 June 18]. Available from: www.perinatalservicesbc.ca/health-professionals/guidelines-standards

28. Provincial Council for Maternal and Child Health. Paediatric levels of care—PCMCH [Internet]. Ottawa (ON): PCMC; 2021 [cited 2021 June 18]. Available from: https://www.pcmch.on.ca/health-care-providers/paediatric-care/pcmch-strategies-and-initiatives/paediatric-levels-of-care/

29. American College of Obstetricians and Gynecologists. Standards of obstetric-gynecologic services. 7th ed. Washington (DC): ACOG; 1989.

30. Miller KJ, Couchie C, Ehman W, Graves L, Grzybowski S, Medves J. No. 282-Rural maternity care. J Obstet Gynaecol Can. 2017;39(12):e558–65.

31. Vanier Institute of the Family. In context: understanding maternity care in Canada [Internet]. Ottawa (ON): Vanier Institute; 2017 [cited 2021 June 18]. Available from: https://vanierinstitute.ca/in-context-understanding-maternity-care-in-canada/

32. Canadian Association of Perinatal and Women's Health Nurses. Perinatal nursing standards in Canada [Internet]. Ottawa (ON): CAPWHN; 2018 [cited 2021 June 18]. Available from: https://capwhn.ca/wp-content/uploads/2019/10/PERINATAL_NURSING_STANDARDS_IN_CANADA.pdf

33. Kane RL, Shamliyan TA, Mueller C, Duval S, Wilt TJ. The association of registered nurse staffing levels and patient outcomes: systematic review and meta-analysis. Med Care. 2007;45(12):1195–204.

34. Tellez M. Work satisfaction among California registered nurses: a longitudinal comparative analysis. Nurs Econ. 2012;30(2):73–81.

35. Aiken LH, Cerón C, Simonetti M, Lake ET, Galiano A, Garbarini A, et al. Hospital nurse staffing and patient outcomes. Revista Médica Clínica Las Condes. 2018;29(3):322–7.

36. Aiken LH, Sloane DM, Cimiotti JP, Clarke SP, Flynn L, Seago JA, et al. Implications of the California nurse staffing mandate for other states: implications of the California nurse staffing. Health Serv Res. 2010;45(4):904–21.

37. Raby C, Dowse T, Bennet L. Postpartum/newborn patients: who are they and do they all need the same amount of nursing care? J Nurs Manag. 2008;16(2):198–203.

38. Association of Women's Health, Obstetric & Neonatal Nursing. Guidelines for professional registered nurse staffing for perinatal units executive summary. J Obstet Gynecol Neonatal Nurs. 2011;40(1):131–4.

39. Singer J, Canadian Institute for Health Information, Negrello T, Rondeau A, Clussich A, Boyes C. A ratio of staff-to-patients—development of a new indicator [Internet]. Ottawa (ON): Canadian Health Workforce Network; 2016 [cited 2021 June 18]. Available from: www.hhr-rhs.ca/images/stories/J.Singer_Presentation_HWAO_Abstract_en.pdf

40. Canadian Nursing Association. How effective are nursing staff mix and nurse-to-patient ratio mechanisms in improving nurses' workloads? [Internet]. Ottawa (ON): CNA; 2006 [cited 2021 June 18]. Available from: https://www.cna-aiic.ca/-/media/cna/page-content/pdf-en/research_summaries_all_e.pdf?la=en&hash=2CE778BA1506C447C21A7DAA4AE757DD1A58D627

41. MacKinnon K. We cannot staff for 'what ifs': the social organization of rural nurses' safeguarding work. Nurs Inq. 2012;19(3):259–69.

42. Koto PS, Fahey J, Meier D, LeDrew M, Loring S. Relative effectiveness and cost-effectiveness of the midwifery-led care in Nova Scotia, Canada: a retrospective, cohort study. Midwifery. 2019;77:144–54.

43. McRae DN, Muhajarine N, Stoll K, Mayhew M, Vedam S, Mpofu D, et al. Is model of care associated with infant birth outcomes among vulnerable women? A scoping review of midwifery-led versus physician-led care. SSM Popul Health. 2016;2:182–93.

44. McRae DN, Muhajarine N, Janssen PA. Improving birth outcomes for women who are substance using or have mental illness: A Canadian cohort study comparing antenatal midwifery and physician models of care for women of low socioeconomic position. BMC Pregnancy Childbirth. 2019;19(1):279.

45. Mattison CA, Lavis JN, Hutton EK, Dion ML, Wilson MG. Understanding the conditions that influence the roles of midwives in Ontario, Canada's health system: An embedded single-case study. BMC Health Serv Res. 2020;20(1):197.

46. Canadian Association of Midwives. Midwifery across Canada [Internet]. Montreal (QC): CAM; 2021 [cited 2021 June 21]. Available from: https://canadianmidwives.org/midwifery-across-canada

47. Peterson WE, Medves JM, Davies BL, Graham ID. Multidisciplinary collaborative maternity care in Canada: easier said than done. J Obstet Gynaecol Can. 2007;29(11):880–6.

48. Multidisciplinary Collaborative Primary Maternity Care Project. Guidelines and implementation tools for multidisciplinary collaborative primary maternity care models [Internet]. Ottawa (ON): MCP2; 2006 [cited 2021 June 22]. Available from: https://www.homebirthsummit.org/wp-content/uploads/2013/09/Multidisciplinary-Collaborative-Primary-Maternity-Care-May_Ottawa.pdf

49. Northern Health. Stories of integrated perinatal services in two northern communities [Internet]. Vancouver (BC): BCPSQC; 2015 [cited 2021 June 22]. Available from: https://bcpsqc.ca/quality-awards/winners/stories-of-integrated-perinatal-services-in-two-northern-communities/

50. Lomonaco-Haycraft KC, Hyer J, Tibbits B, Grote J, Stainback-Tracy K, Ulrickson C, et al. Integrated perinatal mental health care: a national model of perinatal primary care in vulnerable populations. Prim Health Care Res Dev. 2018;20:1–8.

51. Goedde D, Zidack A, Li Y, Arkava D, Mullette E, Mullowney Y, et al. Depression outcomes from a fully integrated obstetric mental health clinic: a 10-year examination. J Am Psychiatr Nurses Assoc. 2021;27(2):123–33.

52. Hutton, Eileen, RM, PhD, Farmer MJ, MD, Carson GD, MD. The roles of multidisciplinary team members in the care of pregnant women. J Obstet Gynaecol Can. 2016;38(11):1068–9.

53. Van Wagner V, Epoo B, Nastapoka J, Harney E. Reclaiming birth, health, and community: midwifery in the Inuit villages of Nunavik, Canada. J Midwifery Womens Health. 2007;52(4):384–91.

54. Epoo B, Stonier J, Wagner V Van, Harney E. Learning midwifery in Nunavik: community-based education for Inuit midwives. Primatisiwin A J Aborig Indig Community Heal. 2012;10:283–99.

55. Bowen A, Pratt C. Indigenous birth. In: Exner-Pirot H, Norbye B, Butler L, eds. Northern and Indigenous health care [Internet]. Saskatoon (SK): University of Saskatchewan; 2018 [cited 2021 June 22]. Available from: https://openpress.usask.ca/northernhealthcare/

56. Indigenous Services Canada. 2017–18 departmental results report [Internet]. Ottawa (ON): ISC; 2018 2018 [cited 2021 June 22]. Available from: https://www.sac-isc.gc.ca/eng/1538153575415/1538153630277

57. Stewart MJ, Smith J, Boland RA. Optimizing outcomes in regionalized perinatal care: Integrating maternal and neonatal emergency referral, triage, and transport. Curr Treat Options Pediatr. 2017;3:313–26.

58. Redpath S, Shah PS, Moore GP, Yang J, Toye J, Perreault T, et al. Do transport factors increase the risk of severe brain injury in outborn infants <33 weeks gestational age? J Perinatol. 2020;40(3):385–93.

59. Whyte HEA, Jefferies AL, Lacaze T, Newhook LA, Hendson L, Lemyre B, et al. The interfacility transport of critically ill newborns. Paediatr Child Health. 2015;20(5):265–9.

60. Harris Jr BA, Wirtschafter DD, Huddleston JF, Perlis HW. In utero versus neonatal transportation of high-risk perinates: a comparison. Obstet Gynaecol. 1981;57(4):496–9.

61. Lasswell SM, Barfield WD, Rochat RW, Blackmon L. Perinatal regionalization for very low-birth-weight and very preterm infants: a meta-analysis. JAMA. 2010;304(9):992–1000.

62. Mosher SL. The art of supporting families faced with neonatal transport. Nurs Womens Health. 2013;17(3):198–209.

63. Yu VYH, Dunn PM. Development of regionalized perinatal care. Semin Neonatol. 2004;9(2):89–97.

64. Newton, Scott M., DNP,RN, EMT-P., Fralic, Maryann, DrPH,RN, FAAN. Interhospital transfer center model: components, themes, and design elements. Air Med J. 2015;34(4):207–12.

65. Aguirre FV, Varghese JJ, Kelley MP, Lam W, Lucore CL, Gill JB, et al. Rural interhospital transfer of ST-elevation myocardial infarction patients for percutaneous coronary revascularization: the stat heart program. Circulation. 2008;117(9):1145–52.

66. Ahl E, Wold R. Defining and developing a specialty stroke transport team. Air Med J. 2009;28(3):133–8.

67. Perinatal Services BC. Provincial maternal newborn transfer network: principles and processes [Internet]. Vancouver (BC): Provincial Health Services Authority; 2004 [cited 2021 June 22]. Available from: www.perinatalservicesbc.ca/Documents/Guidelines-Standards/TransferProcess/MNTNPrinciplesProcessesApril2014.pdf

68. Lee K. Neonatal transport metrics and quality improvement in a regional transport service. Transl Pediatr. 2019;8(3):233–45.

69. Goh A, Browning Carmo K, Morris J, Berry A, Wall M, Abdel-Latif M. Outcomes of high-risk obstetric transfers in New South Wales and the Australian Capital Territory: the high-risk obstetric transfer study. Aust N Z J Obstet Gynaecol. 2015;55(5):434–39.

70. Binder S, Hill K, Meinzen-Derr J, Greenberg JM, Narendran V. Increasing VLBW deliveries at subspecialty perinatal centers via perinatal outreach. Obstet Gynecol Surv. 2011;66(6):331–2.

71. Sampaio TZAL, Wilson M, Aubertin C, Redpath S. Diagnosis discordance and neonatal transport: a single-center retrospective chart review. Am J Perinatol. 2019;36(5):522.

72. Alberta Health Services. Criteria to support appropriate level of obstetrical care [Internet]. Edmonton (AB): AHS; 2020 [cited 2021 June 22]. Available from: https://extranet.ahsnet.ca/teams/policydocuments/1/clp-womens-health-criteria-support-appropriate-level-obstetrical-care-gdl-hcs-201-01.pdf

73. Gagliardi AR, Nathens AB. Exploring the characteristics of high-performing hospitals that influence trauma triage and transfer. J Trauma Acute Care Surg. 2015;78(2):300–5.

74. Lupton BA, Pendray MR. Regionalized neonatal emergency transport. Semin Neonatol. 2004;9(2):125–33.

75. Canadian Paediatric Society. About ACoRN [Internet]. Ottawa (ON): CPS; 2019 [cited 2021 June 22]. Available from: https://www.cps.ca/en/acorn

76. Goswami I, Redpath S, Langlois RG, Green JR, Lee KS, Whyte HEA. Whole-body vibration in neonatal transport: a review of current knowledge and future research challenges. Early Hum Dev. 2020;146:105051.

77. Wright JD. Before the transport team arrives: neonatal stabilization. J Perinat Neonatal Nurs. 2000;13(4):87–107.

78. Canadian Association of Paediatric Health Centres. Competencies profile-interfacility critical care transport of maternal, neonatal, and paediatric patients [Internet]. Ottawa (ON): CAPHC; 2012 [cited 2021 June 22]. Available from: https://www.pcmch.on.ca/wp-content/uploads/2016/01/CAPHC-Transport-Systems-Competencies-Profile-Interfacility-Critical-Care-Transport-of-Maternal-Neonatal-and-Paediatric-Patients.pdf

79. Kyle E, Aitken P, Elcock M, Barneveld M. Use of telehealth for patients referred to a retrieval service: timing, destination, mode of transport, escort level and patient care. J Telemed Telecare. 2012;18(3):147–50.

80. Haynes SC, Dharmar M, Hill BC, Hoffman KR, Donohue LT, Kuhn-Riordon KM, et al. The impact of telemedicine on transfer rates of newborns at rural community hospitals. Acad Pediatr. 2020;20(5):636–41.

81. Mann S, McKay K, Brown H. The maternal health compact. N Engl J Med. 2017;376(14):1304–5.

82. Kim EW, Teague-Ross TJ, Greenfield WW, Keith Williams D, Kuo D, Hall RW. Telemedicine collaboration improves perinatal regionalization and lowers statewide infant mortality. J Perinatol. 2013;33(9):725–30.

83. Fang JL, Collura CA, Johnson RV, Asay GF, Carey WA, Derleth DP, et al. Emergency video telemedicine consultation for newborn resuscitations: the mayo clinic experience. Mayo Clin Proc. 2016;91(12):1735–43.

84. Becker F. Organizational ecology and knowledge networks. Calif Manage Rev. 2007;49(2):42–61.

85. Afulani PA, Moyer CA. Accountability for respectful maternity care. Lancet. 2019;394(10210):1692–3.

86. Bohren MA, Vogel JP, Hunter EC, Lutsiv O, Makh SK, Souza JP, et al. The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review. PLoS Med. 2015;12(6):e1001847.

87. Miller S, Abalos E,Chamillard M, Ciapponi A, Colaci D, Comandé D, et al. Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. Lancet. 2016;388(10056):2176–92.

88. World Health Organization. The prevention and elimination of disrespect and abuse during facility-based childbirth [Internet]. Geneva (CH): WHO; 2014 [cited 2021 June 23]. Available from: https://www.who.int/docs/default-source/mca-documents/advisory-groups/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf

89. Chen D, Cheng L, Hummels C, Koskinen I. Social design: an introduction. Int J Des. 2016;10(1):1–5.

90. Żukiewicz-Sobczak W, Wróblewska P, Zwoliński J, Chmielewska-Badora J, Adamczuk P, Krasowska E, et al. Obesity and poverty paradox in developed countries. Ann Agric Environ Med. 2014;21(3):590–4.

91. Douglas CH, Douglas MR. Patient-friendly hospital environments: exploring the patients' perspective. Health Expect. 2004;7(1):61–73.

92. Cegolon L, Maso G, Heymann WC, Bortolotto M, Cegolon A, Mastrangelo G. Determinants of length of stay after vaginal deliveries in the Friuli Venezia Giulia Region (North-Eastern Italy), 2005–2015. Sci Rep. 2020;10(1):5912.

93. Benahmed N, San Miguel L, Devos C, Fairon N, Christiaens W. Vaginal delivery: how does early hospital discharge affect mother and child outcomes? A systematic literature review. BMC Pregnancy Childbirth. 2017;17(1):289.

94. Saunders RP, Abraham MR, Crosby MJ, Thomas K, Edwards WH. Evaluation and development of potentially better practices for improving family-centered care in neonatal intensive care units. Pediatrics (Evanston). 2003;111(4):e437–49.

95. Public Health Agency of Canada. Chapter 5: Postpartum Care [Internet]. Ottawa (ON): PHAC; 2020 [cited 2021 June 23]. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/maternity-newborn-care-guidelines-chapter-5.html

96. Gooding JS, Cooper LG, Blaine AI, Franck LS, Howse JL, Berns SD. Family support and family-centered care in the neonatal intensive care unit: origins, advances, impact. Semin Perinatol. 2011;35(1):20–8.

97. Janssen PA, Klein MC, Harris SJ, Soolsma J, Seymour LC. Single room maternity care and client satisfaction. Birth. 2000;27(4):235–43.

98. Harris SJ, Farren MD, Janssen PA, Klein MC, Lee SK. Single room maternity care: perinatal outcomes, economic costs, and physician preferences. J Obstet Gynaecol Can. 2004;26(7):633–40.

99. Ulrich R, Zimring C, Joseph A, Quan X, Choudhary R. The role of the physical environment in the hospital of the 21st century: a once-in-a-lifetime opportunity [Internet]. Concord (CA): The Center for Health Design; 2004 [cited 2021 June 23]. Available from: https://www.healthdesign.org/knowledge-repository/role-physical-environment-hospital-21st-century-once-lifetime-opportunity

100. Janssen PA, Harris SJ, Soolsma J, Klein MC, Seymour LC. Single room maternity care: the nursing response. Birth. 2001;28(3):173–9.

101. Halpern S. SOGC joint policy statement on normal childbirth. J Obstet Gynaecol Can. 2009;31(7):602–3.

102. Darcy Mahoney A, White RD, Velasquez A, Barrett TS, Clark RH, Ahmad KA. Impact of restrictions on parental presence in neonatal intensive care units related to coronavirus disease 2019. J Perinatol. 2020;40(Suppl 1):36–46.

103. Jenkinson, B., Josey N, Kruske S. BirthSpace: an evidence-based guide to birth environment design. [Internet]. Brisbane (AU): The Queensland Center for Mothers and Babies; 2014 [cited 2021 June 23]. Available from: https://www.researchgate.net/publication/278328878_BirthSpace_An_evidence-based_guide_to_birth_environment_design

104. Health Sciences Centre Winnipeg. HSC women's hospital update—January 2016 [Internet]. Winnipeg (MB): Health Sciences Centre; 2016 [cited 2021 June 23]. Available from: www.hsc.mb.ca/files/WRHPFAQsFINAL.pdf

105. Hignett S, Evans D. Spatial requirements in hospital shower and toilet rooms. Nurs Stand. 2006;21(3):43–8.

106. Canadian Standards Association. Canadian health care facilities CSA Z8000–18 : planning, design and construction : CSA standards. Ottawa (ON): CSA; 2018.

107. International Health Facility Guidelines. Part B—health facility briefing & design including functional planning units [Internet]. New South Wales (AU): TAHPI; 2017 [cited 2021 June 23]. Available from: http://healthfacilityguidelines.com/ViewPDF/ViewIndexPDF/iHFG_part_b_complete

108. Lee KA, Gay CL. Improving sleep for hospitalized antepartum patients: a non-randomized controlled pilot study. J Clin Sleep Med. 2017;13(12):1445–53.

109. BC Women's Hospital and Health Centre. Antepartum care [Internet]. Vancouver (BC): Provincial Health Services Authority; 2021[cited 2021 June 23]. Available from: www.bcwomens.ca/our-services/pregnancy-prenatal-care/antepartum-care#At--Home

110. West C, Palmer L, Tier T. No place like home: an antepartum program at British Columbia's Women's Hospital has shown that women with complications of pregnancy do better and save the system money when they are cared for at home. Can Nurse. 2000;96:1–5.

111. United Kington Department of Health and Social Care. Children, young people and maternity Services. Health building note 09–02 [Internet]. London (UK): NBS; 2013 [cited 2021 June 23]. Available from: https://www.thenbs.com/PublicationIndex/documents/details?Pub=DHEFD&DocID=303357

112. World Health Organization. WHO recommendations Intrapartum care for a positive childbirth experience [Internet]. Geneva (CH): WHO; 2018 [cited 2021 June 24]. Available from: https://apps.who.int/iris/bitstream/handle/10665/272447/WHO-RHR-18.12-eng.pdf

113. Breman RB, Storr CL, Paul J, LeClair M, Johantgen M. Women's prenatal and labor experiences in a hospital with an early-labor lounge. Nurs Womens Health. 2019;23(4):299.

114. Lorentzen I, Andersen CS, Jensen HS, Fogsgaard A, Foureur M, Lauszus FF, et al. Study protocol for a randomised trial evaluating the effect of a "birth environment room" versus a standard labour room on birth outcomes and the birth experience. Contemp Clin Trials Commun. 2019;14:100336.

115. Hodnett ED, Stremler R, Weston JA, McKeever P. Re-conceptualizing the hospital labor room: The PLACE (Pregnant and Laboring in an Ambient Clinical Environment) pilot trial. Birth. 2009;36(2):159–66.

116. Singh D, Newburn M. Feathering the nest: what women want from the birth environment. RCM Midwives. 2006;9(7):266–9.

117. Hammond A, Foureur M, Homer CSE, Davis D. Space, place and the midwife: exploring the relationship between the birth environment, neurobiology and midwifery practice. Women Birth. 2013;26(4):277–81.

118. Hauck Y, Rivers C, Doherty K. Women's experiences of using a Snoezelen room during labour in Western Australia. Midwifery. 2008;24(4):460–70.

119. White RD, Smith JA, Shepley MM. Recommended standards for newborn ICU design, eighth edition. J Perinatol. 2013;33(1):S2–16.

120. Watson J, DeLand M, Gibbins S, York EM. Improvements in staff quality of work life and family satisfaction following the move to single-family room nicu design. Adv Neonatal Care. 2014;14(2):129–36.

121. Janssen PA, Saxell L, Page LA, Klein MC, Liston RM, Lee SK. Outcomes of planned home birth with registered midwife versus planned hospital birth with midwife or physician. CMAJ. 2009;181(6–7):377–83.

122. Hutton EK, Cappelletti A, Reitsma AH, Simioni J, Horne J, McGregor C, et al. Outcomes associated with planned place of birth among women with low-risk pregnancies. CMAJ. 2016;188(5):e80–90.

123. Association of Ontario Midwives. Home birth FAQ [Internet]. Toronto (ON): AOM; 2021 [cited 2021 June 24]. Available from: https://www.ontariomidwives.ca/home-birth-FAQ

124. Hicks C, McGovern T, Prior G, Smith I. Applying lean principles to the design of healthcare facilities. Int J Prod Econ. 2015;170:677–86.

125. Burack EH, Smith RD. Personnel management: a human resource systems approach. St. Paul (MN): Wiley & Sons; 1977.

126. Bowerman J, Fillingham D. Can lean save lives? Leadersh Health Serv. 2007;20(4):231–41.

127. Smith I. Operationalising the lean principles in maternity service design using 3P methodology. BMJ Qual Improv Rep. 2016;5(1):u208920.w5761.

128. Cesario SK. Designing health care environments: Part I. Basic concepts, principles, and issues related to evidence-based design. J Contin Educ Nurs. 2009;40(6):280–8.

129. Alvaro C, Kostovski D, Andrea Wilkinson A, Gallant S, Gardner P. A planning guide for post occupancy evaluation {Internet]. Toronto (ON): Methologica; 2015 [cited 2021 June 24]. Available from: http://methologi.ca/wp-content/uploads/2017/01/Methologica_PlanningGuide_Web_PrintandFill_Nov8.pdf

130. Ontario Ministry of Health. Patients first: a proposal to strengthen patient-centred health in Ontario [Internet]. Toronto (ON): Government of Ontario; 2015 [cited 2021 June 29]. Available from: www.health.gov.on.ca/en/news/bulletin/2015/docs/discussion_paper_20151217.pdf

131. Alberta Health Services. Strategic direction: defining our focus / measuring our progress [Internet]. Edmonton (AB): Alberta Health Services; 2012 [cited 2021 June 29]. Available from: https://docplayer.net/5964730-Strategic-direction-defining-our-focus-measuring-our-progress.html

132. Saskatchewan Ministry of Health. Patient first review update—the journey so far and the path forward [Internet]. Saskatoon (SK): Government of Saskatchewan; 2015 [cited 2021 June 29]. Available from: https://www.saskatchewan.ca/government/health-care-administration-and-provider-resources/saskatchewan-health-initiatives/patient-first-review

133. Villa S, Barbieri M, Lega F. Restructuring patient flow logistics around patient care needs: implications and practicalities from three critical cases. Health Care Manag Sci. 2009;12(2):155–65.

134. National Center for Interprofessional Practice and Education. Picker Institute's eight principles of patient-centered care [Internet]. Minneapolis (MN): University of Minnesota; 2015 [cited 2021 June 29]. Available from: https://nexusipe.org/informing/resource-center/picker-institute%E2%80%99s-eight-principles-person-centered-care

135. de Labrusse C, Ramelet A, Humphrey T, Maclennan SJ. Patient-centered care in maternity services: a critical appraisal and synthesis of the literature. Womens Health Issues. 2016;26(1):100–9.

136. Conklin A, Morris Z, Nolte E. What is the evidence base for public involvement in health-care policy?: results of a systematic scoping review. Health Expect. 2015;18(2):153–65.

137. Usher S, Denis J, Préval J, Baker R, Chreim S, Kreindler S, et al. Learning from health system reform trajectories in seven Canadian provinces. Health Econ Policy Law. 2020:1–17.

138. Marsh S, Dunkley-Bent J, Jolly M. Implementing better births: a resource pack for local maternity systems [Internet]. London (UK): NHS; 2017 [cited 2021 June 29]. Available from: https://www.england.nhs.uk/wp-content/uploads/2017/03/nhs-guidance-maternity-services-v1.pdf

139. International Association for Public Participation (IAP2). IAP2 spectrum of public pParticipation [Internet]. Denver (CO: IAP2 International Federation; 2018 [cited 2021 June 29]. Available from: https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x11_Print.pdf

140. Bombard Y, Baker GR, Orlando E, Fancott C, Bhatia P, Casalino S, et al. Engaging patients to improve quality of care: a systematic review. Implement Sci. 2018;13(1):98.

141. Lofters A, Virani T, Grewal G, Lobb R. Using knowledge exchange to build and sustain community support to reduce cancer screening inequities. Prog Community Heal Partnerships Res Educ Action. 2015;9(3):379–87–387.

142. Acri M, Olin SS, Burton G, Herman RJ, Hoagwood KE. Innovations in the identification and referral of mothers at risk for depression: development of a peer-to-peer model. J Child Fam Stud. 2014;23(5):837–43.

143. Best A, Greenhalgh T, Lewis S, Saul JE, Carroll S, Bitz J. Large-system transformation in health care: a realist review. Milbank Q. 2012;90(3):421–56.

144. Lukas CV, Holmes SK, Cohen AB, Restuccia J, Cramer IE, Shwartz M, et al. Transformational change in health care systems: an organizational model. Health Care Manage Rev. 2007;32(4):309–20.

145. Buchanan DA, Addicott R, Fitzgerald L, Ferlie E, Baeza JI. Nobody in charge: distributed change agency in healthcare. Hum Relations. 2007;60(7):1065–89.

146. Buchanan R. Wicked problems in design thinking. Source Des Issues. 1992;8:5–21.

147. Willis CD, Best A, Riley B, Herbert CP, Millar J, Howland D. Systems thinking for transformational change in health. Evid Policy. 2014;10(1):113–26.

148. Austin MJ, Ciaassen J. Impact of organizational change on organizational culture: Implications for introducing evidence-based practice. J Evid Based Soc Work. 2008;5(1–2):321–59.

149. Veazie S, Peterson K, Bourne D. Evidence brief: implementation of high reliability organization principles. Washington (DC): Department of Veterans Affairs (US); 2019.

150. Saturno PJ, Martinez-Nicolas I, Robles-Garcia IS, López-Soriano F, Angel-García D. Development and pilot test of a new set of good practice indicators for chronic cancer pain management. Eur J Pain (United Kingdom). 2015;19(1):28–38.

151. Saturno-Hernández PJ, Martínez-Nicolás I, Moreno-Zegbe E, Fernández-Elorriaga M, Poblano-Verástegui O. Indicators for monitoring maternal and neonatal quality care: a systematic review. BMC Pregnancy Childbirth. 2019;19(1):25.

152. Public Health Agency of Canada. Perinatal health indicators (PHI) [Internet]. Ottawa (ON): PHAC; 2020 [cited 2021 June 29]. Available from: https://health-infobase.canada.ca/phi/

153. Global Affairs Canada. Final report: evaluation of the maternal, newborn and child health initiative 2010–11 to 2017–18 [Internet]. Ottawa (ON): GAC; 2019 [cited 2021 June 29]. Available from: https://www.international.gc.ca/gac-amc/publications/evaluation/2019/mnch-smne.aspx?lang=eng

154. Hart JL, Turnbull AE, Oppenheim IM, Courtright KR. Family-centered care during the COVID-19 era. J Pain Symptom Manage. 2020;60(2):e93–7.

155. World Health Organization. Past pandemics [Internet]. Geneva (CH): WHO; 2021 [cited 2021 June 29]. Available from: https://www.euro.who.int/en/health-topics/communicable-diseases/influenza/pandemic-influenza/past-pandemics

156. Daszak P, das Neves C, Amuasi J, Hayman D, Kuiken T, Roche B, et al. Workshop report on biodiversity and pandemics of the intergovernmental platform on biodiversity and ecosystem services [Internet]. Bonn (DE): IPBES; 2020 [cited 2021 June 29]. Available from: https://zenodo.org/record/4311798#.YPB-K-hKhPY

157. Beigi RH, Hodges J, Baldisseri M, English D, Magee-Womens Hospital Ethics Committee, the Magee-Womens Hospital Ethics Committee. Clinical review: considerations for the triage of maternity care during an influenza pandemic—one institution's approach. Crit Care. 2010;14(3):225.

158. Beigi R, Davis G, Hodges J, Akers A. Preparedness planning for pandemic influenza among large US maternity hospitals. Emerg Health Threats J. 2009;2(1):7079.

159. Capanna F, Haydar A, McCarey C, Bernini Carri E, Bartha Rasero J, Tsibizova V, et al. Preparing an obstetric unit in the heart of the epidemic strike of COVID-19: quick reorganization tips. J Matern Neonatal Med. 2020:1–7.

160. Chua M, Lee J, Sulaiman S, Tan H. From the frontline of COVID-19—how prepared are we as obstetricians? A commentary. BJOG. 2020;127(7):786–8.

161. Wilson AN, Ravaldi C, Scoullar MJL, Vogel JP, Szabo RA, Fisher JRW, et al. Caring for the carers: ensuring the provision of quality maternity care during a global pandemic. Women and Birth. 2021;34(3):206–9.

162. American Association of Birth Centers, Commission for the Accreditation of Birth Centers. Guidelines for auxiliary maternity units [Internet]. Perkiomenville (PA): AABC; 2020 [cited 2021 June 29]. Available from: https://cdn.ymaws.com/www.birthcenters.org/resource/resmgr/covid_resources/guidelines_for_auxiliary_mat.pdf

163. Dashraath P, Wong JLJ, Lim MXK, Lim LM, Li S, Biswas A, et al. Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. Obstet Gynecol. 2020;222(6):521–31.

164. Odor PM, Neun M, Bampoe S, Clark S, Heaton D, Hoogenboom EM, et al. Anaesthesia and COVID-19: infection control. Br J Anaesth. 2020;125(1):16–24.

165. Ferrazzi EM, Frigerio L, Cetin I, Vergani P, Spinillo A, Prefumo F, et al. COVID-19 obstetrics task force, Lombardy, Italy: executive management summary and short report of outcome. Int J Obstet Gynaecol. 2020;149(3):377–8.

166. Rajan N, Joshi GP. COVID-19: role of ambulatory surgery facilities in this global pandemic. Anesth Analg. 2020;131(1):31–6.

167. Wong LP, Sam I. Public sources of information and information needs for pandemic influenza A(H1N1). J Community Health. 2010;35(6):676–82.

168. Wu PE, Styra R, Gold WL. Mitigating the psychological effects of COVID-19 on health care workers. CMAJ. 2020;192(17):E459–60.

169. Pfefferbaum B, North CS. Mental health and the Covid-19 pandemic. N Engl J Med. 2020;383(6):510–2.

170. Vazquez-Vazquez A, Dib S, Rougeaux E, Wells JC, Fewtrell MS. The impact of the Covid-19 lockdown on the experiences and feeding practices of new mothers in the UK: preliminary data from the COVID-19 new mum study. Appetite. 2021;156:104985.

171. Bohren MA, Hofmeyr GJ, Sakala C, Fukuzawa RK, Cuthbert A. Continuous support for women during childbirth. Cochrane Database Syst Rev. 2017;2017(7):CD003766.

172. Gildner TE, Thayer ZM. Birth plan alterations among American women in response to COVID-19. Health Expect. 2020;23(4):969–71.

173. Renfrew MJ, Cheyne H, Craig J, Duff E, Dykes F, Hunter B, et al. Sustaining quality midwifery care in a pandemic and beyond. Midwifery. 2020;88:102759.

174. Kotaska A. Informed consent and refusal in obstetrics: a practical ethical guide. Birth. 2017;44(3):195–9.

175. Upshur REG. Principles for the justification of public health intervention. Can J Public Health. 2002;93(2):101–3.