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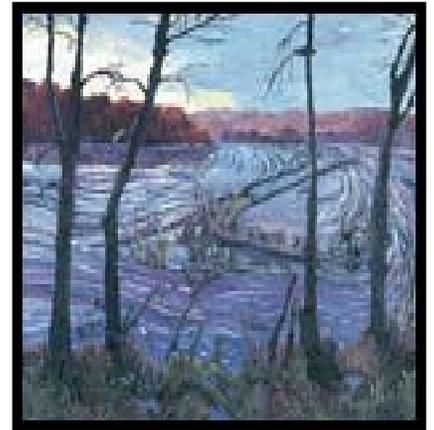
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Some new answers to old questions

Stuart Iglesias, MD  
Hinton, Alta.

CJRM 2000;5(4):195-6.

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In this issue of CJRM two maternity care papers from British Columbia ([page 201](#) and [page 221](#)) highlight many current issues in rural obstetrics.

Enriched by the advanced skills of its medical staff, St. John Hospital in Vanderhoof, BC, serves a catchment area of 10 000 people. It is located 100 km from a regional centre. Pavan and Makin<sup>1</sup> report a robust maternity care program of exceedingly high quality — low outflow (< 10%), good outcomes, low operative delivery rates and low induction rates. In my experience this is a typical medium-sized rural maternity care program.

At Bella Coola Hospital we see maternity care in a much smaller rural community. Bella Coola, BC, is 450 km (8 hours' travelling time in good weather) from a referral centre. The hospital's catchment area of 3500 supports a smaller medical staff and struggles to maintain its operative delivery capacity. The maternity care outflows are high (28%). As reported by McIlwain and Smith,<sup>2</sup> the professional staff, facing the stress of dealing with unanticipated complications of care without the surgical and anesthetic skills required, wonder whether it's appropriate for programs such as theirs to continue.

Pavan and Makin<sup>1</sup> are justifiably proud of St. John Hospital's program. But they do invite their readers to reflect on two aspects of the care. First, 4 of 10 cesarean sections (C sections) performed for dystocia were not augmented with oxytocin. The authors refer to the appropriate SOGC Guideline,<sup>3</sup> which failed to find strong evidence to support the benefits of oxytocin. However, it is also true that Canada's only Consensus Conference on Aspects of Caesarean Birth<sup>4</sup> recommended that a diagnosis of dystocia could only be justified after a trial of oxytocin. Second, Table 3 ("Other" category) of Pavan and Makin's paper states that in the charts they reviewed retrospectively, 4 of 8 C sections were performed because of maternal intolerance of labour. This is not an explanation for C section usually offered in the literature. It may be that this simply reflects a disingenuous honesty in the authors. Regardless, it does suggest that the

very low rate (10%) of epidural analgesia needs to be re-examined. Perhaps these rural anesthesiologists feel understaffed relative to the volume of anesthetic services expected of them. Onerous on-call schedules or inadequate financial compensation might preclude an effective local epidural program. However, an Alberta study documented wide variations in rural epidural programs between communities with similar manpower profiles and within an identical fee schedule (Alberta Medical Association. Final Report of the Ad Hoc Committee on Epidural Analgesia in Labour and Delivery: unpublished data, 1996). It is possible that with new low-dose continuous techniques and patient-controlled epidural analgesia the personal and professional burden to rural anesthesiologists is more perceived than real.

The Bella Coola Hospital staff will find considerable support and encouragement from the Report on the Findings of the Consensus Conference on Obstetrical Services in Rural or Remote Communities (see [page 211](#)). This British Columbia Reproductive Care Program (BCRCP) report,<sup>5</sup> an extraordinary initiative, brought together rural nurses and physicians, program managers and consultants. After reviewing the available evidence, they supported enthusiastically the continuation of low-volume rural programs with or without local C section capability. Clearly, in the view of these conference participants it is preferable for Bella Coola Hospital to retain even a limited C section capability. Equally clearly, other rural communities without local C section capability should be encouraged and assisted to acquire this capability. However, where this is unrealistic, the evidence reports superior outcomes for local maternity care programs without operative delivery than for those outcomes where all local maternity care is withdrawn and women and their families are obliged to travel. McIlwain and Smith<sup>2</sup> reflect on why this protective effect appears to be lost when considering the collective outcomes of an entire community of women obliged to travel for care. Part of the explanation can be found in the management pressures brought to bear by the maternity care travellers, especially for induction. In the McIlwain and Smith study, of the 51 women who left Bella Coola for care elsewhere, 33% had a C section. Of these 51 who left, 24 had no appreciable obstetrical problem.

The BCRCP report<sup>5</sup> endorses new attitudes toward the use of oxytocin and prostaglandin in rural augmentation and induction programs. It recognizes that these pharmacological agents generate powerful contractions (i.e., effective labour). If it is appropriate to care for a parturient patient anticipating strong effective natural labour in a rural community, it is equally appropriate to care for her during her pharmacologically supported labour in that same community. The recognition that induction and augmentation for appropriate indications may be offered in communities without local C section capability has been formalized in the revised "Guidelines for the Induction of Labour" (BC Reproductive Care Committee/Alberta Reproductive Care Committee: unpublished papers, 1998).

Similarly, the BCRCP report<sup>5</sup> challenges some historical attitudes when it points out that nulliparous women are no more, nor less, appropriate for consideration for local rural intrapartum care in rural communities without C section than are multiparous women.

Finally, this issue of CJRM includes two outstanding papers (see [page 226](#) and [page 230](#)) by Dr. Neil Leslie on intrathecal narcotics (ITN).<sup>6,7</sup> The technique is simple — a lumbar puncture. The analgesia provided is effective and may, if morphine is used, last 4 to 7 hours. The safety record is excellent. The complications are infrequent and can be easily managed by rural family physicians.

Leslie concludes that ITN can be delivered safely by rural family physicians without formal training in anesthesiology. He is correct. Several published reports<sup>8–10</sup> reviewed in one of Leslie's papers<sup>6</sup> represent ITN programs delivered by family physicians without anesthesiology training. This recommendation will undoubtedly be controversial. Historically, analgesia delivered through epidural and spinal routes has been restricted to those with advanced training. This reflects the traditional use of local anesthetic agents and the desired or undesired motor block that accompanies these agents. However, there is nothing specific to the route of administration (intrathecal) that should restrict the scope of practice to one particular group of physicians.

ITN, with its simplicity, safety and efficacy, represents an important analgesic alternative for rural family physicians without anesthesiology training; it should find a strategic place in most of our maternity care programs.

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De nouvelles réponses à de vieilles questions

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CJRM 2000;5(4):197-8.

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Dans ce numéro du JCMR, les deux communications de la Colombie-Britannique qui portent sur les soins en maternité ([page 201](#) et [page 221](#)) mettent en évidence un grand nombre d'enjeux courants en obstétrique en milieu rural.

Enrichi par les compétences spécialisées avancées de son personnel médical, l'Hôpital St. John de Vanderhoof (C.-B.) dessert un bassin démographique de 10 000 personnes. L'hôpital se trouve à 100 km d'un centre régional. Pavan et Makin<sup>1</sup> signalent l'existence d'un solide programme de soins en maternité d'une qualité exceptionnelle — faible taux d'exode de patientes (< 10 %), bons résultats, faibles taux d'accouchement par intervention chirurgicale et faibles taux d'induction. Il s'agit selon moi d'un programme modèle d'envergure moyenne de soins en maternité en milieu rural.

L'Hôpital de Bella Coola représente les soins en maternité dans une communauté rurale beaucoup plus petite. Bella Coola (C.-B.) est située à 450 km (8 heures de route par beau temps) d'un centre spécialisé. Le bassin démographique de l'hôpital, qui compte 3500 personnes, est desservi par un personnel médical plus restreint et l'hôpital lutte pour garder sa capacité fonctionnelle de pratiquer des accouchements. Les taux d'exode des patientes en maternité sont élevés (28 %). Comme l'indiquent McIlwain et Smith<sup>2</sup>, face au stress imposé par l'obligation d'affronter des complications imprévues sans posséder les compétences spécialisées nécessaires en chirurgie et en anesthésie, le personnel professionnel se demande s'il convient de maintenir des programmes comme le leur.

Pavan et Makin<sup>1</sup> ont raison d'être fiers du programme de l'Hôpital St. John. Ils invitent toutefois leurs lecteurs à réfléchir à deux aspects des soins. Tout d'abord, 4 césariennes sur 10 pratiquées à cause d'une dystocie n'ont pas été provoquées par l'oxytocine. Les auteurs se reportent au guide approprié de la SOGC<sup>3</sup> qui n'a pas trouvé de preuve solide des avantages de l'oxytocine. Il est toutefois vrai aussi que la seule Conférence de concertation sur les aspects de la césarienne

organisée au Canada<sup>4</sup> a recommandé qu'un diagnostic de dystocie ne soit justifié qu'après un essai d'administration d'oxytocine. Deuxièmement, le Tableau 3 (catégorie «Autres») de la communication de Pavan et Makin indique que dans les dossiers qu'ils ont étudiés rétrospectivement, quatre des huit césariennes ont été pratiquées parce que la mère ne tolérait pas le travail. Il ne s'agit pas là d'une justification de la césarienne qu'on présente habituellement dans les textes. C'est peut-être parce que cette affirmation reflète tout simplement chez les auteurs une honnêteté sans candeur. Elle indique néanmoins qu'il faut réexaminer le taux très bas (10 %) d'analgésies péridurales. Il se peut que les anesthésiologistes ruraux en cause ne se sentent pas assez nombreux par rapport au volume de services d'anesthésie qu'on attend d'eux. Des horaires de garde onéreux ou une rémunération insuffisante pourraient empêcher la mise sur pied d'un programme efficace de péridurale locale. Une étude réalisée en Alberta a toutefois documenté l'importante variation de programmes ruraux de péridurale entre des communautés qui ont un effectif semblable et des grilles d'honoraires semblables (Association médicale de l'Alberta. Rapport final du Comité spécial sur l'analgésie péridurale au cours du travail et de l'accouchement : données non publiées, 1996). Il se peut qu'avec les nouvelles techniques d'administration continue de faibles doses et d'analgésie péridurale contrôlée par la patiente, le fardeau personnel et professionnel des anesthésiologistes ruraux soit bien plus perçu que réel.

Le personnel de l'Hôpital de Bella Coola trouvera beaucoup d'appuis et d'encouragement dans le «Rapport des constatations de la Conférence de concertation sur les services d'obstétrique en milieu rural ou éloigné» (voir [page 211](#)). Le rapport du Programme de soins gynégénésiques de la Colombie-Britannique (PSGCB)<sup>5</sup> constitue une initiative extraordinaire qui réunit des infirmières et des médecins, des gestionnaires de programmes et des consultants de milieux ruraux. Après avoir étudié les données disponibles, ils ont appuyé avec enthousiasme le maintien de programmes ruraux à faible volume avec ou sans capacité locale de pratiquer des césariennes. Les participants à ces conférences affirment clairement qu'il est préférable pour l'Hôpital de Bella Coola de garder une capacité même limitée de pratiquer des césariennes. Il est tout aussi clair qu'il faudrait encourager d'autres communautés rurales sans capacité locale de pratiquer des césariennes à acquérir la capacité en question et les aider à le faire. Dans les régions où il serait irréaliste de le tenter, les données probantes indiquent toutefois que les résultats des programmes locaux de soins gynégénésiques qui n'ont pas de capacité d'accouchement par intervention chirurgicale sont supérieurs à ceux des localités où les soins gynégénésiques locaux sont retirés et les femmes et les membres de leur famille doivent se déplacer. McIlwain et Smith<sup>2</sup> présentent des réflexions sur les raisons pour lesquelles cet effet protecteur semble disparaître lorsque l'on tient compte des résultats collectifs pour toute une communauté de femmes obligées de se déplacer pour obtenir des soins. Une partie de l'explication réside peut-être dans les pressions administratives imposées par les patientes qui doivent se déplacer pour obtenir des soins gynégénésiques et plus particulièrement une induction. Dans l'étude de McIlwain et Smith, sur les 51 femmes qui ont quitté Bella Coola pour obtenir des soins ailleurs, 33 % ont subi une césarienne. Sur les 51 qui sont parties, 24 ne présentaient aucun problème obstétrique appréciable.

Le rapport du PSGCB5 appuie de nouvelles attitudes à l'égard de l'utilisation de l'oxytocine et de la prostaglandine dans le contexte de programmes ruraux d'accélération et d'induction. On reconnaît que ces agents pharmacologiques produisent des contractions puissantes (c.-à-d. un travail efficace). S'il convient de traiter une patiente sur le point d'accoucher qui prévoit un travail naturel puissant et efficace dans une communauté rurale, il convient tout autant de la traiter dans la même communauté pendant le travail appuyé par des agents pharmacologiques. La version révisée du «Guide sur l'induction du travail» (Comités des soins gynégénésiques de la C.-B. et de l'Alberta : documents non publiés, 1998) reconnaît officiellement que l'on peut offrir l'induction et l'augmentation pour des raisons appropriées dans des communautés qui n'ont pas de capacité locale de pratiquer des césariennes.

De même, le rapport du PSGCB5 remet en question quelques attitudes historiques en signalant qu'il n'est ni plus ni moins approprié d'envisager les soins périnataux locaux dans les collectivités rurales qui n'ont pas de capacité de pratiquer des césariennes dans le cas des femmes primipares que dans celui des femmes multipares.

Enfin, ce numéro du JCMR présente deux communications exceptionnelles du Dr Neil Leslie ([page 226](#) et [page 230](#)) sur les stupéfiants intrathécaux (SIT)<sup>6,7</sup>. La technique est simple : c'est celle de la ponction lombaire. L'analgésie administrée est efficace et peut, si l'on utilise de la morphine, durer de quatre à sept heures. Le bilan de sécurité est excellent. Les complications sont peu fréquentes et les médecins de famille peuvent facilement les prendre en charge. Le Dr Leslie conclut que des médecins de famille ruraux qui n'ont pas de formation officielle en anesthésiologie peuvent administrer des SIT sans danger. Il a raison. Plusieurs rapports publiés<sup>8–10</sup> passés en revue dans un des documents du Dr Leslie<sup>6</sup> portent sur des programmes de SIT administrés par des médecins de famille sans formation en anesthésiologie. Cette recommandation suscitera certainement la controverse. L'analgésie administrée par voie péridurale et rachidienne a toujours été réservée aux spécialistes qui ont une formation avancée. Cette attitude reflète l'utilisation traditionnelle d'anesthésiques locaux et le bloc moteur recherché ou indésirable qui les accompagne. Il n'y a toutefois rien de particulier à la voie d'administration (intrathécale) qui devrait limiter la portée de la pratique à un groupe de médecins en particulier. Avec leur simplicité, leur sûreté et leur efficacité, les stupéfiants intrathécaux représentent une importante option analgésique pour les médecins de famille ruraux qui n'ont pas de formation en anesthésiologie. Ils devraient occuper une place stratégique dans la plupart de nos programmes de soins gynégénésiques.

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Review of cesarean sections at a rural British Columbian hospital: Is there room for improvement?

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Michael Makin, MB, ChB, CCFP

CJRM 2000;5(4):201-7.

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**Objective:** To compare the cesarean section (C section) rate at a rural northern British Columbian community hospital with the provincial average and to determine how this rate might be improved, by reviewing the practice patterns of delivery at the hospital.

**Design:** Retrospective chart audit of modes of delivery.

**Setting:** A 33-bed community hospital staffed by family physicians.

**Patients:** For the calculation of the C section rate, all 1123 women who delivered at the study hospital between June 1, 1990, and May 31, 1997; for the chart audit, all 158 women who delivered at that hospital or were transferred from that hospital to a higher level of care, in 1997.

**Outcome measurements:** The average of C section rates for the study hospital and for BC from 1990 to 1997; mode of delivery and indications for C section in 1997; number of multiparous women who were eligible and ineligible for vaginal birth after cesarean (VBAC) in 1997 according to Society of Obstetricians and Gynaecologists of Canada (SOGC) criteria; and number of women diagnosed with dystocia in 1997 who did not fulfil the SOGC criteria for diagnosis.

**Results:** The average C section rate at the study hospital was 17.0% and was not significantly different from the provincial average of 20.7%. In 1997, there were 148 deliveries at the study hospital, with 114 (77.0%) spontaneous, 26 (17.6%) cesarean, 7 assisted (4.7%) and 1 (0.7%) breech. Ten women were transferred to a higher level of care and delivered elsewhere. There was more than 1 stated indication for C section in 9 deliveries, with the top 3 being dystocia (38%), repeat (35%) and fetal distress (27%). Fifteen (63%) of the 24 women eligible for VBAC underwent a trial of labour and achieved a success rate of 60%. Only 1 (10%) of 10 women diagnosed with dystocia did not fulfil the SOGC criteria.

Conclusions: The rate of C section at the study hospital was similar to that of the province. Offering VBAC to women with more than one lower uterine scar and no other contraindication to labour would be the easiest way to lower the rate at the hospital. Development of hospital protocols for the management of dystocia and VBAC could help to decrease the C section rate.

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Objectif : Comparer le taux de césariennes dans un hôpital communautaire rural du nord de la Colombie-Britannique à la moyenne provinciale et déterminer comment on pourrait améliorer ce taux en examinant la pratique des accouchements à l'hôpital.

Conception : Étude rétrospective des dossiers pour vérification du mode d'accouchement.

Contexte : Hôpital communautaire de 33 lits auquel travaillent des médecins de famille.

Patients : Pour le calcul du taux de césarienne, les 1123 femmes qui ont accouché à l'hôpital observé entre juin 1990 et mai 1997; pour la vérification des dossiers, les 158 femmes qui ont accouché à cet hôpital ou qui ont été transférées de cet hôpital à un établissement de soins de plus haut niveau, en 1997.

Mesures des résultats : Moyenne des taux de césariennes pour l'hôpital observé et pour la C.-B. de 1990 à 1997; mode d'accouchement et indications de césariennes en 1997; nombre de femmes multipares se prêtant ou non à une naissance vaginale après une césarienne (NVAC) en 1997 selon les critères de la Société des obstétriciens et gynécologues du Canada (SOGC); nombre de femmes ayant reçu un diagnostic de dystocie en 1997 qui ne répondaient pas aux critères de diagnostic de la SOGC.

Résultats : À l'hôpital observé, le taux moyen de césarienne s'élevait à 17,0 % et n'était pas significativement différent de la moyenne provinciale (20,7 %). En 1997, il y a eu 148 accouchements à l'hôpital observé, dont 114 (77,0 %) accouchements spontanés, 26 (17,6 %) césariennes, sept accouchements assistés (4,7 %) et un (0,7 %) siège. Dix femmes ont été transférées dans un service de soins de plus haut niveau et ont accouché ailleurs. Dans neuf accouchements, il y a eu plus d'une indication désignée pour une césarienne, les trois principales étant une dystocie (38 %), une répétition (35 %) et une détresse fœtale (27 %). Quinze (63 %) des 24 femmes admissibles à une NVAC ont accouché avec succès, après une période de travail, dans une proportion de 60 %. Une femme seulement (10 %) des 10 ayant reçu un diagnostic de dystocie ne répondait pas aux critères de la SOGC.

Conclusions : Le taux de césarienne à l'hôpital observé a été semblable à celui de la province. Pour réduire ce taux à l'hôpital, le plus facile serait d'offrir la possibilité d'une NVAC aux femmes qui présentent plus d'une cicatrice utérine basse sans autres contre-indications au travail. L'élaboration de protocoles hospitaliers pour le traitement de la dystocie et la gestion des NVAC pourraient aider à diminuer le taux de césariennes.

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## Introduction

In the western world, the rates and indications for cesarean sections (C sections) have generated much interest since the rate began to climb precipitously in the 70s and 80s. Canada did not escape this trend. In British Columbia the rate increased from 6.1% in 1969 to a high of 22.9% in 1989/90.<sup>1</sup> The rate has since fallen slightly and stabilized at approximately 20%.<sup>2</sup>

The increase has been attributed to a number of factors, including more frequent use of C section for dystocia, fetal distress and breech delivery, and an increased rate of repeat C section. Other factors include changed demographics of pregnant women that may predispose them to complicated labour,<sup>2</sup> increased use of continuous electronic fetal monitoring,<sup>3</sup> the perceived relative safety of the procedure<sup>1,4</sup> and fear of litigation.<sup>1–4</sup>

Spurred by the alarming increase in the rate of C sections, the National Consensus Conference on Aspects of Caesarean Births was formed in 1985. The panel published evidence-based guidelines for the management of women with a breech presentation, a history of previous C section and the diagnosis of dystocia.<sup>5</sup> These guidelines were updated in SOGC policy statements.<sup>6–8</sup>

The guidelines seem to have had an impact: the rate of C section has declined modestly in Canada, almost entirely due to the increase in vaginal birth after cesarean section (VBAC).<sup>6</sup> At least one Canadian rural community<sup>9</sup> and one US<sup>10</sup> hospital dramatically cut their abdominal delivery rate by instituting strict criteria for the common indications of C section.

In light of this evidence, we became interested in how the rate of cesarean deliveries at St. John Hospital (SJH) in Vanderhoof, a rural community hospital in northern British Columbia, compared with provincial averages, and how we could improve this rate. We examined hospital and provincial data to calculate an 8-year average of C section rates. We then performed a retrospective chart review of the practice patterns of obstetrics at SJH in 1997, paying particular attention to the indications for C section.

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## Methods

### Study site

Saint John Hospital is a 33-bed hospital located in Vanderhoof, BC. It serves a local population of approximately 10 000 people. During 1997, of the 6 full-time and 1 half-time physicians, 6 practised obstetrics, 3 were trained in surgery including C sections and 2 were trained in anesthesia. They provide 24-hour, nearly year-round coverage, including surgical deliveries for a small number of women referred from neighbouring towns. High-risk deliveries are referred to Prince George Regional Hospital, 100 km to the east, or BC Women's Hospital, Vancouver.

Approximately 160 babies are born at SJH each year.

Vanderhoof is defined as "rural" by at least 2 measurements. It is "rural remote" based on the Rural Committee of the Canadian Association of Emergency Physicians' definition of "communities about 80–400 km or about one to four hours transport in good weather from a major regional hospital."<sup>11</sup> It is also "rural" based on Leduc's 6-point General Practice Rurality Index (GPRI), [The GPRI uses 6 weighted variables to predict the difficulty in accessing medical care and the practice profile of rural physicians. It is a 100-point scale: the higher the number, the more rural the community. A score of 10 has been proposed as the threshold for rurality.] rating a score of 60.<sup>12</sup> (See [Appendix 1](#) for the GPRI and calculations for Vanderhoof and [Appendix 2](#) for a definition of the terms.)

### Study population

Charts were identified retrospectively by SJH's medical records keeper for all women who gave birth at SJH (Group 1) and for all women transferred from SJH for an obstetrical reason (Group 2), between Jan. 1 and Dec. 31, 1997.

In Group 1, the complete records of admission, including prenatal and birth records, admission histories, operative reports, progress notes, partograms and physician's order records, were systematically reviewed. Women who had transferred from a neighbouring community to SJH were identified. Data were tabulated by primary investigators according to unit number, age, parity, gestational age, maternal height, maternal weight in first trimester, fetal weight at birth, prenatal attendance to 36 weeks, pregnancy risk to 36 weeks, antepartum complications, intrapartum complications, whether labour was spontaneous, induced, or augmented, whether an epidural was used and whether delivery was vertex, breech, assisted or cesarean. The indications for cesarean deliveries were ascertained as well as whether they were repeat, emergent or VBAC (vaginal birth after cesarean).

In Group 2, the charts were reviewed and data tabulated according to whether the patient had originally been transferred from a neighbouring community hospital to SJH before being transferred from SJH, their unit number, age, parity, gestational age, final reason for transfer to SJH and where they were subsequently transferred to when they left SJH. It was not known whether these women delivered during the transfer to a larger centre, but an attempt was made to determine if these women were subsequently returned to SJH for delivery.

For both Groups 1 and 2, for vaginal and cesarean births, averages for age, gestational age and parity were calculated. An average for birth weights was also calculated for both vaginal and cesarean births in Group 1. Paired, 2-sample t-tests were used to compare between cesarean and vaginal birth groups in Group 1, between Group 1's cesarean births and Group 2, and between Group 1's vaginal births and Group 2. P values were calculated, and a level of  $p < 0.05$  was considered statistically significant.

## Calculation of the cesarean section rate

An 8-year average for the total, primary and secondary C section rates at SJH was calculated using data collected by the director of medical records for June 1, 1990, through to May 31, 1997. These were compared to the 8-year BC provincial averages 1990–97 using a paired, 2-sample t-test. (British Columbia Vital Statistics Agency. Annual reports 1990–1997. The Agency. Available from the Information and Resource Management Branch.) A level of  $p < 0.05$  was considered significant.

## Active phase of labour: SOGC definition

The latent phase of labour is defined by the SOGC<sup>7</sup> as "the phase of uterine activity associated with progressive cervical effacement immediately preceding the active phase." Studies to ascertain the normal length of the latent phase have had highly variable results, likely due to the difficulty in determining its beginning. Furthermore, there is a high degree of variability in duration among women.<sup>3</sup> Thus it is not certain what, if anything, defines a prolonged latent phase.

Although many C sections and other treatments are initiated for prolonged latent phase, studies that compared conservative treatment to intervention in early labour have not shown a benefit for early intervention.<sup>7</sup> Therefore, in 1995 the Society recommended that dystocia not be diagnosed until the active phase of labour has been established. The active phase was precisely defined<sup>7</sup> as:

...the presence of strong regular contractions which result in progressive and rapid cervical dilatation. It extends from the end of the latent phase until full dilatation. The cervix has reached approximately three to four centimetres and 80 to 90 percent effaced in a primiparous woman, and three to five centimetres and 70 to 90 percent effaced in multiparous women.

We used this definition to determine if those cesarean deliveries judged to be for dystocia were performed for true dystocia.

## VBAC: SOGC eligibility criteria

Eligibility criteria for VBAC were based on the latest SOGC guidelines.<sup>6</sup> With respect to dystocia, induction of labour, augmentation, twins, breech presentation and the presence of more than 1 lower-segment scar, the policy is unchanged from the 1993 statement.<sup>13</sup> The SOGC recommends<sup>6</sup> that a trial of labour be offered to all women with a history of previous C section, with a lower uterine scar unless the following contraindications are present:

- previous classical, inverted T incision or unknown incision scar;
- previous hysterotomy;
- previous myomectomy involving entry of the uterine cavity or extensive myometrial dissection;
- previous uterine rupture;

- presence of placenta praevia, transverse lie or any other contraindications to labour.

The delivery should take place in a hospital that can provide emergency operative deliveries. Previous C section for dystocia is not a contraindication. Induction or augmentation with oxytocin is not excluded but is associated with higher rates of complication. Prostaglandin gel for induction has not been studied adequately. Twin, breech presentation and suspected fetal macrosomia are also not contraindicated, although careful assessment is required.

The presence of more than 1 lower-segment scar is not a contraindication. The risk of scar dehiscence (the opening of the uterine scar without maternal or fetal compromise) is less than 4%. Although this is greater than for 1 previous scar (0.5%), the risk of uterine rupture with serious maternal and fetal compromise is small (0.1%) for all comers. Thus, VBAC after more than 1 previous C section is deemed acceptable, but each case should be assessed carefully.

Based on these guidelines, we presumed that all women without the above contraindications and regardless of the number of lower-segment scars were eligible for VBAC unless another contraindication to labour was stated.

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## Results

### Study population

In 1997, there were 148 deliveries, with 114 (77.0%) spontaneous, 26 (17.6%) cesarean, 7 assisted (4.7%) and 1 (0.7%) breech ([Table 1](#)). Four women were transferred from another hospital, of which 3 delivered vaginally. Ten women were transferred to a higher level of care in the antepartum period and in labour. Reasons for transfer included pre-eclampsia (3), premature rupture of membranes (3), premature labour (2), antepartum hemorrhage (1) and previous C section with no anesthetist available (1). There was 1 twin birth, which included the only vaginal breech delivery.

On average, the women in the cesarean group were older than those in the vaginal delivery group ( $p = 0.042$ ), but there was no significant difference between these groups and the 4 women who were transferred from another hospital. There was no statistical difference in gestational age between cesarean and vaginal deliveries. However, women who were transferred to a higher level of care were at an earlier period of gestation than those who delivered at SJH ( $p < 0.001$ ). Parity was similar between all groups ( $p = 0.55$ ). Birth weights were not significantly different ( $p = 0.64$ ) for neonates born vaginally or by C section.

Other characteristics of the births in Group 1 are summarized in Table 1.

### C section rate and indications

There were 1123 deliveries at SJH between June 1, 1990, and May 31, 1997. On average, 17.0% of deliveries were C sections. This rate was not significantly different from the provincial rate over a similar period ( $p = 0.18$ ) ([Table 2](#)). The primary rate was less than the provincial average ( $p = 0.03$ ), but the repeat rate was not ( $p = 0.054$ ).

There was more than one indication for operative delivery in 9 cases ([Table 3](#)). The most common indications were dystocia (38%), repeat (35%) and fetal distress (27%). Of the 10 judged to be for dystocia, 1 was made prior to the onset of labour as defined by the SOGC. Of these 10, 6 received oxytocin augmentation, 1 woman refused and the rest were not given oxytocin. The latter included the 1 woman who did not meet the criteria for dystocia.

### VBAC

In 1997, 58% of women who underwent a C section had previously had the procedure. Of the 24 who met the SOGC eligibility criteria for VBAC, 3 declined and 1 was advised against it because of cephalo-pelvic disproportion (CPD) ([Table 4](#)). In her previous delivery she was unable to deliver vaginally despite oxytocin augmentation. Because prior history of CPD is not a contraindication to VBAC, she was included in the eligible group. Four other women had 2 previous scars and 1 other woman had 3 previous abdominal deliveries. It was not known whether these 5 women declined or were not offered a trial of labour. Although we were unable to determine the type of scar in these women, they were included because another contraindication was not given.

The overall success rate of the 15 women who attempted labour was 60%. Only 1 woman who tried labour received an epidural.

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### Discussion

Results of the data collected in 1997 indicate that low-risk and moderately complicated deliveries are managed at SJH. High-risk pregnancies and those with complications in the pre-term period are transferred to a hospital with a greater ability to deal with potential neonatal complications.

C section rates were similar to those of the whole province, although there was a trend to lower rates. The provincial rate includes high-risk deliveries, whereas only low- to moderate-risk

deliveries are performed at SJH. Several studies have shown that rates in community hospitals may not be comparable to tertiary care facilities because the latter serve higher risk patients.<sup>14,15</sup> Thus, it may be expected that the rate at SJH should be lower than the provincial average.

Indications were similar to those in other studies,<sup>3,4,10,14,16</sup> where dystocia, fetal distress and repeat ranking were among the top 3 reasons for cesarean delivery. There was more than 1 indication in many of the births; some were nontraditional (e.g., maternal distress or exhaustion). The type of distress (i.e., emotional or physical) was unclear, and a consensus could not be reached as to whether maternal exhaustion constitutes dystocia. A suitable definition for these nontraditional conditions could not be found. Therefore, in our analysis they were included in the "Other" category. It is interesting to note that the 3 women who had a diagnosis of maternal distress also had a diagnosis of dystocia.

Our study shows that only 1 C section may have been avoided because of the improper diagnosis of dystocia. Thus, it is unlikely that a change, in the form of more careful diagnoses, would result in a substantial impact on the rate. Only half the women with dystocia were given oxytocin. The SOGC concedes that there are inadequate data on which to base criteria for diagnosing dystocia. It recommends that "women who are in the active phase ... who experience arrest of dilatation evaluated over a two-hour period, or dilate at less than 0.5 centimetres per hour evaluated over a four-hour period, require special attention." Although not yet proven effective, the use of oxytocin to correct dystocia in the absence of fetal compromise and after attention to comfort, hydration and amniotomy is promising and its increased use may have an impact.<sup>7</sup>

The VBAC success rate agreed with the 50%–80% range suggested by the SOGC,<sup>6</sup> but was lower than the rate achieved in a rural Alberta hospital with a similar practice pattern.<sup>9</sup> The authors of that study suggested that the availability of epidural analgesia was important in encouraging the acceptance of VBAC. In our study, only 1 woman who underwent a trial of labour and none of the multiparous women who went on to C section received an epidural. There may be an unwillingness among the patients or physicians to use this procedure for VBAC. The SOGC states that the use of an epidural is not contraindicated in VBAC and may prevent or treat dystocia.<sup>7</sup> Possibly, the success rate could be improved with the use of this procedure.

Participation rates for trial of labour were quite low; none of the women who had more than 1 lower uterine scar attempted VBAC. It is not clear whether these women refused, were not offered, or had a contraindication to VBAC. A reduction in the cesarean rate at SJH could be achieved if the physicians and patients became more comfortable with this alternative. The recent reduction in Canada of the C section rate has been entirely attributed to the increased use of a trial of labour.<sup>6</sup>

In 2 studies, 1 in a tertiary care centre<sup>10</sup> and another in a community hospital with similar demographics to SJH,<sup>9</sup> a reduction in overall C section rate was achieved without compromising patient health. These hospitals achieved success by applying clinical practice guidelines. Another

study showed that only nulliparity influenced the rate of cesarean delivery more than physician practice style.<sup>17</sup> It can be argued that guidelines serve to partially mitigate against this variation. Recognition must be given to local variations in resources and needs of the patients and caregivers, particularly in rural communities.<sup>18</sup> Perhaps the best way to ensure the lowest rate possible is to develop a set of guidelines based on SOGC models that will serve SJH and its patients.

There were a number of limitations to this study. It was a retrospective chart audit, and data were not recorded as to whether there were contraindications to VBAC in the women who did not undergo a trial of labour. A very small population was reviewed, in a single year. Small variations in the number of women who undergo C section and VBAC or receive a diagnosis of dystocia would have a large impact on outcomes. Furthermore, 1997 may not have been a representative year. Finally, when comparing C section rates, the beginning and end of the year were different between the hospital and provincial data. This may have introduced a systematic error.

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#### Conclusion

The rate of C sections at SJH was similar to the provincial average. In the great majority of cesarean deliveries for dystocia, the diagnosis was not made before the active phase of labour. No multiparous women who underwent more than 1 C section had undergone a trial of labour. Offering VBAC to these women may be the easiest way to lower the rate at SJH. Development of hospital protocols for the management of dystocia and VBAC, perhaps based on the SOGC's clinical practice guidelines, could help decrease the C section rate.

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Report on the findings of the Consensus Conference on Obstetrical Services in Rural or Remote Communities, Vancouver, BC, Feb. 24–26, 2000

Edited by Elizabeth Torr, BScN, MSc

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### Background

The British Columbia Reproductive Care Program (BCRCP) is a provincial program whose mission is to optimize maternal/fetal/infant health. Its mandate includes consultation with perinatal care providers, promotion of education and care networks, guidelines for patient care and the development and maintenance of the British Columbia Perinatal Database Registry.

There are at least 30 hospitals in BC that have ceased to offer maternity services, or which do not have full time cesarean section (C section) capability. Over several years, the BCRCP has received requests for guidance from several of these latter sites regarding the level of obstetrical service generally considered acceptable without operative delivery capability. One question that was asked consistently was whether nulliparous women should be allowed to labour and deliver at such a site. In response to these questions and others the BCRCP convened a Consensus Conference, held on Feb. 24–26, 2000, where perinatal providers, experts and regional representatives were invited to answer the following 2 questions.

- Is it safe for apparently low-risk women (i.e., at no appreciable risk) to labour and deliver in their home communities (thereby minimizing disruption of family and community) when there is no on-site C section capability?
- Assuming it is reasonable and good practice, what risk management strategies should be adopted in order to provide optimal care for both mother and newborn? What are the

minimum requirements?

By consensus, we agreed to broaden our debate to include considerations having to do with small/rural communities with or without C section capability, electing to focus on general risk management strategies for such communities.

Attendance was by invitation only; our purpose being to bring together those persons who by reason of professional affiliation, research/educational pursuit or government appointment could inform this debate and assist us in the pursuit of a common solution. Two regional delegates were solicited from each of the health regions and they were joined by invited faculty from the University of British Columbia and the British Columbia Institute of Technology, representatives of the Ministries of Health, Children and Families and Skills and Training, and other expert stakeholders. Delegates represented not only their region, but also the facilities within their region or community health services societies. Individual representation was secured from the College of Physicians and Surgeons of BC, the College of Family Physicians of BC, the College of Midwives of BC, the SRPC, the Society of Obstetricians and Gynaecologists of Canada (SOGC), the BC Public Health Nursing Council and the Registered Nurses Association of BC.

The following paper is a review of the discussion and summary of the consensus reached at the conference.

Please see [Appendix 1](#) for a complete list of all attendees.

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Rural hospitals should, within a regionalized, integrated risk management system, offer maternity care to a low-risk population. The evidence suggests that a local, rural maternity service, even if limited in scope, offers better outcomes than no maternity service. While anesthetic and surgical services are desirable, the available evidence suggests that good outcomes can be sustained without local access to operative delivery.

The capacity (or not) to provide a local operative delivery service has led to a number of rural communities electing to transfer many women, especially nulliparous women, for birthing elsewhere. This is based on the assumption that this group, in particular, represent a higher level of risk and require a higher intensity of care than the multiparous woman. The evidence, however, suggests that the nulliparous woman is no more likely to require urgent C section than the multiparous woman. The same principles of risk management apply to client selection for

operative birth in all sites in a regionalized perinatal system, where a proportion of women identified a priori as being high risk, are transferred to those facilities offering a higher level of care. An effective patient selection/screening process must be in place, backed up by an organized audit and feedback program.

With these principles in mind, lack of on-site C section capability should not constitute a reason for withdrawing obstetrical services for low risk women. In addition, C section capability should be maintained where it exists and consideration given to adding this capability where appropriate and feasible within the context of a regional maternity care plan. The existence of local C section capability can allow more women to receive appropriate care in or near their community and obviate some of the negative social effects of elective transfer.

There is a need to sustain and restore the availability of maternity services in smaller, rural communities. The loss of maternity services is not inevitable or irreversible.

The joint position of the SOGC, the SRPC and the College of Family Physicians of Canada is that maternity care should be provided as close as possible to the rural patient's home location, within the limits of safe practice; regardless of on-site C section support, women in rural communities achieve better delivery outcomes when cared for by local intrapartum programs. There must be an integrated initiative to support the physical, administrative and practitioner environments that make these services available. This involves issues such as maintaining a complement of adequately trained nurses, physicians and midwives, appropriate equipment for labour and birth, an efficient system of emergency transport for mothers and infants and, of course, funding support.

Convinced by the evidence of several position papers (see [Bibliography](#)) and the deliberations of the 2-day consensus focus groups, the conference attendees supported the continuation of these essential services to childbearing women in BC under the following circumstances.

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#### Disclosure and informed consent

Community residents should be aware of the level of service offered and the system of care of which the local service is part. When discussing the options for care during pregnancy and delivery, the mother and her family need to be informed of the advantages, limitations and risks of local maternity care services as well as those of travelling for care. They should be told the estimates of how likely a low-risk woman at the start of her pregnancy will

- remain a candidate for delivery at the local hospital by the end of her pregnancy;
- require transport to another hospital during labour for a non-life threatening condition (e.g., dystocia);
- require transport to another hospital with a life-threatening condition that might result in serious morbidity or mortality for the mother or her infant (e.g., abruptio placentae, cord prolapse).

This will allow the woman and her family to make an informed choice in light of her circumstances.

Current information should be disseminated to the community to allow women to consider their options with respect to place of delivery. Caregivers should be assisted in the process of disclosure by the local hospital and the community it serves. Such disclosure should begin early in antenatal care and should occur throughout the antenatal education program and at the caregiver's office. Documentation should be developed, unique to the local perinatal service, to summarize the information and give the expectant family an opportunity to have their informed consent formally recorded prior to the onset of labour.

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#### System planning and coordination

Each community, including regional planners and the local perinatal team, must determine its own capabilities and the limitations of the local maternity services. This includes deciding which specific cases (including both maternal and newborn care) are appropriate to be undertaken in the community; all decisions should reflect evidence of best practice.

Even with exemplary planning, some women and their infants will inevitably develop problems requiring a higher level of care than is available in the local community. An integrated and well coordinated transport service is critical to ensure an appropriate level of care. Conference participants raised concerns, particularly about regional/local transfer where there was seldom any transport infrastructure in place. Care providers were often unaware as to how to access such services and lacked expertise in understanding the issues related to transport. The appointment of local transport advisors, familiar with the ambulance service and patient needs, was recommended.

The development of standards was considered important. Good communication was emphasized, particularly between referring physicians/midwives and the receiving physician. Finding competent escort personnel is often a problem in a small community, particularly when the family practitioner may be the only physician on call in the community. Such problems are further exacerbated when the escort personnel are left to find their own way home at the end of the transport.

Transfer by the high-risk maternal and newborn transport team in BC is generally well organized. However, occasionally those involved in the organizing of a transport had a poor understanding of local geography and were not always responsive to potential local solutions. Being more receptive to local input was felt to potentially make it easier and faster for the woman, in particular, to receive an appropriate level of care.

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### Clinical decision-making

While the evidence indicates that nulliparous women will require transfer for C section (primarily for dystocia) more often than multiparous women, they are no more likely to require urgent C section than multiparous women. Therefore, nulliparity is not a reason to exclude a woman from delivery if her community lacks C section capability.

Augmentation (with oxytocin) and/or induction of labour (by artificial rupture of membranes, Prostin E<sub>2</sub> Vaginal Gel® or oxytocin) may be offered in communities without local C section capability. If caring for a woman in labour is appropriate in the community, then caring for her during an augmented/induced labour is equally appropriate when there is support by trained local staff and resources. The decision to support induction of labour in a rural community setting must be made with an awareness of what the increased likelihood of C section is and therefore what the need for the availability of support services is.

Regional analgesia may be offered to women in the absence of local C section capability where this can be supported by local staff and resources.

Hospitals offering planned vaginal birth after cesarean (VBAC) should be capable of providing emergency C section.

The conference delegates supported the continued development and dissemination of practical

clinical management guidelines (SOGC, BCRCP), including documented transport protocols and communication pathways.

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#### Facilities and equipment

Hospitals providing planned maternity services must have suitable equipment available, as well as processes for emergency triage and transfer. See [Appendix 2](#).

#### Providers

The primary consideration for perinatal care providers is that team competency is required. Competency of the individual practitioner or discipline is insufficient to offer a consistent service. See [Appendix 3](#).

#### Communication and peer support

Delegates share the professional, intellectual and emotional isolation experienced by health care providers in remote areas. They endorsed the availability of advice (clinical and administrative) via both local and regional networks among all levels of service providers. Telephone consultations to Level 3 centres should be maintained, with person-to-person advance notice of impending problems where possible.

Electronic links such as email, as well as Internet search capabilities should be available at all sites providing maternal/newborn care.

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#### Risk management

A formally documented risk management strategy should be developed for each rural maternity service. It should include processes to identify, assess and manage risk; it must also utilize

appropriate continuous quality improvement strategies to evaluate its effectiveness. Policies of disclosure and informed consent should also be developed.

An effective risk management program for communities without local operative delivery is the acquisition of these services where they could be supported by caregivers and the community. The support thus provided to the care providers and the reduction in outflow will help sustain the local maternity care service.

Note: There was an extensive discussion around the issue of risk identification as it relates to risk scoring. There was no consensus on whether or not it helps to diminish untoward events. Risk management, on the other hand, was strongly advocated by all representatives.

### Outcome evaluation and monitoring

Outcomes, both for individual cases and for the maternity population of the entire community, should be documented and reviewed on a regular basis. This requires a perinatal database that is based on the residence of the mother and the institution(s) where she received care, and a reporting system based on the catchment areas of the rural hospitals.

The capability (or not) of C section alters the pattern of risk litigation. Careful outcome analysis, including perinatal mortality and morbidity audit will allow care providers to carefully plan and revise delivery systems on an ongoing basis.

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### Consensus Statements

1. Women in Canada who reside in a rural community should receive high quality maternity care. Evidence suggests that the presence of a local rural obstetrics service, even if limited in scope, offers better outcomes for mothers and newborns than no service.
2. While local anesthetic and surgical services are desirable and would allow more women to receive appropriate care in their community, the available evidence suggests that good outcomes can be sustained within a regionalized risk management system without local access to operative delivery.
3. Where adequate human and physical resources are present each woman, who can anticipate a safe birth in a rural community, should be supported by physicians, midwives and nurses with local access to advanced maternity skills, including C section . Existing hospitals with C section capability should work to sustain this service.

4. Each community, including planners and the perinatal care team, must be involved in high level system planning and decision-making to determine the capabilities and limitations of the local maternity service. This will include deciding which specific cases (both maternal and newborn) are appropriate to be undertaken in the community. This should reflect evidence of best practice.
5. While the evidence indicates that nulliparous women will require transfer for C section more often than multiparous women, they are no more likely to require urgent C section than multiparous women. Therefore, nulliparity is not a reason to exclude a woman from delivery if her community lacks C section capability.
6. Augmentation of labour may be offered in communities without local C section capability. If caring for a woman in labour is appropriate in the community, then caring for her during an augmented labour is equally appropriate when there is support by trained local staff and resources. Caution should be exercised in augmenting the labour of a multiparous woman whose labour arrests in the active phase.
7. Induction of labour, for appropriate indications, may be offered in communities without local C section capability. If caring for a woman in spontaneous labour is appropriate in the community, then caring for her during an induced labour is equally appropriate when there is support by trained local staff and appropriate resources. Providers must be aware of the increased likelihood of C section and therefore the need for the availability of support services.
8. Regional analgesia may be offered to women in the absence of local C section capability where this can be supported by trained local staff and resources.
9. Hospitals offering planned VBAC should be capable of providing emergency C section.
10. A formally documented risk management strategy should be developed for each rural maternity service. It should include processes to identify, assess and manage risk. It must also utilize appropriate continuous quality improvement strategies to evaluate its effectiveness.
11. When discussing the options for care during pregnancy and delivery, the mother and her family need to be informed of the advantages, limitations and risks of local maternity care services as well as those associated with traveling for care. This will allow the woman and her family to make an informed choice in light of her circumstances.
12. Written information reflecting the services available in a particular community should be provided to the expectant woman and her family in order to give them an opportunity to understand their options prior to delivery. Disclosure should begin early in antenatal care and should occur throughout the antenatal education program and at the caregiver's office. The chance of requiring emergency transport in labour, the rare possibility of a catastrophic event and the implications of moving out of the community to give birth should all be clarified. Caregivers should be assisted in the process of disclosure by the local hospital and the community it serves.
13. Basic competencies for physicians, midwives and registered nurses must be established a priori and maintained. Practitioners must be able to cope with the following conditions.
  - Spontaneous term singleton vertex labour and birth
  - Management of dystocia in the 1st and 2nd stages of labour by nonpharmalogical

and pharmacological (including oxytocin) means

- Fetal surveillance/monitoring
  - Augmentation and induction of labour, for appropriate indications, where this can be supported by trained local staff resources
  - Intrauterine/extruterine resuscitation
  - Outlet and low vacuum extractor or forceps assisted deliveries
  - Management of shoulder dystocia
  - Basic neonatal resuscitation including intubation and management of meconium
  - Repair of laceration or episiotomy
  - Manual removal of placenta
  - Management of postpartum hemorrhage
  - Examination and care of the newborn
14. Maintenance of competence should be assured by
- interdisciplinary standards (i.e., one-on-one nursing care in labour;
  - professional responsibility for continuing education;
  - mentoring;
  - specific workshops or certification (ALARM/ALSO/ NRP);
  - transferability and recognition of advanced competencies.
15. Any decision regarding the provision of maternity services is a multidisciplinary one. This requires interdisciplinary communication and cooperation.
16. Where it is feasible, opportunities should be explored for inter-community (geographically close) and/or regional sharing of resources.
17. There is general support for equipment guidelines outlined in Health Canada's National Maternal/Newborn Family Centered Guidelines (April 2000) and the BC Intermediate Perinatal Care Task Force (1993). See Appendix 3.
18. Prearranged systems for coordination/cooperation between sites are essential.
- Agreements with neighbouring referral facilities
  - Need for referring physician/midwife to talk directly with the physician to whom the woman or her newborn is being referred
  - Communication systems — Internet, Telehealth, email — for education, reference and consults
19. The delivery of safe perinatal care in any community is facilitated by a well coordinated, integrated transport service capable of transferring a woman or her newborn in a safe and expedient manner. Care providers, hospital managers (local, regional and tertiary) together with local and provincial ambulance services are critical to the development and implementation of the transport infrastructure. Issues that need to be addressed are
- development and implementation of clinical guidelines for transfer;
  - consideration of using local and provincial transport advisors/coordinators;
  - use of competent escort personnel and return of such personnel back to their own community;
  - transport equipment, supplies and maintenance.
20. Outcomes, both for individual cases and for the maternity population of the entire community, should be documented and reviewed on a regular basis. This requires a

perinatal database that is based on the residence of the mother and the institution(s) where she received care, and a reporting system based on the catchment areas of the rural hospitals.

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Competing interests: None declared.

The Consensus Conference on Obstetrical Services in Rural or Remote Communities was endorsed by the Obstetrics Committee of the Society of Rural Physicians of Canada (SRPC) with the following caveat.

"The Diagnostic Facilities: Appendix B," represent useful support services for a rural maternity care service. Some are beyond the reach of rural facilities, in particular the wish for 24 hour ultrasound. The absence of any of these diagnostic facilities would not detract from the benefits of providing a local maternity care service.

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Obstetrics in a small isolated community: the cesarean section dilemma

Raymond McIlwain, MD, CCFP, FCFP

Sheila Smith, MD

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This is a retrospective review of the obstetrical experience of all pregnant women who presented for prenatal care in the small isolated community of Bella Coola, BC, over a 4-year period. There was a cesarean section rate of 17.8%; this compares favourably to the provincial average. However, 28% of these women delivered elsewhere. Almost half of these were due to lack of cesarean section coverage at Bella Coola Hospital at the time of delivery. The issues surrounding the provision of cesarean sections in small communities are discussed.

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Étude rétrospective de l'expérience obstétricale de toutes les femmes enceintes s'étant présentées pour recevoir des soins prénatals dans la petite collectivité isolée de Bella Coola (C.-B.), sur une période de quatre ans. Le taux de césarienne s'est établi à 17,8 %, ce qui se compare favorablement à la moyenne provinciale. Cependant, 28 % de ces femmes ont accouché ailleurs. Dans près de la moitié de ces cas, la situation est attribuable au fait que l'hôpital de Bella Coola ne faisait pas de césariennes au moment de leur accouchement. On examine les divers aspects de la question des césariennes dans les petites collectivités.

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Delivery of obstetrical services in small isolated communities is becoming more of an issue, particularly as these communities lose the ability to provide cesarean sections (C sections). There is some evidence that obstetrical outcome is better when provided in the patient's local community, even in the absence of C section coverage. However, many of us who practise rural obstetrics are intuitively uncomfortable with this situation. At Bella Coola Hospital in Bella Coola, BC, we are experiencing increasing difficulty in maintaining our ability to provide

C section coverage, and there is a corresponding increase in the number of women who deliver outside the community. We are attending fewer deliveries and performing fewer C sections. Is this safe and appropriate? We reviewed the obstetrical experience in our community and compared it to the experiences of others.

Bella Coola is a community of approximately 2500 people, with another 1000 in the catchment area. We are 450 km from the nearest hospital and any obstetrical specialist. Transfer entails an 8-hour trip over a difficult highway, or air transport. Because of our location in the coastal mountains, air travel is not always possible. Bella Coola Hospital has 10 acute-care beds and an operating room staffed by 3 general practitioners with anesthesia and C section experience. When 1 or more of our physicians is away or our operating room nurses are not available, we are unable to provide C sections.

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### Methods

A retrospective review of outcomes was carried out on all patients who delivered at Bella Coola Hospital. A review of the outcome for patients who presented to the clinic for prenatal care was also done. Specifically we documented the C section rate, complications, and other operative deliveries or interventions.

The charts of all women who delivered at Bella Coola Hospital between Aug. 1, 1995, and July 31, 1999, were reviewed for parity, gestation at delivery, mode of delivery, induction, epidural use, complications of delivery and neonatal morbidity/mortality. Clinic charts of all prenatal patients with due dates between Aug. 1, 1995, and July 31, 1999, were also reviewed. These records presented the greatest challenge; outcomes of deliveries that occurred elsewhere had to be determined, and the charts were sometimes incomplete. One of us (S.S.) tracked down records from other hospitals and interviewed patients for whom information was incomplete.

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### Results

[Table 1](#) summarizes the experience at Bella Coola Hospital during the study period. Of the 118 deliveries completed, there were 11 C sections and 11 forceps or vacuum extractor assisted deliveries.

[Table 2](#) summarizes outcomes of the 51 patients who were pregnant during the study period but delivered elsewhere. Six had simply moved from the area before their due date. Of the remaining 45, 24 left because of the lack of C section coverage. Of these 24, 15 had no obstetrical problems otherwise. Nine patients chose to deliver elsewhere for personal reasons unrelated to the availability of C section (e.g., family support elsewhere).

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## Discussion

Black and Fyfe's study<sup>1</sup> on obstetrics in Northern Ontario showed that hospitals providing maternity care without C section capability delivered 57% of newborns; hospitals performing fewer than 5 C sections per year delivered 80% of newborns from their area. At Bella Coola Hospital we delivered 72% of our newborns, placing us in between the Ontario hospital percentages. During our study period there was a considerable amount of time in which C section coverage was not available; this likely accounts for our intermediate position. Of the 51 women who delivered elsewhere, 54% did so specifically because there was no C section coverage. If we had had continuous C section coverage, we could have delivered 87% of the women in this community. This compares with the 80% in Black and Fyfe's study.

C section rates vary considerably from hospital to hospital and from area to area. Our nearest referral centre, Cariboo Memorial Hospital in Williams Lake, BC, had a C section rate of 29% (Apr. 1, 1998–Mar. 31, 1999) (Laurie Lord, Medical Records Department, Cariboo Memorial Hospital: personal communication, 2000). Hospitals in Black and Fyfe's study averaged 15.9%. In New South Wales, the C section rate for rural hospitals is 10% and for urban hospitals it is 16%.<sup>2</sup> The 1999 rate in British Columbia was 22.2%. (BC Vital Statistics Agency, prepublication statistics). Our rate of deliveries completed here is 9.2%. It is difficult to interpret whether the C section rate bears any relationship to quality of care or, indeed, to isolate the factors that contribute to the difference in C section rates.

Of interest, of women who delivered elsewhere 33% had C sections. It can be argued that there are a variety of factors contributing to that high rate, however, Nesbitt and colleagues,<sup>3</sup> looking at hospitals in Washington State, demonstrated that the number of birth complications is strongly associated with the proportion of deliveries occurring outside the community. The high C section rate for women delivering out of our community brings our C section rate by residence (all women living in Bella Coola) to 17.8%, which still compares favourably to the provincial average.

Our numbers for neonatal morbidity and mortality are too small for analysis. The prematurity rate seems particularly low, and we wonder if that is real or a deficiency in the accuracy of our

retrospective review. It would be interesting to be part of a prospective group study that looks at neonatal outcome. Klein discusses the possible reasons for the apparent anomaly that overall outcome is better when women deliver in their own community even when no C section service is available (Dr. Michael Klein, Head, Division of Maternity and Newborn Care, University of British Columbia, Vancouver; personal communication, 2000). He suggests that for "a particular case, hospitals with cesarean section would be better than without cesarean section ... at the population level it could be that other protective factors are operating at the community level." He makes the point "that when a COMMUNITY loses its maternity care capability — even if they did not have cesarean section on site before, the overall results based on the community — not the individual — show an increase of prematurity and maternal and infant morbidity when compared to demographically comparable communities with maternity care. The rural settings without cesarean on site ... are likely doing something that is protective." Nesbitt and colleagues<sup>3</sup> support similar hypotheses based on their data, which shows better outcomes in low-outflow compared with high-outflow communities.

We are often unable to provide C section coverage. We also face this question: Is it safe to provide C section service when we average only 3 a year? Forty percent of the 576 hospitals in Canada that provide obstetrical services perform fewer than 20 C sections per year.<sup>4</sup> Rosenblatt and coworkers,<sup>5</sup> looking at outcomes in rural New Zealand, suggest there is no volume threshold below which obstetric care becomes unsafe and that low-risk mothers fare better in a low technology environment. At what threshold does it become unsafe to be performing C sections? The SOGC<sup>6</sup> documents evidence that family practitioners who have acquired competence in C section can maintain their skills with relatively few (5 to 22) cases, and emphasizes that the quality of the initial training may be the most important factor.

Because of our geographic isolation and problems with transport, it remains desirable to have the capability of providing obstetrical care in this community and, if we are to do so, it may be safer to have the availability of C section. Numbers alone do not seem to preclude safe delivery of care, either for routine obstetrics or C section. Not surprisingly, our numbers are too small to make comments regarding perinatal morbidity and surgical/obstetrical complications. However, the data suggest that despite isolation and staffing difficulties, we are providing outcomes that compare favourably. We are encouraged by support from the literature to maintain obstetrical services, with the expectation that our outcomes will continue to be as good or better than those that would occur should we cease to provide obstetrical services. We must ensure that those providing services are adequately trained and regularly upgrade their training. In British Columbia and some other provinces practising physicians can do further funded training as an R111; the program also allows for shorter training periods. This sort of option needs to be encouraged and supported.

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This article has been peer reviewed.

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Intrathecal narcotics for labour analgesia:  
the poor man's epidural

Neil G. Leslie, MD, CCFP, FCFP

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What do you do when all of your non-pharmacological pain-relieving techniques have been tried but have failed to give your labouring patient an acceptable level of pain control? If you are in a large urban maternity centre you call for the epidural service. If you are in a rural community hospital (and even in many larger centres) your patient will not likely have access to 24/7 epidural analgesia services. Other pharmacological interventions at your disposal, such as intravenous narcotics or inhaled nitrous, are much less effective than epidural analgesia, have short duration and may have unwanted maternal or fetal sedation as potential side effects.<sup>1</sup>

Intrathecal narcotic (ITN) administration rivals epidural analgesia<sup>2,3</sup> in providing labour analgesia, but is faster in onset,<sup>3</sup> safer, less technically demanding and can potentially be provided by non-anesthetists.<sup>1,4</sup> ITN is well received by those women who choose to have it and has a high degree of patient satisfaction following its use.<sup>2,5-7</sup>

ITN does have limitations and cannot and will not replace epidural analgesia/anesthesia. But it is a technique that has its own merits and limitations and I believe it has a significant potential for improving pain control in rural maternity services that have no full-time epidural services.

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How does it work?

Intrathecal narcotics provide a selective blockade of pain transmission without significant sympathetic or motor blockade. The patient gets significant, even profound, pain relief without sedation, hypotension or paralysed legs. The technique is simpler than continuous epidural techniques, has a more rapid onset and requires less maintenance and monitoring than an epidural.

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### Physiology

Pain in the first stage of labour is a visceral pain resulting from the contraction of the uterus and dilation of the cervix. Input to the CNS is via slowly conducting unmyelinated "C" afferent nerve fibres entering the spinal cord at the T10–12 and L1 spinal segments. These impulses are modulated at the dorsal horn level in the spinal cord. Narcotics in the spinal fluid actively block this transmission by binding to the opioid receptors in the substantia gelatinosa in the dorsal grey matter of the cord.

Pain in the second stage of labour is associated with perineal stretching. This results in pain stimuli, which travel up the pudendal nerve, entering the spinal cord at the S2-4 segments via quick-conducting myelinated "A" fibers, and which are not modulated at the spinal cord level. Intrathecal narcotics do not relieve this somatic pain significantly. Additional pain management for the second stage may be required. Pudendal block is quite complementary to this technique if additional analgesia is required in the second stage.

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### What are the risks?

Adverse effects can be grouped into the effects of the medication and the possible complications of the route of administration.

#### Medication-related risks

Medications for the intrathecal space must be preservative-free preparations. Preservatives used in medication preparations may cause neurological damage if injected into the spinal fluid. Sublimaze® (fentanyl) or Epimorph® (morphine) are specifically preservative-free.

The side effects of ITN are the same side effects we see with narcotics used parenterally. These side effects are pruritis, nausea, sedation and respiratory depression. An additional side effect specific to ITN, urinary retention, is a fairly common occurrence. Fetal respiratory depression has not been noted, probably due to the very small doses of narcotic required in this technique.

Quality and duration of labour does not seem to be affected.<sup>1,8,9</sup> There have been a few anecdotal reports of uterine hyperactivity following intrathecal fentanyl,<sup>10</sup> but no adverse outcomes have been reported. Larger studies have not found this to be a problem.

Narcotic side effects are generally due to central nervous system (CNS) stimulation by the narcotic in the cerebrospinal fluid (CSF). They are more common with the water-soluble narcotic morphine than the highly lipid-soluble narcotics such as fentanyl and sufentanil, which are more rapidly "fixed" in the lipid-rich tissues of the spinal cord and are less likely to spread cephalad. Side effects with morphine are more prolonged and may occur much later, up to 12 hours, than the more lipid-soluble narcotics. Side effects are also dose related.<sup>7,11</sup>

Studies showing the dose response relation for intrathecal fentanyl and morphine have been done.<sup>7</sup> These have shown that the analgesic effect seems to maximize at about 25 µg for fentanyl and at about 0.25 mg for morphine. Above these levels analgesic effect is not significantly increased. Duration of action does increase with higher doses but unfortunately so does the incidence of adverse effects; therefore, the doses mentioned seem to be the best compromise between efficacy and duration versus adverse effects.

Side effects seem to be more common if the pain level is lower; this is generally also true for parenteral narcotics.<sup>2</sup> For example, there has been a higher reported incidence of nausea and vomiting post-partum in women who have had ITN. The mechanism is unclear. Medication side effects are generally well tolerated and can be managed easily when they need to be.

Pruritis is common, with a frequency of 40%–70% across all studies. The pruritis is generally mild, and most patients are comfortable with it, especially in view of the profound analgesia the technique affords them. In those women in whom the pruritis is uncomfortable, treatment with antihistamines may, or may not, be effective due to the central CNS cause. Treatment of side effects with narcotic agonist/antagonists is very effective and does not alter the analgesic effect once it is established; this is because the analgesic effect is from the binding of the narcotic to the cord tissues and the antagonist does not seem to displace the narcotic once it is bound in the cord tissues.

Occasionally, significant nausea may occur and is more likely to occur post partum.<sup>2</sup> Intrapartum nausea is common in women who have not had any ITN, so it is difficult to know whether to ascribe the nausea to the medication or to the labour. Postpartum nausea is more likely a medication effect and it is quite amenable to treatment with metaclopramide or with naloxone

or naltrexone.

Watch out for urinary retention, which is also common (up to 20%).<sup>7</sup> The intrathecal narcotic seems to interfere with relaxation of the sphincter muscle of the bladder. Urinary retention can be managed by catheterization if necessary.

Respiratory depression is a rare but potentially serious occurrence following ITN. This is due to the effect of the narcotic on the respiratory centre of the brain if the narcotic spreads cephalad. This is more likely to occur early (1 hour) with lipid-soluble narcotics such as fentanyl, which are absorbed rapidly into CNS tissues, but it can be quite delayed (up to 12 hours) with water-soluble narcotics such as morphine. Most of the respiratory depression reported in the literature occurred with higher doses of morphine (1 mg to 5 mg) and more recent studies limiting the dose of morphine to 0.25 mg have had large series without respiratory depression occurring.<sup>1,6,8,12</sup>

Respiratory depression may or may not be accompanied by any change in other CNS functions, so it may appear to cause abrupt respiratory difficulty. If respiratory depression occurs it tends to be progressive and generally can be anticipated by regularly checking the patient's respiratory rate; rates of less than 10 breaths/min should be treated promptly. Pulse oximetry may be helpful but should not be used as the sole method of monitoring. Careful attention to the respiratory rate by the attending nurse is required.

Respiratory depression may be potentiated by additional administration of oral or parenteral narcotics. These should be avoided in the postpartum period for up to 24 hours after administering morphine and for 12 hours after administering fentanyl. Fortunately, postpartum pain is generally managed well with non-narcotic analgesics in this patient population, presumably due to a residual effect of the original intrathecal dose.

Should it occur, respiratory depression is managed using naloxone. Naloxone (Narcan®) should be kept at the bedside so that it is immediately available. One must recognize that the ITN effect may outlast the short duration of naloxone and that repeat dosing or continuous infusion or the additional use of a longer duration antagonist like naltrexone may be required. Some sites routinely give naltrexone, 12.5–25 mg by mouth, postpartum, to prevent respiratory depression.<sup>6</sup> My experience is that if you stay within the dosing suggested, this does not seem warranted because the risk is very low with these doses. Your facility's ability to adequately monitor the patient postpartum may guide you here.

Supplies for ventilatory support should be readily available in the unlikely event that intubation is required.<sup>3</sup> Sedation may also occur but is uncommon at the doses recommended here. Management is the same as for respiratory depression.

Hypotension has been reported anecdotally and has generally been seen with larger doses or when combined with other anesthetic drugs. It has been rare with pure narcotic techniques where

the dosing has been limited. It is more likely when the patient is already dehydrated. Hypotension should be managed by placing the patient in the left lateral supine position and by administering an intravenous fluid bolus. Intravenous ephedrine may also be used as a peripheral vasoconstrictor. Having intravenous access with a large bore (18ga, or better yet, 16 ga) intravenous catheter prior to administering the intrathecal narcotic will allow for prompt management should hypotension occur. This intravenous catheter could be saline locked to allow greater freedom of motion when the ITN is established and it is clear that there is no need for a continuous infusion.

#### Technique-related complications

Post-dural puncture cephalgia (a.k.a. spinal headache) is much less common with new, small-gauge (25 gauge or smaller) pencil-point needles (Whitacre, Sprotte). Spinal headache has a reported incidence of 1%–8% with these needles.

The spinal headache is typically frontal and generally postural-related. It disappears when the patient is supine and comes on when the patient sits or stands. This type of headache generally is mild and self-limited. Post-spinal cephalgia is best treated by good hydration, mild analgesics as required, and keeping the patient in a supine position for 24 hours if it does occur. A very small percentage of patients, less than 1%, may require autologous blood patch to alleviate this symptom.<sup>6</sup>

Infection is a potentially serious complication in the subdural space but is very rare when this technique is used. Care in using aseptic technique is indicated.

Contraindications to ITNs are the same as for any spinal medication: coagulopathy, infection at needle insertion site (some would also say sepsis regardless of site), hypovolemic shock and lack of patient consent.

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#### Other limitations

The technique of ITN is limited in duration.<sup>3</sup> Fentanyl (25 µg) lasts 1–3 hours, and morphine (0.2–0.25 mg) may last 4–7 hours.<sup>7,13</sup> Intrathecal morphine alone has a slow onset (40–60 min) so it is best used in combination with fentanyl, which has a rapid onset (3–5 min).

Leighton<sup>2</sup> reported using a combination of fentanyl (25 µg) with morphine (0.25 mg) and getting onset of profound analgesia within 5 minutes and lasting up to 8 hours. This technique is generally limited to a single use per labour. Repeated doses may be much less effective in their

analgesic effect and will have a very limited duration of action.<sup>6,8</sup> Given these limitations it would seem best suited to use during the active phase of labour, where the duration of labour is not expected to be longer than the duration of the ITN.

ITN may also have some use as an analgesic technique for women with an obstructed labour who are requiring transfer to a centre that has cesarean section capability.

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### Politics

A recent provincial guideline in Manitoba requires that only physicians with anesthesia privileges be allowed to perform ITN techniques. It cites side effects and complications as being unacceptable for management by non anesthesia-trained physicians.<sup>14</sup>

This position is in direct contradiction to studies, done in sites utilizing non-anesthetists, that have shown good effect and outcomes.<sup>1,4,12</sup> These sites have seen ITN as a way to provide patients with superior analgesia when they do not have the resources of 24/7 anesthesia services. The studies support intrathecal narcotic administration as a technique suitable for non-anesthetists, provided they are familiar with the technique and its complications and know how to treat complications, should they arise.

The management of hypotension is within the skill set of most rural physicians, and the management of respiratory depression is familiar to those of us who work in the emergency department.

Additionally, a clear-cut educational protocol for the monitoring requirements and interventions for nursing colleges should be in place so that complications will be recognized in a timely fashion and treated promptly should they occur.

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### Summary

Intrathecal narcotic administration is an effective analgesia option to consider for women in

labour. ITN will have particular appeal for facilities that do not have readily available 24/7 epidural services.

ITN is a technique that could be done by rural physicians who are not trained in anesthesia, provided they are familiar with the technique of lumbar puncture and that they are well informed on the management of potential complications of the dural-puncture procedure and the side effects of the medications.

Implementing ITN in a facility would require that the facility also provide staffing levels to ensure that monitoring of the patient, intra- and postpartum, is adequate to recognize complications in a timely fashion should they arise.

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Competing interests: None declared.

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This article has been peer reviewed.

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14. [Intrathecal narcotics during labour](#). The College of Physicians and Surgeons of Manitoba Practice Guideline, 1997 April.

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## Intrathecal narcotic administration procedure

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CJRM 2000;5(4):230-2.

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If you can do a lumbar tap you can do this procedure. However, you must be able to deal with the possible complications if they should arise. (See companion article, [page 226](#).) A narcotic antagonist, O<sub>2</sub> mask and supply, bag-valve mask and airway intubation supplies should be at hand for the rare occasion when they may be required.

### Materials required

- Intravenous supplies
- Commercially prepared spinal anesthesia tray with a 20-ga introducer needle and a 25- or 26-ga spinal needle with a pencil tip (Whitacre, Sprotte). You can make up your own tray, but the pre-prepared sets are convenient and my hospital says they are cost effective. Smaller gauge (27 ga, 30 ga) spinal needles are available but are much more difficult to use and do not lower the incidence of post-spinal headache significantly over the 25- or 26-ga needles ([Fig. 1](#)).
- Antiseptic solution. Bridine® or Savlon®. Sets come with disinfectant solution included.

### Medications

- 1% lidocaine for skin infiltration
- Ephedrine. 50 mg/mL. Dilute to 5 mg/mL. Used to increase blood pressure by effecting peripheral vasoconstriction. Does not affect uterine arterial flow. Dose of 5 mg can be repeated every 5–10 minutes. Note that the mild hypotension that can occur is usually treated easily by a fluid bolus and by positioning the patient in the left lateral position.
- Naloxone. Used intravenously (IV) for respiratory depression (respiratory rate of <10 breaths/min or pulse O<sub>2</sub> <94%) or severe nausea or pruritis. Dose, 0.2 mg. May have to be repeated as it has a short half-life compared to the narcotics.
- Naltrexone. Narcotic antagonist. Used for respiratory depression, pruritis or severe nausea. Dose, 12.5 mg orally. Long duration.

- Nalbuphine. Narcotic agonist/antagonist. Used for severe nausea or pruritis. 5–10 mg IV.
- Benadryl®. For pruritis. Usual dose is 25 mg IV.
- Metaclopramide. Dose, 10 mg IV for nausea.
- Ephedrine. Peripheral vasoconstrictor. Used for treatment of hypotension that is not responding easily to fluid challenge. Usual dose is 5 mg IV and it may be repeated every 5–10 minutes if necessary.
- Narcotics suitable for use are listed in [Table 1](#).

Medications for the intrathecal space must be preservative free preparations

Preservatives used in medication preparations may cause neurological damage if injected into the spinal fluid.

Because it has slow onset of analgesia morphine is usually best combined with a small dose of fentanyl (15 µg) to get a more rapid onset.

- Obtain consent.
- Start an intravenous with suitable device. 18 ga, or better yet 16 ga. (Use local with larger intravenous catheters).
- Pre-load with 500–1000 mL of normal saline if you suspect the patient is dehydrated. (Prolonged labour or significant nausea and vomiting during labour.)
- Position the patient. I prefer a sitting patient for this procedure. Feet should be supported with a stool and she should have a table or partner to support her. The patient should be encouraged to make her back arch "like a Halloween cat" to encourage the intraspinal spaces to be maximized ([Fig. 2](#)).
- Prep the skin with Savlon® or iodine solution (Bridine®). Wash the skin with alcohol solution to remove excess Bridine® because Bridine® is very irritating to the subarachnoid tissues and even a small amount introduced by your needle may cause discomfort.
- Infiltrate the skin and subcutaneous tissue with 1% lidocaine.
- Use a 20-gauge introducer needle in the L3–L4 interspace to act as a guide for your small-gauge spinal needle, which will be easier to direct with the introducer in place ([Fig. 3](#)).
- Insert the spinal needle through the introducer and advance it until the dura is entered. This can be recognized by the characteristic "pop" of the dura and the return of cerebrospinal fluid (CSF). Both of the signs are subtler with the very thin needles, so some patience is necessary. The patient must be encouraged to stay still because movement during placement of the spinal needle will make the procedure difficult and has the potential of causing a rent in the dura, which can lead to an increase in the risk of post-spinal headache. It is best to do the puncture between contractions to limit the chances of the patient moving during the procedure. In addition, the patient should be warned that there might be some discomfort, particularly if a nerve root is encountered on the way. I find an experienced nurse is very helpful in supporting the patient through the procedure.
- Attach the syringe containing your medication of choice and aspirate a little CSF to

confirm placement of the needle, then inject the medication into the CSF. Some practitioners prefer to increase the volume of the medication by using sterile, preservative free, saline or dextrose 7.5% to a volume of 1–2mL total. Alternatively you can withdraw the equivalent volume of CSF to ensure that the dose is completely delivered.

Administration should be prompt but not overly vigorous because the force and speed of delivery of the solution does affect the spread of the medication. (Read up on barbotage in an anesthesia text for a more detailed description of this phenomenon.)

- Have the patient in a semi-supine position for 10–15 minutes while the medication "sets" in the spinal tissue. If you use a lateral position, make sure you change the patient from the left to right lateral position after 5 minutes to ensure that the medication spreads evenly; this will prevent a unilateral distribution and an uneven analgesic effect.
- Monitor blood pressure, pulse, and respiratory rate every 5 minutes for 15 minutes, then every 30 minutes thereafter, if stable. Some centres use pulse oximetry as well, leaving it on for 8 hours after fentanyl and up to 24 hours after morphine. This can be removed when the patient is ambulatory and replaced when she is in bed.
- Monitor for urinary retention. Catheterize as needed.

The onset of analgesia with fentanyl is rapid, and your patient will be comfortable within 1–2 contractions. You can then decide whether you will use medications for pruritis and nausea only as they arise, or whether you prefer to give them prophylactically as done at some facilities.

This technique is simple and effective and reports in the literature show that it is safe and results in a high degree of satisfaction by patients. Give it consideration for your labouring patients in need of effective analgesia — you and they will be pleased with the results.

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Competing interests: None declared.

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## Obstetrics on the Web

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"I got my education, out behind the barn, I ain't a-fooling, no-o-o sir-ee-ee. Passed each examination, out behind the barn, but it almost made a wreck out of me"  
— sung by Little Jimmy Dickens, circa 1950

To match CJRM's theme for this issue, this column features Web sites dealing with obstetrics, with an emphasis on Canadian sites and rural practice. The sections include tools for efficient searches, Web sites for physicians, on-line medical journals, and patient-oriented sites.

### Web site search engines

Many Web sites use an internal search engine to help you find relevant content quickly. This feature may be buried in a menu list or at the bottom of the page. Typically, you will find a box for typing search terms, separated by spaces and a button labelled "Search" or "Go" that initiates the search. Some search only words in titles or headings, whereas others search for key concepts. A future column will discuss "external" search-engine Web sites that search the entire Internet.

### Search terms

The most useful search terms are "pregnancy" and "obstetrics," "Canada," "Canadian" and "rural." To search for items about "labour," add the alternative spelling "labor" or you will miss some items. Some Web sites allow the concept of truncation, sometimes called wildcards or stemming. Ending a word stem with an asterisk (e.g., "obstetric\*") matches the words "obstetric," "obstetrics," "obstetrical" and "obstetrician." Most sites allow phrase searching. Enter a phrase in quotation marks (e.g., "diabetes in pregnancy") to match only items where the words appear in that exact order.

If you find too many items on your first search, try adding more specific search terms. If you find

too few, try using fewer search terms or use more general words. If you are still stuck, try thinking of other words that an author might use in the title or text of a relevant article.

#### Canadian Journal of Rural Medicine

[www.cma.ca/cjrm/](http://www.cma.ca/cjrm/)

The CJRM Web site is a good place to start. Begin with a general search for "obstetrics" or "pregnancy." Then search for "cjrm rural maternity care" to find the full text of the "Joint position paper on rural maternity care," which was published in the Spring 1998 issue.

#### Canadian Medical Association — Clinical Practice Guidelines

[www.cma.ca/cpgs/](http://www.cma.ca/cpgs/)

The CPG section of the CMA Web site contains several pregnancy-related guidelines. It uses its own search engine but has no master index.

#### Society of Obstetricians and Gynaecologists of Canada

[www.sogc.medical.org](http://www.sogc.medical.org)

The SOGC site has no search engine. The most useful sections to browse include "public education" (information for patients), "clinical practice guidelines" (extensive), and "maternity skills and cesarean section." The SOGC publishes an excellent journal but does not make it available online to non-members.

#### Advances in Labour and Risk Management (ALARM)

[www.sogc.org/alarm/index.htm](http://www.sogc.org/alarm/index.htm)

The SOGC sponsors this 2-day course to help obstetricians, family physicians and midwives keep up to date on the latest techniques in labour management.

#### Motherisk

[www.motherisk.org](http://www.motherisk.org)

This University of Toronto site contains sections on "recommendations & studies" and "other interesting sites," a comprehensive list of links to pregnancy-related Web sites. The "publications" section contains an archive of the "Motherisk Update" column published in Canadian Family Physician.

#### Advanced Life Support Skills in Obstetrics course (ALSO)

[www.cfpc.ca/alsoprovider.htm](http://www.cfpc.ca/alsoprovider.htm)

The College of Family Physicians of Canada conducts several of these workshops each year. Visit this site to find out if one will be held in your area.

#### Just the Berries

[www.theberries.ns.ca/](http://www.theberries.ns.ca/)

This searchable Canadian Web site has a variety of practical articles for family physicians,

several of which deal with pregnancy.

#### Virtual Hospital

[www.vh.org](http://www.vh.org)

This University of Iowa site provides a wide range of information. Physicians should follow the link path Providers > family practice. For patient-oriented information, follow the path Patients > common problems > pregnancy.

#### Family Practice Handbook — Obstetrics

[www.vh.org/Providers/ClinRef/FPHandbook/FPContents.html](http://www.vh.org/Providers/ClinRef/FPHandbook/FPContents.html)

A highlight of the Virtual Hospital site is the Family Practice Handbook, which includes a detailed section on obstetrics. The table of contents includes 34 chapters on all aspects of obstetrical care.

#### Canadian Library of Family Medicine

[www.uwo.ca/fammed/clfm/bib80.html](http://www.uwo.ca/fammed/clfm/bib80.html)

Among the pre-searched bibliographies available is one entitled "obstetrics in rural areas." Use the PubMed Web site to search for the abstract of any article that interests you.

#### PubMed — Literature Search

[www.ncbi.nlm.nih.gov/PubMed/](http://www.ncbi.nlm.nih.gov/PubMed/)

PubMed is a free service of the US National Library of Medicine. To find the BMJ articles mentioned below, enter the search terms "ABC of labour care" and "BMJ." Click on the author's name to display article details, then on the "Free BMJ" logo to display the full text.

#### British Medical Journal

[www.bmj.com](http://www.bmj.com)

In 1999, the BMJ published an excellent series of articles entitled "ABC of labour care." The full text of these articles is available online. To obtain the full text of all 11 articles, use the BMJ "search/archive" link and enter the strategy ("abc" AND "labour care" AND "clinical review") in the "word(s) anywhere in article" box of the search engine. The positioning of the quotes and the capitalized "AND" are required.

#### American Journal of Obstetrics and Gynecology

[www.mosby.com](http://www.mosby.com)

The abstracts are public, but full text is only available to subscribers or to users of MDConsult ([www.mdconsult.com](http://www.mdconsult.com)). Follow the path: Periodicals > find a journal > American Journal of Obstetrics and Gynecology.

#### Health Canada

[www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)

This site is sponsored by the Government of Canada. Click on "pregnancy" or "women's health" in the index. The link to "family-centred maternity and newborn care" provides Canadian guidelines for pregnancy management, which are downloadable in the PDF format. The link "nutrition for a healthy pregnancy" is available in both HTML and PDF formats. It includes a useful section on nutrition for pregnant vegetarians. Among the most useful topics are

- A healthy start: prenatal nutrition
- Breast feeding and infant nutrition
- Fetal alcohol syndrome
- Neural tube defects, prevention
- Report on maternal mortality in Canada

Canadian Health Network

[www.canadian-health-network.ca](http://www.canadian-health-network.ca)

This consumer-oriented Web site provides some pregnancy information not found on the Health Canada site.

US National Library of Medicine

[www.nlm.nih.gov/medlineplus/pregnancy.html](http://www.nlm.nih.gov/medlineplus/pregnancy.html)

This site has an extensive list of pregnancy-related links. The parent MEDLINE Plus site is a good resource for finding information on a variety of health topics.

Mayo Clinic

[www.mayohealth.org](http://www.mayohealth.org)

This site contains patient-oriented information. Follow the path: Women's health > pregnancy & child health centre. An internal search engine is also available. Patients may enjoy using the illustrated due-date calculator on this site.

Yahoo Canada

[www.yahoo.ca](http://www.yahoo.ca)

This general Canadian directory site contains a "pregnancy and birth section." Follow the path: Health > reproductive health > pregnancy and birth. Some content may not be reliable!

Canadian Parents

[www.canadianparents.com](http://www.canadianparents.com)

The "stork headquarters" section of the Web site deals with pregnancy. The site is very high on advertising content targeted at pregnant women. Some content may not be reliable!

In the next issue of CJRM, this column will be about Internet search engines that search the entire Internet for information. I would be interested to hear from readers about which search engine they find most useful ([bmccombs@ucalgary.ca](mailto:bmccombs@ucalgary.ca)). My current favourites are Northern Light

([www.northernlight.com](http://www.northernlight.com)) and Google ([www.google.com](http://www.google.com)), but there are many others — each with its own strengths and weaknesses.

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[www.ruralnet.ab.ca/medinfo/specialty/obstetrics.htm](http://www.ruralnet.ab.ca/medinfo/specialty/obstetrics.htm)

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## Instructions for Authors

The Canadian Journal of Rural Medicine (CJRM) is a quarterly peer-reviewed journal available in print form and on the Internet. CJRM seeks to promote research into rural health issues, promote the health of rural (including native) communities, support and inform rural practitioners, provide a forum for debate and discussion of rural medicine, provide practical clinical information to rural practitioners and influence rural health policy by publishing articles that inform decision-makers.

Material in the following areas will be considered for publication.

- Original articles: research studies, case reports and literature reviews of rural medicine
- Commentary: editorials, regional reviews and opinion pieces
- Clinical articles: practical articles relevant to rural practice. Illustrations and photos are encouraged
- Off Call articles: a grab-bag of material of general interest to rural doctors (e.g., travel, musings on rural living, essays)
- Cover: artwork with a rural theme

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## Manuscript submission

Submit 3 hard copies of the manuscript and a copy on computer disk to Editor, Canadian Journal of Rural Medicine, Box 1086, Shawville QC J0X 2Y0; 819 647-2972, fax 819 647-2845, [cjrm@fox.nstn.ca](mailto:cjrm@fox.nstn.ca). Include a covering letter indicating that the piece has not been published or submitted for publication elsewhere. Hard copies of the manuscript should be double-spaced, with a separate title page, an abstract of no more than 200 words, followed by the text, full references and tables (each table on a separate page).

"[Uniform requirements for manuscripts submitted to biomedical journals](http://www.cmaj.ca/misc/ifora.shtml)" (see [www.cmaj.ca/misc/ifora.shtml](http://www.cmaj.ca/misc/ifora.shtml)).

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## Accepted manuscripts

Authors will be required to submit the most recent version of the manuscript by email or on diskette. Please specify the software used.

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Rural obstetrics

CJRM 2000;5(4):236.

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A MEDLINE search on "obstetrics" and "rural health" yielded interesting results. No claims of comprehensiveness are made, but one trend was evident: much of the current literature on this subject is being generated in Canada. Since these articles appear in journals accessible to Canadian physicians, they're not reviewed here; they are listed in order of publication date.

A step in the right direction [letter; comment]. Clarke LT. *Can Fam Physician* 2000;46(1):39.

Joint position paper on training for rural family practitioners in advanced maternity skills and cesarean section. College of Family Physicians of Canada, Society of Rural Physicians of Canada, Society of Obstetricians and Gynaecologists of Canada. *Can Fam Physician* 1999;45:2416-22,26-32.

Launch of a rural advanced maternity care curriculum [editorial; comment]. Klein MC. *Can Fam Physician* 1999;45:2273-4, 7-9.

Obstetrics anyone? How family medicine residents' interests changed. Ruderman J, Holzapfel SG, Carroll JC, Cummings S. *Can Fam Physician* 1999;45:638-40, 43-7.

Rural obstetrics. Joint position paper on rural maternity care. Iglesias S, Grzybowski SCW, Klein MC, Gagné GP, Lalonde A. *Can Fam Physician* 1998;44:831-6. [Can J Rural Med 1998;3\(2\):75-80](#). *J Soc Obstet Gynaecol Can* 1998;20(4):393-8.

From further afield several interesting articles were identified.

Impact of physicians' perceptions of malpractice and adaptive changes on intention to cease obstetrical practice. Burns LR, Connolly T, DeGraaff RA. *J Rural Health* 1999;15(2):134-46.

US researchers surveyed all the rural obstetrical care providers in one state and obtained a 94% response rate. They found that the perception about the negative consequences of being sued, rather than the perception of the likelihood of being sued, as well as the effect on reputation

rather than amount of any potential settlement of a suit, were the driving forces behind an intention to leave obstetrics.

Accidental out-of-hospital births in Finland: incidence and geographical distribution 1963–1995. Viisainen K, Gissler M, Hartikainen AL, Hemminki E. *Acta Obstet Gynecol Scand* 1999;78(5):372-8.

Location of delivery was reviewed in the context of a centralization of maternity units. Centralization has occurred in Finland since 1963 with the closure of small hospitals and expansion of the central hospital network. The incidence of accidental births decreased between 1963 and 1973 to 0.4/1000, but rose again in the 90s to 1.0/1000. The parity adjusted risk was highest in rural areas and in Northern Finland. The authors note the temporal correlation of this trend with the trend to close small units.

Educating medical students for Alaska. Fortuine R, Domino MJ. *Int J Circumpolar Health* 1998;57(Suppl 1):79-82.

Seven years' experience was reviewed as part of WAMI (an educational agreement between Washington, Alaska, Montana, and Idaho to train medical students for these rural states). During this time 30% of students accepted into the program from Alaska had rural backgrounds and a further 10% were Alaskan Natives. Curriculum includes exposure to Alaskan communities from the 1st year of the program. An Alaskan track is being developed; this would allow a 3rd-year student to "do most of the third year in state via clerkships in family medicine, obstetrics/gynecology, psychiatry, internal medicine, and pediatrics."

Practice patterns of rural Texas physicians trained in a full-service family practice residency program. Young RA, Byrd AN. *Tex Med* 1999;95(2):64-8.

The concept of the "full-service" family physician is particularly relevant to rural practice. The authors surveyed 30 years of a training program geared toward graduating this type of practitioner. Compared with other rural members of the American Academy of Family Physicians, graduates of this program "provided more obstetrical care, critical care, and office-based procedures" and "recent graduates were more likely to provide obstetrical care than older graduates." They concluded that rural Texas continues to need practitioners with these skills and that this program is relatively successful in providing them.

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**Appendix 1. A proposed General Practice Rurality Index (GPRI) and calculation for St. John Hospital, Vanderhoof, BC, using Leduc's GPRI for Canada\***

Sum the points for each of the following that apply (maximum 100). Refer to Appendix 2 for definitions.

Remoteness from closest advanced referral centre  
Distance, km ÷ 50  
Vanderhoof: Vancouver, 900 km ÷ 50 = 18

Remoteness from closest basic referral centre (or advanced referral centre if closer)  
Distance, km ÷ 25  
Vanderhoof: Prince George, 100 km ÷ 25 = 4

Drawing population  
20 - (drawing population ÷ 2000). If negative, score = 0  
Vanderhoof: 20 - (10 000 ÷ 2000) = 15

No. of general practitioners  
20 ÷ (no. of full time equivalent GPs with the main place of business within 25 km of the centre of the community)  
Vanderhoof: 20 ÷ 6 = 3

Number of specialists  
If there are no specialists with the main place of business within 25 km of the centre of the community, score = 10.  
Otherwise, score = 6 ÷ (no. of specialists).  
Vanderhoof: 10

Presence of an acute care hospital  
If there is no acute care hospital with inpatient beds within 25 km of the centre of the community, score = 0.  
Otherwise, score = 10 - (no. of specialists).  
If negative score = 0  
Vanderhoof: 10

Vanderhoof total: 60

\*Adapted, with permission, from Table 1 of reference 12: Leduc E. Defining rurality: a General Practice Rurality Index for Canada (*Can J Rural Med* 1997;2[3]:125-31).

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## Appendix 2. Definitions of terms used in GPRL\*

### Advanced referral centre

Closest major metropolitan area with registered subspecialists in cardiothoracic surgery, neurosurgery, pediatric surgery, radiation oncology and hematology.

### Basic referral centre

Closest community with registered specialists in general internal medicine, general surgery, ophthalmology, orthopedic surgery and radiology.

### Community

Any city, town or village with a centre identified on an official government road map; does not include areas, districts, counties or regions without an identifiable community centre.

### Distances

Shortest route in kilometres by paved road from the centre of one community to the centre of another; if no paved road, use the shorter of the unpaved road multiplied by 2 or, in the case of boat or airplane travel, the water distance multiplied by 4 or the air distance as the crow flies.

### Drawing population

The community population plus the area population that regularly uses the community GPs for primary care; if a community has at least one GP, the whole population of that community is assumed to see the local GP(s) for its primary care, so that population should not be included in the drawing population of any other community.

### General practitioner

Any licensed physician working full time who is not registered as a specialist by the provincial licensing authority.

\*Reprinted, with permission, from Table 2 of reference 12: Leduc E. Defining rurality: a General Practice Rurality Index for Canada (*Can J Rural Med* 1997;2[3]:125-31).

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**Table 1. Data on deliveries at St. John Hospital (SJH), Vanderhoof, BC, (Group 1) and on patients who transferred from SJH to a higher level of care (Group 2), in the year 1997**

Attribute	Group 1, <i>n</i> = 148		Group 2
	Vaginal deliveries	Cesarean deliveries	
No. of patients	122	26	10
Age, yr	26.0	28.3	25.1
Gestational age, wk	39.9	39.8	34.4
Parity	1.3	1.1	1.2
Nulliparous (%)	48 (39)	10 (38)	4 (40)
Multiparous (%)	74 (61)	16 (62)	6 (60)
Birth weight, g	3464*	3514	NA
Induced	20	4	NA
Augmented	11	6	NA
Assisted†	7	1	NA
Epidural	15	5	NA

\*For calculation of birth weights, *n* = 114.  
†Includes both forceps and vacuum extraction.

[\[Return to text\]](#)

**Table 2. Comparison of cesarean rates, 1990–1997, between St. John Hospital and the province of British Columbia**

	St. John Hospital,* %	Province of BC,† %
Primary cesarean	10.2	12.8
Repeat cesarean	6.8	7.9
Totals	17.0	20.7

\*June 1, 1990, to May 31, 1997

†1990–1997

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Table 3. Indications for cesarean delivery in the 26 cases during 1997 at St. John Hospital	
Indication*	No. (%)†
Dystocia‡	10 (38)
SOGC criteria met	9 (90)
SOGC criteria not met	1 (10)
Repeat	9 (35)
Fetal distress	7 (27)
Breech presentation	1 (4)
Other§	8 (31)

SOGC = Society of Obstetricians and Gynaecologists of Canada  
 \*More than one indication for 9 patients.  
 †Percentages calculated with no. of deliveries as denominator.  
 ‡Failure to progress (2), malposition (4), arrest 1st stage (2), deep transverse arrest in 2nd stage (2). Denominator for percentages is 10 for SOGC criteria.  
 §Maternal exhaustion (3), maternal distress (1), maternal request (1), query abruptio placenta (1), query dehiscence (1) and vaginal bleeding (1).

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**Table 4. Outcome among multiparous women eligible for vaginal birth after cesarean (VBAC) during 1997 in St. John Hospital**

Women eligible for VBAC, <i>n</i> = 24	No. (%)
Declined, or not offered VBAC	9 (37)
Attempted VBAC	15 (63)
Successful*	9 (60)
Unsuccessful*	6 (40)

\*Denominator is number attempted.

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**Appendix 2. Facilities and equipment that must be made available for planned maternity services**

**Physical facilities**

- labour or birthing bed, stool
- lighting and auxiliary power source
- adequate ventilation and temperature controls
- emergency signal and intercom system
- patient and staff washrooms
- storage facilities including patient's personal effects
- charting area
- secure area for medications
- sphygmomanometer, stethoscope and fetoscope
- intravenous infusion solutions and mechanical pumps
- separate oxygen and suction outlets for mother and baby
- hand-washing facilities
- stretchers
- instrument table with scissors, needle driver, pickups, suture materials, gauze, drapes, towels and disinfectant solutions
- emergency tray
- vacuum extractor
- outlet forceps
- equipment for inhalation anesthesia
- clean and soiled utility room

- sterilization equipment
- infant and adult resuscitation equipment
- infant and adult weigh scale
- wall clock

**Diagnostic facilities**

Availability of the following:

- hemoglobin, hematocrit, within 15 minutes
- other blood work (e.g., complete blood count and differential, electrolytes, liver function test) within 60 minutes
- bacterial cultures and sensitivities within 24–48 hrs
- ultrasound and radiography, with technician on call 24 hrs

**Pharmacy**

- local/regional anesthetic solutions
- neonatal/adult resuscitation drugs (e.g., Narcan® [naloxone])
- analgesic/anti-inflammatory tablets and suppositories
- oxytocic agents (i.e., Syntocinon®, ergot, prostaglandin E<sub>2</sub>, Hemabate®)
- narcotics, antiemetics
- nitroglycerine
- ephedrine
- laxatives, astringents

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**Appendix 3. Medical conditions and situations in which the perinatal care providers, as a team, must be competent**

Practitioners should have the skills to cope with the following conditions and situations:

- Spontaneous term singleton vertex labour and birth
- Management of dystocia in the first and second stages of labour by non-pharmacological and pharmacological means (including oxytocin)
- Augmentation and induction of labour, for appropriate indications, where this can be supported by trained local staff and resources
- Fetal surveillance/monitoring according to national standards
- Intrauterine/extruterine resuscitation
- Outlet and low vacuum extraction or low forceps-assisted deliveries
- Management of shoulder dystocia
- Basic neonatal resuscitation including intubation and management of meconium
- Repair of laceration or episiotomy
- Management of post-partum hemorrhage
- Examination and care of the newborn

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**Table 1. Data on 118 deliveries in Bella Coola Hospital (BCH), Bella Coola, BC, over a 4-year period**

Data	Total
Primiparas*	42
C section†	11
Emergency	9
Elective	2
Assisted vaginal delivery‡	11
Forceps	2
Vacuum extractor	9
Inductions	15
Reason for induction	
Medical	8
Social / staffing	7
Post-partum hemorrhaging (PPH)	8
C-section complications	3
Bladder laceration	1
Endometritis	1
PPH	1
Neonatal perinatal mortality	2
Premature (24–25 wk)	1
Multiple congenital anomalies	1
* 35.6% of deliveries at BCH, 45.0% of deliveries in BC in 1998.	
† 9.3% of deliveries at BCH, 21.1% of deliveries in BC in 1998.	
‡ 9.3% of deliveries at BCH, 9.4% of deliveries in BC in 1998.	

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**Table 2. Data for 51 patients who did not deliver at Bella Coola Hospital (BCH)**

Data	Total
Reason for not delivering at BCH	
Moved before termination of pregnancy	6
Lack of C section coverage at BCH	24
Patient preference	9
Medical reasons	11
Delivered en route to hospital	1
Outcome	
No obstetric problems	15
Vaginal birth after cesarean	2
Breech birth	3
C section deliveries	15
Emergency	9
Elective	6
Assisted vaginal delivery	6
Forceps	3
Vacuum extraction	3
Other	4
Neonatal perinatal morbidity	2
Premature delivery	1
Cerebral palsy	1

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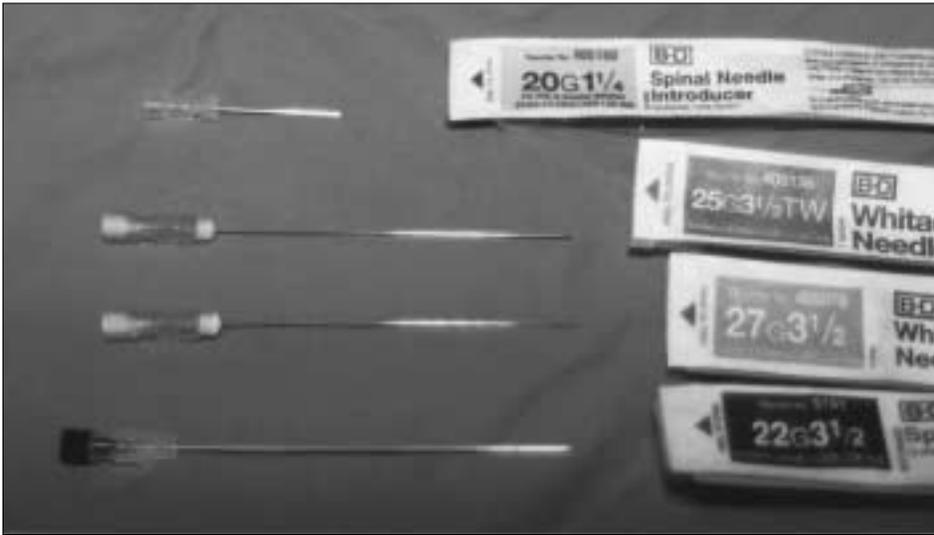


Fig. 1. Selection of spinal needles. From top to bottom: 20-ga introducer needle, 25-ga Whitacre tip, 27-ga Whitacre tip and a standard 22-ga bevel-tip spinal needle for comparison.

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Drug	Dose	Onset	Duration
Sufentanil	7.5–12.5 µg	<5 min	80–120 min
Fentanyl	25 µg	<5 min	60–90 min
Morphine	0.25 mg	40–60 min	4–6 h

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Fig. 2. Positioning the patient in a sitting position with the back arched as much as possible, given the gravid uterus.

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Fig. 3. X marks the spot. A horizontal line between the iliac crest identifies the L3-4 interspace.

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**Appendix 1. List of attendees\* at Consensus Conference on Obstetrical Services in Rural or Remote Communities, Feb. 24–26, 2000**

Saskia Acton, MD, Golden	Patty Keith, RN, SCM, Vancouver	Allison Rice, RM, Vancouver
Ron Benson, Port McNeill	Nancy Kent, MD, Vancouver	Liz Ross, PHN, Kaslo
Jackie Blake, BScN, Maple Ridge	Elizabeth Kidd, RN, Dawson Creek	Carol Russell, RN, Salmon Arm
Kim Campbell, RM, Abbotsford	Barb Kinnon, RN, MSN, Whistler	Nelson Savein, MD, FSOGC, FRCSC, Burnaby
George Carson, MD, Regina, Sask.	Michael Klein, MD, CCFP, Vancouver	Diane Sawchuck, MSN, Vancouver
Marilyn Chung, RN, New Westminster	Gina Klevorick, RN, Revelstoke	Jackie Scobie, RN, Prince George
Ann Crawford, RN, Kamloops	Charlene Kotze, MD, Port McNeill	Arnold Shoichet, MD, Mission
Mark Duncan, MD, Kelowna	Neil Leslie, MD, FCFP, Revelstoke	Patricia J. Short, PHN, Fort St. James
Judy Eathorne, RN, Penticton	Robert Liston, MB, CHB, FRCOG, FRCSC, FACOG, Vancouver	Laurel Shugarman, MD, Alert Bay
William Ehman, MD, Nanaimo	Luba Lyons Richardson, RM, Victoria	Elaine Stefura, PHN, Kamloops
Charmaine Enns, MD, Tofino	Joyce MacKenzie, RN, Surrey	Barbara Stoddard, RN, Richmond
Duncan Farquharson, MD, Vancouver	Paul Martiquet, MD, Gibson	Leslie Sundby, RN, Nanaimo
Jerome Farrell, MD, Kamloops	David J. Mathews, MD, Nanaimo	B.T.B. Taylor, MD, Vancouver
Marsha Forrest, RN, Queen Charlotte Island	Derek Matthew, MD, Victoria	Charlotte Thompson, RN, CNM, MSN, Vancouver
Vera M. Frinton, MD, Vancouver	Kim Millar Lewis, CM, IBLCE, Victoria	Alan Thomson, MD, MSC, Victoria
Terry Frizzel, PHN, Merrit	Margaret Miskelly, RN, Terrace	Elizabeth Torr, BScN, MSc, Vancouver
Catherine Gaulton, Victoria	Clare Moisey, MD, FRCPC, Smithers	Rose Touchie, RN, BSN, Merrit
Paul Gotto, Victoria	Jan O'Flanagan, BScN, Dawson Creek	H.A. Ukpeh, MD, Trail
Janet M. Greenwood, RN, Oliver	Wendy Panton, RN, Vancouver	Reina Van Lagen, RN, MSN, Agassiz
Linda Grey, RN, Vancouver	Margaret Pendray, MBBS, FRCPC, Vancouver	Sandra Waarne, MD, Port Hardy
Stefan Gryzbowski, MD, CCFP, MCISC, FCFP, Vancouver	Rose Perrin, RN, Prince George	Julie Waller, RN, Vancouver
Stuart Iglesias, MD, Hinton, Alta.	Sydney Pilley, MB, FRCS, LLB, Burnaby	Glen Ward, MD, White Rock
Donna Jepsen, PHN, Gibson	Betty J. Price, RN, Mission	Jean Wheeler, RN, Port McNeill
Lynette Jones, RN, Richmond	Duncan Price, MD, Surrey	Sally Williams, Port McNeill
Lois Keen, RN, North Vancouver	Joan Reiter, BScN, IBCLC, Vancouver	Karen Wonders, RN, BScN, Prince George

\*All attendees were from British Columbia, unless otherwise noted.

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