POLICY BRIEF
Issues in Rural Maternity Care Series
1.2
AUGUST 2008

A Systematic Approach to Rural Service Planning—The Rural Birth Index (RBI)

Rural Maternity Care New Emerging Team

Background

- → Since 2000, 20 rural BC hospitals have closed their maternity services, leaving local maternity care in flux.
- → Service allocation decisions have often been made in an ad-hoc manner.
- → The need for a systematic approach to planning rural community maternity services is evident.

Rural maternity health services across Canada are currently in flux. In the past 10 years, many small, rural maternity services have closed in British Columbia and across Canada,[1-3] with 20 closures in British Columbia alone since 2000.[4,5] These closures have occurred for a variety of reasons, including the centralization of services within a health authority,[6-8] concerns about the safety of small units,[2] and difficulties recruiting practitioners to staff rural maternity units.[6,9-12] The result is that many communities are left with limited or no intrapartum services, forcing pregnant women to travel to access birthing care,[6,13,14] to employ the "10 cm strategy" (showing up at the local hospital fully dilated to preclude transfer out of the community), or to birth at home unattended.[15,16]

In British Columbia, there is currently no systematic approach to planning rural maternity services and a limited evidence-base to inform such decision making.[4,17-20] A review of British Columbia policy documents from the past decade provides little evidence of specific planning for maternity care services in general or for rural maternity services in particular, indicating that much of the decision making with respect to health services has been made in an ad-hoc manner in response to a local or regional sense of crisis.[20] Accordingly, there is a need to change planning strategies from reactive to proactive and systematic.

Health planners are tasked with the challenge of making economically viable and population sensitive decisions that meet the maternity care needs of rural populations within a context of competing social, political, and financial priorities.[17] Traditionally, health care systems have been planned using a predictive approach that applies one strategy (such as regionalization of services) to a vast array of communities. In reality, the health care needs of each community are unique. In order for decision makers to plan maternity care services that are suited to the dynamic nature of indi-

SUMMARY

In the context of changing rural maternity services in British Columbia, the need for new health services planning tools is apparent. This policy brief presents a predictive model, the Rural Birth Index (RBI), for determining the appropriate level of maternity services for small, rural communities in British Columbia based on population need. The RBI highlights the importance of population characteristics and degree of isolation in determining service needs. These approaches and methods may be applied to other health service planning problems and jurisdictions.

GLOSSARY

Rural Birth Index (RBI)
A health service delivery tool to determine the appropriate level of rural maternity service for a given community.

Intrapartum Services
Management and delivery of maternity care to women in labour

GP Surgeon
A general practitioner with enhanced skills training in surgeries relevant to a rural environment

Referral Hospital
A hospital offering specialist (surgical) labour and delivery services to outlying communities

The **Rural Maternity Care New Emerging Team** (RM-NET), housed in the Centre for Rural Health Research, is a collaborative group of academic and community-based researchers, policy makers, administrators, and other key stakeholders working together to achieve a comprehensive understanding of rural maternity care services in British Columbia. The RM-NET is co-directed by Jude Kornelsen and Stefan Grzybowski and its core team includes Shelagh Levangie, Sarah Munro, Melanie McDonald, and Bryce Westlake with student support for this policy brief from Laura Schummers.

vidual rural communities and health care programs, a flexible, community-based approach is necessary.

Why do we need the Rural Birth Index?

Optimal safety, equitable access, and sustainable cost-effective services are goals that ultimately drive our rural health service planning. The evidence base needed to drive this planning is, to date, sparse and largely inadequate. Yet decisions about specific rural community services need to be made now.

The Rural Birth Index is based on a systems approach to small rural maternity services across British Columbia and extensive field work in 23 communities.[15,16,20] It compares objective characteristics of population need and isolation across communities using a formula developed through sensitivity analysis designed to establish a best fit within the context of rural British Columbia.

In the past, researchers and policy makers have used analytic approaches to predict health service delivery. The models have equally weighted a number of factors in predicting health service needs, such as geography, feasibility (existing facilities and human resources), and social demographic factors (population and socioeconomic status).[17,21-23] While we don't disagree with the need to consider a broad range of characteristics of a given community, we believe that the most efficacious approach is to assess objective community need first and then subsequently consider feasibility issues, such as human resources and physical infrastructure in a multi-stage process. We have developed the Rural Birth Index within this conceptual approach.

What is the Rural Birth Index?

The Rural Birth Index (RBI) is mathematical *model* that weights key community characteristics (population, isolation, and social vulnerability) and calculates a score for maternity service level needs, ranging from no local maternity services to local access to services provided by a specialist. The development of the RBI was informed by a recognition that in the special circumstances of rural and isolated communities, two dominant characteristics are predictive of rural service sustainability: **population** characteristics and degree of **isolation**.

The formula is:

$$RBI = (PBS \times APV) + IF$$

→ **PBS** (Population Birth Score): The average number of births in a hospital's one hour catchment over 5 years divided by 10

→ **IF** (Isolation Factor): The degree of isolation based on the following travel times to cesarean services:

Distance	Score
Less than 30 minutes	-3
31-45 minutes	-2
45-60 minutes	-1
60-90 minutes	1
90-120 minutes	2
2-4 hours	3
Greater than 4 hours	4

→ **APV** (Adjustment for Population Vulnerability): A social vulnerability score derived from BC Statistics, ranging from 0.8 (advantaged) to 1.4 (disadvantaged).

What does an RBI Score mean?

The RBI score for a community correlates to a recommended service level, as follows:

RBI Score	Recommended Service Level
0-6.5	No local intrapartum services
6.5-9	Local intrapartum services without operative delivery
9-14	Local GP Surgical services
14-27	Mixed model of Specialists and GP Surgeons
>27	Specialist service

We have calculated RBI scores for all rural communities in British Columbia with a population of 25,000 or less. The RBI works to predict appropriate service level in 32 of 42 small rural services, and our research suggests that 6 of the remaining 10 communities have unsustainable and suboptimal levels of care.

How to Use an RBI Score

- → Use a community's RBI score as a guideline for maternity service needs
- → Conduct a feasibility analysis
- → Prioritize competing health service needs

The RBI model should be used as a starting point for decision makers in a three-stage maternity service planning process:

Stage 1: Use the RBI to determine the appropriate level of maternity service for a rural community;

Stage 2: Assess the *feasibility* of this level of service based on community characteristics (such as a review of existing facilities, availability of health human resources, consideration of transport, and economic issues); and

Stage 3: Consider the implementation of the appropriate level of service based on the Health Authority's *planning priorities* (e.g. maternity care versus palliative care for a given region).

Limitations

The RBI was developed within the social and geographic context of British Columbia's rural health services, and is intended for populations of 25,000 and under. Generalizability to other jurisdictions and health services needs to be tested.

Steps Forward

The RBI has the potential to be a foundational planning tool for health care decision makers. It highlights communities that have a service level out of sync with the majority of rural communities in British Columbia. As currently structured, it works effectively for maternity care services. It is likely to work well for other rural health services, such as emergency room care or cancer treatment. Additionally, as populations grow and community demographics change, the RBI may be further applied to plan services based on population projections. Adaptation of this index approach to other provinces and other health service issues provides us with a timely tool to make sustainable, proactive decisions about rural health care.

AT A GLANCE

What happens when a rural community has a maternity service level that is too low or too high for its needs? Our research suggests that certain effects may occur:

- → When a community is under-served, a number of women will choose alternatives to traveling to access maternity care at referral hospitals including the "10 cm strategy," seasonal timing of pregnancy, and unassisted home birth.[15, 16] These effects are enhanced as the social resources of the women decrease.
- → Communities whose RBI score is out of synch with existing level of service will have significant challenges to sustainability and suboptimal maternal-newborn outcomes.[24,25]
- → Over-served communities are likely to experience increased intervention rates and difficulties in provider retention.

The *Issues in Rural Maternity Care* policy brief series addresses current issues in the provision of maternity care in British Columbia and provides timely recommendations for improving the quality and safety of rural intrapartum care. Targeted at policy makers and maternity care providers, it is produced by the Rural Maternity Care New Emerging Team (RM-NET).

Resources

1. Hutten-Czapski PA. Decline of obstetric services in northern Ontario. Can J Rural Med 1999;4:72-6.
2. Rourke JTB. Trends in small hospital obstetrical services in Ontario. Can Fam Physician 1998;44:2117-2124.
3. Hutten-Czapski PA. The state of rural health care. Presentation to the Standing Senate Committee on Social Affairs, Science and Technology. May 31, 2001. Available from: URL: http://srpc.ca/librarydocs/Kirby_SRPC.htm
4. British Columbia Reproductive Care Program. Report on the findings of a Consensus Conference on Obstetrical Services in Rural and Remote Communities. Vancouver (BC): BC Reproductive Care Program; 2002.
5. BC Perinatal Database Registry. British Columbia deliveries by maternal residence and delivery hospital highest level of service/care. Vancouver, BC: BC Reproductive Care Program; 2000-2007.
6. Kornelsen J, Grzybowski S. Is local maternity care an optional service in rural communities? J Obstet Gynaecol Can 2005;27:327–329.
7. Benoit C, Carroll D, Millar A. But is it good for non-urban women's health? Regionalizing maternity care services in British Columbia. Can Rev Sociol Anthropol 2002;39:373-396.
8. Klein M, Johnston S, Christilaw J, Carty E. Mothers, babies, and communities: Centralizing maternity care exposes mothers and babies to complications and endangers community sustainability. Can Fam Physician 2002;48:1177-9, 1183-5.
9. Chance G. Family practice obstetrics: Time of opportunity. Can Fam Physician 1995;41:548-9.
10. Larsen-Soles, T. Physician numbers in Rural British Columbia. Can J Rural Med 2001;6(1):24-30.
11. Thommasen HV, Berkowitz J, Grzybowski S. Community factors associated with long-term physician retention. BC Med J 2000;42:426-9.
12. Thommasen HV, Lavanchy M, Connelly I, Berkowitz J, Grzybowski S. Mental health, job satisfaction, and intention to relocate among physicians in rural British Columbia. Can Fam Physician 2001;47:737-44.
13. Chamberlain M, Barclay K. Psychosocial costs of transferring indigenous women from their community for birth. Midwifery 2000;16:116-22
14. Jasen P. Race, culture, and the colonization of childbirth in northern Canada. Soc Hist Med 1997;10:383-400.
15. Kornelsen J, Grzybowski S. The reality of resistance: the experiences of rural parturient women. J Midwifery Womens Health 2006;51:260-5.
16. Kornelsen J, Grzybowski S. Safety and community: the maternity care needs of rural parturient women. J Obstet Gynaecol Can 2005;27:554-61
17. Ministries of Health Services and Health Planning. Standards of accessibility and guidelines for provision of sustainable acute care services by health authorities; Victoria (BC): Government of British Columbia; 2002.
18. Kirby MJL. The health of Canadians: The federal role. Final report. Ottawa: The Standing Senate Committee on Social Affairs, Science and Technology; 2002.
19. Lyons RF, Gardner P. Strategic initiative in rural and northern health research. Canadian Institutes of Health Research. Ottawa (ONT): Canadian Institutes of Health Research; 2001 Nov. Available from: URL:http://www.irsc.gc.ca/e/27537.html
20. Kornelsen J, Grzybowski S. Rural women's experiences of maternity care: implications for policy and practice. Ottawa (ONT): Status of Women Canada; 2005.
21. Allen D. Relationship of infant mortality to the availability of obstetrical care in Indiana. J Fam Pract 1991;33(6):609-13
22. Rural and Regional Health Services Branch, Rural and Regional Health and Aged Care Services. Rural birthing services: A capability based planning framework. Melbourne (Victoria): Victorian Government Department of Human Services; 2004.
23. Lambrew JM, Ricketts TC. Patterns of obstetrical care in single hospital, rural communities. Med Care 1993;31:822-833.
24. Nesbitt TS, Connell FA, Hart GL, Rosenblatt RA. Access to obstetric care in rural areas: effect on birth outcomes. Amer J Public Health 1990;80:814-18.
25. Larimore WL, Davis A. Relationship of infant morality to availability of care in rural Florida. J Am Board Fam Pract 1995;8:392-99.

CENTRE FOR RURAL HEALTH RESEARCH

530-1501 WEST BROADWAY | VANCOUVER, BC V6J 4Z6
T: 604.742.1796 | F: 604.742.1798
www.ruralmatresearch.net