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.

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-
individual 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. 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). 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:
  - 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:

<table>
<thead>
<tr>
<th>RBI Score</th>
<th>Recommended Service Level</th>
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<tbody>
<tr>
<td>0-6.5</td>
<td>No local intrapartum services</td>
</tr>
<tr>
<td>6.5-9</td>
<td>Local intrapartum services without operative delivery</td>
</tr>
<tr>
<td>9-14</td>
<td>Local GP Surgical services</td>
</tr>
<tr>
<td>14-27</td>
<td>Mixed model of Specialists and GP Surgeons</td>
</tr>
<tr>
<td>&gt;27</td>
<td>Specialist service</td>
</tr>
</tbody>
</table>

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 sync 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