Sustainable Rural Maternity Care: A Comprehensive Approach to Program Planning

CAHSPR
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The Centre for Rural Health Research
Objectives:

• To explore the implications of rural population catchment definition on hospital service planning.
• To apply the reasoning to rural maternity service planning in British Columbia.
• To outline the Rural Birth Index planning tool.
Prince George Local Health Area
Mc Bride One Hour Catchment with Postal Codes
Local Health Areas Overlaid by One Hour Catchments

Level of Service
- Pink: Specialists
- Brown: Mixed Models
- Red: GP Surgeons
- Blue: Primary Care
Under Serviced Optimal Over Serviced

Adverse Perinatal Outcomes

Expected Effect
• Increase travel for women to access services → increased stress → increased adverse outcomes
• Increase out of hospital births

Expected Effect
• Increased Intervention Rates
• Problem Retaining Provider
• Undermining Surrounding Services

CRHR October 18th, 2007

Increasing Level of Maternity Services and Population Need
1996 Rural Maternity Services in B.C.

- Specialist Services: Sacklet, Powell River, Smithers
- GP Surgeon + Specialist: Bella Coola, Mackenzie, Kinloch, Fort St. James, Queen
- GP Surgeon: Queen, Charlotte, City, Invermere, Merrit
- No Surgical Services: Bella Bella, St. James, Creede, Castlegar, Golden, Fennie
- No Maternity Services: Summit

Catchment Area Population Size:

- 2,500 to 30,000
Maternity Service Closures in B.C. since 2000

- Kimberly and District Hospital (May 1/02)
- Sparwood General Hospital (May 1/02)
- Arrow Lakes Hospital (Nakusp)
- Castlegar and District Hospital (March 1/02)
- Summerland General Hospital (June 00)
- South Okanagan General Hospital (Oliver) (April 1/00)
- Nicola Valley General Hospital (Merritt) (April 1/01)
- St. Bartholomew's Hospital (Lytton) (April 1/01)
- Ashcroft and District Hospital (April 1/02)
- Fraser Canyon Hospital (Hope) (April 1/02)
- R.W. Large Memorial Hospital (Bella Bella) (2001)
- Saanich Peninsula Hospital (Saanichton) (May 1/02)
- Masset Hospital (QCI/Haida Gwaii) (May 2002)
- Mission Hospital (2002)
- Alert Bay (2002)
- Port Hardy (2002)
Background

• Development of the Rural Birth Index (RBI) was informed by data gathering through 6 funded projects involving:
  – Repeat visits to 23 communities;
  – Interviews/focus groups with
    • 121 rural women;
    • 216 providers;
    • 49 administrators/key informants
The RBI Model

A health service delivery tool to determine the appropriate level of rural maternity service for a given rural community population.
Methodology

• Developing a formula based on comprehensive and prolonged immersion in the phenomena of the sustainability of small rural maternity health services in one Canadian Province.

• Recognizing the dominant nature of population need and degree of isolation in predicting level of service for small rural populations.

• Sensitivity analysis to establish optimal weighting of components of the formula and service level transition points.
Component parts of the RBI

To project the appropriate service level for a given community, the RBI Model takes into account 3 factors.

- Birth rate;
- Social vulnerability,
- Proximity to nearest cesarean section service
Birth rate

The Birth rate is transformed into a Population Birth Score (PBS).

*Population Birth Score (PBS):*
Average # of births in catchment area of hospital over 5 years divided by 10.
Adjustment for Population Vulnerability (APV)

Social vulnerability is represented by a score derived from a BC stats composite score (range -1 to +1) of several social indicators* and is weighted in the RBI between:

0.8 (advantaged) to 1.4 (disadvantaged)

* Overall regional socio-economic index including levels of: human economic hardship, crime, health problems, education concerns, children and youth at risk.
www.bcstats.gov.bc.ca/data/sep/i_lha/lha_main.asp
RBI Model: Proximity to nearest cesarean section service

Measured by an Isolation Factor (IF):
Surface travel time is weighted as follows:

- < 30 minutes = -3
- 31-45 minutes = -2
- 46-60 minutes = -1
- 61-90 minutes = 1
- 91-120 minutes = 2
- 2-4 hours = 3
- > than 4 hours = 4

* If Cesarean Section provided locally then distance to next service is calculated as if existing local service was closed.
RBI Formula

\[ RBI = (PBS \times APV) + IF \]

RBI: Rural Birthing Index
PBS: Population Birthing Score
APV: Adjustment for Population Vulnerability
IF: Isolation Factor
What does the RBI Score mean?

The calculated score corresponds to the appropriate level of service for a given rural service catchment population:

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 GPS
>27: Specialist service
RBI Model: Limitations

- Intended for application to rural populations of under 25,000 and has been developed within the context of British Columbia’s geography and health policy structure.
- Population and Birth data is reported using adapted Local Health Area mapping rather than 1 hour surface travel time.
- The adjustment for population vulnerability is an average across the LHA and is likely to underestimate the degree of vulnerability of the women who make up the parturient population.
Three Examples of application of the RBI Model

• Summerland
• Queen Charlotte city
• Merritt
Summerland
Summerland

Data:
Average # of births (5 years): 71
Social Index of Vulner.: -0.79
Travel Time to clinic: 17 minutes

RBI Factors:
PBS: 7.1
Adjustment for Population Vulnerability (APV): 0.84
Isolation Factor (IF): -3

\[ RBI = (7.1 \times 0.84) - 3 = 3.0 \]

Recommended level of service: No Local Intrapartum Services
Queen Charlotte city
Queen Charlotte City

Data:
Average # of births (5 years): 30
SIV: 0.29
Travel Time to cxion: 4 hours

RBI Factors:
PBS: 3.0
Adjustment for Population Vulnerability (APV): 1.12
Isolation Factor (IF): 4

RBI = (3.0 X 1.12) + 4 = 7.4

Recommended level of service: Intrapartum services with no c/s
Merritt
**Merritt**

**Data:**
- Average # of births (5 years): 105
- SIV: 0.87
- Travel Time to cxion: 53 minutes

**RBI Factors:**
- PBS: 10.5
- Adjustment for Population Vulnerability (APV): 1.35
- Isolation Factor (IF): -1

\[
\text{RBI} = (10.5 \times 1.35) - 1 = 13.2
\]

**Recommended level of service:** Local intrapartum services with operative delivery
Three-stage planning process for Rural Maternity Care Services

1. Projecting the appropriate service level to meet the needs of a given community based on size of birthing population and degree of isolation using the Rural Birth Index (RBI);

2. Assessing the feasibility of implementing the proposed model of care based on community characteristics;

3. Considering potential implementation within the planning priorities of the Health Authority.
Stage 2: Measuring Feasibility

In Stage 2, the feasibility of implementing a certain level of service is evaluated.

Factors that might be considered:
• Public transit access and schedules
• Local infrastructure (existing hospital services)
• Local caregiver Resources
• Community maternity service history
• Influence of other organizations (e.g. United Church Health Services)
Stage 3: Administrative Priorities

Making choices about service priorities:

- Addressing the greatest need (e.g. cancer care vs maternity care vs operative facilities)
- Political agenda