Data Reporting, Indicator Monitoring and Process Control Charting

Best Practices in Rural Maternity Care Service Outcomes Reporting

May 2nd 2008
1. BCPHP/BCPDR Background
2. Quality improvement and measurement
3. Run charts
4. Process control charts
5. How do I compare to other similar groups?
6. Putting it all together - Hospital variance reporting
The mandate of the BCPHP is to optimize neonatal, maternal and fetal health in BC by:

– Collection and analysis of perinatal data

– Development of clinical practice guidelines

– Promotion and facilitation of inter-professional outreach education

– Consultation and liaison with providers and facilities

– Promotion of perinatal care networks within the province

– Provincial Specialized Perinatal Services
DATA SOURCE – BC PERINATAL DATABASE REGISTRY

Medical Record

Manual/Electronic entry (70%)

~ 300 data elements

CIHI (30%)

Hospital Perinatal Database

Data Collection by BCPDR at hospital

Home Births

BC Vital Stats

BC Ministry of Health

BCPDR

~420,000 births

DATA SOURCE – BC PERINATAL DATABASE REGISTRY

CONFIDENTIAL – FOR BCPHP USE ONLY – NOT FOR DISTRIBUTION
BCPDR OUTPUTS

BCPHP Clinical Guidelines

BC Perinatal Reporting Tool

Annual Report

NRP

Facility Comparison Reports

Ad hoc requests (external)

Research support (external)

External programs support (e.g. Early Hearing Screening)

Linkage to VSA (aboriginal report)

Program Based Reports (e.g. C/S Birth Task Force)

BCPDR

~420,000 births
‘A broad range of activities of varying degrees of complexity and methodological and statistical rigour through which health care providers develop, implement, and assess small-scale interventions and identify those that work well and implement them more broadly in order to improve clinical practice’

The Ethics of Improving Health Care Quality & Safety: A Hastings Center/AHRQ Project, Mary Ann Bailey, PhD, Associate for Ethics and Health Policy, The Hastings Center, Garrison, New York, July 2006.
## BC PERINATAL FACILITY COMPARISON REPORT – MOTHER DELIVERY – PART 1 (500+ Births)
### FACILITY TABLE

<table>
<thead>
<tr>
<th>Partly</th>
<th>Total Deliveries</th>
<th>%</th>
<th>Labour</th>
<th>Spontaneous</th>
<th>Elective</th>
<th>Emergent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nullip</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Induced</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PEER GROUPS TABLE

- **500-999 Births (7 Sites)**
  - Nullip: 1,961 (43.22%)
  - >=1: 2,576 (56.78%)
  - Total: 4,537 (100.00%)

- **1000-2499 Births (10 Sites)**
  - Nullip: 6,294 (46.72%)
  - >=1: 7,177 (53.28%)
  - Total: 13,471 (100.00%)
BC PERINATAL COMPARISON REPORT - MOTHER DELIVERY - PART 1

8 PONTANEUS LABOUR - NULLIP
(% OF TOTAL NULLIP DELIVERIES)
PEER GROUP 2600+

<table>
<thead>
<tr>
<th>Year</th>
<th>Template</th>
<th>PEER 2500+</th>
<th>PROVINCIAL BC (Facility Births)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001/02</td>
<td>0.00%</td>
<td>66.10%</td>
<td>66.83%</td>
</tr>
<tr>
<td>2002/03</td>
<td>0.00%</td>
<td>66.94%</td>
<td>66.68%</td>
</tr>
<tr>
<td>2003/04</td>
<td>0.00%</td>
<td>65.56%</td>
<td>66.28%</td>
</tr>
<tr>
<td>2004/05</td>
<td>0.00%</td>
<td>66.22%</td>
<td>67.46%</td>
</tr>
<tr>
<td>2005/06</td>
<td>0.00%</td>
<td>63.75%</td>
<td>65.59%</td>
</tr>
</tbody>
</table>

8 PONTANEUS LABOUR - PARITY >=1
(% OF TOTAL MULTIP DELIVERIES)
PEER GROUP 2500+

<table>
<thead>
<tr>
<th>Year</th>
<th>Template</th>
<th>PEER 2500+</th>
<th>PROVINCIAL BC (Facility Births)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001/02</td>
<td>0.00%</td>
<td>64.86%</td>
<td>65.11%</td>
</tr>
<tr>
<td>2002/03</td>
<td>0.00%</td>
<td>66.08%</td>
<td>65.95%</td>
</tr>
<tr>
<td>2003/04</td>
<td>0.00%</td>
<td>66.10%</td>
<td>65.14%</td>
</tr>
<tr>
<td>2004/05</td>
<td>0.00%</td>
<td>64.68%</td>
<td>64.52%</td>
</tr>
<tr>
<td>2005/06</td>
<td>0.00%</td>
<td>63.12%</td>
<td>63.01%</td>
</tr>
</tbody>
</table>
MODEL FOR RAPID-CYCLE IMPROVEMENT

What are we trying to accomplish? **AIM**

How will we know that a change is an improvement? **CURRENT KNOWLEDGE**

CYCLE FOR LEARNING AND IMPROVEMENT (PDSA CYCLE)

- **DO**
  - What changes can we make that will result in improvement?
- **STUDY**
- **PLAN**
- **ACT**

Measurement is:
• part of the ‘Study’ in the PDSA cycle
• provides feedback loop
• signals need for change or accomplishment of change (goal attainment)

Indicator monitoring examples:
• Run chart
• Control charts – trending one facility (or catchment area) over time
• Control charts – comparing facilities (or catchment area) to other ‘like’ facilities or catchment areas

Similar characteristics for each:
• Simple (relevant) aggregations – hospital, resident, catchment area – which is most useful?
• One indicator at a time
• Frequent data points
A run chart is a series of data points that can compare one group to itself over time and includes a mean or median value.

Caesarean Section Rate for Hospital X, January 2001 to March 2007

Mean CS rate for Hospital X between January 2001 and March 2007 (24.8%)
New values can be added to a run chart each reporting period (e.g. weekly, monthly, quarterly, annually, etc), depending on frequency of event and availability of data.

Mean CS rate for Hospital X between January 2001 and June 2007 (24.9%)
A process control chart is a series of data points (e.g., a run chart) with an overlay of statistical controls (e.g., mean, upper control limit, lower control limit).
A process control chart is a series of data points (e.g., a run chart) with an overlay of statistical controls (e.g., mean, upper control limit, lower control limit).

**Caesarean Section Rate for Hospital X, April 2001 to June 2007**

- **Upper Control Limit (+2SD)**
- **Mean CS rate**
- **Lower Control Limit (-2SD)**
Intermittent auscultation (only) – change to an existing data field beginning in April/04

Intermittent Auscultation Rate (Labouring Moms Only) for Hospital Y, April 2004 to March 2006

- Upper Control Limit (13.2)
- Mean (4.6)
- Lower Control Limit (-5.1)
New values (one fiscal year) added

Outside of control limit, non-random cause: New staff member, workshop, change in policy, etc?

Upper Control Limit (50.6)
Mean (17.6)
Lower Control Limit (-20.0)
Previous examples show how one facility performs over time; but, how do facilities compare to each other?

**Caesarean Section Rate by Facility, Peer Group 500-999, 2006/2007**

Mean CS rate for the peer group for 2006/2007 (29.8%)
PUTTING IT TOGETHER

Determine:

• Indicators of interest to track
• Frequency of reporting (monthly, quarterly, etc) – can vary by indicator
• Population – e.g., report by hospital, resident LHA, catchment area, service level, etc.
• Comparison group

Can compile a score sheet or report card that identifies trends, flags, and comparisons
Detailed report for each hospital or catchment area with:

- Trend over time for each selected indicator
- Comparison to peer group or other similar population
- Identification of any flags
- Data detail as needed

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Flag</th>
<th>Symbol</th>
<th>Target (Peer Group or Provincial or ?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Population</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2. Caesarean Section Deliveries</td>
<td>Red</td>
<td>▲</td>
<td>20%</td>
</tr>
<tr>
<td>A3. Assisted Vaginal Deliveries</td>
<td>Green</td>
<td>□</td>
<td>5%</td>
</tr>
<tr>
<td>A4. Spontaneous Vaginal Deliveries</td>
<td>Light Green</td>
<td>◇</td>
<td>75%</td>
</tr>
<tr>
<td>A5. Induction of Labour</td>
<td>Yellow</td>
<td>●</td>
<td>10%</td>
</tr>
<tr>
<td>A6. Attempted VBAC</td>
<td>Orange</td>
<td>♣</td>
<td>60%</td>
</tr>
<tr>
<td>A7. Postpatum Average Length of Stay - Vaginal</td>
<td>Green</td>
<td>□</td>
<td>&lt; 48 hours</td>
</tr>
<tr>
<td>A8. Postpatum Average Length of Stay - C/S</td>
<td>Yellow</td>
<td>●</td>
<td>&lt; 72 hours</td>
</tr>
</tbody>
</table>

**B. NEWBORN**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Flag</th>
<th>Symbol</th>
<th>Target (Peer Group or Provincial or ?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1. Population</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2. Low Birth Weight (&lt;2500 grams)</td>
<td>Red</td>
<td>▲</td>
<td>5%</td>
</tr>
<tr>
<td>B3. Apgar &lt;7 at 5 Minutes</td>
<td>Yellow</td>
<td>●</td>
<td>2%</td>
</tr>
<tr>
<td>B4. IPPV/ETT</td>
<td>Orange</td>
<td>♣</td>
<td>2%</td>
</tr>
<tr>
<td>B5. Stillbirth</td>
<td>Green</td>
<td>□</td>
<td>0%</td>
</tr>
</tbody>
</table>
EXAMPLE: VARIATION FLAGGING DETAILED REPORT

Hospital Y
By Favourite Health Authority

Current Quarter: Jan/Feb/Mar 2007
Previous Quarter: Oct/Nov/Dec 2006

A1. Total maternal discharges:

<table>
<thead>
<tr>
<th></th>
<th>Hospital</th>
<th>Peer Group</th>
<th>BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Quarter</td>
<td>131</td>
<td>1,145</td>
<td>9,940</td>
</tr>
<tr>
<td>Current Quarter</td>
<td>139</td>
<td>1,139</td>
<td>9,780</td>
</tr>
<tr>
<td>Trend</td>
<td>INCREASING</td>
<td>DECREASING</td>
<td>DECREASING</td>
</tr>
</tbody>
</table>

A2. Caesarean section rate:

<table>
<thead>
<tr>
<th></th>
<th>Hospital</th>
<th>Peer Group</th>
<th>BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Quarter</td>
<td>26.2%</td>
<td>36.1%</td>
<td>31.7%</td>
</tr>
<tr>
<td>Current Quarter</td>
<td>30.2%</td>
<td>25.7%</td>
<td>30.7%</td>
</tr>
<tr>
<td>Trend</td>
<td>INCREASING</td>
<td>DECREASING</td>
<td>DECREASING</td>
</tr>
</tbody>
</table>

Caesarean Section Rate for Hospital Y, October 2006 to March 2007

Caesarean Section Rate by Facility, Peer Group 500-999, January to March 2007

Conclusions:
- Caesarean section rates at hospital Y do not vary significantly in the last six months (e.g., they are within the control limits)
- Hospital Y has a higher CS rate than the peer group rate for the current quarter (this difference is significant)