Outcomes of Five Years of Planned Home Birth Attended by Regulated Midwives vs. Planned Hospital Birth in British Columbia

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L Saxell, RM, MA3 R Liston, MD, FRCSC, FRCOG.4,5 SK Lee, MBBS, PHD, FRCPC,

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My personal story

- Stanford
- Trained by midwives in Ethiopia early 1960s
- Exiled
- Worked for single payer since 1960s
- Moved to Canada in 1967-70
- Worked in Canada before national health
- Worked in USA 1970-75
- Worked back in Canada 1975 to present under national health. No contest
Brief History of Canadian Midwifery

- Before early 1990s midwifery was not illegal just a-legal
- First in early 1990s in Ontario, Quebec and 1998 in British Columbia “midwife” became a reserved term
- Today there are still some who practice as “midwives” or self-styled doulas but use the tools and techniques of midwifery
- In every province, midwifery became regulated as a result of a coroners report

Funding Models

- Canadian Health Care Model—midwifery covered
- BC, Ontario entrepreneurial model
- Alberta, Saskatchewan, NWT, Manitoba use salary model
- Quebec uses Maison de Naissances (Birth Centres)
  - Very few hospital or home births
  - Early difficulties with physician-midwife relationships, consultation, sharing care
What kind of midwife?

- Not nurse-midwifery
- Autonomous midwifery
- 4 year baccalaureate university degree
- Often situate themselves in departments of family practice
- Deeply self-regulated by Provincial Colleges of Midwifery
- Highly structured criteria for midwifery care and home birth, transfer from care or from home, audit, continuing professional education

Midwifery and Home Birth
I support licensed/regulated midwifery services

- **Agree**:
  - OB: 71.0%
  - FP Int.: 65.1%
  - FP Other: 82.2%
  - RN: 23.9%
  - Doula: 16.5%
  - Neutral: 98.9%
  - Disagree:
  - OB: 12.5%
  - FP Int.: 11.0%
  - FP Other: 13.9%
  - RN: 4.1%
  - Doula: 0.8%

Home birth is more dangerous than hospital birth, even in an uncomplicated pregnancy

- **Agree**:
  - OB: 88.9%
  - FP Int.: 74.0%
  - FP Other: 72.6%
  - RN: 53.8%
  - Disagree:
  - OB: 97.6%
  - FP Int.: 90.8%
  - FP Other: 32.5%
Controversy....

**SOGC**
- Endorses evidence-based practice and encourages ongoing research into the safe environment of all birth settings. (2003)

**ACOG**
- Choosing to deliver a baby at home is to place the process of giving birth over the goal of having a healthy baby. (2008)
Study Question

Is the decision to plan birth at home with a regulated midwife in attendance compared to the decision to plan birth in hospital attended by a) a physician or b) a regulated midwife associated with adverse perinatal or maternal outcomes?

Primary outcome: perinatal mortality

Limitations of studies to date

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Authors</th>
<th>Journal</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inability to separate outcomes attributable to birth attendant vs birth setting</td>
<td>Baruffi G, Carol J</td>
<td>J Nurse Midwifery Fam Med</td>
<td>1990</td>
</tr>
<tr>
<td>Retrospective</td>
<td>Hutton E</td>
<td>BIRTH</td>
<td>2010</td>
</tr>
</tbody>
</table>
Large Cohort Studies of Planned Home vs Hospital

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Study</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>1999</td>
<td>Chamberlain</td>
<td>Postal survey</td>
</tr>
<tr>
<td>US</td>
<td>1994</td>
<td>Janssen</td>
<td>Birth certificate data</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1996</td>
<td>Weigers</td>
<td>Voluntary participation</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1996</td>
<td>Ackermann</td>
<td>Clinic-based</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1997</td>
<td>Gulbransen</td>
<td>Voluntary participation</td>
</tr>
<tr>
<td>Canada</td>
<td>2010</td>
<td>Hutton</td>
<td>Retrospective</td>
</tr>
</tbody>
</table>

Incomplete Ascertainment

Midwifery in Canada
Direct-entry, autonomous, mostly office/health centre-based

- BC Regulated and funded, 4 year baccalaureate program
- Alberta – similar very recently
- Saskatchewan – Regulated and funded
- Manitoba – Regulated and funded
- Ontario – Regulated and funded, 4 year baccalaureate program
- Quebec – Regulated and funded for birth centres, recently for home and limited hospital-baccalaureate program
- New Brunswick – Regulated and funded
- Nova Scotia,, PEI, Nfld, Nunavit, Yukon – not regulated
- Northwest Territories – in process
Eligibility Requirements for Home Birth in BC

Exclusions
- Gestational age > 41 or < 37 weeks
- Multiple birth
- Breech or other abnormal presentations
- Cardiac disease
- Hypertensive chronic renal disease
- PIH with proteinuria >30 mg/dl
- Insulin-dependent diabetes
- Antepartum hemorrhage after 20 weeks
- Active genital herpes
- More than 1 previous C/S

Home Birth Study Group

Inclusion
- Birth took place at home or in hospital and midwife listed as the caregiver at any time—even after transfer
- But for planned home cohort, birth had to meet eligibility criteria at the start of labour at home
Transfer Rates from Home

Nullips 38.1%

Multips 12.8%

Overall: 23.6%

Methods
Study Group for Comparison of Birth Outcomes

Primary Study Group n = 2899
   All births planned (at the onset of labour) to be at home and attended by a regulated midwife eg
   Complete Ascertainment

Comparison Groups
   1. Physician-attended births in hospital n = 5331

   2. Midwife-attended births planned (at the onset of labour) to be in hospital n = 4752 (same midwives)

Physician Hospital Comparison Group

Inclusion:
   Delivered by a physician in a hospital in which midwives were practicing
   Midwife not listed as any kind of caregiver in hospital record
   Met eligibility requirements for home births

Matching (2:1)
   • Year of Birth: 2000-2004
   • Parity (nulliparous vs. multiparous)
   • Hospital where midwife caring for study subject has privileges
   • Lone parent (yes, no)
   • Age (< 15 yrs, 15-19, 20-24, 25-29, 30-34, 35+)
Midwife Hospital Comparison Group

Inclusion (all midwife-attended planned hospital births)

- Gave birth in 2000-2004
- Met eligibility requirements for home birth
- Midwife listed as any type of caregiver in hospital record
- College of Midwife records indicate birth was planned in hospital
Socio-Demographic Characteristics - Age

- HBDP
- Physician
- Midwife
### Use of Substances

<table>
<thead>
<tr>
<th></th>
<th>HBDP</th>
<th>Physician</th>
<th>Midwife</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Other Pregnancy Characteristics

<table>
<thead>
<tr>
<th></th>
<th>HBDP</th>
<th>Physician</th>
<th>Midwife</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>166.5 ± 6.6</td>
<td>164.3 ± 7.0</td>
<td>166.4 ± 7.0</td>
</tr>
<tr>
<td>Weight (pre-preg)</td>
<td>63.1 ± 11.7</td>
<td>62.6 ± 13.0</td>
<td>64.4 ± 12.7</td>
</tr>
<tr>
<td>Gravidity</td>
<td>2.6 ± 1.7</td>
<td>2.4 ± 1.4</td>
<td>2.3 ± 1.5</td>
</tr>
<tr>
<td>First prenatal contact</td>
<td>12.2 ± 7.0</td>
<td>11.8 ± 6.8</td>
<td>12.2 ± 6.8</td>
</tr>
<tr>
<td>Number prenatal visits</td>
<td>11.8 ± 3.3</td>
<td>9.3 ± 2.7</td>
<td>11.2 ± 3.6</td>
</tr>
</tbody>
</table>

Midwifery clients seen earlier and more often!
Interventions in Labour by Intention to Treat

Method/Mode of Delivery

Midwifery hospital birth outcomes more similar to physician patients than to midwifery home birth clients
Maternal Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Home Birth n=2899</th>
<th>Physician n=5331</th>
<th>Relative Risk</th>
<th>Hospital Midwife. n=4752</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Fetal Monitoring</td>
<td>394 (13.6)</td>
<td>4201 (78.8)</td>
<td>0.17 (0.16-0.19)</td>
<td>1992 (41.9)</td>
<td>0.32 (0.29-0.36)</td>
</tr>
<tr>
<td>Augmentation</td>
<td>688 (23.7)</td>
<td>2689 (50.4)</td>
<td>0.47 (0.44-0.51)</td>
<td>1897 (39.9)</td>
<td>0.59 (0.55-0.69)</td>
</tr>
<tr>
<td>Narcotic</td>
<td>122 (4.2)</td>
<td>1877 (35.2)</td>
<td>0.12 (0.10-0.14)</td>
<td>713 (15.0)</td>
<td>0.27 (0.22-0.32)*</td>
</tr>
<tr>
<td>Epidural Analgesia</td>
<td>224 (7.7)</td>
<td>1487 (27.9)</td>
<td>0.28 (0.24-0.32)</td>
<td>901 (19.0)</td>
<td>0.39 (0.33-0.46)*</td>
</tr>
<tr>
<td>Assisted Vaginal</td>
<td>86 (3.0)</td>
<td>736 (13.8)</td>
<td>0.22 (0.18-0.27)</td>
<td>344 (7.2)</td>
<td>0.41 (0.33-0.52)</td>
</tr>
<tr>
<td>C/S</td>
<td>208 (7.2)</td>
<td>588 (11.0)</td>
<td>0.65 (0.56-0.76)</td>
<td>498 (10.5)</td>
<td>0.76 (0.64-0.91)*</td>
</tr>
<tr>
<td>Episiotomy</td>
<td>84 (3.1)</td>
<td>800 (16.9)</td>
<td>0.19 (0.15-0.23)</td>
<td>289 (6.8)</td>
<td>0.49 (0.38-0.63)*</td>
</tr>
<tr>
<td>3rd/4th degree tear</td>
<td>34 (1.2)</td>
<td>183 (3.4)</td>
<td>0.34 (0.24-0.49)</td>
<td>137 (2.9)</td>
<td>0.43 (0.29-0.63)*</td>
</tr>
<tr>
<td>PPH</td>
<td>110 (3.8)</td>
<td>357 (6.7)</td>
<td>0.57 (0.45-0.70)</td>
<td>285 (6.0)</td>
<td>0.62 (0.49-0.77)</td>
</tr>
<tr>
<td>Infection</td>
<td>4 (0.1)</td>
<td>28 (0.5)</td>
<td>0.26 (0.09-0.75)</td>
<td>17 (0.4)</td>
<td>0.39 (0.13-1.14)</td>
</tr>
<tr>
<td>Pyrexia</td>
<td>19 (0.7)</td>
<td>154 (2.9)</td>
<td>0.23 (0.14-0.37)</td>
<td>68 (1.4)</td>
<td>0.45 (0.29-0.76)</td>
</tr>
</tbody>
</table>

* Adjusted for parity

Statistically Significant
Stillbirth or Neonatal Death/1000 Births

- **HBDP**: 0.35, 1.03
- **Physician**: 0, 0.64
- **Midwife**: 0, 0.57

Neonatal Outcomes

In newborns without major congenital anomalies

- **Apgar < 7**: HBDP, Physician, Midwife
- **Apgar 5-7**: HBDP, Physician, Midwife
- **Meconium Aspiration**: HBDP, Physician, Midwife
- **Asphyxia**: HBDP, Physician, Midwife
Neonatal Resuscitation

Birth Trauma
## Neonatal Outcomes

<table>
<thead>
<tr>
<th>Event</th>
<th>Home Birth n=2874</th>
<th>Physician n=5943</th>
<th>Relative Risk</th>
<th>Hospital Midwife. n=4928</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB or Neonatal Death</td>
<td>1 (0.0)</td>
<td>3 (0.1)</td>
<td>0.61 (0.06-5.88)</td>
<td>3 (0.1)</td>
<td>0.55 (0.06-5.25)</td>
</tr>
<tr>
<td>Apgar &lt;7 at 1 min</td>
<td>240 (8.4)</td>
<td>531 (11.3)</td>
<td>0.76 (0.66-0.88)</td>
<td>581 (11.0)</td>
<td>0.74 (0.64-0.86)</td>
</tr>
<tr>
<td>Apgar &lt;5 at 5 min</td>
<td>26 (0.9)</td>
<td>43 (0.9)</td>
<td>0.92 (0.58-1.47)</td>
<td>52 (1.0)</td>
<td>0.99 (0.61-1.61)</td>
</tr>
<tr>
<td>Meconium Aspir.</td>
<td>9 (0.3)</td>
<td>33 (0.7)</td>
<td>0.83 (0.38-1.81)</td>
<td>20 (0.4)</td>
<td>0.45 (0.21-0.93)</td>
</tr>
<tr>
<td>Asphyxia at Birth</td>
<td>6. (0.2)</td>
<td>14 (0.3)</td>
<td>0.79 (0.30-2.05)</td>
<td>14 (0.3)</td>
<td>0.70 (0.27-1.83)</td>
</tr>
<tr>
<td>Birth Trauma</td>
<td>7 (0.2)</td>
<td>35 (0.7)</td>
<td>0.26 (0.11-0.58)</td>
<td>49 (0.9)</td>
<td>0.33 (0.15-0.74)</td>
</tr>
<tr>
<td>Resusc. at Birth</td>
<td>17 (0.6)</td>
<td>50 (1.1)</td>
<td>0.23 (0.14-0.37)</td>
<td>139 (2.6)</td>
<td>0.56 (0.32-0.96)</td>
</tr>
<tr>
<td>Low Birth Weight</td>
<td>15 (0.5)</td>
<td>26 (0.6)</td>
<td>0.44 (0.25-0.78)</td>
<td>62 (1.2)</td>
<td>0.95 (0.56-1.78)</td>
</tr>
<tr>
<td>Seizures</td>
<td>2 (0.1)</td>
<td>5 (0.1)</td>
<td>0.61 (0.12-3.03)</td>
<td>6 (0.1)</td>
<td>0.66 (0.13-3.38)</td>
</tr>
<tr>
<td>Oxygen Therapy</td>
<td>22 (0.8)</td>
<td>94 (2.0)</td>
<td>0.37 (0.24-0.59)</td>
<td>109 (2.1)</td>
<td>0.38 (0.24-0.61)</td>
</tr>
<tr>
<td>Ventilation</td>
<td>5 (0.2)</td>
<td>12 (0.3)</td>
<td>1.02 (0.34-3.04)</td>
<td>9 (0.2)</td>
<td>0.68 (0.24-1.93)</td>
</tr>
<tr>
<td>Readmission</td>
<td>84 (2.9)</td>
<td>59 (2.1)</td>
<td>1.09 (0.83-1.42)</td>
<td>142 (2.7)</td>
<td>1.39 (1.09-1.85)</td>
</tr>
</tbody>
</table>

Statistically Significant

**Mostly Jaundice**
Comment, Conclusions

Not a Randomized Controlled Trial

Strength or Limitation?
Conclusions

Compared to women who planned birth in hospital with a physician, women who planned birth at home with a regulated midwife were:

- Less likely to have interventions during labour
- Less likely to have adverse maternal outcomes:
  - 3rd/4th degree tear
  - Postpartum hemorrhage
  - Infection or pyrexia
- Less likely to have newborns with:
  - Apgar scores less than 7 at one minute
  - Birth trauma
  - Resuscitation at birth
  - Birthweight < 2500 g at term
  - Requirement for oxygen therapy more than 24 hours

Conclusions

Compared to women who planned birth in hospital with a regulated midwife, women who planned birth at home with a regulated midwife were:

- Less likely to have interventions during labour
- Less likely to have adverse maternal outcomes:
  - 3rd/4th degree tear
  - Postpartum hemorrhage
  - Pyrexia
- Less likely to have newborns with:
  - Apgar scores less than 7 at one minute
  - Meconium aspiration
  - Birth trauma
  - Resuscitation at birth
  - Requirement for oxygen therapy more than 24 hours
- More likely to have a newborn:
  - Admitted to hospital
Caveat

Home birth is neither safe or unsafe
◆ Hospital birth is neither safe or unsafe
◆ Either can be safe or unsafe
◆ DEPENDS!!
◆ In BC home birth by regulated supported midwives appears to be safe
◆ Quebec Maison de Naissance (Birth Centres)??
◆ Safety depends on cooperation and support and collegiality

In most respects, the procedures and outcomes of hospital births attended by regulated midwives are more similar to hospital births attended by physicians than they are to home births attended by the same midwives
Award

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• This week this article and the management of its public dissemination received the “UBC Presidents Award for Public education Through Media”

• Little push-back and an unprecedented policy change by the BC College of Physicians and Surgeons permitting physicians to attend home births