Recent Trends & Outcomes in Out of Hospital Births

Wendy J. Smith MD, MPH
Women’s Services, Legacy Health System
Portland, Oregon

Idaho Winter Perinatal Conference
February, 2015

Disclosures
1. I have no relevant financial ownership or significant stock position in any company whose products will be mentioned
2. I do not receive honorarium or have a Speakers Bureau relationship with any company
3. I will not be discussing FDA off-label indications for drugs or devices
4. I am currently the physician member of the Oregon State Board of Direct Entry Midwifery but am not representing the Board in my role today

“Home birth is going to happen whether we like it or not. Getting mad about it is like getting mad at the rain.”

Duncan Neilson MD
Portland Monthly Magazine
December 18, 2012
Why are we talking about this today?

- Women in US want alternatives for childbirth
  - Exposed to more information via internet
  - Pregnancy not a medical condition – it is a normal physiologic event
  - Empowered to be involved in health care decision making
  - Desire for low-intervention physiologic births in comfortable environments with more control
  - Concerns regarding health trends in childbirth
    - rates of other interventions in hospital births
    - rising rate of cesarean section from 1996 to 2009

- Rates of out of hospital births in US are rising

Out-of-Hospital Births


CDC/NCHS, National Vital Statistics System, birth certificate data.

Where do US women give birth?

Rates and Definitions

1) Hospital 98.64%
2) Home [66%] 1.36%
3) Birth Center [29%] 1.36%

APHA: Any health facility, place, or institution which is not a hospital or in a hospital and where births are planned to occur away from the mother’s usual residence following normal and uncomplicated pregnancy
- Currently between 200-250 licensed birth centers in US
- None in 13 states

AABC: Guided by principles of prevention, sensitivity, safety, appropriate medical intervention, and cost-effectiveness

Who attends out of hospital births?
Rates and Definitions
1) Physicians (MD, DO): 6%
2) Certified Nurse Midwives (CNM): 29%
   - educated as nurses first then complete program in midwifery from ACNM accredited program; often part of Master’s degree
3) Direct Entry Midwife (DEM): 41%
   - trained as midwives without becoming nurses first
4) Other: 24%
   - family members, first responders, etc.
   - may be more common in states where DEM not legal

Types of Direct Entry Midwives
1) Certified Professional Midwife (CPM)
   - graduate from accredited midwifery education programs or equivalent
   - certified by the North American Registry of Midwives (NARM)
   - pass national certification exam through NARM
   - only midwifery credential that requires knowledge about and experience in OOH settings
2) Certified Midwife (CM)
   - DEM credential offered by American College of Nurse Midwives (ACNM)
   - graduate from ACNM accredited midwifery education programs
   - pass national certification exam through Am Midwifery Certification Board
   - can practice legally throughout U.S.
3) Licensed Midwife (LM) or Registered Midwife (RM)
   - licensed by a state that does not require national certification
   - licensure requirements vary by state
4) Lay Midwife, Traditional Birth Attendant
   - no additional credential, license, or registration
   - training through apprenticeship, self-study
Legal status and requirements for DEM by state

- **Not regulated by state, no licensure available (23)**
  - Alabama, Connecticut, District of Columbia, Georgia, Illinois, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, West Virginia

- **Regulated by state, licensure available (25)**

- **Legal to practice but no licensure available (2)**
  - Hawaii, Missouri

- **Collaborative agreement with physician required for permit to practice (1)**
  - Delaware

*Midwives can purchase/administer O2, oxytocin, Vit K inj, lidocaine, erythro ointment
**CNM, CM, CPM only
♯ Able to bill Medicaid for reimbursement

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Regulation of Direct Entry Midwifery by State

Who chooses out of hospital births?

- **89% of increase in OOH births from 2004-2012 due to increase in non-Hispanic, white women**

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Source: CDC, 2014
Who chooses out of hospital births (US, 2010)?

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Home</th>
<th>Birth Center</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 31,509</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teen</td>
<td>2%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>20-34 yrs</td>
<td>77%</td>
<td>83%</td>
<td>77%</td>
</tr>
<tr>
<td>35 and older</td>
<td>21%</td>
<td>15%</td>
<td>14%</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>23%</td>
<td>36%</td>
<td>41%</td>
</tr>
<tr>
<td>1-2</td>
<td>46%</td>
<td>44%</td>
<td>48%</td>
</tr>
<tr>
<td>3+</td>
<td>31%</td>
<td>20%</td>
<td>11%</td>
</tr>
<tr>
<td>Smoker</td>
<td>2%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Married</td>
<td>85%</td>
<td>85%</td>
<td>59%</td>
</tr>
</tbody>
</table>

Who chooses out of hospital births?

- Desire for "low-intervention"
  - Avoid: oxytocin, epidural, pharmacology, episiotomy, instrumentation, C-S
- Avoid iatrogenic complications
- Desire freedom, control, comfort
- Self-determined, reliant on their own intuition rather than professional advice
- More confidence in their bodies
- Religious, cultural, economic concerns

Are women who deliver out of hospital “low risk”?

- “We know that only low-risk women should deliver outside of a hospital, but the precise definition of low risk remains controversial.” – Marion MacDorman, senior statistician and researcher, Reproductive Statistics Branch at the NCHS, CDC

- ACOG Committee on Obstetric Practice supports:
  - Absence of preexisting maternal disease
  - Absence of significant disease arising during the pregnancy
  - Singleton fetus
  - Cephalic presentation
  - Gestational age >36 weeks and < 41 weeks
  - Spontaneous labor or outpatient induction
  - No previous cesarean section
What does the data suggest about maternal risk factors and OOH birth (US, 2010)?

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Home</th>
<th>Birth Center</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Birth</td>
<td>1.0%</td>
<td>0.3%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.1%</td>
<td>1.1%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>0.3%</td>
<td>0.1%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Preterm Birth</td>
<td>5.4%</td>
<td>2.2%</td>
<td>12.1%</td>
</tr>
</tbody>
</table>

- Appropriate risk selection of low-risk women as candidates for out-of-hospital births is occurring
- Differences reflect differences in risk factor diagnosis and reporting between out-of-hospital and hospital settings cannot be ruled out
- No data readily available for other risk factors

Out of Hospital Births - Outcomes

High quality evidence is limited especially in North America
- No adequate RCTs
- Most data from observational studies
- 4 recent studies from the US


Maternal and Neonatal Outcomes of OOH Births Compared with Hospital Births

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Oxytocin Augment</th>
<th>3rd/4th Labor</th>
<th>C-Section</th>
<th>Maternal Antibiotic Use</th>
<th>NICU Admit</th>
<th>5 min Apgar &lt;7</th>
<th>Neonatal Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheney  (2014)</td>
<td>4.5%</td>
<td>1.2%</td>
<td>5.2%</td>
<td>0.4%</td>
<td>2.8%</td>
<td>1.5%</td>
<td>0.76/1000</td>
</tr>
<tr>
<td>Cheng (2013)</td>
<td>2.1%</td>
<td>NA</td>
<td>NA</td>
<td>2.6%</td>
<td>0.57%</td>
<td>2.42%</td>
<td>NA</td>
</tr>
<tr>
<td>Stapleton (2013)</td>
<td>NA</td>
<td>NA</td>
<td>6.1%</td>
<td>NA</td>
<td>2.6%</td>
<td>NA</td>
<td>0.58/1000</td>
</tr>
<tr>
<td>Wax (2010)</td>
<td>NA</td>
<td>1.2%</td>
<td>5.0%</td>
<td>0.7%</td>
<td>NA</td>
<td>NA</td>
<td>1.94/1000</td>
</tr>
<tr>
<td>Hospital Births*</td>
<td>22.2%</td>
<td>2.5%</td>
<td>9.3%</td>
<td>15.2%</td>
<td>2.6%</td>
<td>3.03%</td>
<td>1.17%</td>
</tr>
</tbody>
</table>

NA = Not Available

Which fetuses/neonates are at risk for morbidity and mortality during a planned home birth?

**Fetal Position During Labor**

- **VERTEX**:
  - Intrapartum Death Rate: 1.09
  - Early Neonatal Death Rate: 0.36
  - Late Neonatal Death Rate: 0.30

- **BREECH**: 4.57

**Parity at Time of Labor**

- **NULLIPAROUS**:
  - Intrapartum Fetal Death: 2.92
  - Early Neonatal Death: 0.84
  - Late Neonatal Death: 0.8

- **MULTIPAROUS**:
  - Intrapartum Fetal Death: 0.46
  - Early Neonatal Death: 0.27
  - Late Neonatal Death: 0.23

* p=0.004

**Women with Prior Cesarean Section**

- **No Prior C-S**: 2.85
  - Intrapartum Fetal Death: 0.66
  - Early Neonatal Death: 0.41
  - Late Neonatal Death: 0.17

- **TOLAC**: 0.95

* p=0.052
Out of Hospital Births Compared with Hospital Births
Women are more SATISFIED with their experience

▪ EXCEPT: women who planned out-of-hospital birth but actually deliver in hospital
  - rate birth experience as less satisfying than those who had expected to deliver in-hospital*
▪ especially associated with previously nulliparous women


Intrapartum Transport Rates and Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Total Intrapartum Transport</th>
<th>Nullip Transport</th>
<th>Multip Transport</th>
<th>Postpartum Transport</th>
<th>Neonatal Transport</th>
<th>C-S Rate w/Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANA Stats '04-'09</td>
<td>10.9%</td>
<td>23.0%</td>
<td>7.5%</td>
<td>1.7%</td>
<td>1.0%</td>
<td>NA</td>
</tr>
<tr>
<td>Birth Center II '07-'10</td>
<td>12.4%</td>
<td>22.0%</td>
<td>4.5%</td>
<td>2.4%</td>
<td>2.6%</td>
<td>37.8%</td>
</tr>
<tr>
<td>Birthplace in England: Home '08-'10</td>
<td>14.2%</td>
<td>35.1%</td>
<td>6.4%</td>
<td>6.2%</td>
<td>NA</td>
<td>19.2%**</td>
</tr>
<tr>
<td>Birthplace in England: FBC* '08-'10</td>
<td>16.5%</td>
<td>29.6%</td>
<td>5.3%</td>
<td>4.8%</td>
<td>NA</td>
<td>21.8%**</td>
</tr>
</tbody>
</table>

**Freestanding Birth Center ** Referent group: planned low risk hospital births, C-S rate= 11.0%

References:
In Idaho...

- **Licensed direct entry midwives**: 43
  - including 5 "grandmothered" midwives

- **Licensure is required for practice** (2009)

- **Licensure renewal requires submission of:**
  - 12 months practice data
  - APGAR scores of infants delivered
  - # prenatal transfers
  - # transfers during labor, delivery, postpartum
  - Any perinatal deaths, morbidity statistics

- **4 Birth Centers** (2 accredited)

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### Idaho Birth Statistics, 2012-13

(>36 wks, singleton)

<table>
<thead>
<tr>
<th>Maternal Characteristics</th>
<th>TOTAL</th>
<th>Hospital</th>
<th>Birth Center</th>
<th>Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate PNC</td>
<td>30,889</td>
<td>29,912 (96.8)</td>
<td>9,176 (95.7)</td>
<td>9,927 (97.0)</td>
</tr>
<tr>
<td>Inadequate</td>
<td>9,591</td>
<td>188 (66.3)</td>
<td>6 (0.1)</td>
<td>15 (1.0)</td>
</tr>
<tr>
<td>No PNC</td>
<td>311</td>
<td>2 (0.1)</td>
<td>2 (0.1)</td>
<td>6 (0.6)</td>
</tr>
<tr>
<td>Non-Smoker</td>
<td>36,661</td>
<td>35,168 (95.9)</td>
<td>460 (2.0)</td>
<td>549 (1.5)</td>
</tr>
<tr>
<td>Smoker</td>
<td>4,240</td>
<td>3,210 (99.3)</td>
<td>41 (2.5)</td>
<td>57 (4.8)</td>
</tr>
<tr>
<td>Adequate BMI</td>
<td>21,497</td>
<td>20,445 (96.8)</td>
<td>456 (2.1)</td>
<td>596 (2.8)</td>
</tr>
<tr>
<td>Inadequate BMI</td>
<td>9,097</td>
<td>8,945 (98.3)</td>
<td>53 (0.6)</td>
<td>99 (1.1)</td>
</tr>
<tr>
<td>BMI &lt;24.9</td>
<td>21,497</td>
<td>12,315 (66.7)</td>
<td>19 (0.1)</td>
<td>66 (0.3)</td>
</tr>
<tr>
<td>BMI 25-29.9</td>
<td>10,238</td>
<td>9,007 (88.3)</td>
<td>14 (0.1)</td>
<td>84 (0.8)</td>
</tr>
<tr>
<td>BMI &gt;=30.0</td>
<td>9,097</td>
<td>8,045 (98.3)</td>
<td>53 (0.6)</td>
<td>99 (1.1)</td>
</tr>
</tbody>
</table>
(>36 wks, singleton)

<table>
<thead>
<tr>
<th>Labor Characteristic</th>
<th>Hospital (39,392)</th>
<th>Birth Center (655)</th>
<th>Home (877)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induction/Augmentation</td>
<td>22,118 (56.1)</td>
<td>25 (3.8)</td>
<td>12 (0.1)</td>
</tr>
<tr>
<td>Chorioamnionitis/Maternal Temp &gt;100.4</td>
<td>764 (1.9)</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Epidural/Spinal Anesthesia</td>
<td>30,443 (77.3)</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Prolonged Labor (&gt;20 hrs)</td>
<td>836 (2.1)</td>
<td>28 (4.3)</td>
<td>27 (3.1)</td>
</tr>
</tbody>
</table>

Delivery/Birth Outcomes: Idaho Births, 2012-13
(>36 wks, singleton)

<table>
<thead>
<tr>
<th>Delivery/Birth Outcome</th>
<th>Hospital (39,392)</th>
<th>Birth Center (655)</th>
<th>Home (877)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal, spontaneous</td>
<td>27,077 (68.7)</td>
<td>618 (94.3)</td>
<td>825 (94.1)</td>
</tr>
<tr>
<td>Vaginal, operative</td>
<td>2,216 (5.6)</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Cesarean section, primary</td>
<td>4,942 (12.5)</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Cesarean section, repeat</td>
<td>4,260 (10.8)</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>VBAC</td>
<td>814 (2.1)</td>
<td>37 (5.6)</td>
<td>49 (5.6)</td>
</tr>
<tr>
<td>Weight neonate, mean</td>
<td>3,384 gm</td>
<td>3,558 gm</td>
<td>3,641 gm</td>
</tr>
<tr>
<td>5 min Apgar &lt;7</td>
<td>1,355 (3.4)</td>
<td>13 (2.0)</td>
<td>11 (1.3)</td>
</tr>
<tr>
<td>NICU admission</td>
<td>2,747 (7.0)</td>
<td>9 (1.4)</td>
<td>12 (1.4)</td>
</tr>
<tr>
<td>Antibiotic therapy, neonate</td>
<td>867 (2.2)</td>
<td>6 (0.9)</td>
<td>9 (1.0)</td>
</tr>
<tr>
<td>Neonatal demise, (&lt;7 days)</td>
<td>27 (0.68/1000)</td>
<td>--------</td>
<td>3 (3.4/1000)</td>
</tr>
</tbody>
</table>

Oregon, my Oregon
Oregon has...
Licensed direct entry midwives: 92

![Graph showing the growth in the number of active licenses for direct entry midwives in Oregon from July 2009 to January 2014.]

Oregon has...
Licensed Birth Centers: 14

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>City</th>
<th>County</th>
<th>Zip</th>
<th>License Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eugene Midwifery Services</td>
<td>301 N 105th Ave ste 110</td>
<td>Tukwila</td>
<td>WA</td>
<td>98168</td>
<td>AABC</td>
</tr>
<tr>
<td>Portland Birth Center</td>
<td>3212 NE Martin Luther</td>
<td>Portland</td>
<td>OR</td>
<td>97213</td>
<td>AABC</td>
</tr>
<tr>
<td>Salem Birth Center</td>
<td>1305 E 6th St</td>
<td>Salem</td>
<td>OR</td>
<td>97301</td>
<td>AABC</td>
</tr>
<tr>
<td>Middletown Birth Center</td>
<td>833 1st Ave</td>
<td>Middletown</td>
<td>OR</td>
<td>97306</td>
<td>AABC</td>
</tr>
<tr>
<td>Eola Birth Center</td>
<td>2201 SE 2nd Ave</td>
<td>Salem</td>
<td>OR</td>
<td>97306</td>
<td>AABC</td>
</tr>
<tr>
<td>Union City Birth Center</td>
<td>1800 NE 22nd Ave</td>
<td>Portland</td>
<td>OR</td>
<td>97213</td>
<td>AABC</td>
</tr>
<tr>
<td>Rainier Birth Center</td>
<td>1801 NE 20th Ave</td>
<td>Portland</td>
<td>OR</td>
<td>97213</td>
<td>AABC</td>
</tr>
<tr>
<td>Sweet Home Birth Center</td>
<td>5225 SE 28th Ave</td>
<td>Portland</td>
<td>OR</td>
<td>97206</td>
<td>AABC</td>
</tr>
<tr>
<td>North Portland Birth Center</td>
<td>10301 NE 12th Ave</td>
<td>Portland</td>
<td>OR</td>
<td>97229</td>
<td>AABC</td>
</tr>
<tr>
<td>Clinic Birth Center</td>
<td>1722 NW 26th Ave</td>
<td>Portland</td>
<td>OR</td>
<td>97210</td>
<td>AABC</td>
</tr>
<tr>
<td>Columbia Birth Center</td>
<td>3900 NE Martin Luther</td>
<td>Portland</td>
<td>OR</td>
<td>97213</td>
<td>AABC</td>
</tr>
<tr>
<td>Central Oregon Birth Center</td>
<td>10551 NE 166th St</td>
<td>Salem</td>
<td>OR</td>
<td>97306</td>
<td>AABC</td>
</tr>
</tbody>
</table>
|*** Accredited Birth Center (AABC)***

Out-of-Hospital Births – Oregon, 2012

Oregon House Bill 2380:
1) planned place of birth after onset of labor
2) planned birth attendant
3) report annually on birth outcomes by location and attendant type
Out-of-Hospital Births – Oregon, 2013

During 2013:

• 45,591 live term births in Oregon
• 1,876 PLANNED as an out-of-hospital birth: 4.1%
• 265 of 1,876 delivered in-hospital: 14.1%
• “Actual” planned out-of-hospital birth rate: 3.5%

Planned Out-of-Hospital Births in Oregon

Compared to women who chose hospital birth, women who planned OOH birth:

• Older (57.2% vs 42.5%) aged 30 or older
• White, non-Hispanic (87.7% vs 67.7%)
• Married (82.1% vs 64.3%)
• College-educated (45.9% vs 29.0%)
• Less overweight or obese prepregnancy (32.3% vs 49.1%)
• More likely to have inadequate prenatal care (9.8% vs 4.8%) or no prenatal care (2.8% vs 0.4%)
• Less likely to smoke (2.1% vs 10.6%)

Planned Out-of-Hospital Births vs. Planned Hospital Births

Oregon Outcomes - 2013

Interventions:

Induction/Augmentation labor: 8.9% vs. 47.1%
Epidural/Spinal anesthesia: 8.4% vs. 61.4%
Operative vaginal delivery: 0.4% vs. 3.1%
VBAC: 2.9% vs. 2.3%
Primary Cesarean delivery: 5.0% vs. 17.3%
Planned Out-of-Hospital Births vs. Planned Hospital Births
Oregon Outcomes – 2013

Maternal and Neonatal:
- Prolonged labor (≥ 20 hours): 7.3% vs. 2.9%
- Maternal transfusion: 0.7% vs. 0.5%
- Chorioamnionitis: 0.9% vs. 2.2%
- Admission to NICU: 2.1% vs. 3.2%
- Neonatal Seizures: 0.2% vs. 0.04%

Term early neonatal death (<7 dol) (2012): 1.98* vs. 0.65*

- 4/30 (13.3%) term, early neonatal deaths in Oregon occurred among planned out of hospital births

*per 1000 live births

Study Question
How can we work to improve neonatal outcomes and preserve maternal choice and satisfaction?

Hypothesis
Identifying and counseling women who desire out-of-hospital birth but who may be at higher risk for hospital transport may lead to improved outcomes

Reduce maternal and neonatal morbidities

Improve satisfaction with maternal birth experience
Objectives

• To characterize women who planned out-of-hospital birth but who transported to hospital for delivery after start of labor
• To evaluate maternal and neonatal outcomes associated with these births
• To compare characteristics and outcomes to previous delivery type-matched, low-risk women who planned hospital delivery

Study Design

• retrospective chart review
• ≥37 weeks EGA
• planning an out-of-hospital birth
• transferred to and delivered at Legacy Emanuel Hospital after start of labor or ROM
• January 1 through December 31, 2012

Results

Selected maternal, pregnancy, and delivery characteristics of women with intrapartum transport (N=68)
Reasons for intrapartum transport (N=77)

- Failure to Progress 1st Stage Labor: 10%
- Failure to Progress 2nd Stage Labor: 12%
- Fetal Heart Rate Decelerations: 1st Stage Labor: 1%
- Fetal Heart Rate Decelerations: 2nd Stage Labor: 3%
- Malposition: 7%
- Request for Fetal Monitoring: 28%
- Hypertension: 4%
- Base deficit >8: 5%
- Fetal Status: 5%
- Cesarean section: 8/10
- Operative vaginal: 2/10
- Base deficit >8: 4/10 → one demise

Reasons/Outcomes of Delivery w/in One Hour of Transport

- 14/68 transfers (20.6%)
  - Malpresentation: 4/14 (28.6%)
    - Breech x 2, active labor
    - Transverse x 1, active labor
    - 2nd Twin- prolapsed arm → demise
  - Fetal status: 10/14 (71.4%)
    - Cesarean section: 8/10
    - Operative vaginal: 2/10
    - Base deficit >8: 4/10 → one demise

Study Groups

Compared:
1) Women w/planned out-of-hospital birth (n=62)
   - intrapartum transport
   - no prior vaginal delivery
   - nulliparous (n=51)
   - VTOL (n=11)
2) Women w/ planned hospital birth (n=62)
   - presenting during same time period to LEH
   - In labor or after SROM
   - CNM service
   - no prior vaginal delivery
   - nulliparous (n=51)
   - VTOL (n=11)
### Maternal demographic characteristics of study subjects (no prior vaginal delivery)

<table>
<thead>
<tr>
<th>Age (y), mean</th>
<th>Planned Home Birth (N=62) n (%)</th>
<th>Planned Hospital Birth (N=62) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19</td>
<td>0 (0)</td>
<td>4 (6.5)</td>
</tr>
<tr>
<td>20-24</td>
<td>4 (6.5)</td>
<td>19 (30.6)</td>
</tr>
<tr>
<td>25-29</td>
<td>12 (19.4)</td>
<td>13 (21.0)</td>
</tr>
<tr>
<td>30-34</td>
<td>29 (46.8)</td>
<td>15 (24.2)</td>
</tr>
<tr>
<td>35-39</td>
<td>15 (24.2)</td>
<td>11 (17.7)</td>
</tr>
<tr>
<td>40-45</td>
<td>2 (3.2)</td>
<td>0</td>
</tr>
</tbody>
</table>

### Maternal demographic characteristics of study subjects (no prior vaginal delivery)

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Planned Home Birth (N=62) n (%)</th>
<th>Planned Hospital Birth (N=62) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, Non-Hispanic</td>
<td>57 (91.9)</td>
<td>41 (66.1)</td>
</tr>
<tr>
<td>Black or African American</td>
<td>1 (1.6)</td>
<td>8 (12.9)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2 (3.2)</td>
<td>11 (17.7)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (3.2)</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>American Indian</td>
<td>0</td>
<td>1 (1.6)</td>
</tr>
</tbody>
</table>

### Pregnancy and labor characteristics of study subjects (no prior vaginal delivery)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Planned Home Birth (N=62) n (%)</th>
<th>Planned Hospital Birth (N=62) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal BMI (at delivery)</td>
<td>31.8</td>
<td>30.3</td>
</tr>
<tr>
<td>Gestational age, mean</td>
<td>41.1</td>
<td>39.8</td>
</tr>
<tr>
<td>Meconium present</td>
<td>42 (67.7)</td>
<td>16 (25.8)</td>
</tr>
<tr>
<td>Labor epidural*</td>
<td>44 (83.0)</td>
<td>43 (69.4)</td>
</tr>
<tr>
<td>Chorio/endometritis, dx</td>
<td>13 (21.0)</td>
<td>4 (6.5)</td>
</tr>
<tr>
<td>Hours from ROM to delivery (mean)</td>
<td>25.8 (range 0.94 - 3.5)</td>
<td>13.5 (range 3.5 - 72.0)</td>
</tr>
</tbody>
</table>

*of those eligible
### Delivery outcomes of study subjects (no prior vaginal delivery)

<table>
<thead>
<tr>
<th>Delivery Type</th>
<th>Planned Home Birth (N=62) n (%)</th>
<th>Planned Hospital Birth (N=62) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal, spontaneous</td>
<td>16 (25.8)</td>
<td>37 (59.7)</td>
</tr>
<tr>
<td>Vaginal, operative</td>
<td>9 (14.5)</td>
<td>6 (9.7)</td>
</tr>
<tr>
<td>Cesarean section, primary</td>
<td>29 (46.8)</td>
<td>14 (22.6)</td>
</tr>
<tr>
<td>Cesarean section, repeat</td>
<td>8 (12.9)</td>
<td>5 (8.1)</td>
</tr>
<tr>
<td>VBAC % (n/n with prior C-section)</td>
<td>20.0</td>
<td>54.5</td>
</tr>
<tr>
<td>Weight neonate, mean (gm)</td>
<td>3756</td>
<td>3529</td>
</tr>
<tr>
<td>5 min Apgar &lt;7</td>
<td>5 (8.1)</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>Cord artery base deficit ≥12</td>
<td>2 (3.2)</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>Antibiotic therapy, neonate</td>
<td>14 (22.6)</td>
<td>3 (4.8)</td>
</tr>
<tr>
<td>Neonatal demise, within 1 wk</td>
<td>2 (3.2)*</td>
<td>0</td>
</tr>
</tbody>
</table>

*One due to sepsis and HEL, one due to undiagnosed Apert’s syndrome

### Limitations

- Comparing apples to oranges
- No data available for appropriate denominator
- Small numbers, many providers with wide range of practice styles and thresholds for transport

### Improve Transfers / Improve Outcomes

**Prepare mothers about transfer**
- It is a real possibility
- Drill it, demystify it
- It is not the mother’s fault
- It is not the midwife’s fault

**Prepare midwife for transport**
- Develop formal plan
- Client review
- Client is relying on your judgement and advice
- Clear, complete records ready

**Prepare hospital staff for transfers**
- Quick, smooth reception and admission
- Notify on call provider
Increase Transfers / Improve Outcomes

- De Verloskundige Indicatielijst (Kloosterman List – the Netherlands)
- Indicators for hospital birth/transfer of care:
  - Previous cesarean section
  - >42 weeks
  - Twins
  - Breech presentation
  - Meconium
  - Not in labor after 24 hours ruptured membranes

Conclusions

- Planned out-of-hospital labors are inevitable
- Intrapartum hospital transports are inevitable
- Improve maternal and neonatal outcomes:
  - Integrate out-of-hospital deliveries into medical system
  - Patient selection
  - In-hospital birth centers
  - Provider education
  - Family education/counseling/preparation

KEEP CALM AND CARRY ON - A BIG UMBRELLA