Obstetric Care Quality in Rural Hospitals

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Rural Health Advisory Committee (RHAC)
MN Department of Health
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Rural Obstetric Care

- Childbirth is the most common and costly reason for hospitalization in the US
  - Total costs of $27 billion annually for hospital care
- Half a million babies are born each year in rural hospitals
- Decline in access to obstetric services at rural hospitals
  - More than half of rural counties have no obstetric services
- Among rural hospitals that do provide obstetric services, there a need for data on patterns of care, quality of care, and workforce.
Overview: Three Studies

- Relationship Between Birth **Volume and Quality** in Rural Hospitals
- Rural Obstetric **Workforce Challenges** and Opportunities
- Childbirth in **Non-Local Hospitals** Among Rural Women
Secondary Data

- State Inpatient Discharge (SID) data for nine states with significant rural populations
  - 100% of hospital discharge records for all payers within a state
    - 332 rural hospitals in 2002, 309 rural hospitals in 2010
    - 111,764 births in 2010 and 104,312 births in 2012
- American Hospital Association Annual Survey data on hospital characteristics
Primary Data

• Survey of all 306 rural hospitals in these nine states with at least ten births in 2010
• Advisory Committee of rural obstetric nurse managers
• Content: closed and open-ended questions on delivery volume, types & numbers of attending clinicians, staffing challenges & changes
• Timeline: November 2013 – March 2014
• Response rate 86% (n=263)
States Included in Our Studies

WA
OR
CO
IA
WI
NY
VT
NC
KY
What is the relationship between hospital birth volume and obstetric care quality among rural hospitals?
Methods

• Models: generalized estimating equations (GEE)
  – Pre-post strategy (longitudinal data)
  – Clustered standard errors (hospital)
  – Childbirth hospitalization is the unit of analysis
  – Conditional on eligibility for study outcomes

• Control variables:
  – state fixed effect
  – clinical characteristics associated with specific outcomes
Measurement

• Rural location
  – Rural=CAH+others in micropolitan / non-core counties
• Birth volume quartiles
  – low (10-110)
  – medium (111-240)
  – medium-high (241-460)
  – high (>460)
• Patient covariates
  – Age, race/ethnicity, payer, maternal medical conditions
Measurement

- Quality and safety outcomes
  - Low-risk cesarean (term, singleton, vertex, no prior cesarean)
  - Cesarean without medical indication (indications based on Joint Commission criteria)
  - Induction without medical indication (indications based on Joint Commission criteria)
  - Episiotomy (vaginal deliveries)
  - 3rd/4th degree lacerations (vaginal deliveries)
Study Results

- **Low-risk cesarean and cesarean without medical indication:** low-volume hospitals had higher (worse) rates than medium-high and high-volume hospitals, no significant differences vs. medium volume.

- **Induction without medical indication:** low-volume hospitals had higher (worse) rates than medium-volume hospitals, no significant difference vs. medium-high or high-volume hospitals.

- **Episiotomy:** low-volume had lower (better) rates than medium-high and high-volume hospitals.

- **3rd/4th degree lacerations:** no significant differences by birth volume.
• Obstetric quality and safety outcomes vary significantly across rural hospitals by birth volume
• Better performance is not consistently associated with lower or higher birth volume

So...what does this mean for maternity care quality improvement in rural settings?
Study Implications

• Addressing “relentless rise” of cesareans poses rural-specific challenges
  – Specialized personnel
  – Flexibility in surgical staffing
  – Recruitment (Ob/Gyn, Anesthesia, General Surgery)

• Quality measurement and reporting requirements
  – Opportunities for greater collaboration (measurement, IT)
  – Challenges of data collection, ability to address rapidly-changing guidelines
Study: Obstetrics Workforce

Research Questions

1. What types and combinations of clinicians are delivering babies in rural hospitals?
2. What is the relationship between hospital birth volume and staffing models?
3. What staffing challenges are rural hospitals facing?
Prior Research

- Obstetrician-gynecologists are unevenly distributed
- Family physicians are attending fewer births
- General surgeon supply has not kept pace with population increases
- Other clinicians/providers needed in rural areas for obstetrics
  - Obstetric anesthesia services
  - Labor & delivery nurses
  - Postpartum Care
Methods

- Hospital annual birth volume quartiles:
  - low (10-110), medium (111-240), medium-high (241-460), or high (> 460)

- Multivariable regression analysis of associations between hospital birth volume and obstetric workforce

- Qualitative analysis of workforce changes and staffing challenges
Average Number of OBs/FPs in Surveyed Rural Hospitals, by Birth Volume

Study: Obstetrics Workforce

- All Rural Hospitals (n=244)
- Low (n=43)
- Medium (n=75)
- Medium-High (n=65)
- High (n=61)
Percent of OBs/FPs Employed by Surveyed Rural Hospitals, by Birth Volume

Study: Obstetrics Workforce

- **Obstetricians**
- **Family Physicians**

- **All Rural Hospitals** (n=244)
- **Low** (n=43)
- **Medium** (n=75)
- **Medium-High** (n=65)
- **High** (n=61)
Percent of Surveyed Rural Hospitals (n=244) Citing OB Staffing Challenge

- Scheduling: 36.2%
- Training: 23.0%
- Recruitment and Retention: 20.6%
- Census Fluctuation: 19.8%
- Intra-Hospital Relationships: 11.9%
Study Results

• General surgeons perform cesarean deliveries in 58.1 percent of lowest-volume (<110) hospitals, but in none of the high-volume (>460) hospitals surveyed.

• Hospitals with lower birth volume (< 240 births per year) are more likely to have family physicians and general surgeons attending deliveries, while those with a higher birth volume more frequently have obstetricians and midwives attending deliveries.

• Workforce challenges reported by surveyed hospitals are related to their rural location and low birth volume.
Study Implications

• Individual hospitals working in isolation may struggle to address staffing challenges.

• Possible solutions may include telehealth, simulation training, and interprofessional education.

• Specific efforts:
  – Preparing clinicians for rural obstetric practice
  – Maintaining skills in low-birth-volume settings
1. What proportion of rural women delivered babies in non-local hospitals in 2010 and 2012?

2. Do non-local hospital delivery rates for rural women vary by maternal characteristics and local hospital characteristics?
Prior Research

- Most existing research: studies of a single-state or metropolitan area, conducted in 1980s or early 1990s
- Different definitions of non-local hospitals
- Rural women with greater social and economic resources are more likely to travel to deliver babies
- Limited information on medical conditions and hospital characteristics
Methods

• Multivariate logistic regression models used to predict the odds of childbirth in a non-local hospital

• Variables
  – Patient demographics and rurality
  – Primary payer
  – Maternal clinical diagnoses
  – Local hospital characteristics

• Focus on primary payer as relevant for policy and quality improvement
Definition of Local Hospital(s)

- Any hospital within 30 road miles from patient’s residence that provides obstetric services (at least 10 births annually)
- OR nearest hospital with obstetric services if none within 30 road miles
Clinical Conditions Among Rural Women with Childbirth Hospitalizations by Payer Status

<table>
<thead>
<tr>
<th>Condition</th>
<th>Medicaid (n=109,800)</th>
<th>Private Insurance (n=94,489)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May require MFM services</td>
<td>42.3%</td>
<td>40.6%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>6.4%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Gestational hypertension</td>
<td>8.1%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Hemorrhage / placenta problems</td>
<td>2.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Malposition, malpresentation</td>
<td>7.0%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Multiple gestation</td>
<td>1.2%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Pregnancy delivered before 37 weeks</td>
<td>7.4%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Previous cesarean section</td>
<td>16.5%</td>
<td>16.0%</td>
</tr>
</tbody>
</table>

- Medicaid (n=109,800)
- Private Insurance (n=94,489)
Non-Local Delivery Rates by Rurality and Insurance Type

- **All Women in Study (216,076)**: 25.4%
- **Micropolitan (133,658)**: 19.5%
- **Noncore Adjacent (49,200)**: 35.9%
- **Noncore Not Adjacent (33,218)**: 33.7%
- **Medicaid (24,685)**: 22.5%
- **Private Payer (27,052)**: 28.6%

*Note: Bars represent the percent of patients in each category who delivered in a non-local hospital.*

*Study: Non-Local Childbirth*
## Likelihood of Non-Local Delivery: Adjusted Odds Ratios for Selected Conditions / Local Hospital Characteristics

<table>
<thead>
<tr>
<th>Condition / Characteristic</th>
<th>AOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions Which May Require Maternal Fetal Medicine Services or Consultation</td>
<td>1.28</td>
</tr>
<tr>
<td>Malposition, Malpresentation</td>
<td>1.16</td>
</tr>
<tr>
<td>Multiple Gestation</td>
<td>1.82</td>
</tr>
<tr>
<td>Pregnancy Delivered Before 37 Weeks Gestation</td>
<td>2.41</td>
</tr>
<tr>
<td>Previous Cesarean Section</td>
<td>1.25</td>
</tr>
<tr>
<td>Any Neonatal Intensive Care Units</td>
<td>Ref</td>
</tr>
<tr>
<td>Neonatal Intermediate Care Units Only</td>
<td>1.77</td>
</tr>
<tr>
<td>No NICU or NINT</td>
<td>1.94</td>
</tr>
</tbody>
</table>
Study Results

- One-quarter of rural women give birth in non-local hospitals.
- Non-local childbirth is significantly related to maternal clinical diagnoses, socio-demographic factors, insurance status, and local hospital characteristics.
- Rural women with preterm births and clinical complications, as well as those without local access to higher-acuity neonatal care, are more likely to give birth in non-local hospitals.
- Medicaid-covered women are less likely to deliver non-locally.
Study Limitations

• No information about whether local providers had referred women for obstetric care at a non-local hospital, or about the quality of local providers.

• Other factors that may be important were not observable in our data, including:
  – maternal education, income, and willingness to travel
  – rural women’s perceptions regarding the quality of local and non-local providers
  – health care marketplace influences
  – the influence of friends and family
Study Implications

- Our results highlight the need for:
  - greater clarity concerning levels of maternity care available at hospitals
  - greater systems-level support for regional perinatal care networks
  - Further investigation into access to higher-acuity care for rural Medicaid beneficiaries
Future Directions

• Relationships between OB workforce/delivery models and quality, taking birth volume into account

• Impact of regionalization and ACO implementation on OB access and quality
  – Consolidation
  – Sharing expertise
  – Choice of provider/distance to care

• Ongoing role of Medicaid policy in obstetric care
  – Performance monitoring and reporting
  – Regulation/contracting
  – Education, outreach, training
  – Payment policy
For Additional Information


Thank You!

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