Diminishing Access to Rural Maternity Care and Associated Changes in Birth Location and Outcomes

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Agenda

• Background on access to rural maternity care
• Declining access to maternity care in rural counties
• Changes in birth location and outcomes following rural obstetric unit loss
Access to Rural Maternity Care

• 18 million reproductive-age women live in rural US communities
• Half a million babies born in rural hospitals each year
• Declining access to obstetric services at rural hospitals
  – In 1985, 24% of rural counties lacked OB services
  – By 2002, this number had risen to 44%
• Distance to maternity care is correlated with outcomes (NICU, infant mortality)
Who Takes Care of Rural Mothers?

- Hospitals with lower birth volume (<240 births per year) are more likely to have family physicians and general surgeons attending deliveries
- Hospitals with a higher birth volume more frequently have obstetricians and midwives attending deliveries
- Employment of physicians decreases as birth volume increases
- ¾ of rural hospitals with <300 births a year have shared nurse staff
- Midwives attend deliveries in 1/3 of rural hospitals
- Workforce challenges reported by surveyed hospitals are related to their rural location and low birth volume.
Rural Obstetric Unit and Hospital Closures

• What is the scope of obstetric unit and hospital closures resulting in loss of obstetric services in rural US counties between 2004-2014?
## Data Sources

<table>
<thead>
<tr>
<th>Hospital-level</th>
<th>Area Health Resources Files</th>
<th>2004, 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>County-level</td>
<td>American Hospital Association Annual Survey</td>
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</tr>
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<td>Area Health Resources Files</td>
<td>US Census data</td>
<td>2000, 2010</td>
</tr>
</tbody>
</table>
Methods

• Measurement of closure status:
  – Counties without obstetric services during 2004-2014
  – Counties with continual obstetric services
  – Counties experiencing full closures of obstetric services

• Analysis:
  – County-level multivariate regression, focusing on correlates of full closures
Number of Rural Hospitals with OB Services, 2004-2014
Number of Rural Counties with OB Services, 2004-2014

[Graph showing a decrease in the number of rural counties with OB services from 541 in 2004 to 404 in 2014 for Micropolitan areas, and a decrease from 530 to 503 in the same period for Noncore areas.]
Percent of Rural Counties with Hospital OB Services, 2004-2014

![Graph showing the percentage of rural counties with hospital OB services from 2004 to 2014. The graph indicates a decrease in the percentage over the years, with Micropolitan areas remaining relatively high compared to Noncore areas.](image-url)
Counties with Lower Birthrates Had Higher Odds of Losing OB Services

<table>
<thead>
<tr>
<th>County-level Number of Annual Births</th>
<th>Adjusted Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=90</td>
<td>8.32</td>
</tr>
<tr>
<td>91-200</td>
<td>3.49</td>
</tr>
<tr>
<td>201-400</td>
<td>1.75</td>
</tr>
<tr>
<td>&gt;400</td>
<td>1</td>
</tr>
</tbody>
</table>
Counties with More Black Residents Had Higher Odds of Losing OB Services

<table>
<thead>
<tr>
<th>Category</th>
<th>Adjusted Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hispanic White</td>
<td>1.00</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>4.73</td>
</tr>
<tr>
<td>AIAN</td>
<td>1.57</td>
</tr>
<tr>
<td>Asian</td>
<td>0.02</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.32</td>
</tr>
<tr>
<td>Others</td>
<td>4.06</td>
</tr>
</tbody>
</table>
Higher Workforce Supply was Associated with Lower Odds of Losing OB Services

<table>
<thead>
<tr>
<th>Professional</th>
<th>Adjusted Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBGYN per 1,000 females aged 15-44</td>
<td>0.86</td>
</tr>
<tr>
<td>Family physicians per 1,000 county</td>
<td>0.88</td>
</tr>
</tbody>
</table>
Variability Across States

- More than two-thirds of rural counties in FL (78%), NV (69%), and SD (66%) had no in-county hospital obstetric services.

- Rural counties in SC (25%), WA (22%), and ND (21%) experienced the greatest decline in access.

- ND (15%), FL (17%), and VA (21%) had the lowest percentage of rural counties with continual hospital obstetric services.
  - Closures in rural noncore areas of ND and VA
  - Closures in micropolitan areas of FL
Key Findings on Rural Maternity Care Access

- More than half of rural counties have no hospital-based obstetrics services
  - 9% of rural counties lost OB services between 2004-2014
  - Most vulnerable communities: black, low-income, shortage areas, remote, stingy Medicaid programs
Changes in Birth Location and Outcomes Following Obstetric Services Loss

• For rural counties that lost hospital-based obstetric services between 2004-2014, what were the associated changes in birth location and birth outcomes?
Association Between Loss of Hospital-Based Obstetric Services and Birth Outcomes in Rural Counties in the United States

Kozhimannil, Hung, Henning-Smith, et al.

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Available at jama.com and on The JAMA Network Reader at mobile.jamanetwork.com
## Data Sources

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<tr>
<td></td>
<td>US Census data</td>
<td>2000, 2010</td>
</tr>
<tr>
<td>Individual-level</td>
<td>Restricted Use Natality Detail File (NDF) with county identifiers</td>
<td>2004-2014</td>
</tr>
<tr>
<td></td>
<td>(maternal residence, hospital location)</td>
<td></td>
</tr>
</tbody>
</table>
Outcomes

• Birth location:
  – Out-of-hospital birth
  – Birth in a hospital without an obstetric unit

• Birth outcomes: Preterm birth (<37 weeks’ gestation)
Methods

• Multivariable linear regression models in an interrupted time series approach
• Separate models for urban-adjacent and non-urban-adjacent rural counties
Changes in Out-of-Hospital Birth

A. Out-of-hospital births

- Rural counties not adjacent to urban areas
  - Unadjusted mean (95% CI) per county
  - Linear trend
- Rural counties adjacent to urban areas
  - Unadjusted mean (95% CI) per county
  - Linear trend

Births Occurring Outside of a Hospital per County, Mean %

Time Prior to Obstetric Services Loss, y

Time Following Obstetric Services Loss, y
Changes in Births in Hospitals without Obstetric Services

![Graph showing changes in births in hospitals without obstetric services over time.](chart)

- **B**: Births in hospital without obstetric services

**Time Prior to Obstetric Services Loss, y**

-8, -7, -6, -5, -4, -3, -2, -1

**Time Following Obstetric Services Loss, y**

0, 1, 2, 3, 4, 5, 6, 7, 8

**Births Occurring in a Hospital Without Obstetric Capacity per County, Mean %**

0, 1, 2, 3, 4, 5, 6
Changes in Preterm Birth

![Graph showing changes in preterm births](image-url)
Key Findings on Changes in Birth Location and Outcomes

• After losing obstetric services, rural counties that are not adjacent to urban areas had higher rates of preterm birth, out-of-hospital birth, and births in hospitals without obstetric units.

• In rural counties next to urban areas, there was also an increase in births in hospitals without obstetric units, although this declined as time went on.
The Way Forward – Federal Policy

• Federal policy efforts to address workforce shortages.
  – Improving Access to Maternity Care Act

• Federal policy efforts to improve maternity care quality
  – Quality of Care for Moms and Babies Act
The Way Forward – State and Local Policy

• Medicaid policy
• State scope of practice laws
• State and local efforts
  – Subsidies; “home-grown” rural workforce
  – Education and training; rotations that include obstetrics in rural areas
  – Capacity building/training: CME support
  – Telemedicine for obstetrics
  – Training for law enforcement, EMTs, and others who might encounter births
  – Housing and transportation support for rural families
  – Insurance regulation/costs
    (for hospitals, doctors)
The Goal for Rural Communities

- Workable solutions to the challenges that rural communities face to ensure maternity care access and quality


