Policy Implications of Rural-Urban Differences in Obstetric Care Trends, 2002-2010

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Motivation for Study

- About one-quarter of US births occur in rural hospitals
- Hospital closures affect obstetric care practices
- Major shifts are occurring in obstetric care
- Growth in perinatal quality and safety initiatives
Study Objective

• To measure changes in obstetric care quality in rural and urban hospitals over the past decade.
  – Relevant prior research has not examined rural vs. urban settings
  – Rural hospitals have been shown to have higher Cesarean rates on weekdays than urban hospitals
  – Expecting to find greater use of labor induction or Cesarean delivery without medical indication in rural hospitals
Methods

AHRQ Healthcare Cost and Utilization Project
Nationwide Inpatient Sample (NIS):

• 20% sample of US hospitals
  – N=7.2m total births: 6.3m urban hospitals, 837,772 rural
• NIS classification of hospitals as urban or rural status based on CBSA
• Bed size categories based on Census region (S/M/L)
• Patient-level data
  – age, race/ethnicity, primary payer, and medical conditions (complications of pregnancy, labor, and/or delivery)
Methods, continued

Outcomes are quality measures:
• Cesarean delivery among lower-risk mothers (full term, singleton, vertex pregnancies with no prior Cesarean deliveries)

• Vaginal birth after cesarean (VBAC)

• Non-indicated Cesarean delivery

• Non-indicated labor induction
Analysis

• Childbirth hospitalization was the unit of analysis

• Generalized estimating equations (GEE) adjusted to account for hospital-level clustering.

• Interaction terms to measure annual trends in outcomes, focusing on whether trends changed more quickly or slowly in rural vs. urban hospitals.
Analysis, continued

- Final models controlled for all individual demographic characteristics and included interaction terms between year and rurality to evaluate whether annual trends in study outcomes differed across rural and urban hospitals.

- Hospital characteristics were not included in the models due to collinearity issues with rurality.
Limitations

• Hospital discharge data do not contain clinical notes or information on prenatal care, parity, or gestational age at birth.

• Ability to measure rurality / hospital characteristics is limited by data available for all hospitals.
Results

• Women giving birth in rural hospitals tend to be younger, less racially diverse, and more likely to have Medicaid coverage.

• Births in rural hospitals had lower rates of clinical complications compared with urban births.
Results, continued

• Cesarean delivery among lower-risk women was more common in rural vs. urban hospitals (AOR=1.61, p<0.001) and increased more rapidly (AOR=1.04, p<0.001).

• Labor induction without medical indication was less common in rural vs. urban hospitals (AOR=0.89, p<0.001) but increased more rapidly in rural hospitals (AOR=1.05, p<0.001).
Results, continued

• VBAC was less common in rural vs. urban hospitals (AOR=0.62, p<0.001), and declined less steeply in rural hospitals, where VBAC rates were already extremely low (<1% in both 2002 and 2010).
Average Predicted Probability of Cesarean Delivery among Low-Risk Women, by Rurality

Rural   Urban   Linear (Rural)   Linear (Urban)

0%  5%  10%  15%  20%  25%  30%  35%  40%
Average Predicted Probability of Non-Indicated Induction for Low-Risk Women, by Rurality

- Rural
- Urban
- Linear (Rural)
- Linear (Urban)


Probability: 0%, 2%, 4%, 6%, 8%, 10%, 12%
Conclusions

- Rural hospitals generally compare favorably with urban hospitals on rates of non-indicated obstetric procedures; however...

- National trends toward higher low-risk cesarean rates and greater use of non-indicated labor induction differentially impact deliveries in rural hospitals.
Key Policy Implications

- Rising Cesarean rates and limited VBAC access are problems in both rural and urban locations

- Payment reforms for non-indicated interventions may face implementation challenges in rural settings

- Suggested methods for reducing Cesarean rates may be more difficult to implement in rural settings due primarily to staffing limitations