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# 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



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# 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



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# 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)



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# 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



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# 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.



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# 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.



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# 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.



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# 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,  $p<0.001$ ).

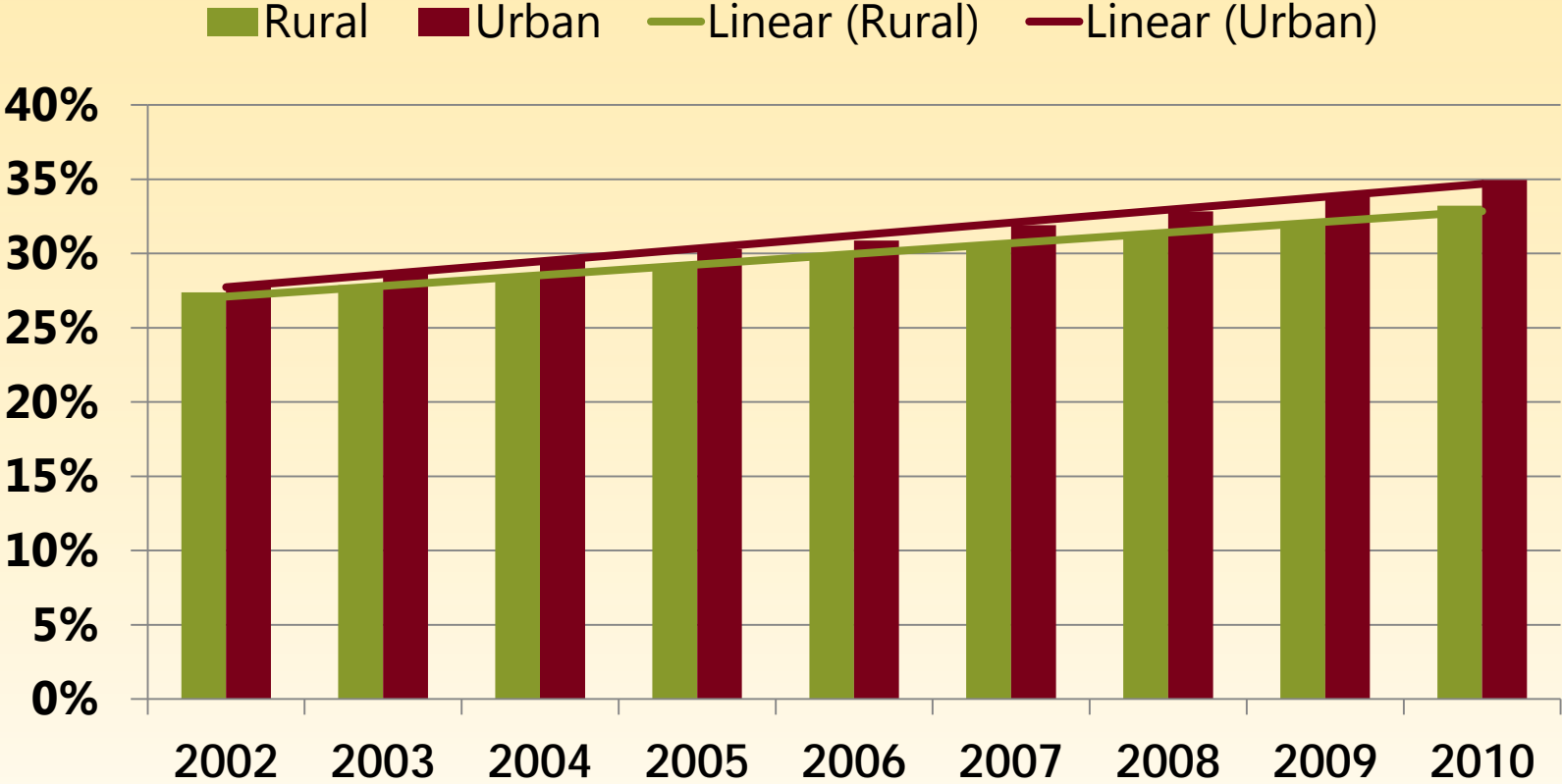


# Results, continued

- 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).

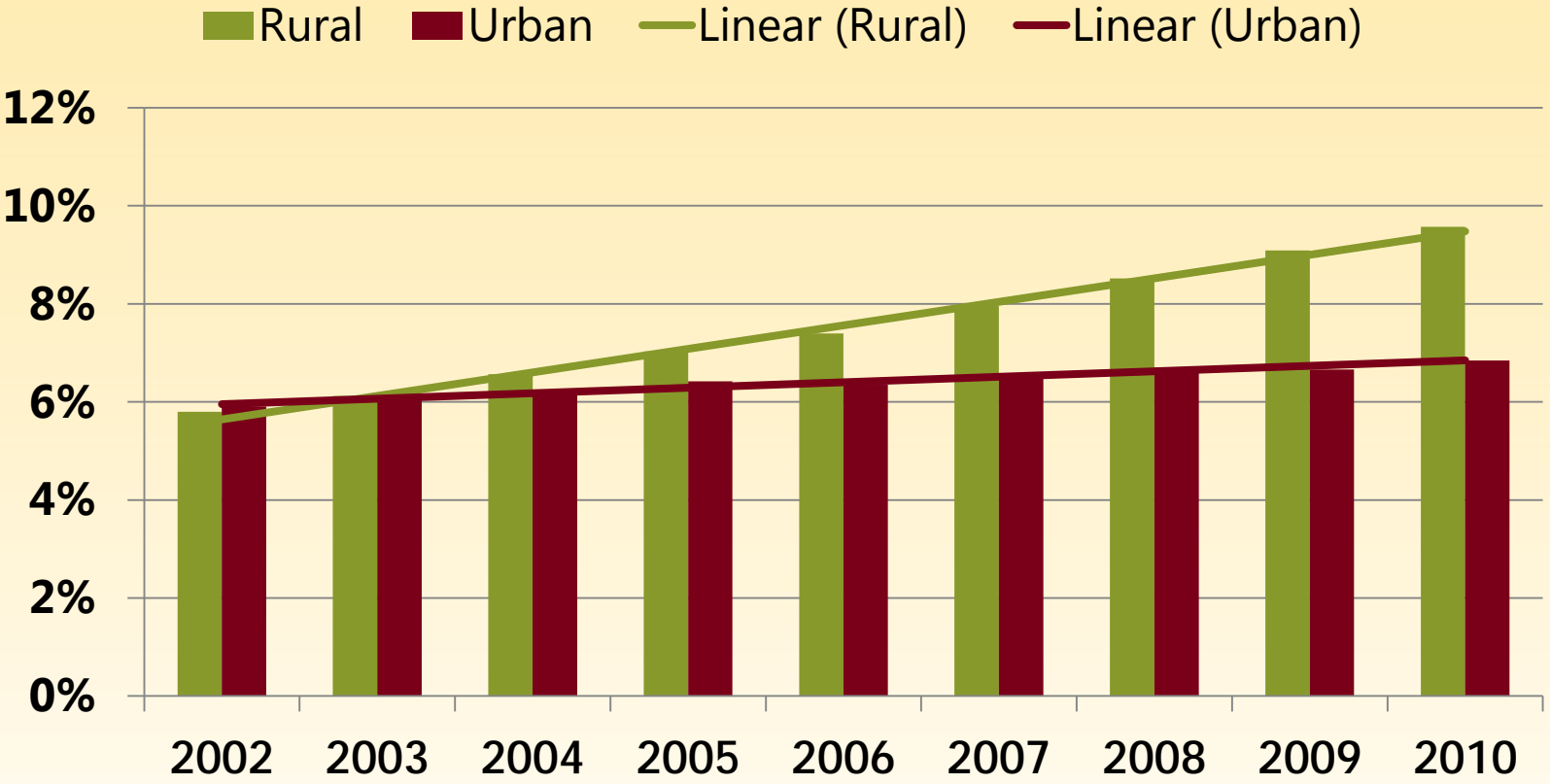


# Average Predicted Probability of Cesarean Delivery among Low-Risk Women, by Rurality



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# Average Predicted Probability of Non-Indicated Induction for Low-Risk Women, by Rurality



# 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.



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# 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

