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

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Webinar Presentation:

Rural Health Research Gateway

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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



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# 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%
  - Approximately 760 U.S. hospitals closed their OB services, 1985–2002.
- 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
- $\frac{3}{4}$  of rural hospitals with <300 births a year have shared nurse staff
- Midwives attend deliveries in  $\frac{1}{3}$  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?



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# Data Sources

<b>Hospital-level</b>	American Hospital Association Annual Survey	2003-2014
<b>County-level</b>	Area Health Resources Files	2004, 2014
	US Census data	2000, 2010



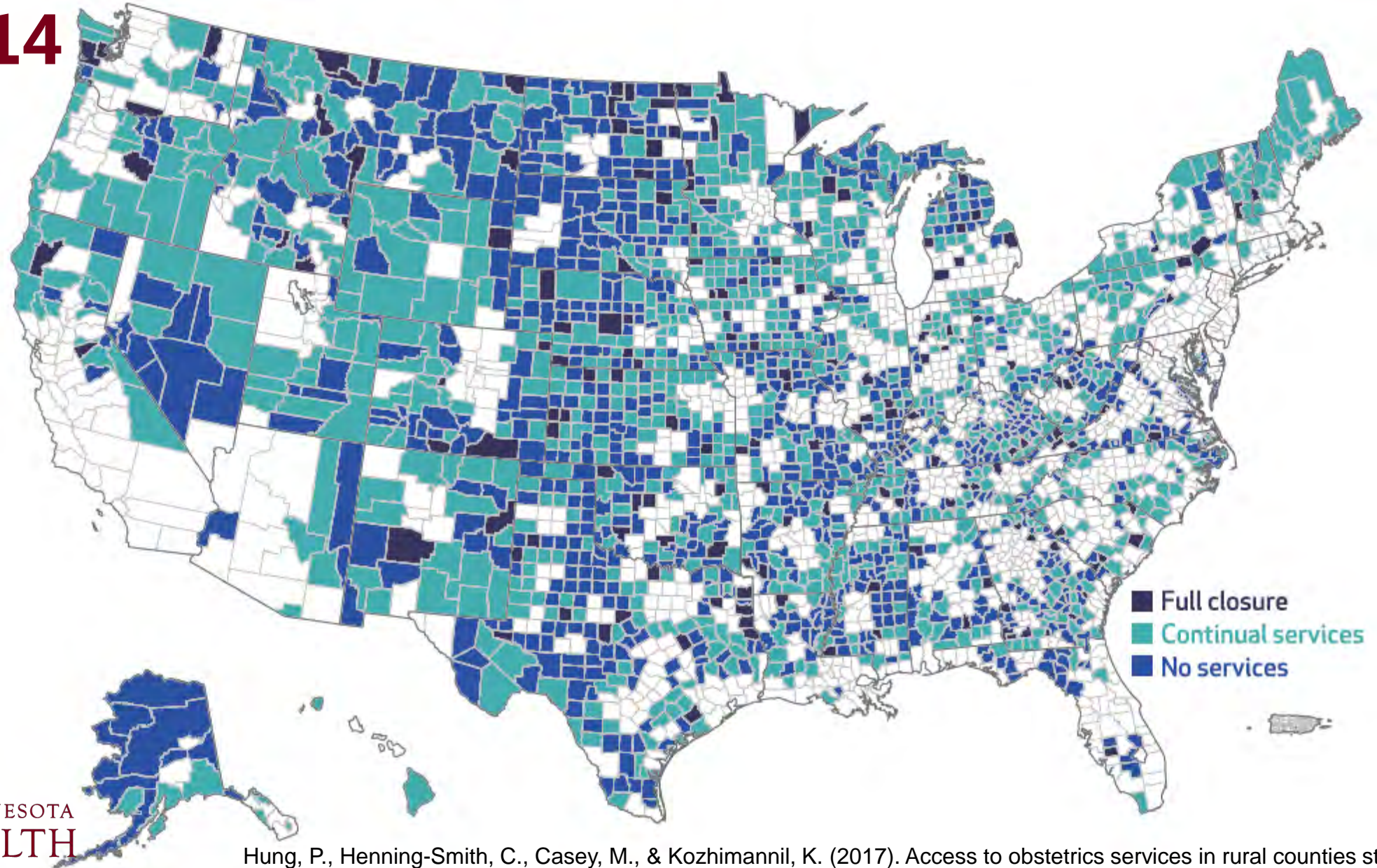
# Methods

- 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

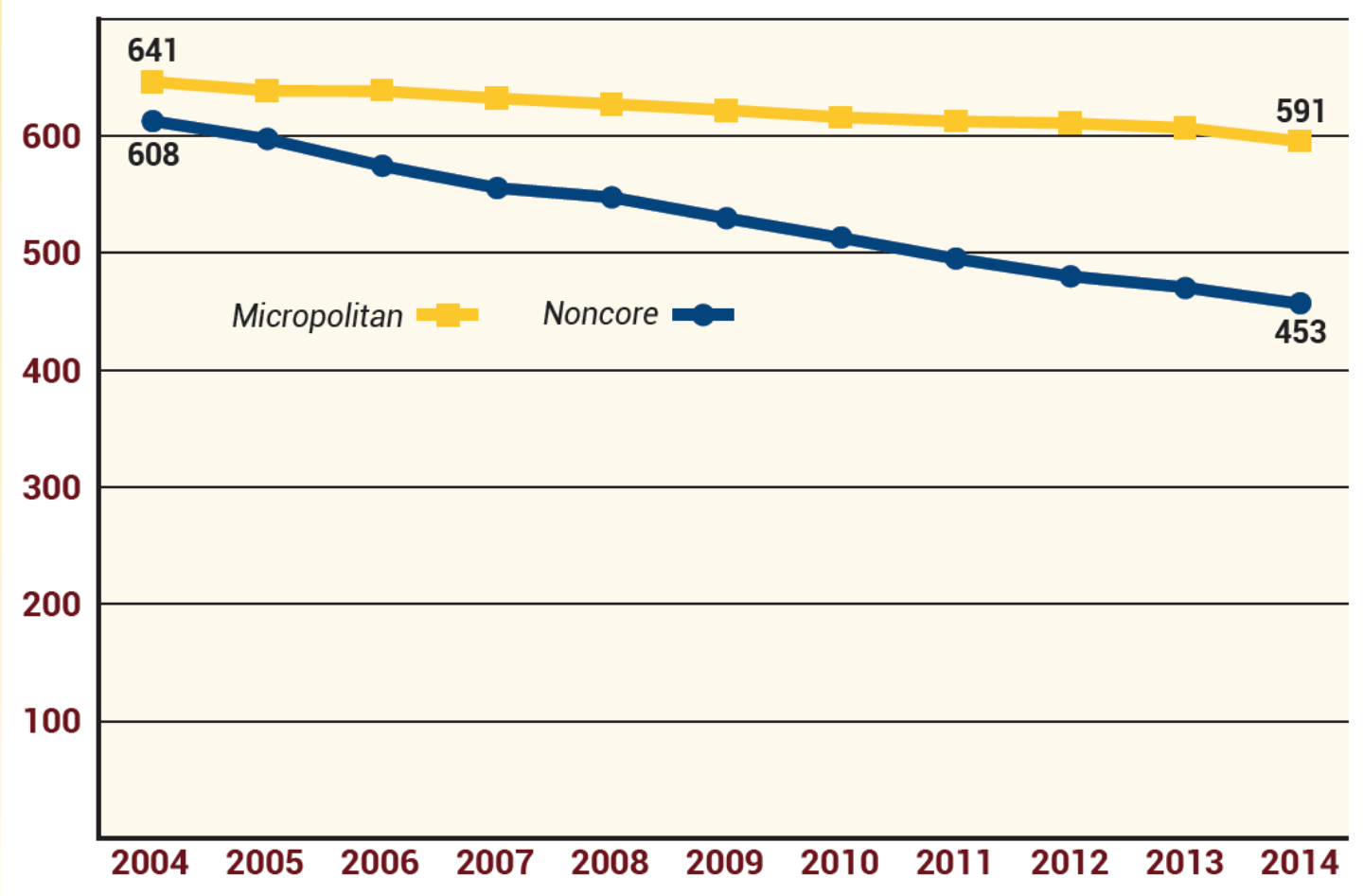




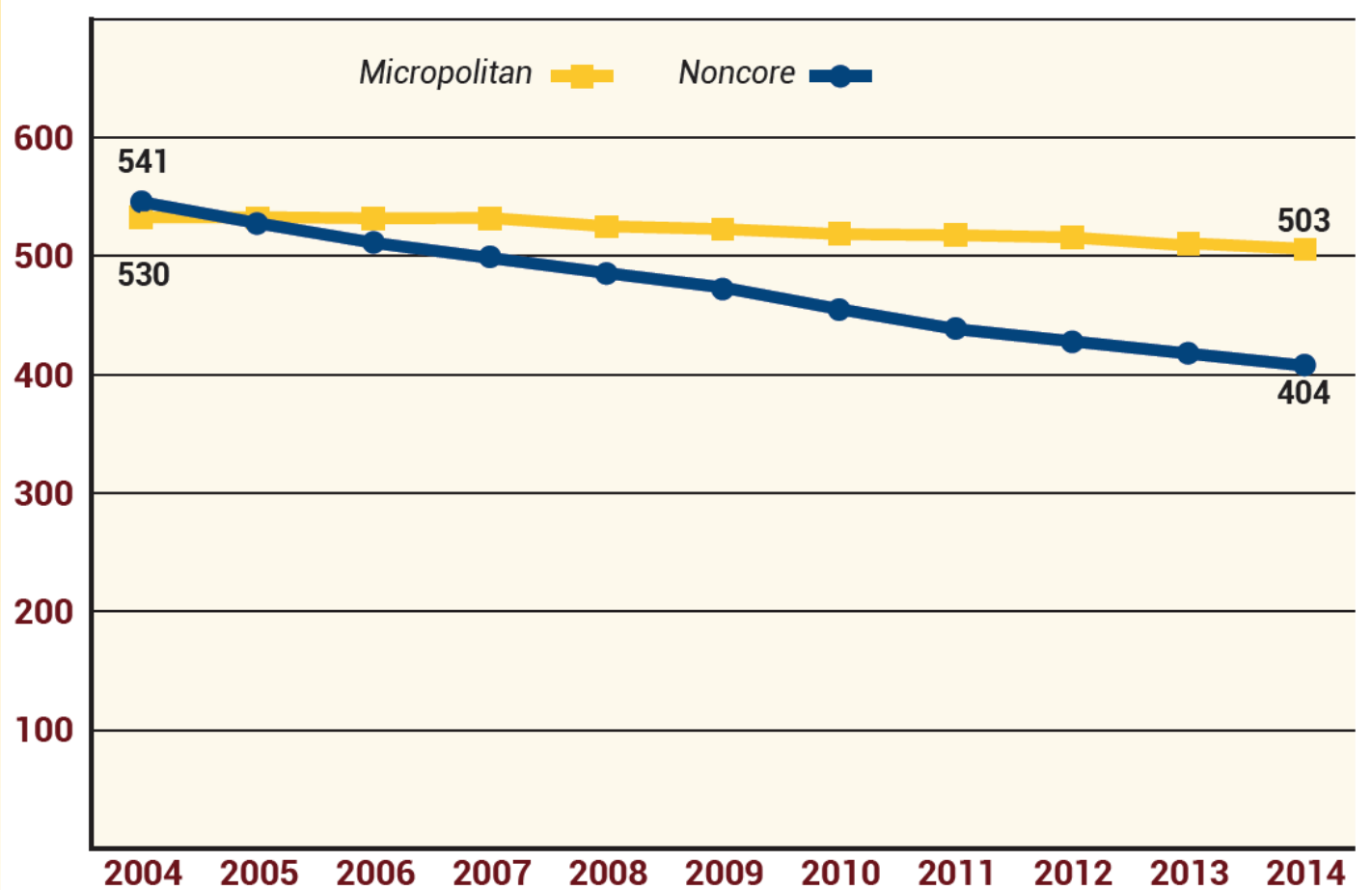
# Hospital Obstetric Services in Rural Counties, 2004 - 2014



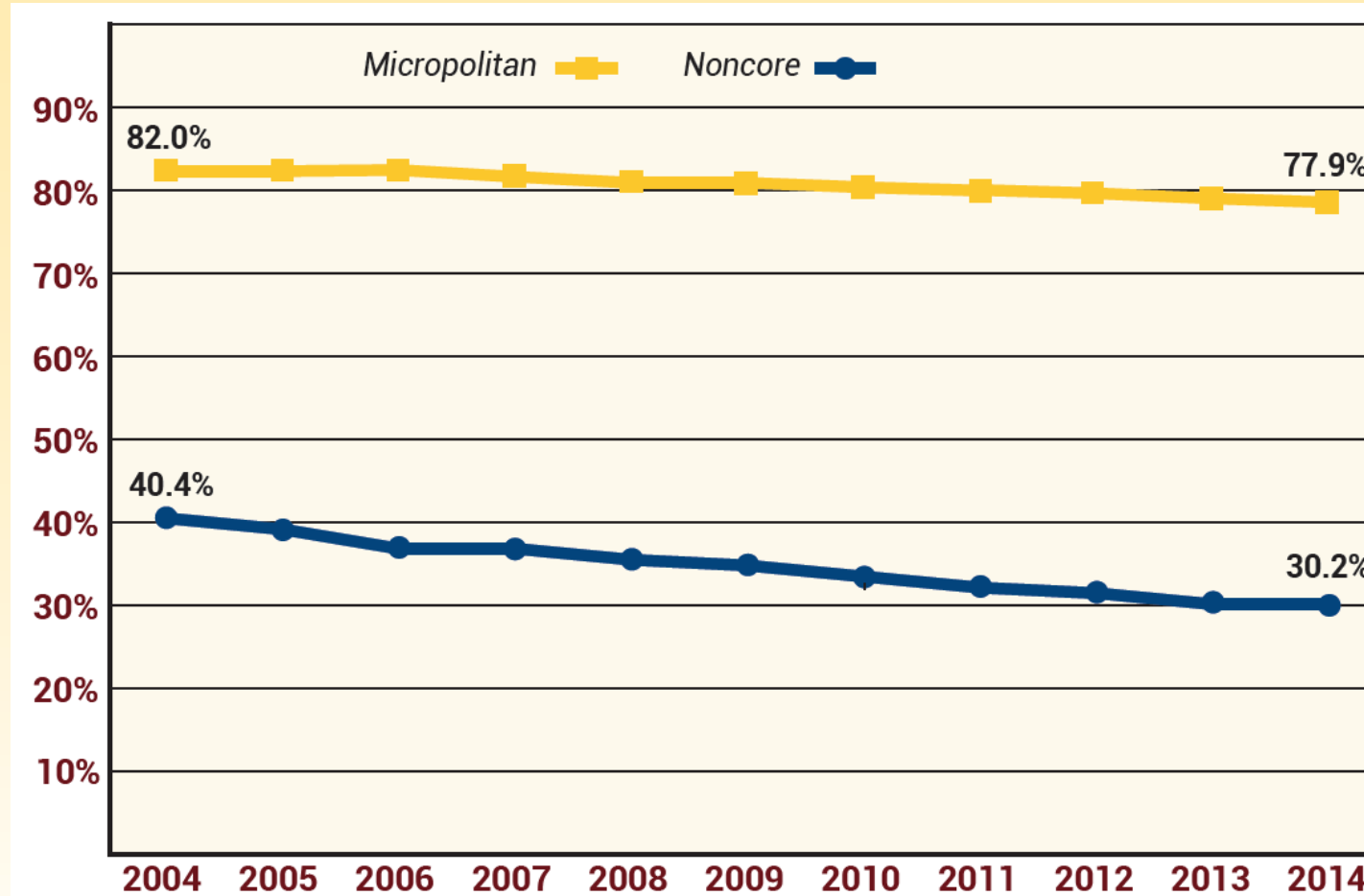
# Number of Rural Hospitals with OB Services, 2004-2014



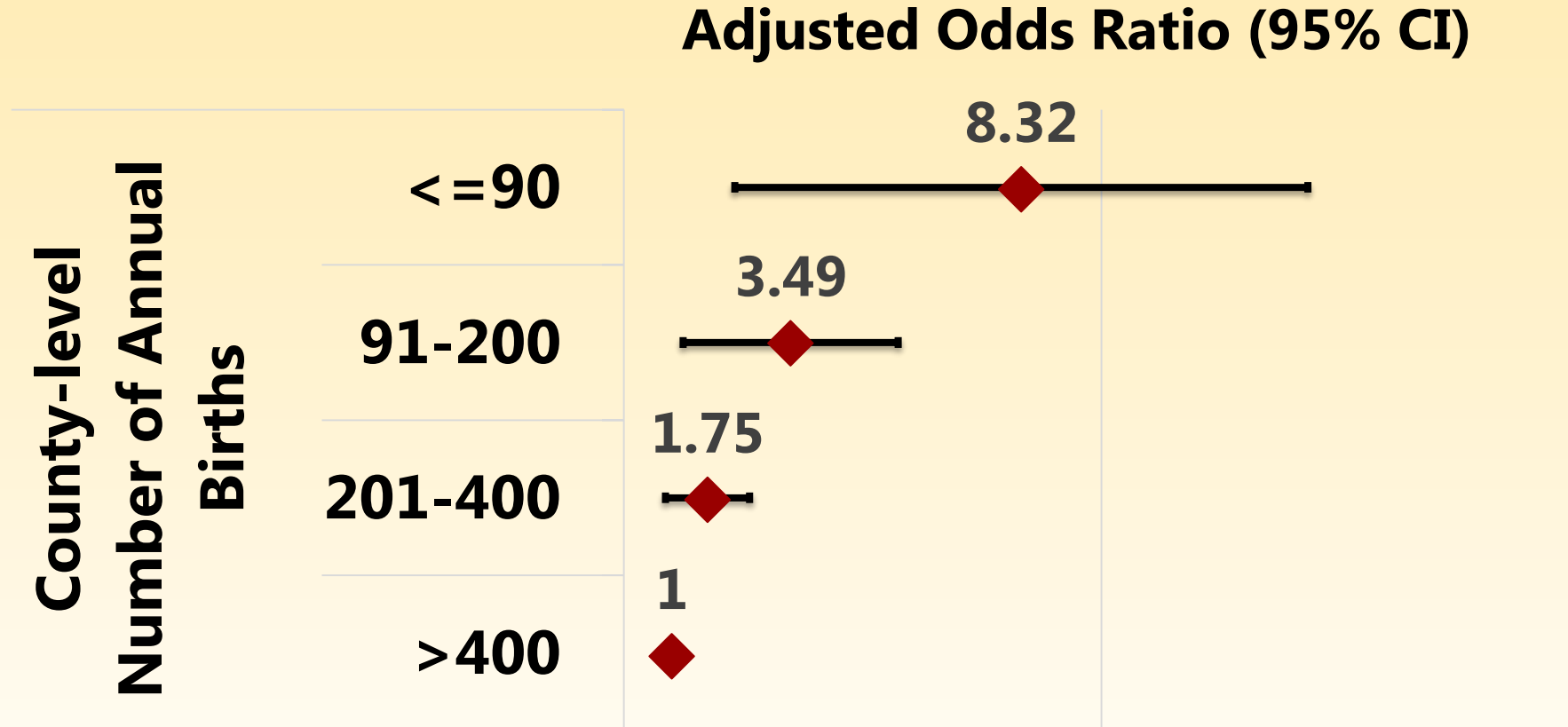
# Number of Rural Counties with OB Services, 2004-2014



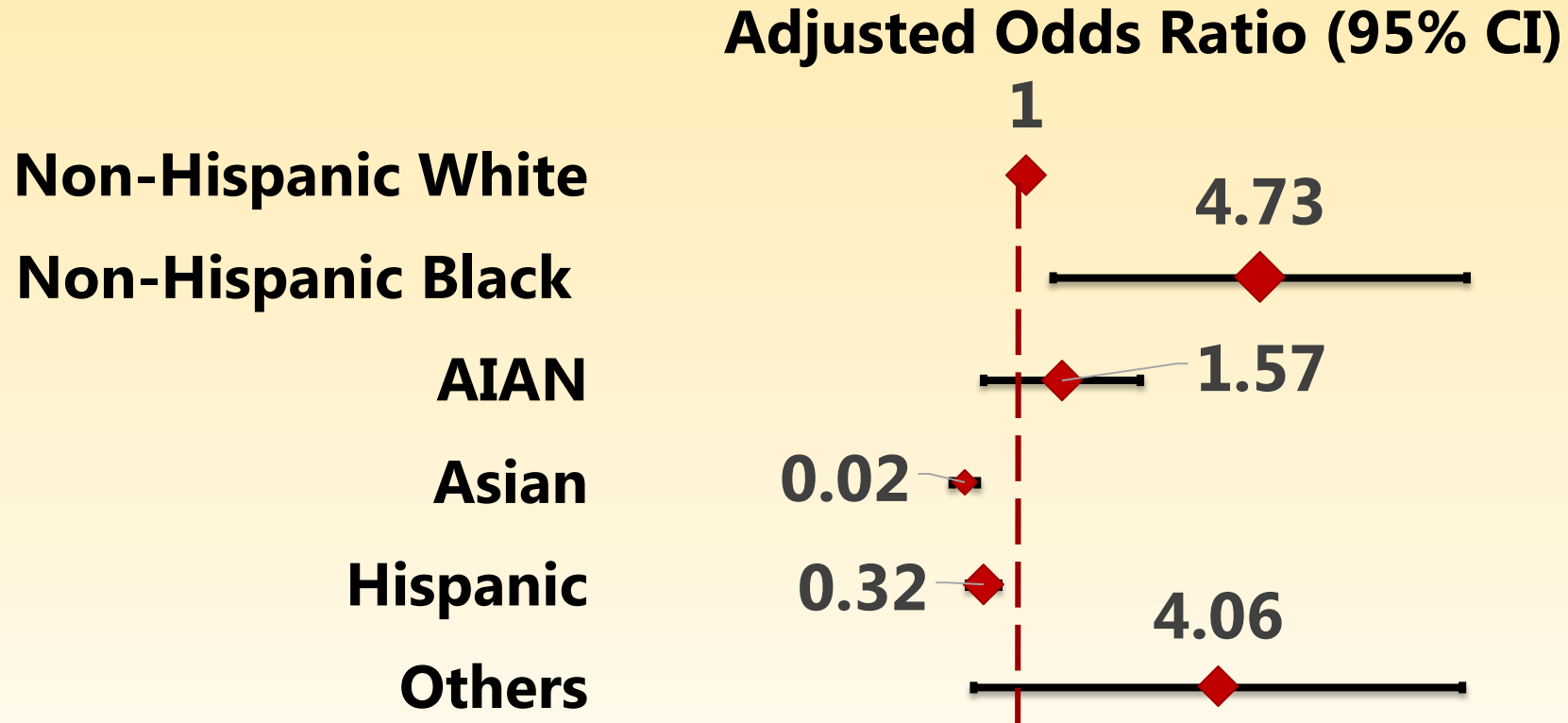
# Percent of Rural Counties with Hospital OB Services, 2004-2014



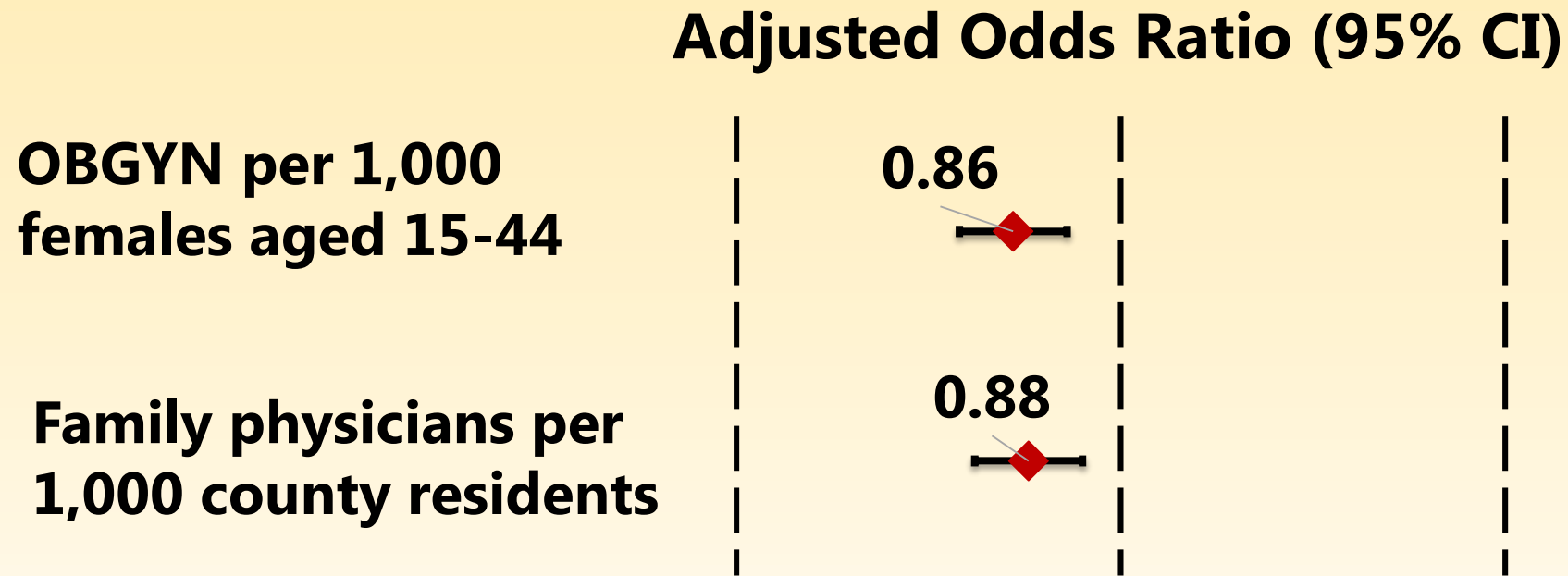
# Counties with Lower Birthrates Had Higher Odds of Losing OB Services



# Counties with More Black Residents Had Higher Odds of Losing OB Services



# Higher Workforce Supply was Associated with Lower Odds of Losing OB Services



# 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



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# 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

Katy B. Kozhimannil, PhD, MPA; Pelyin Hung, PhD, MSPH; Carrie Henning-Smith, PhD, MPH, MSW; Michelle M. Casey, MS; Shailendra Prasad, MBBS, MPH

**IMPORTANCE** Hospital-based obstetric services have decreased in rural US counties, but whether this has been associated with changes in birth location and outcomes is unknown.

**OBJECTIVE** To examine the relationship between loss of hospital-based obstetric services and location of childbirth and birth outcomes in rural counties.

**DESIGN, SETTING, AND PARTICIPANTS** A retrospective cohort study, using county-level regression models in an annual interrupted time series approach. Births occurring from 2004 to 2014 in rural US counties were identified using birth certificates linked to American Hospital Association Annual Surveys. Participants included 4 941 387 births in all 1086 rural counties with hospital-based obstetric services in 2004.

**EXPOSURES** Loss of hospital-based obstetric services in the county of maternal residence, stratified by adjacency to urban areas.

**MAIN OUTCOMES AND MEASURES** Primary outcomes were county rates of (1) out-of-hospital births; (2) births in hospitals without obstetric units; and (3) preterm births (<37 weeks' gestation).

**RESULTS** Between 2004 and 2014, 179 rural counties lost hospital-based obstetric services. Of the 4 941 387 births studied, the mean (SD) maternal age was 26.2 (5.8) years. A mean (SD) of 75.9% (23.2%) of women who gave birth were non-Hispanic white, and 49.7% (15.6%) were college graduates. Rural counties not adjacent to urban areas that lost hospital-based obstetric services had significant increases in out-of-hospital births (0.70 percentage points [95% CI, 0.30 to 1.10]); births in a hospital without an obstetric unit (3.06 percentage points [95% CI, 2.66 to 3.46]); and preterm births (0.67 percentage points [95% CI, 0.02 to 1.33]), in the year after loss of services, compared with those with continual obstetric services. Rural counties adjacent to urban areas that lost hospital-based obstetric services also had significant increases in births in a hospital without obstetric services (1.80 percentage points [95% CI, 1.55 to 2.05]) in the year after loss of services, compared with those with continual obstetric services, and this was followed by a decreasing trend (-0.19 percentage points per year [95% CI, -0.25 to -0.14]).

**CONCLUSIONS AND RELEVANCE** In rural US counties not adjacent to urban areas, loss of hospital-based obstetric services, compared with counties with continual services, was associated with increases in out-of-hospital and preterm births and births in hospitals without obstetric units in the following year; the latter also occurred in urban-adjacent counties. These findings may inform planning and policy regarding rural obstetric services.

← Editorial and Viewpoint

⊕ Supplemental content

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# JAMA

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# Data Sources

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<b>County-level</b>	Area Health Resources Files	2004, 2014
	US Census data	2000, 2010
<b>Individual-level</b>	Restricted Use Natality Detail File (NDF) with county identifiers (maternal residence, hospital location)	2004-2014



# Outcomes

- Birth location:
  - Out-of-hospital birth
  - Birth in a hospital without an obstetric unit
- Birth outcomes: Preterm birth (<37 weeks' gestation)



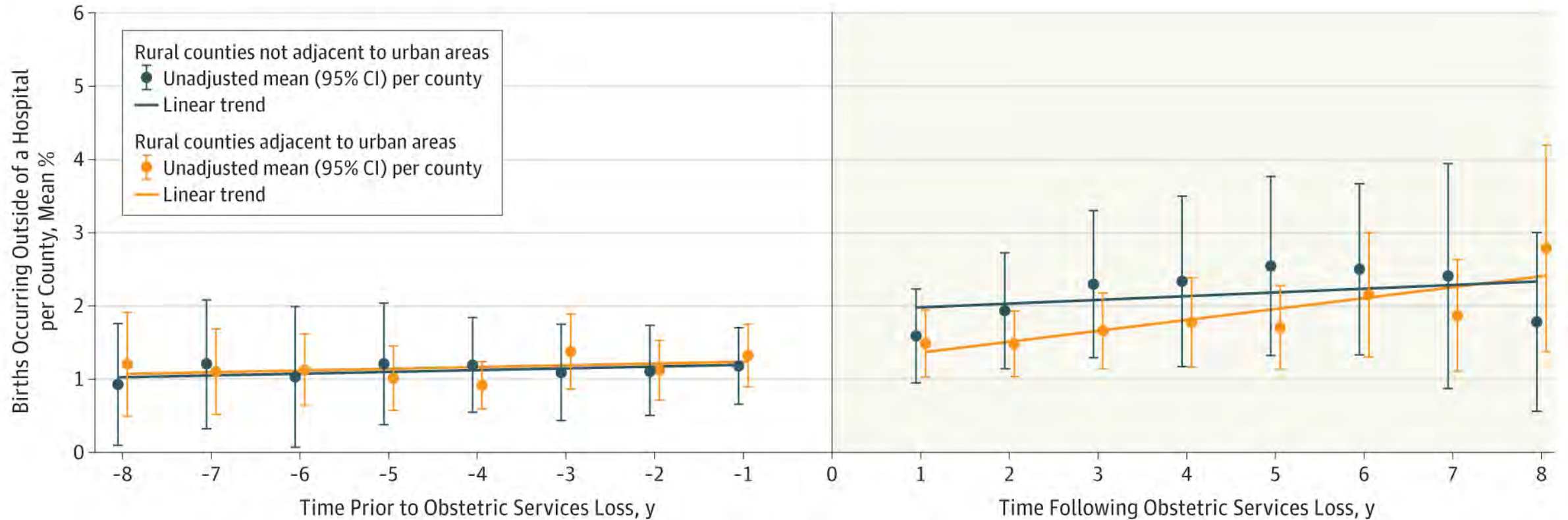
# Methods

- Multivariable linear regression models in an interrupted time series approach
- Separate models for urban-adjacent and non-urban-adjacent rural counties



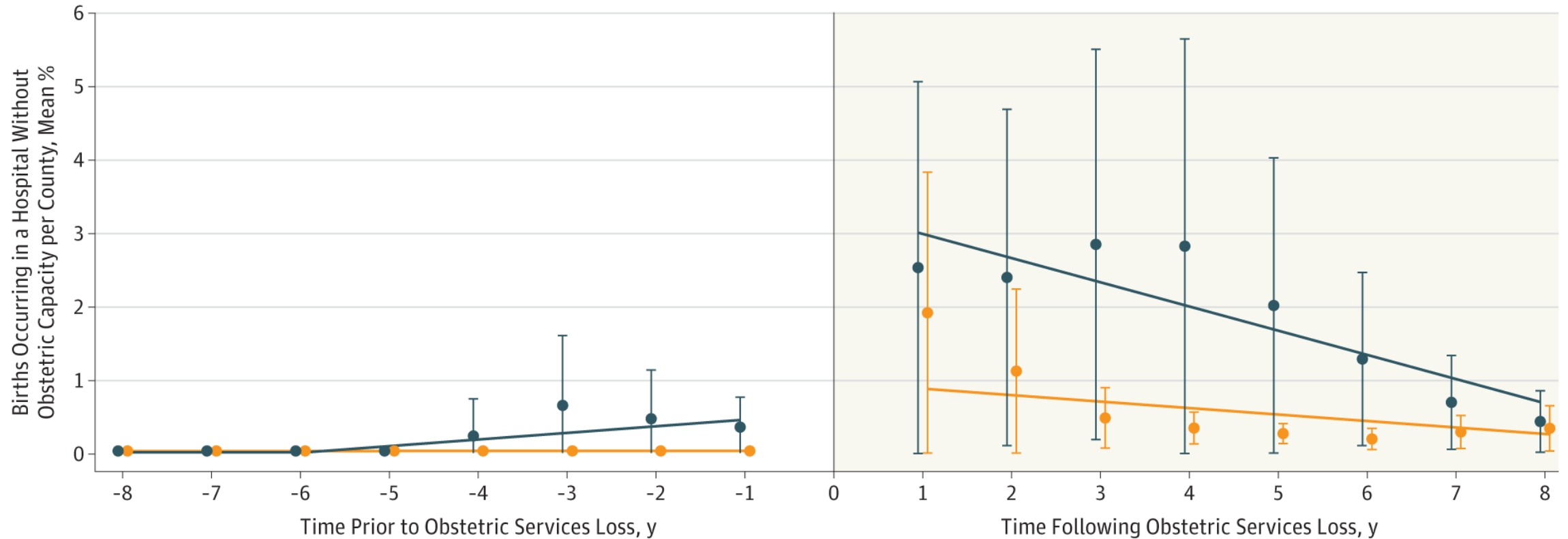
# Changes in Out-of-Hospital Birth

**A** Out-of-hospital births



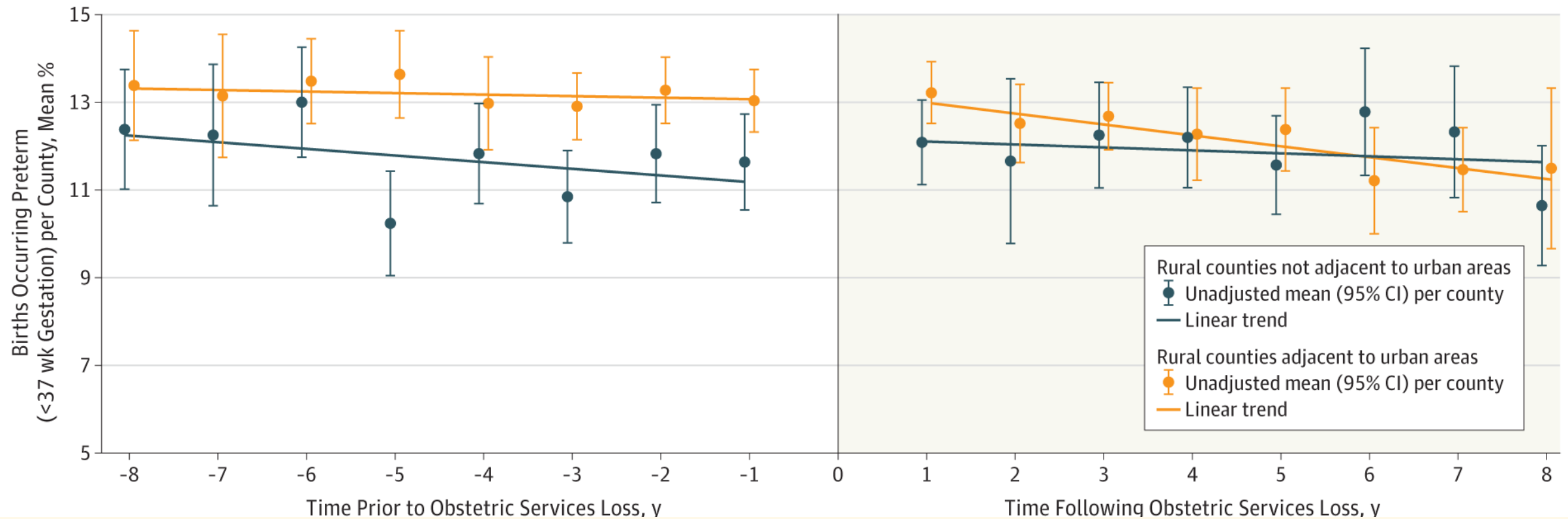
# Changes in Births in Hospitals without Obstetric Services

**B** Births in hospital without obstetric services





# Changes in Preterm Birth



# 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)



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# The Goal for Rural Communities

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



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# For Additional Information

- Kozhimannil, K., Hung, P., Henning-Smith, C., Casey, M, & Prasad, S. **Association between loss of hospital-based obstetric services in rural counties and birth location, healthcare utilization, and clinical outcomes.** *JAMA*, 2017; Epub ahead of print, doi: 10.1001/jama.2018.1830.
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- Hung, P., Kozhimannil, K.B., Casey, M., & Henning-Smith, C. **State variability in access to hospital-based obstetric services in rural US counties.** University of Minnesota Rural Health Research Center Policy Brief, April 2017. <http://rhrc.umn.edu/2017/04/state-variability-in-access-to-hospital-based-obstetric-services-in-rural-u-s-counties/>



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# Thank You!

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