Differences in timing of delivery among rural women in the United States

OBJECTIVE: National safety and quality efforts have aimed to optimize delivery timing at 39 weeks of gestation. The 39-week rule was the result of evidence suggesting reduced neonatal morbidity and mortality with delivery at 39 weeks’ gestation or beyond compared with deliveries in the early-term period (defined as 37+0 to 38+6 weeks of gestation). Studies show broad compliance with this effort nationally. However, it is unclear if differences in compliance to the 39-week rule exist for rural women. We sought to determine the differences in timing of delivery among rural women in the United States.

STUDY DESIGN: We conducted a retrospective cohort study using US restricted-use—linked vital statistics infant death data (2015) from the National Center of Health Statistics. In addition to the publicly available data, the data files we utilized included unmasked geographic identifiers, including maternal county of residence and delivering hospital location by county. We included all singleton, nonanomalous pregnancies within the gestational ages of 36 to 41 weeks (Supplementary Figure 1). We further excluded individuals with preexisting diabetes, gestational diabetes, chronic hypertension, and gestational hypertension to identify a low-risk cohort without identifiable conditions for which medical induction of labor would be recommended. This study was deemed exempt from full review by the Oregon Health & Science University Institutional Review Board.

We used chi-square tests to compare the demographics between rural and nonrural residents. We compared deliveries at each gestational age between rural and nonrural residents using chi-square tests. Multinomial logistic regression analyses were performed using gestational age as a dependent variable. Relative risk ratios (RRR) were examined to explore the influence of rural location and demographic variables on delivery at various gestational ages using 39 weeks as the base outcome. The variance inflation factor (VIF) was measured to detect multicollinearity between the explanatory variables. A mean VIF score of <2 confirmed the nonexistence of multicollinearity. All statistical analyses were performed using Stata/SE 17 (StataCorp LP, College Station, TX). Statistical significance was set at P<0.05.

RESULTS: We identified 3,010,183 women, of which 338,093 (11.2%) had a rural residence (Supplemental Table 1). Overall, rural women were more likely to deliver at 36 weeks (3.2% vs 2.9%; P<0.001), 37 weeks (7.9% vs 7.6%; P<0.001), and 38 weeks (16.2% vs 16.1%; P<0.001) of gestation than nonrural women at the same gestational ages. Rural women were less likely to deliver at 39—41 weeks of gestation (72.7% vs 73.4%; P<0.001) than nonrural women (Supplementary Figure 2). The RRR of delivery at 36 weeks compared with that at 39 weeks increased by a factor of 1.03 in rural women (RRR=1.03; 95% confidence interval [CI], 1.00—1.05), whereas that of delivery at 40 weeks decreased by a factor of 0.83 among rural residents (RRR=0.83; 95% CI, 0.82—0.84) (Table).

CONCLUSION: Differences in the distribution of deliveries exist between rural and nonrural women. It is unclear if these differences are the result of medical necessity, timing of spontaneous delivery, or variance in application of the 39-week rule. Additional research is warranted to identify the

REFERENCES

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Disparities in biomarker testing in ovarian cancer: a real-world analysis

OBJECTIVE: Every year, 22,000 people are diagnosed with ovarian cancer and approximately 14,000 die from this disease. Biomarker testing has become critical in ovarian cancer with the advent of biomarker-targeted chemotherapies, such as poly (ADP-ribose) polymerase (PARP) inhibitors, and a minimum of germline genetic testing is now universally recommended at diagnosis by major cancer organizations. Although the 5-year survival rate is 46% in ovarian cancer, with PARP inhibitors, the 25% of patients who are biomarker-positive for homologous recombination deficiency (HRD) mutations, such as germline or somatic breast cancer susceptibility genes (BRCA 1 and BRCA2), can triple their progression-free survival, and some may be cured. In other cancers, uptake of biomarker testing has been uneven and may worsen racial and insurance disparities in cancer. In ovarian cancer, White patients have had a 15% increase in 5-year survival since the 1980s, whereas Black patients have had a 3% decrease. Given these concerns—and the survival benefit of providing biomarker-targeted therapies to eligible patients—our study aimed to examine the association of patient, sociodemographic, and cancer factors with biomarker testing in ovarian cancer.

STUDY DESIGN: We conducted a retrospective cohort study of patients with epithelial ovarian cancer diagnosed from 2011 to 2021, using the nationwide deidentified, electronic health record–derived Flatiron Health database. This database includes data from approximately 280 cancer clinics, representing approximately 800 sites of care in both academic and community practices in the United States. We used multivariable Poisson regression modeling to analyze the association of biomarker testing with patient, sociodemographic, health-system, and cancer factors, allowing us to control for possible confounders. We report relative risks for documented receipt of biomarker testing overall and for each biomarker: BRCA (germline and/or somatic) and HRD/GIS.

RESULTS: Of 8519 patients with ovarian cancer, 55.4% underwent any biomarker testing (95% confidence interval [CI], 54.3–56.4), 55.3% underwent BRCA testing (95% CI, 54.3–56.5), and 6.1% underwent HRD/GIS testing (95% CI, 5.6–6.6). The rate of ever testing increased from 36.0% among patients diagnosed in 2011 (95% CI, 32.5–39.5) to 65.6% among patients diagnosed in 2020 (95% CI,
### SUPPLEMENTARY FIGURE 1
**Inclusion criteria for rural/non-rural analysis**

**Total Births for the year 2015**
(n=3,988,733)

- Exclusions:
  - Maternal race other than NHW, NHB, Hispanic, and Asian (n=220,726)
  - Multiple births (n=129,468)
  - Anomalies (n=15,592)
  - Gestational age <36 weeks and >41 weeks (n=179,835)
  - Unknown rural/nonrural classification (n=35,863)

**Total births included** (n=3,407,249)

- Exclusions for low-risk cohort:
  - Chronic hypertension (n=49,265)
  - Gestational hypertension (n=168,779)
  - Preexisting diabetes (n=17,574)
  - Gestational diabetes (n=161,448)

**Total births included** (n=3,010,183)

SUPPLEMENTARY FIGURE 2
Proportion of deliveries in each gestational age by rural/non-rural residential status


SUPPLEMENTAL TABLE 1
Demographics of rural and non-rural individuals in United States

<table>
<thead>
<tr>
<th></th>
<th>Overall count (3,010,183 women)</th>
<th>Non-rural n = 2,672,090</th>
<th>Rural n = 338,093</th>
<th>P valuea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>52.10%</td>
<td>75.60%</td>
<td></td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Black</td>
<td>14.60%</td>
<td>9.70%</td>
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<tr>
<td>Hispanic</td>
<td>26.30%</td>
<td>13.60%</td>
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<tr>
<td>Asian</td>
<td>7.00%</td>
<td>1.10%</td>
<td></td>
<td></td>
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<tr>
<td>Maternal age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20 y</td>
<td>5.70%</td>
<td>8.50%</td>
<td></td>
<td>&lt;.01</td>
</tr>
<tr>
<td>≥35 y</td>
<td>15.70%</td>
<td>9.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt;18.5 (underweight)</td>
<td>3.90%</td>
<td>3.90%</td>
<td></td>
<td>&lt;.01</td>
</tr>
<tr>
<td>BMI ≥25 (overweight &amp; obese)</td>
<td>47.50%</td>
<td>52.50%</td>
<td></td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Education (less than college)</td>
<td>59.10%</td>
<td>70.0%</td>
<td></td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Marital status (unmarried)</td>
<td>39.50%</td>
<td>42.60%</td>
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<td>&lt;.01</td>
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<tr>
<td>Smoker</td>
<td>6.30%</td>
<td>15.80%</td>
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<tr>
<td>Public insurance</td>
<td>45.70%</td>
<td>53.90%</td>
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<td>&lt;.01</td>
</tr>
<tr>
<td>Nulliparous</td>
<td>32.20%</td>
<td>30.50%</td>
<td></td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

BMI, body mass index.  
a Chi-square test.