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# Reporting and Performance of Maternity-related Quality Measures in Critical Access Hospitals

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## KEY FINDINGS

- Overall, 30.6% of Critical Access Hospitals (CAHs) provide labor and delivery services, with no statistically significant differences among these CAHs by system ownership. CAHs located in the South were less likely to have labor and delivery compared to CAHs located in other census regions.
- Some statistically significant differences in reporting of maternity care quality measures by Electronic Health Record (EHR) vendor emerged, including CAHs using Epic being more likely to report the maternal morbidity structural measure and CAHs using CPSI/Evident being more likely to report PC-05 (exclusive breast milk feeding).
- Performance across maternity care measures did not vary based on annual Emergency Department (ED) volume or annual births, suggesting that low-volume CAHs are performing as well as other CAHs on these measures.

## PURPOSE

The primary objectives of this project are to 1) describe the characteristics of Critical Access Hospitals (CAHs) that provide labor and delivery, 2) identify relationships between maternity care quality performance and CAH characteristics such as system affiliation, volume, and location, and 3) identify quality measures related to maternity and birth outcomes that are most feasible and relevant for CAHs and rural hospitals.

## BACKGROUND

Maternity care in rural areas continues to be a priority nationally, as access to quality health care for mothers and infants is critical for the health and well-being of parents and babies. There are higher rates of out-of-hospital and preterm births in areas without hospital-based obstetric services, which place these infants at higher risk of death.<sup>1</sup> Rural residents are less likely to have access to hospital-based obstetric services, with approximately half of rural counties nationally lacking a hospital with these services.<sup>2</sup> Many rural hospitals, including CAHs, have also struggled to keep their obstetric services open, largely due to a combination of staffing issues, low birth volume, and financial issues.<sup>3,4</sup> These differences are also reflected in health outcomes, with a 9% higher risk of maternal morbidity and mortality among rural women compared to urban women.<sup>5</sup>

Hospital quality measures aim to track measurable outcomes and processes to improve patient care, including several measures specific to maternity care.



Measures specific to maternity care are further described in Table 1. By tracking measures on maternity care, CAHs can identify trends in maternal and infant care at their facility and make appropriate changes to their processes to improve care and outcomes. They can also use quality measure data to demonstrate successes to hospital leadership and their community.

This brief first describes characteristics of CAHs with and without labor and delivery services, and then describes CAH reporting and performance on five key quality measures related to maternity care and birth outcomes. These analyses may help inform future engagement in supporting maternity care in the Medicare Rural Hospital Flexibility (Flex) Program and inform consideration of future Medicare Beneficiary Quality Improvement Project (MBQIP) quality measures in this area. We will also identify which existing maternal and birth outcome quality measures may be most relevant to CAHs and most feasible for CAHs to report.

**APPROACH**

Data for this project come from the 2023 CAH Quality Inventory and Assessment (“Assessment”) which is collected by the Flex Monitoring Team, the 2023 American Hospital Association (AHA)

Annual Survey, Kaiser Family Foundation (KFF), and Centers for Medicare & Medicaid Services (CMS). Assessment data were used to identify CAH characteristics including system affiliation, annual Emergency Department (ED) visits, EHR vendor, and service lines including labor and delivery. Total births data came from AHA, using only values that were reported (not imputed data). KFF data were used to identify state Medicaid coverage rules (Medicaid expansion, coverage for mothers 1-year post-partum, and coverage for home births). Data on Medicaid coverage for home births were not available for nine states (AR, GA, KY, MN, NE, NH, NM, OH, and SD); thus, CAHs in those states are not included in the analyses for this characteristic.

Our first analysis compared characteristics of CAHs with and without labor and delivery services to assess for any notable differences. We then analyzed characteristics and relevant quality measures from the CMS Quality Reporting Program and electronic clinical quality measures (eCQMs) from the Medicare Promoting Interoperability Program including the maternal morbidity structural measure, PC-01 (elective delivery), PC-02 (cesarean births), PC-05 (exclusive breast milk feeding), and PC-07 (severe obstetric complications) among these CAHs (see Table 1 for measure descriptions).

TABLE 1. Maternity-related Quality Measures of Interest

Quality measure and link to specifications	Brief Description
<a href="#">Maternal Morbidity Structural Measure</a>	Assesses whether a hospital participates in a Statewide or National Perinatal Quality Improvement (QI) Collaborative initiative, and implements patient safety practices and/or bundles related to maternal morbidity from that QI Collaborative.
<a href="#">PC-01 (elective delivery)</a>	Patients with elective vaginal deliveries or elective cesarean births at >= 37 and < 39 weeks of gestation completed
<a href="#">PC-02 (cesarean births)</a>	Nulliparous women with a term, singleton baby in a vertex position delivered by cesarean birth
<a href="#">PC-05 (exclusive breast milk feeding)</a>	Exclusive breast milk feeding during the newborn’s entire hospitalization
<a href="#">PC-07 (severe obstetric complications)</a>	Patients with severe obstetric complications which occur during the inpatient delivery hospitalization



Quality measure data come from CMS. For these analyses, we used the Assessment data as the identifier for hospitals providing labor and delivery, though these data are available from other sources, including AHA and others. These data did not always align with other sources but includes the vast majority of CAHs (89%) and are considered reliable for our purposes as they are reported directly by CAH staff.

TABLE 2. Characteristics of CAHs with Labor and Delivery Services

	% with Labor and Delivery (Assessment)
<b>OVERALL</b>	30.6%
<b>System affiliation</b>	
Owned by system (N=367)	33.0%
Managed but not owned by system (N=198)	24.8%
Not owned or managed (N=656)	31.1%
<b>Census region</b>	***
Midwest (N=573)	32.5%
Northeast (N=70)	35.7%
South (N=286)	13.3%
West (N=292)	42.8%
<b>Medicaid expansion</b>	
Yes (N=933)	31.7%
No (N=288)	27.1%
<b>Medicaid coverage for mothers 1-year post-partum</b>	
Yes (N=1,151)	30.3%
No (N=70)	35.7%
<b>Medicaid coverage for home births</b>	**
Yes (N=475)	34.5%
No (N=474)	25.5%
<b>CAH-owned RHC</b>	
Yes (N=900)	30.0%
No (N=321)	32.4%
<b>CAH-owned primary care clinic (non-RHC)</b>	***
Yes (N=373)	40.8%
No (N=848)	26.2%

\*\*p < 0.01, \*\*\*p < 0.001.

We used chi-square tests, ANOVAs, t-tests, and logistic regressions in the analyses to identify statistically significant differences in providing labor and delivery, quality measure reporting, and quality measure performance by different characteristics. Analyses were completed using STATA 18.

**RESULTS**

*Labor and delivery services in CAHs*

We first assessed characteristics of CAHs with labor and delivery services, as shown in Table 2, finding 30.6% of CAHs (n=374) provide labor and delivery services.

Among CAHs with labor and delivery, there were not statistically significant differences by several characteristics, including system affiliation, Medicaid expansion, Medicaid coverage for mothers 1-year post-partum, or CAH-owned Rural Health Clinic (RHC). In terms of U.S. Census regions, CAHs in the South were least likely to have labor and delivery (13.3%) and CAHs in the West were most likely to have labor and delivery (42.8%) (p-value <0.001). CAHs located in states with Medicaid coverage for home births were significantly more likely to have labor and delivery services (34.5%) compared to CAHs in states without this coverage (25.5%). While there was not a significant difference in labor and delivery services based on whether CAHs had a CAH-owned RHC, there was a significant difference for CAHs that owned a non-RHC primary care clinic (40.8% with labor and delivery) compared to CAHs without a non-RHC primary care clinic (26.2%). It is also worth noting that most CAHs (73.7% of all CAHs) own an RHC, but this number is reversed for non-RHC primary care clinics, with only 30.6% of CAHs owning a non-RHC clinic.

Additionally, annual ED visits (not displayed in the table) were found to have a statistically significant odds ratio of 1.000096 (p-value <0.001), demonstrating that higher ED volume is associated with a slightly greater likelihood of providing labor and delivery services.



**Quality measure reporting among CAHs with labor and delivery**

Our analysis of maternity quality measure reporting was restricted to CAHs that provide labor and delivery services as attested in the Assessment. Findings are shown in Table 3 and Table 4. The applicable reporting mechanism of Hospital Inpatient Quality Reporting (IQR) Program or eCQM is included for each measure as well for context.

System affiliation may impact a CAH’s capacity and infrastructure for quality reporting, as well as which measures they choose to focus on tracking and reporting and how much autonomy CAHs may have over these decisions. Notably, there was a statistically significant difference in reporting of most measures by system affiliation, though the pattern varied by measure. The maternal morbidity structural measure and PC-01 had the highest reporting among CAHs owned by a system (76.9% and 61.2%, respectively).

TABLE 3. CAH Maternity Care Quality Measure Reporting by Key Characteristics

Characteristics	Maternal Morbidity Structural Measure % reporting (N=177)	PC-01 (elective delivery) % reporting (N=183)	PC-02 (cesarean births) % reporting (N=50)	PC-05 (exclusive breast milk feeding) % reporting (N=116)	PC-07 (severe obstetric complications) % reporting (N=53)
Reporting Mechanism	IQR	IQR	eCQM	eCQM	eCQM
<b>CAHS with Labor and Delivery Reporting %</b>	47.3%	48.9%	13.4%	31.0%	14.2%
<b>System Affiliation</b>	***	**		***	*
<i>Owned by system (N=121)</i>	76.9%	61.2%	13.2%	15.7%	19.8%
<i>Managed but not owned by system (N=49)</i>	40.8%	34.7%	22.5%	36.7%	20.4%
<i>Not owned or managed (N= 204)</i>	31.4%	45.1%	11.3%	38.7%	9.3%
<b>Census Region</b>					
<i>Midwest (N=186)</i>	43.0%	49.5%	13.4%	26.9%	15.6%
<i>Northeast (N=25)</i>	60.0%	56.0%	16.0%	24.0%	20.0%
<i>South (N=38)</i>	50.0%	52.6%	18.4%	34.2%	15.8%
<i>West (N=125)</i>	50.4%	45.6%	11.2%	37.6%	10.4%
<b>Service Lines</b>					
<i>OB/GYN (N=342)</i>	48.8%	50.3%	13.5%	31.6%	14.6%
<i>Primary care clinic (N=152)</i>	57.2%***	51.3%	10.5%	25.0%*	10.5%
<i>RHC (N=270)</i>	43.7%*	47.0%	13.0%	31.9%	12.6%
<b>EHR Vendor</b>	***	**		***	*
<i>Epic (N=144)</i>	63.9%	57.6%	13.9%	27.1%	20.1%
<i>Cerner (N=95)</i>	42.1%	51.6%	9.5%	22.1%	7.4%
<i>CPSI/Evident (N=37)</i>	27.0%	29.7%	5.4%	64.9%	5.4%
<i>Meditech (N=70)</i>	38.6%	37.1%	20.0%	32.9%	18.6%
<i>Other (N=28)</i>	28.6%	50.0%	17.9%	32.1%	7.1%

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.



TABLE 4. Odds Ratios (ORs) Predicting CAH Maternity Care Quality Measure Reporting by Volume

	Maternal Morbidity Structural Measure reporting OR (N=177)	PC-01 (elective delivery) reporting OR (N=183)	PC-02 (cesarean births) reporting OR (N=50)	PC-05 (exclusive breast milk feeding) reporting OR (N=116)	PC-07 (severe obstetric complications) reporting OR (N=53)
<b>Volume Metric</b>					
Annual ED visits	1.000***	1.000***	0.999	0.999	0.999
Total annual births	1.002	1.007***	1.000	0.998	0.999

\*\*\*p < 0.001.

However, independent hospitals had the highest percentage reporting PC-05 (38.7%), and hospitals that were managed but not owned had the highest percentage reporting PC-07 (20.4%). There was no significant difference in reporting PC-02 by system affiliation.

A few significant differences emerged in analyzing reporting of maternity care measures by related service lines (OB/GYN, primary care clinic, and RHC). CAHs with a non-RHC primary care clinic had higher rates of reporting the maternal morbidity structural measure (57.2%), whereas CAHs with an RHC had lower rates of reporting this measure (43.7%). CAHs with a non-RHC primary care clinic were also significantly less likely to report PC-05 (25.0%) compared to CAHs without a primary care clinic.

Some significant differences in reporting measures by EHR vendor emerged in this analysis, suggesting that EHR vendor and the capabilities of different EHRs may impact the choices and/or capacity for reporting quality measures among CAHs. A higher percentage of CAHs using Epic reported the maternal morbidity structural measure, PC-01, and PC-07 compared to CAHs using other EHR vendors, with the greatest gap seen for the maternal morbidity structural measure. For PC-05, CAHs using CPSI/Evident had the highest percentage of reporting, nearly double that of the next highest group. There was no statistically significant difference in reporting PC-02 by EHR vendor.

While some statistically significant differences were found related to volume metrics and reporting of maternity care measures (Table 4), caution should be exercised in interpreting the clinical and practical significance of these differences. For example, the odds ratio (OR) for total births and reporting PC-01 is 1.007, meaning that for each additional birth per year, the odds of the hospital reporting this measure increases by .7%. Statistically significant increases in reporting by volume metrics include reporting the maternal morbidity measure by ED volume and reporting of PC-01 by both volume metrics.

**Quality measure performance among CAHs with labor and delivery**

Our final analysis includes assessing performance on these maternity care measures among CAHs with labor and delivery by key characteristics, shown in Table 4. For the maternal morbidity structural measure and PC-05, a higher percentage indicates better performance, whereas a lower percentage is considered better for PC-01 and PC-07. For PC-02, a benchmark of 30% or lower is considered within an acceptable range by the Joint Commission.

Unlike reporting, there were no significant differences in performance on any of the five measures of interest by system affiliation. In terms of census region, a significant difference was found only for PC-05, with CAHs in the South having lower performance compared to CAHs in other regions (28.8% compared to values over 50% in the other regions).



Some statistically significant differences emerged when assessing state Medicaid coverage rules. CAHs in states that have expanded Medicaid were more likely to attest “yes” to the maternal morbidity structural measure (95.4% compared to 78.6%, p-value=0.002), but no differences were observed in performance of other quality measures. CAHs in states without Medicaid coverage for home births

were significantly more likely to attest “yes” to the maternal morbidity structural measure (98.3% compared to 86.1%). There was also a significant difference in cesarean births (PC-02) between CAHs in states with and without Medicaid coverage for home births, with a lower rate among CAHs in states with coverage (15.7%) compared to CAHs in states without coverage (22.8%).

TABLE 5. CAH Maternity Care Quality Measure Performance by Hospital Characteristics

Characteristics	Maternal Morbidity Structural Measure (% yes - excluding N/As)	PC-01 (elective delivery) mean	PC-02 (cesarean births) mean	PC-05 (exclusive breast milk feeding) mean	PC-07 (severe obstetric complications) mean
<b>CAHs with Labor and Delivery Performance</b>	94.3%	2.6%	20.2%	62.7%	1.3%
<b>System Affiliation</b>					
<i>Owned by system</i>	92.9%	3.0%	22.5%	69.2%	0.9%
<i>Managed but not owned by system</i>	85.0%	0%	20.6%	54.8%	1.7%
<i>Not owned or managed</i>	95.2%	3.4%	18.2%	62.9%	1.4%
<b>Census Region</b>				***	
<i>Midwest</i>	96.5%	1.7%	21.6%	65.7%	1.4%
<i>Northeast</i>	93.3%	1.4%	22.1%	51.8%	0.6%
<i>South</i>	93.8%	2.6%	16.3%	28.8%	1.5%
<i>West</i>	87.3%	5.2%	16.0%	67.4%	0.7%
<b>State Context</b>					
Medicaid expansion	**				
<i>Yes</i>	95.4%	3.2%	20.4%	62.9%	1.8%
<i>No</i>	78.6%	1.3%	15.0%	60.0%	1.3%
Medicaid coverage for mothers 1-year post-partum					
<i>Yes</i>	92.8%	3.1%	19.4%	61.7%	0.9%
<i>No</i>	91.7%	2.8%	22.7%	69.6%	1.2%
Medicaid coverage for home births	*		*		
<i>Yes</i>	86.1%	1.0%	15.7%	61.9%	0.8%
<i>No</i>	98.3%	3.4%	22.8%	61.2%	1.1%

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

Note: Medicaid coverage for home births data includes 36 states.



TABLE 6. Odds Ratios (ORs) and Correlate Tests of CAH Maternity Care Quality Measure Performance by Volume

	Maternal Morbidity Structural Measure OR of reporting "yes"	PC-01 (elective delivery) correlate	PC-02 (cesarean births) correlate	PC-05 (exclusive breast milk feeding) correlate	PC-07 (severe obstetric complications) correlate
<b>Volume Metric</b>					
Annual ED visits	1.000	0.0314	.0765	0.0364	-0.0173
Total annual births	.999	0.1245	0.2704	-0.1573	0.2489

Interestingly, a logistic regression and correlate tests revealed no statistically significant differences in performance on any of these measures by either of the assessed volume metrics (Table 6).

### DISCUSSION

With an increase in rural labor and delivery closures over the past decade and indications of widening health outcome gaps between rural and urban mothers, this study adds an overview of CAHs with labor and delivery services including an important analysis of reporting and performance of key maternity care quality measures among CAHs.

#### System Affiliation

System ownership or affiliation can have a significant impact on a CAH’s service lines (including labor and delivery) as well as their quality measure reporting processes and improvement initiatives. Our analysis found no significant difference in provision of labor and delivery services among CAHs by system affiliation; that is, a similar proportion of system-owned, managed but not owned, and independent CAHs provide labor and delivery services.

There were significant differences in reporting for four of the five measures by system affiliation, though the pattern varied by measure. Maternal morbidity and PC-01 had a higher proportion of system-owned hospitals reporting. While there were differences in reporting of measures based on system ownership,

there were no statistically significant differences in performance on these same measures by system affiliation. This suggests that system affiliation may impact the reporting of these measures through a variety of mechanisms including staff capacity, technological infrastructure (e.g., EHRs or other systems that alleviate some of the reporting burden), and system oversight on which measures to report or prioritize. At the same time, system ownership does not appear to help or hinder actual performance on these measures.

#### Census Region

While every state and rural community is unique, CAHs within the same region of the U.S. may share some commonalities including similar geography and health care systems; thus, we assessed our outcomes for any differences by CAH census region. We found that CAHs in the South were significantly less likely to have labor and delivery (13%), while CAHs in the West were more likely (43%). These regional trends are consistent with previous findings that states in the South have worse scores on a composite measure of maternity care access.<sup>6</sup> There were no significant differences in reporting of any of the five maternity care quality measures by census region, demonstrating that CAHs in all four regions are reporting these measures at similar rates. Performance on PC-05 (exclusive breast milk feeding), however, was different by region, with CAHs in the South having lower performance on



this measure compared to CAHs in other regions (28.8% compared to more than 50% in each of the other three regions). This is consistent with overall breastfeeding trends nationally.<sup>7</sup> Further research on this may illuminate why there are such stark differences in this measure by regionality, and may present opportunities for appropriate hospital-level interventions.

### State Context

Medicaid reimbursement differences across states are important to consider when assessing provision and quality of labor and delivery services in CAHs, particularly as roughly half of rural births are paid by Medicaid.<sup>8</sup> Therefore, we included an analysis of three Medicaid coverage rules as they relate to our outcomes: Medicaid expansion, Medicaid coverage for mothers 1-year postpartum, and Medicaid coverage for home births. We found that CAHs located in states with Medicaid coverage for home births were more likely to have labor and delivery services, compared to CAHs located in states without home birth coverage from Medicaid. However, the need for labor and delivery services in CAHs located in states without this coverage may be even greater if birthing location options are even more limited, especially for pregnant people insured by Medicaid.

Some differences emerged in performance on these measures when assessing CAHs in states with and without Medicaid coverage for home births. CAHs in states without Medicaid coverage for home births were more likely to attest “yes” to the maternal morbidity structural measure. This finding combined with our other finding that CAHs in states without this coverage were less likely to provide labor and delivery services in the first place suggests that perhaps those CAHs that do provide labor and delivery are more likely to be engaged with their PQC in order to help fill that service gap. However, more work is needed to understand the relationship between these findings.

### Service Lines

Continuity of care is an important consideration for mothers, and CAHs with primary care clinics may be better equipped to offer seamless maternity care between their clinics and hospital. Our analysis found that CAHs with a non-RHC primary care clinic were more likely to have labor and delivery services (40.8% compared to 26.2% of CAHs without a non-RHC primary care clinic). CAHs with a non-RHC primary care clinic were also more likely to report the maternal morbidity structural measure, though no significant differences were found for reporting any other measures. No significant difference in provision of labor and delivery services was found between CAHs that have an RHC and those that do not. More research in this area could highlight why more CAHs with a non-RHC primary care clinic have labor and delivery, how these services may be integrated, and why that difference was not seen for CAHs with RHCs.

### Volume

Our analysis found a small but positive correlation between ED visits and provision of labor and delivery services. The odds ratio indicated that for each additional ED visit (annually), the odds of the CAH providing labor and delivery increases by .0096%. This finding complements previous qualitative research demonstrating hospital staff frequently cite insufficient birth volume as a barrier to maintaining expensive OB units.<sup>4</sup> However, it's important to note that the ED visits metric we used in this analysis may not directly correlate with birth volumes but is instead used as a general indicator of hospitals' overall patient volume, and thus perhaps a greater capacity to support labor and delivery services with a larger overall patient volume.

We also found a positive association between patient volume and reporting of some maternity care quality measures, including ED volume and maternal morbidity and PC-01 by both ED volume and birth



volume. No statistically significant differences in *performance* were found across either of the volume metrics compared to any maternity care quality measures. This finding may be encouraging for CAHs with low volumes that are concerned with how their low volumes may impact their maternity care quality measure performance, though their low volume concerns for performance-related data validity may remain.

### **EHR Vendor**

There were some differences by EHR vendor, with CAHs that use Epic being more likely to report the maternal morbidity structural measure, PC-01, and PC-07 compared to CAHs using other EHR vendors. One possible reason may be if Epic has technological capabilities that facilitate collecting, tracking, and/or reporting of any of these measures. For the maternal morbidity structural measure, perhaps Epic facilitates the use of safety bundles, which is one of the two components CAHs attest to for the measure. Safety bundles are collections of evidence-informed best practices for specific health conditions and include specific steps of care in emergencies, which can be integrated into EHR clinician workflows. For another measure, PC-05, a significantly higher proportion of CAHs that use CPSI/Evident EHR report this measure, compared to CAHs using other EHR vendors. PC-05 and PC-07 are eCQMs, thus reporting of these measures may be closely tied to the EHR's ability to extract the corresponding data. Future work focused on EHR capabilities specific to these measures may provide further insight on technological facilitators and barriers faced by CAHs using different EHRs.

### **Implications for MBQIP**

This analysis offers some valuable insights into these five maternity quality measures, including reporting rates and performance among CAHs that provide labor and delivery services. PC-01 and the maternal morbidity structural measure had the highest reporting rates, and thus may be feasible options to consider for MBQIP for CAHs providing labor and delivery. PC-02 and PC-07, while reported by fewer CAHs, may be clinically valuable measures for CAHs and states to track over time. State Flex Programs may use these findings to better understand the national rates of reporting and performance on these measures to inform conversations with CAHs in their state that provide labor and delivery services about their reporting and performance on maternity care measures. The data may also be useful context for any State Flex Programs that want to initiate a project on maternity care-related quality initiatives.

### **CONCLUSION**

Rural residents continue to face challenges accessing maternity care in their communities, with roughly half of rural counties lacking a hospital with labor and delivery services. This analysis provides a closer look at the nearly one-third of CAHs that offer labor and delivery, as well as their engagement in reporting maternity care quality measures and their performance on these measures. Efforts should be made to support CAHs that provide labor and delivery to track and report quality measures that are relevant to their initiatives in order to provide the highest quality care for rural mothers.

For more information on this report, please contact Madeleine Pick, [pickx016@umn.edu](mailto:pickx016@umn.edu).

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