



## Post-delivery care

Limited at rural hospitals without active obstetric services

BY SANDRA STOVER, MD; KELSEY HESSIL; EMILY ORTIZ; SAMANTHA C. FRIEDRICHSEN, MPH; AND REBECCA L. EMERY, PHD, LP

**C**ommunity-based obstetrical delivery services are declining in rural areas in Minnesota and across the country. Complex reasons contribute to this trend, but there has been little exploration of what kind of post-delivery care is given at sites that don't have an active program for obstetrical services.

We were curious about current delivery care in Critical Access Hospitals (CAHs) in Minnesota and chose to look at programs where there were no active delivery programs to see what post-delivery care for mother and infant was provided. We also wanted to compare preparedness for delivery services at sites with and without

active obstetrical programs, understanding that not all deliveries follow plans made in advance.

Many factors contribute to whether communities provide obstetrical care. Closure of delivery services occurs most commonly in smaller communities where there is already a limited obstetric workforce. It can be expensive for a hospital to maintain an active delivery program when patient numbers are low. A community may have unique challenges contributing to the closure of obstetric units, including hospital ownership/type and typical family income in the area.

Maternity program closures mean that many rural women have to travel further to hospitals for planned and emergent deliveries. Scheduled deliveries using induction or repeat c-sections allow some con-

trol over the timing of deliveries and help families in their planning, but they also may increase cost and individual patient risk. Even with a scheduled delivery, labor may begin before expected and births may occur at a site without an active obstetrical program.

These factors—longer travel, possible increased costs and patient risks, unique community challenges—have led to an increase in perceived stress among rural mothers during pregnancy.

When an emergent delivery occurs in a hospital without active labor and delivery services, there's still a need for postpartum care immediately following delivery; this is a critical period for maternal and infant health. Best practices for postpartum care include allowing time for maternal-infant bonding, which maximizes breastfeeding

## Hospital characteristics and obstetric training practices of critical access hospitals with and without obstetric services

Hospital Characteristics	OVERALL (N=28) n (%) or mean (SD)	PROVIDING	NOT PROVIDING
		OBSTETRIC SERVICES (N=14) n (%) or mean (SD)	OBSTETRIC SERVICES (N=14) n (%) or mean (SD)
Number of hospital beds	20.0 (10.1)	22.8 (5.4)	17.3 (5.2)
Obstetric care provider types			
Obstetrician	8 (28.6%)	7 (50.0%)	1 (7.1%)
Family medicine	17 (60.7%)	14 (100%)	3 (21.4%)
Certified nurse midwife	6 (21.4%)	6 (42.9%)	0 (0.0%)
Emergency medicine	1 (3.6%)	0 (0.0%)	1 (7.1%)
No obstetric care providers	10 (35.7%)	0 (0.0%)	10 (71.4%)
If no obstetric care providers, primary provider type for emergent deliveries in the emergency department (missing n=1)			
Emergency medicine	--	--	7 (77.8%)
Family medicine	--	--	3 (33.3%)
Nurse practitioner	--	--	2 (22.2%)
Physician assistant	--	--	3 (33.3%)
If no obstetric care providers, contract type for emergent delivery provider (missing n=1)			
Directly employed in system	--	--	4 (44.4%)
Contracted from locum firm	--	--	6 (66.7%)
Obstetric Training			
Hours of facility training each provider completes per year for obstetric services (missing n=8)	6.4 (6.0)	10.0 (5.4)	1.9 (3.3)
Guidelines followed for obstetric training (missing n=1)			
ACOG	22 (81.5%)	13 (100%)	9 (64.3%)
Other <sup>1</sup>	5 (18.5%)	0 (0.0%)	5 (35.7%)
Types of training provided			
Online	20 (71.4%)	11 (78.6%)	9 (64.3%)
Mock drills	15 (53.6%)	12 (85.7%)	3 (21.4%)
On-site	13 (46.4%)	10 (71.4%)	3 (21.4%)
Off-site	14 (50.0%)	7 (50.0%)	7 (50.0%)
Types of off-site training			
ALSO	6 (42.9%)	5 (71.4%)	1 (14.3%)
NALS	3 (21.4%)	1 (14.3%)	2 (28.6%)
CALS	11 (78.6%)	4 (57.1%)	7 (100%)
Other <sup>2</sup>	3 (21.4%)	3 (42.9%)	0 (0.0%)
Provider types that receive obstetric training			
Medical doctor/doctor of osteopathy	25 (89.3%)	14 (100%)	11 (78.6%)
Certified nurse practitioner	12 (42.9%)	4 (28.6%)	8 (57.1%)
Physician's assistant	13 (46.4%)	4 (28.6%)	9 (64.3%)
Certified nurse midwife	6 (21.4%)	6 (42.9%)	0 (0.0%)
Other <sup>3</sup>	3 (10.7%)	0 (0.0%)	3 (21.4%)
Do nurses receive training for the care of a newborn following a delivery? (missing n=1)			
Yes	22 (81.5%)	14 (100%)	8 (61.5%)
No	5 (18.5%)	0 (0.0%)	5 (38.5%)
If yes, types of training nurses receive (n=22)			
NALS	10 (45.5%)	5 (35.7%)	5 (65.5%)
Ear screening	8 (36.4%)	8 (57.1%)	0 (0.0%)
Maternal education	12 (54.6%)	10 (71.4%)	2 (25.0%)
Other <sup>4</sup>	10 (45.5%)	7 (50.0%)	3 (37.5%)

Note: <sup>1</sup>Other guidelines include in-house training, in-house orientation to processes and equipment, none, and unsure; <sup>2</sup>Other off-site training include NRP, S.T.A.B.L.E. program, and obstetric conferences; <sup>3</sup>Other staff trained includes: registered nurses, nursing staff; <sup>4</sup>Other nurses training includes: NRP, S.T.A.B.L.E. program, PALS training, mock drills, postpartum hemorrhage, care of newborn and prepare for transfer, and precipitous deliveries. ACOG = American College of Obstetricians and Gynecologists; ALSO = Advanced Life Support in Obstetrics; CALS = Comprehensive Advanced Life Support; NALS = Neonatal Advanced Life Support; NRP = Neonatal Resuscitation Program; PALS = Preeclampsia and Low Sodium.

and contributes to improved outcomes for babies and mothers. Supportive education before discharge is also linked to better outcomes for families; but low-resource hospitals have a harder time providing robust education programs.

We—the author and a group of University of Minnesota Medical School Duluth students and collaborators—wanted to look at current delivery care practices in CAHs in Minnesota and to describe the care for mothers and infants after an emergent delivery occurs at a site without an active program for obstetrical care.

Our questions were directed at patient impact, including the length of stay post-delivery and travel time to higher-level care when required. We surveyed for the types of providers available—and the obstetric training of those providers, which we feel reflects on the hospitals' prioritization and potential cost-burden of obstetric care.

### Participating hospitals and procedures

Data were collected between July and October 2020. At that time, there were 77 CAHs in Minnesota. We contacted either the director of nursing or the administrative lead for 60 of those and emailed them an electronic REDCap survey. Responses were received from 28 of them. **Figure 1** shows the location of participating and non-participating CAHs.

Electronic survey items included demographics for the hospital and individual completing the survey (e.g., job title, number of hospital beds, obstetric care provider types), whether the hospital provides planned labor and delivery services, types of obstetric training provided and guidelines for obstetric training. For hospitals not providing planned deliveries, additional questions were asked about procedures for unplanned deliveries.

Given the small sample size and exploratory nature of this study, inferential statistics were not conducted. Rather, potentially meaningful differences were considered in the interpretation of the findings.

## Results

Half of the participating CAHs provided labor and delivery services. Most CAHs without labor and delivery services reported that they stopped providing such care prior to 2014, with five reporting that they stopped such care between 2014 and 2019 and one reporting that it never provided such care. Only five of the CAHs currently partner with community entities to support obstetric and post-delivery services. All hospitals except one reported that the nearest hospital providing planned labor and delivery services is more than 20 miles away. Emergent deliveries were rare; the highest number at a CAH was four in 2019.

Table 1 shows additional hospital characteristics. Family medicine physicians provided obstetric care at all of the CAHs with labor and delivery services. Only half of these had obstetricians available to support specialty-level obstetric care, with even fewer employing certified nurse midwives for deliveries.

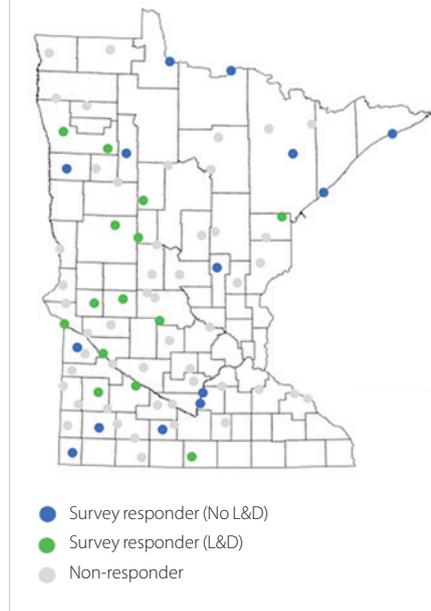
For the 14 CAHs not providing labor and delivery services, most (10) had no providers available to administer obstetric-delivery care. These CAHs were further asked about emergency delivery services. Of the nine responses received, seven indicated that emergency deliveries were overseen by emergency medicine physicians. The remaining CAHs reported that emergency deliveries were handled by family medicine physicians (three) and/or physician's assistants (three), with two sites relying on nurse practitioners. Six of the emergency delivery providers were contracted from locum firms, with the remaining four directly employed in the CAH system.

Only one CAH without labor and delivery services reported allowing mothers to stay at the hospital after delivery. The remaining 13 reported that they transfer mothers following delivery; the majority within four hours of delivery, with the distance to the transferring facility being 30 minutes or more for most of them (Table 2).

FIGURE 1

### Critical access hospitals, survey response, and planned labor and delivery status.

(Note: L&D = labor and delivery)



### Obstetric training practices

CAHs with planned labor and delivery services reported providing an average of 10 hours of obstetric training for their providers each year, compared to just under two hours at CAHs not providing planned labor and delivery. All CAHs with labor and delivery services used training guidelines from the American College of Obstetricians and Gynecologists (ACOG) and at least half of these hospitals included online training, mock-drills and on- and off-site training. For CAHs not providing planned labor and delivery services, nine reported following ACOG training guidelines and the majority provided training online and/or off-site. The majority of CAHs, regardless of labor and delivery services, reported that physicians were the primary provider types who received obstetric care training. All of the 14 CAHs with labor and delivery services reported that nurses receive obstetric training, which was true for only eight of the 14 CAHs without labor and delivery services.

## Discussion

The results of this study raise concerns about the care provided during the post-delivery time, adding to other discussions surrounding the ongoing loss of planned obstetric services in rural areas. This sensitive time impacts both mother and child as well as the facilities where emergent deliveries occur, compounding training budget issues and workforce shortages.

Deliveries happening at rural hospitals that do not have a program for obstetrical deliveries most commonly result in an emergent transfer of mother and infant post-delivery, often within hours of giving birth. Our findings show a preference to transfer emergent-delivery patients to a higher-level hospital with an active obstetric program as soon as possible; the majority (61 percent) transfer patients in less than two hours after giving birth; another 23 percent transfer patients between two and four hours after birth, with the majority of sites (61 percent) staying less than two hours and another 23 percent staying between two and four hours. This timeframe is a vulnerable period for both mother and infant, counter to optimal post-delivery care recommendations.

We found that CAHs without active delivery programs most often had emergency room physicians managing emergent deliveries, three-quarters of whom came from locum tenens firms. Emergency room physicians often are uncomfortable with obstetrical-delivery procedures. This introduces a potential for variable training and provider comfort in providing obstetric care. The implications for hospital staff anxiety as well as proficiency in providing delivery care is important for healthcare systems to be aware of for multiple reasons. Anxiety is a factor in provider burnout and patient stress. Patients should have a full understanding of the services provided as they make choices in their healthcare. It is important for community sustainability to have services available that can support the health needs of young families.

It can be expensive to maintain an active delivery program and to a greater degree in rural versus urban centers. Costs include both facility and professional costs

TABLE 2

### Post-emergent delivery care procedures for critical access hospitals that do not provide obstetric services (n=14)

	N (%)
Does the mother stay at hospital after emergent delivery?	
Yes	1 (7.14%)
No	13 (92.9%)
How long are stable mothers kept post-delivery? (missing n=1)	
0-2 hours	8 (61.5%)
2-4 hours	3 (23.1%)
Other <sup>1</sup>	2 (15.4%)
If transfer is needed, average transfer time	
<30 minutes	2 (14.3%)
30-60 minutes	10 (71.4%)
>60 minutes	2 (14.3%)

Note: 1Other text includes: 24-48 hours, transferred out.

for maternal and infant care. We found that ongoing training occurred in both planned delivery and emergency delivery sites. Not surprisingly, CAHs with planned deliveries had a higher percentage of providers completing training and there were more on-site simulated practice opportunities. Despite having no program in place for planned deliveries, many sites could be expected to prepare for emergent deliveries. However, this increases costs for hospitals trying to maintain skills where low emergent delivery numbers would be reflected in low cost-reimbursement. As such, there is a need to identify affordable programs and strategies to maintain provider preparedness for emergent deliveries while minimizing the cost burden to hospital systems with low delivery rates. While the numbers of our study are low, the finances involved in skill maintenance are worth exploring for system stability.

This study is unique in that it provides an initial step in the unexplored area regarding maternal and neonatal care options following delivery in hospitals that do not have programs for planned obstetrical services. While a strength of this study includes a reasonable rate of return on the surveys at 46 percent, a limitation is the overall low number of facilities surveyed and only in Minnesota. There were only 14 respondents from CAHs that had

emergency-only obstetric services available. In addition, our respondents were in a variety of administrative positions, and it is possible that not all respondents were fully aware of department-level policies in place to address emergency obstetric deliveries.

We didn't measure outcomes for the mother and child, but best practices clearly support having maternal/infant bonding time allowed to enhance breastfeeding and frequent patient evaluation to monitor for postpartum hemodynamic instability and fetal stress. Future studies should take a more comprehensive look at all hospitals in rural areas that have planned- and/or emergent-deliveries and explore maternal outcomes and families' perceived experiences.

Understanding the experience of providers managing unplanned deliveries is important and could be linked to provider wellness and sustainability in practice, financial costs to already low-resource systems and perceptions of community members to availability of care within their communities. We looked at types of training providers receive, but further exploration of this area could lead to coordinated resources for training modalities across systems by utilizing telehealth options and addressing other financial strains that hospitals face.

Maternal, family-related and community experiences are other areas for further exploration. Few studies have explored the patient experience in low-resource rural communities after the loss of active delivery services. Adding a survey to better understand patient experience and outcomes with post-delivery transfer of mother and infant is essential in seeing the full impact to the families and communities involved.

We hope this introductory look at the non-planned delivery experience for rural patients and healthcare systems can spur further queries on this topic. We believe that further information regarding the continuum of care for babies, mothers and families in low-resource areas is fundamental to providing optimal healthcare options for rural communities and can inform hospital systems and policy makers, allowing for future planning for the provision of best practices in healthcare for all communities. **MM**

Sandra Stover, MD, is assistant professor, Department of Family Medicine and BioBehavioral Health, University of Minnesota Medical School, Duluth. Kelsey Hessel and Emily Ortiz are third-year medical students, University of Minnesota Medical School, Duluth. Samantha C. Friedrichsen, MPH, is a statistician for Professional Data Analysts. Rebecca L. Emery, PH.D, LP, is a post-doctoral fellow, Department of Family Medicine and BioBehavioral Health, University of Minnesota Medical School, Duluth.

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