Eroding Access and Quality of Childbirth Care in Rural US Counties

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**Although it is difficult** to imagine a health care service that is more valuable to society than childbirth, US hospitals often lose money when they provide local childbirth services for healthy mothers.¹ This discrepancy is a major flaw in the design of the maternal health system that may be the basis for lagging birth outcomes in the United States compared with other high-income nations.²

Obstetric services are structured with high fixed costs and low reimbursements, making maternity wards financial loss leaders in community hospitals across the country. In recent years, an increasing number of hospital obstetric units with small volumes and large shares of Medicaid recipients have closed.³,⁴ As Kozhimannil and colleagues⁵ report in this issue of *JAMA*, the consequences of this trend may be particularly important for rural US families who have no other local options to access care.

The authors previously observed that from 2004 to 2014, the total percentage of rural counties in the United States with hospital-based obstetric services declined from 55% to 46%.⁴ In their current retrospective cohort study, Kozhimannil and colleagues⁵ used birth certificates linked to American Hospital Association Annual Surveys to identify all of the nearly 5 million births that occurred in 1086 rural US counties during this period and examined the association between closures of hospital-based obstetric services and birth outcomes, using county-level regression models with an annual interrupted time-series approach. To further understand the effect of rurality, the authors stratified their observations based on whether the rural county was adjacent to an urban one. Even with the limited fidelity that county-level data provide, the emerging picture raises substantial concerns for both access and quality of childbirth care in rural counties in the United States.

All counties with closures of hospital-based obstetric services (n = 179) experienced significant increases in the number of births that occurred in hospitals without obstetric services, a primary outcome of the study. The association was most pronounced in counties not adjacent to urban areas, where travel distances to the nearest obstetric hospital are likely to be the longest, with a 3.06-percentage point (95% CI, 2.66-3.46) increase in the year after the closure. These more geographically isolated communities saw significant increases in out-of-hospital births as well, including those that occurred in homes and freestanding birth centers (0.70-percentage point change [95% CI, 0.30-1.10]). While the intentions of the birthing families cannot be directly inferred, it is likely that at least some of these out-of-hospital births were unplanned.

Of particular concern is the quality of care received by birthing families who did not access organized hospital obstetric services in the period following service closure. Studies of workforce density have shown that rural counties without hospital obstetric services are also likely to lack an obstetric workforce, including obstetricians, midwives, and family practice physicians.⁶,⁷ Even if these families were cared for by adequately trained clinicians, the lack of an organized system to deliver obstetric services may have compromised patient safety. At the facility level, system factors, including staff coordination and resource allocation, have been independently associated with neonatal asphyxia, maternal hemorrhage, and other morbidities.⁸,⁹ At the broader service delivery scale, processes need to be in place to safely transfer mothers or neonates with risks identified prenatally or during labor to an appropriately resourced facility. In the study, it is possible that the ability to anticipate such risks may have been compromised by the service closures, particularly during the prenatal period.

The study by Kozhimannil et al⁵ examined prenatal care visits, a secondary outcome, as a measure of prenatal care access and observed an association of hospital service closures with decreased outpatient prenatal care use in the year after loss of services in both areas adjacent and not adjacent to urban areas. The low threshold in this study for defining “low prenatal care use” (<10 prenatal visits) may have overestimated the magnitude of the association between closures and prenatal care access. However, the directional effect is consistent with both workforce density studies and telephone interviews with hospital administrators in a subset of these communities.¹ It is likely that many counties that closed obstetric hospital services lost local prenatal care access as well.

Of greatest concern is the relationship between inadequate access to care and the observed increased rates of prematurity following service closures in the more geographically isolated counties. Even after adjusting for maternal age, race/ethnicity, education, and common clinical conditions at the county level, the significant association with increased prematurity remained, with a 0.67-percentage point (95% CI, 0.02-1.33) increase in the year after closure. Prematurity is a major cause of both neonatal mortality and lifelong morbidity in the United States, particularly in rural areas that may be hours away from a hospital neonatal intensive care unit.¹¹

Other secondary outcomes included 5-minute Apgar scores less than 7 and cesarean delivery. Although significant differences in low 5-minute Apgar scores were not detected, these scores are unlikely to fully reflect neonatal morbidity owing
to poor interrater reliability and long-term predictive ability. Rates of cesarean delivery, a potential rescue from intrapartum morbidity, were also not significantly associated with the closures, which may reflect an averaging of decreased access in some settings with increased indication to perform cesarean deliveries in settings where access existed. Specific measures of neonatal morbidity were not available for analysis.

Despite these limitations, this study provides the first indication of how waning local obstetric services combined with geographic isolation may be affecting the 20% of US families that live in rural counties.\(^8\) For these families, both access and quality of childbirth care appear inadequate and continue to erode. The full magnitude of these effects and the specific morbidities imposed by the closures remain challenging to measure. Even for families who experience good objective birth outcomes, the costs of obstetric service closures include inconvenience at best and significant distress at worst, including reports of sharply increased anxiety about getting to the hospital.\(^12\) In some cases, local closures mean traversing hundreds of miles, many times, over the duration of an entire pregnancy to seek care.

Among high-income countries, this burden on birthing families is unique to the United States. In the United Kingdom and other European countries, families have access to a wider spectrum of safe birth settings, including home births and freestanding birth centers, with more sustainable cost structures. Such options are made safe by a coordinated system of service delivery that not only ensures each setting is staffed appropriately, but provides clear transfer protocols when higher levels of care are needed.\(^13\) In contrast, hospitals in the United States infrequently cooperate to triage risk and coordinate care. In many cases, they may actually face financial disincentives to transfer care. Moreover, the geographic distribution of pregnant women is challenging, as 75% of the total national landmass is rural, and timely transfers may not be feasible.\(^8\)

These challenges are not insurmountable but will require greater investment in the well-being of birthing families. Geographic distances might be bridged with novel service delivery models that leverage modern modes of communication, both to access expert consultants and to identify and triage risks as early as possible.\(^14\) Fixed costs could be defrayed with a more diversified workforce, such as in some European countries in which midwives are at the center of care for low-risk pregnancies. In addition, maternity wards in rural counties might avoid closure altogether if childbirth services were reimbursed at a level closer to the amount at which those services are truly valued.

### ARTICLE INFORMATION

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**Published Online:** March 8, 2018. doi:10.1001/jama.2018.1646

**Conflict of Interest Disclosures:** The author has completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

### REFERENCES