Family Medicine Presence on Labor and Delivery: Effect on Safety Culture and Cesarean Delivery

Emily White VanGompel, MD, MPH[1]
Lavisha Singh, MPH[2]
Francesca Carlock, MPH[2]
Claire Rittenhouse, MPH[1]
Kelli K. Ryckman, PhD[3]
Stephanie Radke, MD, MPH[4]

[1]Department of Family and Community Medicine, University of Illinois at Chicago College of Medicine, Chicago, Illinois

[2]NorthShore University HealthSystem Research Institute, Evanston, Illinois

[3]Department of Epidemiology and Biostatistics, School of Public Health - Bloomington, Indiana University, Bloomington, Indiana

[4]Department of Obstetrics and Gynecology, University of Iowa, Iowa City, Iowa

MORE ONLINE
www.annfammed.org

VISUAL ABSTRACT

AJC *Annals* Journal Club selection

Conflicts of interest: authors report none.

CORRESPONDING AUTHOR

Emily White VanGompel
1919 W. Taylor St
Chicago, IL 60612
ewhite5@uic.edu

ABSTRACT

PURPOSE Currently, 40% of counties in the United States do not have an obstetrician or midwife, and in rural areas the likelihood of childbirth being attended to by a family medicine (FM) physician is increasing. We sought to characterize the effect of the FM presence on unit culture and a key perinatal quality metric in Iowa hospital intrapartum units.

METHODS Using a cross-sectional design, we surveyed Iowa physicians, nurses, and midwives delivering intrapartum care at hospitals participating in a quality improvement initiative to decrease the incidence of cesarean delivery. We linked respondents with their hospital characteristics and outcomes data. The primary outcome was the association between FM physician, obstetrician (OB), or both disciplines' presence on labor and delivery and hospital low-risk, primary cesarean delivery rate. Unit culture was compared by hospital type (FM-only, OB-only, or Both).

RESULTS A total of 849 clinicians from 39 hospitals completed the survey; 13 FM-only, 11 OB-only, and 15 hospitals with both. FM-only hospitals were all rural, with < 1,000 annual births. Among hospitals with < 1,000 annual births, births at FM-only hospitals had an adjusted 34.3% lower risk of cesarean delivery (adjusted incident rate ratio = 0.66; 95% CI, 0.52-.0.98) compared with hospitals with both. Nurses endorsed unit norms more supportive of vaginal birth and stronger safety culture at FM-only hospitals ($P < .05$).

CONCLUSIONS Birthing hospitals staffed exclusively by FM physicians were more likely to have lower cesarean rates and stronger nursing-rated safety culture. Both access and quality of care provide strong arguments for reinforcing the pipeline of FM physicians training in intrapartum care.

Ann Fam Med 2024;22:375-382. https://doi.org/10.1370/afm.3157

INTRODUCTION

The United States is facing multiple maternal health crises including increasing severe maternal morbidity (SMM) and mortality, racial inequities in SMM, and a shrinking footprint of pregnancy care services in rural areas.[1-4] People giving birth in rural areas experience greater rates of SMM despite controlling for sociodemographic and clinical risk factors, and this disparity is projected to increase.[5] This disparity is likely driven by lack of access to prenatal and intrapartum care as well as by rural residents being disproportionately affected by public health crises.[6] Losing access to hospital units providing pregnancy care in rural areas is associated with adverse birth outcomes.[7] Despite this, rural birthing units continue to close, with administrators citing changing local community needs, safety concerns, such as not having enough deliveries to maintain clinical competency among staff and physicians, and financial nonviability.[8] To solve these complex issues, it is necessary to look for places where a model of care is succeeding in providing safe, high-quality care for rural areas.

Access to pregnancy care services in the United States has been characterized and mapped by the March of Dimes in their recent report on maternity care deserts.[9] The updated March of Dimes report adds analysis and mentions of the role of family medicine (FM) physicians in providing access to pregnancy care in rural areas. Specifically, despite the fact that 40% of counties in the United States do not have an obstetrician or midwife, only 6.5% of counties do not have an FM physician; a minority of FM physicians continue to provide intrapartum care after residency training, potentially diminishing the rural lack of access to pregnancy care.[10] Family medicine physicians as providers of intrapartum care have been decreasing

almost since the profession's founding.[11] However, hospitals with lower birth volumes in rural areas are more likely to be staffed by FM physicians than obstetricians, often with general surgeons used as back-up for cesarean deliveries.[12] This is the current landscape in Iowa, where the Iowa Maternal Quality Care Collaborative supported a statewide quality improvement initiative to promote vaginal birth and decrease cesarean deliveries in an effort to decrease SMM, based on the Alliance for Innovation on Maternal Health patient safety bundle.[13]

Despite decades of research documenting the high quality of care provided by FM physicians,[14-16] controversy continues regarding whether family physicians trained in existing FM residency programs should provide intrapartum obstetric care, given the substantial barriers they face; some of these barriers include being unable to find a practice that offers the opportunity to provide intrapartum obstetric care, malpractice insurance being cost prohibitive, and difficulty obtaining privileges.[17,18] This controversy, examined both empirically and philosophically,[11] is not new. However, in the last decade, there has been increasing attention to SMM, maternal health disparities, and the role of state-based perinatal quality improvement initiatives as a means to collect hospital performance data and improve care quality to decrease SMM. These movements, while performing critically important work, have tended to focus on engagement with obstetrician-gynecology and nursing professional organizations, and sometimes certified nurse midwives, but have not had substantial engagement or input from FM professional organizations.[14] The role of family physicians in contributing to these perinatal quality initiatives has not been investigated. We aimed to use tools developed to measure perinatal care quality in the context of a statewide initiative to decrease cesarean delivery overuse to revisit the question of what effect FM physicians' presence on labor and delivery might have.

METHODS

This study was approved by the University of Iowa Institutional Review Board. We used a cross-sectional study design linking a validated survey of Iowa clinicians' attitudes, beliefs, and perceived unit norms with hospital outcomes data and characteristics. Forty-three of the 56 hospitals with obstetrical units participated in the Iowa Maternal Quality Care Collaborative initiative to promote vaginal birth and decrease cesarean deliveries. All participating facilities were invited to also participate in the Labor Culture Survey (LCS) as part of a larger quality improvement initiative to gain insight into each unit. The LCS is an anonymous validated survey with 6 subscales that measure various aspects of labor and delivery culture associated with cesarean delivery rates. Subscales include overestimation of cesarean birth's safety, fear of vaginal birth, maternal agency, acceptance of physician oversight, personal support for best practices to decrease cesarean deliveries, and unit norms that support vaginal birth.[19] Mean subscale scores have shown significant association with hospital-level nulliparous, term, singleton, vertex (NTSV) cesarean delivery rates in prior studies[20] and individual physician-level NTSV cesarean delivery rates.[21] Subscales contain varying numbers of items, which use Likert-style responses scored from 1 (Strongly Disagree) to 4 (Strongly Agree) with no neutral option, and are summed and divided by the number of items in the subscale to obtain subscale means.

Clinicians, including nurses, obstetricians, FM physicians, and midwives, providing intrapartum care at participating hospitals were invited to complete the LCS in the first 3 months of the 15-month improvement collaborative, which was launched in May 2021. Each hospital's local quality improvement champion distributed the survey to eligible clinicians, and study staff provided weekly completion reports aggregated by role to each champion to encourage and track participation. In addition to the validated items, participants self-reported their clinical role, number of years practicing, gender, race/ethnicity, and number of years at their current hospital.

Hospital-level characteristics, including birth volume, nursery acuity level, Iowa-specific maternity care level[22] (predates nationally recognized levels of maternal care[23]), geographic location (rural/urban), proportion of publicly insured patients, proportion of birthing patients with body mass index >30, and proportion of birthing patients aged ≥35 years, were obtained from the Iowa Department of Health and Human Services vital statistics for 2020 (initiative baseline).[24] Each hospital's regional access level to pregnancy care (maternity care desert status) by county was obtained from a publicly available database linked on the March of Dimes website,[9] which has been replaced by a digital dashboard.[25]

Cesarean delivery rate was measured at the hospital level using the National Quality Forum-endorsed quality metric of the NTSV cesarean delivery rate by hospital[26] and obtained from the Iowa Department of Health and Human Services vital statistics.[24] The NTSV cesarean delivery rate has been designated as a key hospital quality measure to decrease overuse of cesarean delivery because it removes many prelabor risk factors for medically indicated cesarean delivery such as breech presentation, multiple gestation, and history of cesarean delivery.[26,27] Healthy People 2030 has set a pragmatic goal NTSV cesarean delivery rate of no more than 23.6% for US hospitals.[28]

Statistical Methods

We categorized hospitals by the presence of different physician specialties on labor and delivery; specifically, whether FM physicians, obstetricians (OBs), or both provided intrapartum care on the unit (provider presence category). Survey participant and hospital characteristics were compared by provider presence category using the Kruskal-Wallis test for continuous variables and χ^2 or Fisher exact test for categorical variables. We examined the association of hospital NTSV

cesarean delivery rate with provider presence category using multivariate Poisson regression. We compared all nurse responses on LCS subscales by provider presence category using first the Kruskal-Wallis test followed by pairwise 2-sided multiple comparison analysis using the Dwass-Steel-Critchlow-Fligner method.[29] We used partially completed surveys if they completed a preset minimum number of subscales (≥4 of 6 subscales). We calculated subscale scores using the mean of completed items. If any scale had <50% of the items completed, that response was excluded from analysis. By hospital unit, we evaluated for nonresponse bias by performing a sensitivity analysis limiting the nursing sample to nurses from units that had achieved a minimum response rate of 30%. We considered *P* values <.05 statistically significant. All statistical analysis was performed using SAS version 9.4 (SAS Institute Inc).

Table 1. Survey Responder Characteristics by Hospital of Practice (Hospital Presence of Family Medicine Physicians and/or Obstetricians)

	Overall (N = 849)	Both (n = 527)	FM-Only (n = 150)	OB-Only (n = 172)	*P* Value[a]
Role, No. (%)					< .0001
Labor and delivery nurse	569 (67)	329 (62.4)	103 (68.7)	137 (79.7)	
Obstetrician	98 (11.5)	74 (14)	0 (0)	24 (14)	
Certified nurse midwife	35 (4.1)	31 (5.9)	3 (2)	1 (0.6)	
Family medicine physician	78 (9.2)	52 (9.9)	26 (17.3)	0 (0)	
Anesthesiologist	20 (2.4)	18 (3.4)	1 (0.7)	1 (0.6)	
Nurse educator	15 (1.8)	12 (2.3)	2 (1.3)	1 (0.6)	
Nurse manager/director	34 (4)	11 (2.1)	15 (10)	8 (4.7)	
Race/ethnicity, No. (%)					.49
American Indian/Alaska Native	1 (0.1)	1 = (0.2)	0 (0)	0 (0)	
Asian/Pacific Islander	12 (1.4)	11 (2.1)	0 (0)	1 (0.6)	
Black/African American	3 (0.4)	3 (0.6)	0 (0)	0 (0)	
Hispanic/Latine	12 (1.4)	6 (1.1)	1 (0.7)	5 (2.9)	
White (non-Hispanic)	782 (92.7)[b]	478 (91.6)[b]	144 (96)	160 (93)	
Prefer not to say	28 (3.3)	19 (3.6)	4 (2.7)	5 (2.9)	
Other (includes multirace)	6 (0.7)	4 (0.8)	1 (0.7)	1 (0.6)	
Gender, No. (%)					.40
Female	764 (90)	467 (88.6)	136 (90.7)	161 (93.6)	
Male	75 (8.8)	51 (9.7)	14 (9.3)	10 (5.8)	
Nonbinary/third gender	1 (0.1)	1 (0.2)	0 (0)	0 (0)	
Prefer not to say	9 (1.1)	8 (1.5)	0 (0)	1 (0.6)	
Years working on labor and delivery at this hospital, median (IQR)	6 (2-14)	6 (2-14)	7 (2-14)	6 (2-19)	.48
Years practicing maternity care independently, median (IQR)	7 (3-16)	7 (2-16)	7 (3-15)	9 (3-19)	.29
Years working in maternity care, median (IQR)	9 (4-19)	9 (4-19)	9 (4-18)	9 (4-20)	.80

FM = family medicine; IQR = interquartile range; OB = obstetrician.

[a] *P* values calculated using nonparametric Kruskal-Wallis test for continuous variables and χ^2 or Fisher exact test for categorical variables.

[b] Missing = 5.

RESULTS

A total of 849 clinicians from 39 of the 43 eligible hospitals in Iowa participated in the LCS (Table 1). Sixty-seven percent were nurses, 11.5% OBs, 9.2% FM physicians, and 4.1% certified nurse midwives. A total of 34 hospitals achieved a minimum LCS response rate for their unit nursing staff (mean response rate 57%, range 7%-100%). There were no significant differences in race/ethnicity, gender, years practicing or working in pregnancy care, or years working at their current hospitals by provider presence category. However, hospital characteristics, varied significantly according to provider presence category (Table 2). Hospitals with only FM physicians were all in rural areas with annual delivery volumes of <1,000, had a smaller proportion of patients aged >35 years, and were more likely to have basic nurseries and level 1 maternal care designations. Only 1 FM-only and 1 OB-only hospital were designated teaching hospitals, compared with more than one-half of the Both category. Among the hospitals where FM physicians practice (FM-only and Both), respondents' characteristics were similar across most demographic characteristics but differed in terms of the number of years practicing independently and number of years working in maternity care, which was significantly greater for FM-only hospitals (Table 3).

To compare within a more homogenous group, and because FM-only hospitals all had <1,000 annual deliveries, we compared the NTSV cesarean delivery rate among hospitals with <1,000 annual deliveries (n = 29) by provider presence category (Table 4). Family medicine-only hospitals showed a significant association with decreased cesarean delivery rates compared with the Both category (Table 5). After adjusting for hospital annual birth volume, geography, proportion of birthing patients with body mass index >30, proportion of birthing patients aged >35 years, and proportion of publicly insured patients, the magnitude of this association increased. Specifically, the NTSV cesarean delivery rate was a relative 34.3% lower in FM-only hospitals (adjusted incident rate ratio = 0.66; 95% CI, 0.52-0.98) compared with the Both category (Table 5).

Differences in culture and individual attitudes were apparent between provider presence categories as well (Table 6). Nurses at FM-only hospitals reported overall unit norms more supportive of vaginal birth compared with nurses at hospitals with Both or OB-only (3.05 vs 2.91 vs 2.93, respectively; $P = .007$), with both the vaginal birth microculture and safety culture subscales showing significantly greater agreement at FM-only hospitals. Nursing agreement with best practices to support vaginal birth was significantly less at OB-only hospitals compared with Both (3.27 vs 3.37; $P = .047$). The directionality and significance of these findings were consistent when limiting the sample to nurses practicing at hospitals that met the minimum survey response rate. Physician attitudes differed by provider presence category as well. Family medicine physicians practicing at FM-only hospitals were more likely to endorse unit norms supportive of vaginal birth (3.30 vs 3.04; $P < .01$ compared to Both) (Supplemental Table 1). Obstetrician attitudes were more supportive of maternal agency in OB-only hospitals compared with Both (2.65 vs 2.34; $P = .04$); however, OB agreement with best practices to support vaginal birth was significantly lower at OB-only hospitals compared with Both (2.57 vs 2.83; $P = .01$) (Supplemental Table 2).

Hospital characteristics across maternity care desert categories showed notable differences. Compared with hospitals with full regional access to pregnancy care, those with moderate access were more likely to be FM-only hospitals (13% vs 60%; $P = .01$), have lower annual delivery volume, be in a rural area, be a nonteaching hospital, have a basic-level nursery, and have a maternal care designation of 1 (Supplemental Table 3).

Table 2. Hospital Characteristics by Family Medicine and Obstetrician Presence on Labor and Delivery

	Overall (N = 39)	Both (n = 15)	FM-Only (n = 13)	OB-Only (n = 11)	*P* Value[a]
NTSV cesarean birth rate, mean (SD)	0.25 (0.08)	0.28 (0.05)	0.23 (0.10)	0.23 (0.08)	.145
% Maternal age >35 years, mean (SD)	0.09 (0.02)	0.11 (0.02)	0.08 (0.02)	0.10 (0.02)	.002
% Maternal BMI >30, mean (SD)	0.32 (0.05)	0.33 (0.04)	0.33 (0.06)	0.30 (0.05)	.30
% Medicaid insurance, mean (SD)	0.41 (0.10)	0.43 (0.09)	0.42 (0.07)	0.37 (0.13)	.57
Rural status, No. (%)					.001
Nonrural	17 (43.6)	10 (66.7)	0 (0)	7 (63.6)	
Rural	22 (56.4)	5 (33.3)	13 (100)	4 (36.4)	
Teaching hospital, No. (%)					.01
No	29 (74.4)	7 (46.7)	12 (92.3)	10 (90.9)	
Yes	10 (25.6)	8 (53.3)	1 (7.7)	1 (9.1)	
Nursery acuity level, No. (%)[b]					.04
Basic/well newborn	18 (58.1)	4 (30.8)	9 (90)	5 (62.5)	
Special care	7 (22.6)	3 (23.1)	1 (10)	3 (37.5)	
NICU	5 (16.1)	5 (38.5)	0 (0)	0 (0)	
Regional NICU[b]	1 (3.2)	1 (7.7)	0 (0)	0 (0)	
Maternal care level, No. (%)[c,d]					.01
1	13 (43.3)	2 (16.7)	9 (90)	2 (25)	
2	13 (43.3)	6 (50)	1 (10)	6 (75)	
3	2 (6.7)	2 (16.7)	0 (0)	0 (0)	
4	2 (6.7)	2 (16.7)	0 (0)	0 (0)	
Average annual delivery volume, No. (%)					.04
<1,000	29 (74.4)	9 (60)	13 (100)	7 (63.6)	
1,000-2,499	7 (17.9)	3 (20)	0 (0)	4 (36.4)	
≥2,500	3 (7.7)	3 (20)	0 (0)	0 (0)	
County-level maternity care access, No. (%)					.002
Access	23 (59)	11 (73.3)	3 (23.1)	9 (81.8)	
Moderate access	15 (38.5)	4 (26.7)	10 (76.9)	1 (9.1)	
Desert[e]	1 (2.6)	0 (0)	0 (0)	1 (9.1)	

BMI = body mass index; FM = family medicine; NICU = neonatal intensive care unit; NTSV = nulliparous, term, singleton, vertex; OB = obstetrician.

[a] *P* values calculated using nonparametric Kruskal-Wallis test for continuous variables and χ^2 or Fisher exact test for categorical variables.
[b] Missing (n = 8).
[c] Iowa-specific maternal care level designations.[22]
[d] Missing (n = 9).
[e] Maternity care desert designation by county.[9]

DISCUSSION

This study of hospitals in Iowa examined a critical shrinking facet of pregnancy care in the United States that is provided by FM physicians in small rural hospitals located in areas with limited access to pregnancy care. These data show that FM physicians are providing the majority of pregnancy care in these small rural hospitals in Iowa; specifically, rural obstetrics care exists in these areas because of family medicine. We found that birthing hospitals staffed exclusively by FM physicians were more likely to have lower adjusted NTSV cesarean delivery rates, stronger nursing-rated patient safety culture, and unit norms more supportive of vaginal birth. These unit culture measures have shown strong associations with lower NTSV cesarean delivery rates in other states and have been associated with a hospital's ability to change in response to quality improvement initiatives.[20,31]

Our findings are consistent with studies that have found pregnancy care provided by FM physicians to be of equal quality to that by OBs[16,32] and extend the contribution to the quality and safety of pregnancy care provided by FM physicians as a source of strong safety culture.[31,33] This contribution to unit culture, which includes teamwork and communication skills, might be a result of FM residency training, which emphasizes relationship building, continuity of care, and shared decision making.[34] These skills, whereas certainly not unique to FM physicians, have been considered central aspects of the philosophy of care in FM residency training since its founding[35] and in subsequent iterations of the specialty's focus.[36] This emphasis might explain why primary care patients treated by family physicians are more likely to experience patient-centered care compared with other primary care providers.[37] In addition, FM training is unique in its encompassing of competency in care of both mother and neonate, namely the maternal-child dyad, an understanding of which has been proposed as a method to prevent failures in communication and cross-disciplinary collaboration, which contribute to perinatal health disparities.[38] The fact that our data were collected at baseline, before significant quality improvement work had been undertaken to improve teamwork and patient-centered care, supports the idea that these skills are related to FM training. Incorporating similar training emphases in obstetrics training, particularly in larger teaching hospitals, might improve pregnancy care quality and safety across a broader swath of the United States.[39,40]

We also found confirmation of workforce pipeline insufficiencies in regard to FM physicians filling these critical access points in vulnerable communities with limited access to pregnancy care. Family medicine physicians at FM-only hospitals, which were more likely to be in moderate-access maternity care desert counties, had been practicing independently on average 8 years longer than their counterparts at hospitals with both FM physicians and OBs. Our findings are consistent with studies of recent FM graduates who often espouse the intention to practice pregnancy care but are not able to follow through on this intention. In the most recent survey of graduates from FM residencies, 82% of new FM graduates felt that their residency training prepared them to provide pregnancy care; however, only 11% actually end up providing it.[41] The reasons for this leaky pipeline are many but include among other things disinterest, inability to find FM jobs with obstetrics, lifestyle concerns, fear of liability, malpractice

Table 3. Characteristics of FM Physicians in FM-Only Hospitals vs Hospitals With Both Obstetrician and FM Physicians

	Overall (N = 78)	Both (n = 52)	FM-Only (n = 26)	*P* Value[a]
Race/ethnicity, No. (%)				.38
American Indian/Alaska Native	0 (0)	0 (0)	0 (0)	
Asian/Pacific Islander	3 (4.1)	3 (5.9)	0 (0)	
Black/African American	1 (1.4)	1 (2)	0 (0)	
Hispanic/Latine	0 (0)	0 (0)	1 (3.8)	
White (non-Hispanic)	63 (86.3)[b]	42 (82.4)	23 (88.5)	
Prefer not to say	6 (8.2)b	5 (9.8)	2 (7.7)	
Other (includes multiracial)	0 (0)	0 (0)	0 (0)	
Gender, No. (%)				.42
Female	41 (55.4)	30 (57.7)	13 (50)	
Male	31 (41.9)	20 (38.5)	13 (50)	
Nonbinary/third gender	0 (0)	0 (0)	0 (0)	
Prefer not to say	2 (2.7)	2 (3.8)	0 (0)	
Years working on labor and delivery at this hospital, median (IQR)	4 (2-16)	4 (2-12)	9 (3-19)	.16
Years practicing maternity care independently, median (IQR)	6 (1-19)	4 (0-16)	12 (4-21)	.04
Years working in maternity care, median (IQR)	8 (4-19)	7 (2-17)	13 (7-22)	.01

FM = family medicine; IQR = interquartile range.

[a] *P* values calculated using nonparametric Kruskal-Wallis test for continuous variables and χ^2 or Fisher exact test for categorical variables.

[b] Missing = 1.

Table 4. Hospital Delivery Volumes by Provider Presence Category for Hospitals With <1,000 Deliveries per Year, for 2020

Hospitals With	No.	Median	Lower Quartile	Upper Quartile	Minimum	Maximum
Both FM & OB	9	505	212	704	53	950
FM-only	13	127	92	237	54	585
OB-only	7	474	303	696	227	873

FM = family medicine; OB = obstetrician.

Table 5. Association of Hospital NTSV Cesarean Birth Rate and Hospital Type (Presence of Both FM & OB, FM-Only, and OB-Only) Delivery Volume <1,000

Hospitals With	Estimate (95% CI)	*P* Value	Estimate (95% CI)[a]	1 – aIRR[b]	*P* Value
Both FM & OB	reference		reference		
FM-only	−0.30 (−0.49 to −0.12)	.0012	−0.42 (−0.64 to −0.20)	34.3%	.0002
OB-only	−0.13 (−0.28 to 0.02)	.0888	−0.13 (−0.30 to 0.03)	13.0%	.111

aIRR = adjusted incident rate ratio; BMI = body mass index; FM = family medicine; NTSV = nulliparous, term, singleton, vertex; OB = obstetrician.

[a]Model adjusted for geographic location, maternal % BMI >30, maternal % age >35 years, and maternal % Medicaid as primary insurance.
[b]The adjusted incident rate ratio was subtracted from 1 to obtain the expected relative reduction in NTSV cesarean births for hospitals with FM only or OB only compared with both FM & OB.

insurance costs, and challenges with privileging.[41] Credentialing concerns, particularly in light of rural practice where delivery volumes might be low, are significantly greater among FM physicians who end up not providing pregnancy care,[42] despite existing evidence that low delivery volume does not affect quality of outcomes in pregnancy care provided by family physicians.[43] The present study found evidence of high-quality outcomes in the setting of significantly lower delivery volumes in hospitals staffed exclusively by FM physicians, consistent with prior evidence.[43] Iowa, as a state with a larger proportion of rural hospitals staffed only by FM physicians than many others, provides an important window into the communities across the United States living with limited access to pregnancy care. The present study shows that these hospitals provide a model to be replicated and extended.

The present study had limitations given its observational study design, which cannot infer causality. In addition, in the analysis of cesarean delivery rates by hospital, it is possible that individual physicians might be directing their prenatal patients to different hospitals based on risk profiles, which could have decreased NTSV cesarean delivery rates at lower-acuity hospitals. Based on published estimates, this would likely represent a small proportion of rural births and be less common among publicly insured patients,[44] which in our sample were more often cared for in hospitals with some FM presence. The population of Iowa clinicians completing the LCS mirrored the state's population as a whole, which is less racially and ethnically diverse than many states in the United States.[45] This might limit the generalizability of our findings in states where rural public health crises intersect with structural racism.

In a 2021 article on FM's role in pregnancy care,[46] Barr asked the question, "What does society need from family medicine?" and concluded that, "comprehensive primary care for women requires a physician who can care for women's most common health needs, which includes…perinatal health care." Our findings extend this answer to include the specialty's foundation in the biopsychosocial model of health. Recent Accreditation Council for Graduate Medical Education (ACGME) changes to FM pregnancy care training might have sent the message that providing pregnancy care is an exception or addition, rather than an expected part of FM graduates' practice.[47] The new competency-based education requirements state that the requirement can be completed, "with or without competence in labor and delivery." Allowing for this exception is likely to decrease the numbers of FM graduates trained to deliver babies. This was seen after the 2014 ACGME changes allowed programs to tier their training in pregnancy care to specific intensities, after which there was a 22% decrease in deliveries performed by FM residents.[48] In effect, the specialty appears to be backing away from pregnancy care at the precise moment that the unique talents of its graduates, in patient- and family centered care, teamwork, and communication, are most needed to solve a growing maternal health crisis.

Table 6. Nurse Attitudes in Hospitals With Both FM and OB vs Only OB vs Only FM

	Both OB & FM (N = 329) Mean (95% CI)	FM-Only (n = 103) Mean (95% CI)	OB-Only (n = 137) Mean (95% CI)	*P* Value[a]
Best practices	3.37 (3.33-3.42)	3.31 (3.23-3.40)	3.27 (3.20-3.34)	.047[b]
Fear of vaginal birth	1.37 (1.32-1.42)	1.31 (1.22-1.40)	1.32 (1.25-1.40)	.14
Physician oversight	3.31 (3.26-3.37)	3.33 (3.23-3.42)	3.29 (3.20-3.38)	.87
Maternal agency	2.88 (2.81-2.95)	3.04 (2.91-3.16)	2.85 (2.75-2.95)	.05
Overestimation of cesarean safety	1.91 (1.86-1.96)	1.85 (1.75-1.94)	1.91 (1.83-1.99)	.49
Unit norms[c]	2.91 (2.87-2.96)	3.05 (2.98-3.13)	2.93 (2.86-2.99)	.007[d,e]
Vaginal birth microculture	3.00 (2.95-3.05)	3.12 (3.04-3.20)	3.02 (2.95-3.09)	.03[d]
Safety culture	2.76 (2.71-2.82)	2.94 (2.84-3.04)	2.77 (2.69-2.84)	.002[d,e]

FM = family medicine; OB = obstetrician.

[a] Kruskal-Wallis test followed by the pairwise 2-sided multiple comparison analysis Dwass-Steel-Critchlow-Fligner method.
[b] Comparing both vs OB only.
[c] Unit norms contains 2 subscales measuring latent constructs that fall within the overall larger scale, vaginal birth microculture and safety culture.[30]
[d] Comparing FM only vs both.
[e] Comparing FM only vs OB only.

Read or post commentaries in response to this article.

Key words: family medicine; cesarean birth; organizational culture

Submitted January 18, 2024; submitted, revised, May 31, 2024; accepted June 4, 2024.

Funding support: This work was supported by the Agency for Healthcare Research and Quality (grant No. K08HS028028) and the NorthShore Auxiliary. The Iowa Maternal Quality Care Collaborative (IMQCC) is supported by a Maternal Health Innovation award from the Health Resources and Services Administration (No. U7AMC33719).

Previous presentation: This work was presented at the North American Primary Care Research Group Annual Meeting, Nov 18-22, 2022, Phoenix, Arizona.

Acknowledgments: We would like to acknowledge Nancy Weathers for study coordination, Stephanie Trusty for IMQCC coordination within the Iowa Department of Public Health and improvement coaching, Nicole Anderson for IMQCC program coordination, and Jill Hinkle and Amy Dunbar for IMQCC improvement coaching during the cesarean collaborative implementation.

Supplemental materials

References

1. Berg CJ, Callaghan WM, Syverson C, Henderson Z. Pregnancy-related mortality in the United States, 1998 to 2005. *Obstet Gynecol*. 2010;116(6):1302-1309. 10.1097/AOG.0b013e3181fdfb11
2. Callaghan WM, Creanga AA, Kuklina EV. Severe maternal morbidity among delivery and postpartum hospitalizations in the United States. *Obstet Gynecol*. 2012;120(5):1029-1036. 10.1097/AOG.0b013e31826d60c5
3. MacDorman MF, Thoma M, Declcerq E, Howell EA. Racial and ethnic disparities in maternal mortality in the United States using enhanced vital records, 2016-2017. *Am J Public Health*. 2021;111(9):1673-1681. 10.2105/AJPH.2021.306375
4. Kozhimannil KB, Interrante JD, Tuttle MKS, Henning-Smith C. Changes in hospital-based obstetric services in rural US counties, 2014-2018. *JAMA*. 2020;324(2):197-199. 10.1001/jama.2020.5662
5. Kozhimannil KB, Interrante JD, Henning-Smith C, Admon LK. Rural-urban differences in severe maternal morbidity and mortality in the US, 2007-2015. *Health Aff (Millwood)*. 2019;38(12):2077-2085. 10.1377/hlthaff.2019.00805
6. Kozhimannil KB, Admon LK. Structural factors shape the effects of the opioid epidemic on pregnant women and infants. *JAMA*. 2019;321(4):352-353. 10.1001/jama.2018.20395
7. Kozhimannil KB, Hung P, Henning-Smith C, Casey MM, Prasad S. Association between loss of hospital-based obstetric services and birth outcomes in rural counties in the United States. *JAMA*. 2018;319(12):1239-1247. 10.1001/jama.2018.1830
8. Kozhimannil KB, Interrante JD, Admon LK, Ibrahim BLB. Rural hospital administrators' beliefs about safety, financial viability, and community need for offering obstetric care. *JAMA Health Forum*. 2022;3(3):e220204. 10.1001/jamahealthforum.2022.0204
9. Brigance C, Lucas R, Jones E, et al. Nowhere to go: maternity care deserts across the U.S. (2022 Report). March of Dimes. Accessed Jul 9, 2024. https://www.marchofdimes.org/maternity-care-deserts-report
10. Barreto TW, Eden AR, Petterson S, Bazemore AW, Peterson LE. Intention versus reality: family medicine residency graduates' intention to practice obstetrics. *J Am Board Fam Med*. 2017;30(4):405-406. 10.3122/jabfm.2017.04.170120
11. Larimore WL, Reynolds JL. Family practice maternity care in America: ruminations on reproducing an endangered species—family physicians who deliver babies. *J Am Board Fam Pract*. 1994;7(6):478-488.
12. Kozhimannil KB, Casey MM, Hung P, Han X, Prasad S, Moscovice IS. The rural obstetric workforce in US hospitals: challenges and opportunities. *J Rural Health*. 2015;31(4):365-372. 10.1111/jrh.12112
13. Lagrew DC, Low LK, Brennan R, et al. National Partnership for Maternal Safety: consensus bundle on safe reduction of primary cesarean births—supporting intended vaginal births. *Obstet Gynecol*. 2018;131(3):503-513. 10.1097/AOG.0000000000002471
14. Ely JW, Ueland K, Gordon MJ. An audit of obstetric care in a university family medicine department and an obstetrics-gynecology department. *J Fam Pract*. 1976;3(4):397-401.
15. Phillips WR, Rice GA, Layton RH. Audit of obstetrical care and outcome in family medicine, obstetrics, and general practice. *J Fam Pract*. 1978;6(6):1209-1216.
16. Mengel MB, Phillips WR. The quality of obstetric care in family practice: are family physicians as safe as obstetricians? *J Fam Pract*. 1987;24(2):159-164.
17. Barreto TW, Eden AR, Hansen ER, Peterson LE. Barriers faced by family medicine graduates interested in performing obstetric deliveries. *J Am Board Fam Med*. 2018;31(3):332-333. 10.3122/jabfm.2018.03.170427
18. Goldstein JT, Hartman SG, Meunier MR, et al. Supporting family physician maternity care providers. *Fam Med*. 2018;50(9):662-671. 10.22454/FamMed.2018.325322
19. White VanGompel E, Perez S, Wang C, Datta A, Cape V, Main E. Measuring labor and delivery unit culture and clinicians' attitudes toward birth: revision and validation of the Labor Culture Survey. *Birth*. 2019;46(2):300-310. 10.1111/birt.12406
20. White VanGompel E, Perez S, Datta A, Wang C, Cape V, Main E. Cesarean overuse and the culture of care. *Health Serv Res*. 2019;54(2):417-424. 10.1111/1475-6773.13123
21. White VanGompel E, Main EK, Tancredi D, Melnikow J. Do provider birth attitudes influence cesarean delivery rate: a cross-sectional study. *BMC Pregnancy Childbirth*. 2018;18(1):184. 10.1186/s12884-018-1756-7
22. Cornell Law School Legal Information Institute. Chapter 150 - Iowa regionalized system of perinatal health care. Accessed Jul 9, 2024. https://www.law.cornell.edu/regulations/iowa/agency-641/chapter-150
23. Kilpatrick SJ, Menard MK, Zahn CM, Callaghan WM; American Association of Birth Centers; Association of Women's Health, Obstetric and Neonatal Nurses; American College of Obstetricians and Gynecologists; Society for Maternal-Fetal Medicine; Centers for Disease Control and Prevention. Obstetric Care Consensus # 9: levels of maternal care: (replaces Obstetric Care Consensus number 2, February 2015). *Am J Obstet Gynecol*. 2019;221(6):B19-B30. 10.1016/j.ajog.2019.05.046
24. Iowa Department of Health and Human Services. Health Statistics. Accessed Jul 9, 2024. https://hhs.iowa.gov/public-health/health-statistics
25. Deloitte Touche Tohmatsu Ltd. March of Dimes maternity care deserts dashboard. Accessed Aug 30, 2024. https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/march-of-dimes-maternity-care-deserts-dashboard.html
26. Main EK, Moore D, Farrell B, et al. Is there a useful cesarean birth measure? Assessment of the nulliparous term singleton vertex cesarean birth rate as a tool for obstetric quality improvement. *Am J Obstet Gynecol*. 2006;194(6):1644-1651. 10.1016/j.ajog.2006.03.013
27. Caughey AB, Cahill AG, Guise JM, Rouse DJ; American College of Obstetricians and Gynecologists (College); Society for Maternal-Fetal Medicine. Safe prevention of the primary cesarean delivery. *Am J Obstet Gynecol*. 2014;210(3):179-193. 10.1016/j.ajog.2014.01.026
28. US Office of Disease Prevention and Health Promotion. Healthy People 2030. Reduce cesarean births among low-risk women with no prior births—MICH-06. Accessed Jul 9, 2024. https://health.gov/healthypeople/objectives-and-data/browse-objectives/pregnancy-and-childbirth/reduce-cesarean-births-among-low-risk-women-no-prior-births-mich-06
29. Douglas CE, Michael FA. On distribution-free multiple comparisons in the one-way analysis of variance. *Commun Stat Theory Methods*. 1991;20(1):127-139. 10.1080/03610929108830487
30. White VanGompel E, Singh L, Lai JS, Carlock F, Brown J, Low LK. Patient safety culture or embracing low intervention evidence-based care to support vaginal birth: where should hospitals start? *Health Serv Res*. 2021;56(S2):54. 10.1111/1475-6773.13823
31. White VanGompel EC, Perez SL, Datta A, Carlock FR, Cape V, Main EK. Culture that facilitates change: a mixed methods study of hospitals engaged in reducing cesarean deliveries. *Ann Fam Med*. 2021;19(3):249-257. 10.1370/afm.2675
32. Hueston WJ, Applegate JA, Mansfield CJ, King DE, McClaflin RR. Practice variations between family physicians and obstetricians in the management of low-risk pregnancies. *J Fam Pract*. 1995;40(4):345-351.

33. Peahl A, Low LK, Langen ES, Moniz M, Hu HM, Waljee J. Provider and hospital-level predictors of variation in postpartum opioid prescribing: a statewide analysis. *Am J Obstet Gynecol*. 2023;228(1 Suppl):S253-S254. 10.1016/j.ajog.2022.11.460

34. Allen S. Development of the family medicine milestones. *J Grad Med Educ*. 2014;6(1 Suppl 1):71-73. 10.4300/JGME-06-01s1-06

35. Carek PJ, Anim T, Conry C, et al. Residency training in family medicine: a history of innovation and program support. *Fam Med*. 2017;49(4):275-281.

36. Martin JC, Avant RF, Bowman MA, et al; Future of Family Medicine Project Leadership Committee. The Future of Family Medicine: a collaborative project of the family medicine community. *Ann Fam Med*. 2004;2(Suppl 1):S3-S32. 10.1370/afm.130

37. Bertakis KD, Azari R. Determinants and outcomes of patient-centered care. *Patient Educ Couns*. 2011;85(1):46-52. 10.1016/j.pec.2010.08.001

38. Glazer KB, Zeitlin J, Howell EA. Intertwined disparities: applying the maternal-infant dyad lens to advance perinatal health equity. *Semin Perinatol*. 2021;45(4):151410. 10.1016/j.semperi.2021.151410

39. Moore JE, Titler MG, Kane Low L, Dalton VK, Sampselle CM. Transforming patient-centered care: development of the evidence informed decision making through engagement model. *Womens Health Issues*. 2015;25(3):276-282. 10.1016/j.whi.2015.02.002

40. Tucker Edmonds B. Shared decision-making and decision support: their role in obstetrics and gynecology. *Curr Opin Obstet Gynecol*. 2014;26(6):523-530. 10.1097/GCO.0000000000000120

41. American Board of Family Medicine. National Graduate Survey for year(s): 2023. Accessed Jul 9, 2024. https://www.theabfm.org/app/uploads/2024/03/2023-National-Graduate-Survey-Report_NationalOnly.pdf

42. Barreto TW, Eden A, Hansen ER, Peterson LE. Opportunities and barriers for family physician contribution to the maternity care workforce. *Fam Med*. 2019;51(5):383-388. 10.22454/FamMed.2019.845581

43. Klein MC, Spence A, Kaczorowski J, Kelly A, Grzybowski S. Does delivery volume of family physicians predict maternal and newborn outcome? *CMAJ*. 2002;166(10):1257-1263.

44. Kozhimannil KB, Casey MM, Hung P, Prasad S, Moscovice IS. Location of childbirth for rural women: implications for maternal levels of care. *Am J Obstet Gynecol*. 2016;214(5):661.e1-661.e10. 10.1016/j.ajog.2015.11.030

45. United States Census Bureau. 2020 Census: racial and ethnic diversity index by state. Published Aug 12, 2021. Accessed Jul 9, 2024. https://www.census.gov/library/visualizations/2021/dec/racial-and-ethnic-diversity-index.html

46. Barr WB. Women deserve comprehensive primary care: the case for maternity care training in family medicine. *Fam Med*. 2021;53(7):524-527. 10.22454/FamMed.2021.451637

47. Newton WP, Magill M, Barr W, Hoekzema G, Karuppiah S, Stutzman K. Implementing competency based ABFM board eligibility. *J Am Board Fam Med*. 2023. 10.3122/jabfm.2023.230201R0

48. Fashner J, Cavanagh C, Eden A. Comparison of maternity care training in family medicine residencies 2013 and 2019: a CERA program directors study. *Fam Med*. 2021;53(5):331-337. 10.22454/FamMed.2021.752892