

Interspecialty Differences in the Obstetric Care of Low-Risk Women

ABSTRACT

Objectives. This study examined differences among obstetricians, family physicians, and certified nurse-midwives in the patterns of obstetric care provided to low-risk patients.

Methods. For a random sample of Washington State obstetrician-gynecologists, family physicians, and certified nurse-midwives, records of a random sample of their low-risk patients beginning care between September 1, 1988, and August 31, 1989, were abstracted.

Results. Certified nurse-midwives were less likely to use continuous electronic fetal monitoring and had lower rates of labor induction or augmentation than physicians. Certified nurse-midwives also were less likely than physicians to use epidural anesthesia. The cesarean section rate for patients of certified nurse-midwives was 8.8% vs 13.6% for obstetricians and 15.1% for family physicians. Certified nurse-midwives used 12.2% fewer resources. There was little difference between the practice patterns of obstetricians and family physicians.

Conclusions. The low-risk patients of certified nurse-midwives in Washington State received fewer obstetrical interventions than similar patients cared for by obstetrician-gynecologists or family physicians. These differences are associated with lower cesarean section rates and less resource use. (*Am J Public Health*. 1997;87:344-351)

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Background

Obstetric care is one of the most important health services in the United States, accounting for over 10% of hospital discharges.¹ Despite the large number of babies delivered annually, substantial controversy exists over what constitutes optimal management of pregnancy.² This controversy applies not only to the management of major complications that arise in pregnancy, but also to how to care for the healthy woman with a low-risk pregnancy.

The situation is complicated further by differences in the training, philosophical orientation, and technical proficiency of the health care professionals who deliver babies. In most parts of the United States, obstetric care is provided by obstetricians, general and family physicians, and certified nurse-midwives. The current partition of obstetric care among these three specialties has been shaped by the economics and politics of medicine, patient preferences, medical malpractice issues, credentialing policies in hospitals and within states, and the health professional career decisions of students. Enormous intraspecialty differences exist in the way providers treat similar conditions^{3,4}; even greater variation can be expected to occur across disciplines as diverse as the three studied here. These differences are potentially important for a variety of reasons, including the quality of medical care received, patient satisfaction, the accessibility of care, and the process and cost of care.

This study examined interspecialty differences in the provision of prenatal and intrapartum care by a stratified random sample of obstetric providers. We

tested the hypothesis that systematic differences exist in the style and resource intensity of care provided to similar groups of women by certified nurse-midwives, family physicians, and obstetricians. We hypothesized that obstetricians adopt the most intensive practice style and certified nurse-midwives the least intensive approach, with family physicians occupying an intermediate position.

Methods

The unit of analysis in this study of provider behavior was the individual obstetrician, family physician, or certified nurse-midwife. The study participants were a random sample of all urban obstetric providers in the state of Washington who routinely provided obstetric care in hospital settings during calendar year 1988. Patient data were based on the records of pregnant women who initiated care with a study provider in Washington

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This paper was accepted May 30, 1996.

State between September 1, 1988, and August 31, 1989. All the women in the study delivered between February 10, 1989, and April 26, 1990. Prenatal and intrapartum care to patients was recorded through retrospective chart abstraction in the offices of the study providers and in the hospitals where deliveries occurred. Patient data for each provider were aggregated for that provider.

We used an intention-to-treat protocol, attributing all subsequent care to the booking provider. All referrals and consultations during the prenatal period, and any operative intervention performed during the intrapartum period, are assigned to the provider with whom the patient initiated care, even if that provider did not perform the service. For example, although all of the patients of midwives who ultimately required cesarean sections had the procedure performed by physicians, the cesarean sections themselves and the resources used for these procedures are attributed to the midwives with whom the patients began care.

Selecting the Provider Sample

The sampling frame was derived from rosters of all family physicians, obstetricians, and certified nurse-midwives maintained by the major relevant professional organizations in the state, including the Washington State Medical Association, the Washington Academy of Family Physicians, the Washington chapter of the American College of Obstetricians and Gynecologists, the Washington chapter of the American College of Nurse-Midwives, and the Washington State Obstetrical Association. We identified 1680 obstetric providers: 461 obstetricians, 1134 family physicians, and 85 certified nurse-midwives.

Because we sought to determine whether provider specialty was associated with a difference in the use of resources, we used the total costs of prenatal and intrapartum care as the variable of interest in our power calculations. Previous studies completed in 1988 demonstrated that the cost for obstetrical care for low-risk women was \$4000 with a standard deviation of \$1000. We sought to detect a difference of \$500 between provider samples for one-tailed significance tests with 95% confidence and a power of 0.8. Achieving this power required 60 providers in each of the three cells of the study, and we determined the number of providers in each group to approach on the basis of our prediction of their response rate. We approached all urban certified nurse-

TABLE 1—Selection of Patients for Study of Differences in Obstetric Care of Low-Risk Women, Washington State, 1988 and 1989

	Obstetricians (n = 54)	Family Physicians (n = 54)	Certified Nurse- Midwives (n = 43)	Total
New obstetrical charts per provider group	6155	1484	1831	9470
Exclusions (not mutually exclusive)				
Disqualifying medical condition	1000	291	401	1692
Disqualifying obstetrical history	1505	322	338	2165
Risk factor in current pregnancy	1498	441	592	2165
Sociodemographic factor associated with risk	190	107	126	423
Patients eligible for record abstraction (low risk at entry to care)	3000	655	776	4431
Total patient charts selected for abstraction	643	455	415	1513
Exclusions (mutually exclusive)				
Miscarriages and abortions	29	24	10	63
Patient changed provider	27	14	15	56
Hospital record unavailable	15	11	7	33
Patient moved	9	3	4	16
Other	11	4	8	23
Complete patient charts abstracted for study	552	399	371	1322

TABLE 2—Demographic and Practice Characteristics of Providers in Study of Differences in Obstetric Care of Low-Risk Women, Washington State, 1988 and 1989

	Obstetricians (n = 54)	Family Physicians (n = 54)	Certified Nurse- Midwives (n = 43)	Significance ^a (P)
Age				
Mean	45.8	40.8	40.7	.000
Median	45.5	40.0	40.0	
Range	32-67	32-63	28-59	
% female	20.4	18.5	100.0	.000
Practice type				
Solo	27.8	25.9	11.6	.128
Single-specialty group	51.9	46.3	48.8	.849
Multispecialty group	20.4	27.8	39.5	.116
Practice organization				
Private	92.6	72.2	23.3	.000
Health maintenance organization	3.7	11.1	34.9	.000
Hospital or university clinic	3.7	5.6	23.3	.002
Community clinic	0.0	11.1	18.6	.006
Mean no. new pregnant patients booked in study year	114.0	25.2	42.6	.000

^aChi-square and F-test statistics as appropriate.

midwives because fewer than 60 were practicing in Washington state.

All providers in this study practiced in urban areas. We restricted this analysis to urban areas because virtually no certified nurse-midwives practiced in rural communities. Urban practice location was defined as a practice within a county

that was designated as a Metropolitan Statistical Area by the US Department of Agriculture's rural-urban continuum codes.⁵ By this definition, 28 of Washington's 39 counties are urban.

Of the 1680 obstetric providers identified in Washington State, we randomly selected providers for inclusion in

TABLE 3—Pregnancy Outcomes of Women Selected for Study of Differences in Obstetric Care of Low-Risk Women, by Specialty of Provider, Washington State, 1989 and 1990

Neonatal Outcomes	Obstetricians (n = 54)	Family Physicians (n = 54)	Certified Nurse- Midwives (n = 43)	Significance ^a (P)
Live births, %	99.8	99.4	100.0	.378
5-minute Apgar, mean	8.84	8.91	8.95	.096
5-minute Apgar >7, %	96.9	97.1	98.2	.598
Birthweight, mean, g	3475	3489	3543	.387
Vertex presentation, %	96.3	96.8	95.8	.802

^aF test.

the study on the basis of our prediction of eligibility and participation rate. To be eligible for the study, a provider must have personally attended a minimum of 10 births during the calendar year 1988 and have remained in active urban practice through 1990. After we screened the provider sample and determined eligibility by telephone, we approached 177 randomly selected providers, requesting their participation in the study: 70 obstetricians, 64 family physicians, and 43 certified nurse-midwives.

Provider Recruitment and Participation Rates

To attain high participation, we created a provider encouragement network using the methods developed by Kosecoff et al.⁶ A policy advisory board was established composed of the leadership of the major organizations from which our sampling frame was derived. Project staff, working with the policy advisory board, then created a provider encouragement network composed of influential, obstetrically active clinicians throughout the state representing the three disciplines of interest. Training workshops across the state made these influential clinicians familiar with the study protocol. Once the study samples were selected, the encouragement network physicians contacted the study physicians and urged their participation. A total of 156 providers allowed us to abstract their charts: 77.1% of obstetricians (54), 92.2% of family physicians (59), and 100% of certified nurse-midwives (43). Information was obtained for all study providers describing their personal demographic information, professional training, and the characteristics of their practice setting and organization.

After data collection was completed, five physicians were found to have only one eligible low-risk patient each during the study year, even though all had met the initial eligibility criteria for the study. Because of the potential volatility introduced by these five providers, these physicians and their patients were eliminated from the analyses.

Selection of Patient Sample and Data Collected

All patients who initiated obstetric care with an index provider during the study year were potentially eligible for inclusion in this study. Trained medical abstractors determined potential eligibility according to a written protocol. Patients were excluded from the sampling frame if their outpatient obstetric charts had evidence of one or more of the following exclusion criteria:

1. History of concurrent major medical conditions (e.g., renal failure)
2. History of major obstetric complication, including previous stillbirth, more than four previous spontaneous abortions before 14 weeks' gestation, previous cesarean section, or previous premature birth before 34 weeks' gestation
3. Potential risk factors in current pregnancy, including first prenatal visit after first trimester, grand-multiparity (more than three previous live births), history of drug or alcohol abuse, having initiated care with another obstetric provider and referred subsequently to study provider, less than 18 or greater than 34 years old at time of booking, or uninsured

Of the 9470 charts examined by the abstractors, 4431 (46.8%) met the eligibility criteria (Table 1); random-number tables were used to randomly select 11 charts from each provider's practice for inclusion in the study. Providers who had fewer than 11 eligible charts during the study year had all their eligible charts abstracted. Of the patient charts, 1513 were randomly selected for abstraction; 12.6% of these were subsequently found to be incomplete for various reasons. The reasons for incomplete records were similar for each provider group. The final patient sample covered 1322 pregnancies. The average obstetrician had 10.2 patients included in the study; the average certified nurse-midwife had 8.6 patients; and the average family physician had 7.4 patients. The lower numbers of eligible patients for certified nurse-midwives and family physicians were due to their smaller obstetrical volumes.

Results

Provider Characteristics

The average age of the 151 providers in our study was 43.7 years, ranging from 28 to 67 years of age. Obstetricians tended to be older than either family physicians or certified nurse-midwives (Table 2). Just over 80% of the physicians were men, whereas all the certified nurse-midwives were women.

Approximately half of each provider group were part of single-specialty group practices; most physicians were in private practice as well. Certified nurse-midwives were less likely than physicians to be in solo practice, and fewer than one quarter were in private practice; most worked in either health maintenance organization or hospital settings. Obstetricians had by far the highest obstetric volumes, booking over twice as many new patients annually as certified nurse-midwives and over four times as many as family physicians.

Practice Profiles Based on Study Patients

The sociodemographic and obstetric characteristics of low-risk patients cared for by the three provider types were similar on most parameters. The typical low-risk woman in the typical practice was multiparous, White, married, privately insured, and in her mid-20s. The birth outcomes for these low-risk women were similar across provider groups (Table 3). All but three of the babies were born alive—there were two fetal deaths among

TABLE 4—Intrapartum Management by Specialty of Provider: Percentage of Low-Risk Patients Receiving Selected Labor Interventions, Washington State, 1989 and 1990

	Obstetricians (n = 54)	Family Physicians (n = 54)	Certified Nurse- Midwives (n = 43)	Overall Significance (P) ^a	Significance of Pairwise Comparisons (P) ^b		
					Obstetricians vs Family Physicians	Obstetricians vs Certified Nurse-Midwives	Family Physicians vs Certified Nurse-Midwives
Labor characteristics							
Spontaneous	55.8	58.8	71.8	.000	.449	.000	.001
Induced or augmented	41.8	40.0	26.3	.000	.652	.000	.001
Elective cesarean-section without labor	2.3	1.2	1.9	.508	.250	.681	.500
Fetal monitoring							
Continuous	62.4	57.6	46.6	.017	.355	.004	.057
Intermittent	10.0	11.0	21.3	.006	.746	.008	.014
Type unknown	25.7	29.7	27.1	.740	.417	.811	.649
None	1.9	1.6	5.0	.046	.818	.076	.051
Anesthesia (vaginal deliveries only)							
Epidural	42.1	30.8	18.4	.000	.036	.000	.014
Pudendal	5.5	3.7	2.4	.345	.435	.143	.423
Local	39.2	44.5	42.1	.609	.336	.598	.670
Other	1.4	1.2	1.4	.612	.469	.312	.803
None	11.8	19.8	35.8	.000	.034	.000	.001
Episiotomy rates (vaginal deliveries only)							
	59.6	57.6	30.2	.000	.716	.000	.000

^aF test.^bt test. To adjust for multiple comparisons, the criterion for statistical significance was set at $P \leq .01$.

patients booking with family physicians and one to an obstetrician—and no significant differences occurred across groups in the mean 5-minute Apgar score or the percentage of babies with low 5-minute Apgar scores. Birthweights were very similar across disciplines. It should be noted that this was not a study of perinatal outcomes. Sample sizes were too small to detect small differences in outcome across groups.

Differences in Practice Style

Prenatal period. The approach to patients in the prenatal period is very similar across disciplines, as we have shown in an earlier publication.⁷ Obstetricians saw their patients slightly less often than either family physicians or certified nurse-midwives and did slightly fewer screening laboratory tests. Although the differences were statistically significant, they were so small as to have little practical importance.

The most notable difference in clinical approach across disciplines during the prenatal period occurred in the use of amniocentesis. Obstetricians were much more likely than either family physicians or nurse-midwives to perform amniocentesis; 6.8% of the patients of obstetricians

had an amniocentesis versus 1.4% of the patients of family physicians and 2.2% of the patients of midwives. The higher rate was evident both in amniocenteses done for genetic diagnosis (<18 weeks gestation) and in those performed to assess fetal lung maturity (>28 weeks gestation).

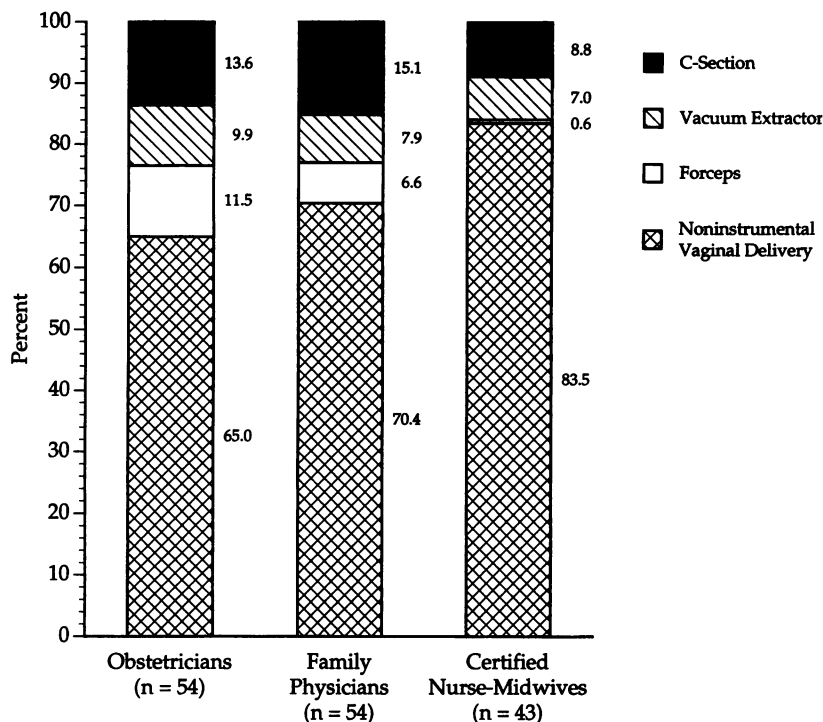
Certified nurse-midwives were more likely to obtain nonstress tests than their physician colleagues, perhaps reflecting a preference for fetal surveillance over induction in postdate pregnancies. That supposition is supported by the differences in rates of induction, which are presented in the next section. The number of ultrasound examinations was almost identical across specialty groups; most low-risk women received one ultrasound scan during pregnancy regardless of the specialty of their obstetric attendant.

Intrapartum period. Major differences occurred among the specialties in the management of the intrapartum period, in contrast to the prenatal period. Certified nurse-midwives were significantly less likely to induce or augment their patients, continuously electronically monitor their patients, use epidural anesthesia, or perform episiotomies (Table 4). These differences were all statistically

significant. By contrast, the differences in intrapartum management between family physicians and obstetricians were less marked. Although family physicians were less likely than obstetricians to use epidural anesthesia, their use of electronic fetal monitoring and induction or augmentation of labor were very similar.

Perhaps as a consequence of these differences in intrapartum management, certified nurse-midwives were much more likely than physicians to deliver their patients without an operative intervention. As Figure 1 shows, the average certified nurse-midwife in this study had a cesarean section rate of 8.8%, versus 13.6% for obstetricians and 15.1% for family physicians. Instrumental deliveries were also less frequently performed for the patients of certified nurse-midwives. As a result, the average certified nurse-midwife delivered 83.5% of her patients vaginally without the use of forceps or vacuum extractors, a significantly higher rate of noninstrumental vaginal delivery than among either obstetricians or family physicians. Obstetricians and family physicians did not differ significantly from one another.

The more active style of intrapartum management used by obstetricians is



	Ob-FP	Ob-CNM	FP-CNM
C-section	.597	.016	.018
Vacuum extractor	.426	.260	.741
Forceps	.055	.000	.001
NSVD	.173	.000	.000

Note. Ob = obstetricians; CNM = certified nurse-midwives; FP = family physicians; NSVD = noninstrumental vaginal delivery.

FIGURE 1—Delivery method by specialty in study of differences in obstetrical care of low-risk women, Washington State, 1988 and 1989.

associated with a modest increase in the use of resources. If one applies the 1989 fee schedule used by Blue Cross of Washington to approximate the cost of obstetric care rendered by each provider, obstetricians used 12.2% more resources than certified nurse-midwives, a difference that is statistically significant. Family physicians, as hypothesized, occupy a position intermediate between obstetricians and midwives but do not differ significantly from either of the other two specialties. Most of the difference between obstetricians and midwives can be accounted for by costs associated with anesthesia use and longer lengths of hospital stay for women having cesarean sections.

Although we excluded women with identified medical and obstetric risk factors from the sampling frame, the low-risk sample is still somewhat heterogeneous, including Medicaid recipients, ethnic minorities, nulliparas, and unmarried women. In order to test the robustness of our findings, we performed a sensitivity analysis by restricting our analysis to low-risk women who are White, married, multiparous, and privately insured—an extremely homogeneous group. The findings remain virtually the same as for the entire patient sample.

We also repeated our analyses of intrapartum care for the following parity groups: nulliparous women, women with parity of one and two separately, all

multiparous women, and women with parity greater than two. Although the numbers of patients and providers in individual cells become small in some cases, the results are not affected in a material way by the parity of the women in the study. In every analysis, patients initiating care with nurse-midwives were less likely to be induced; to receive continuous electronic fetal monitoring, epidural anesthetics, or episiotomies; or to have an operative delivery. It is interesting to note that among nulliparous women, the difference in cesarean section across disciplines is greater than among multiparas—11.7% for certified nurse-midwives versus 23.0% for obstetricians and 26.4% for family physicians.

We also used multiple regression to explore the possibility that other provider variables in addition to specialty explain the interspecialty differences observed. Neither the age nor the gender of the booking provider was statistically significant in explaining the total amount of resources used. In addition, patient variables such as marital status and race were not significant in the final model. The variable explaining the greatest proportion of variance, even after all other factors were held constant, was specialty of the provider.

Discussion

Obstetric care falls within the practice domain of three quite different disciplines: obstetrics and gynecology, family practice, and nurse-midwifery. Numerous researchers have explored the differences among these disciplines, but the studies suffer from a number of serious methodological limitations, including failure to control for patient case mix, biases in patient selection, small numbers of practitioners and patients, and nonrepresentative samples of providers.⁸⁻¹³ This study was designed to address most of these flaws by studying a representative sample of all urban providers within an entire state and rigorously excluding from the study women with identified medical, obstetric, or sociodemographic risk factors.

The results suggest that certified nurse-midwives in urban Washington State have a different approach to intrapartum care than their physician colleagues. Certified nurse-midwives were much less likely to use a variety of technological tools to monitor or modify the course of labor. Patients of certified nurse-midwives were less likely to be continuously elec-

tronically monitored during labor, to receive oxytocin to induce or augment labor, or to be given epidural anesthesia. Probably as a consequence, fewer of their patients have an operative delivery.¹⁴⁻¹⁶ A lower rate of cesarean sections—particularly among nulliparous women—is associated with shorter hospital stays and smaller expenditures for operating room and anesthesia staff.^{17,18}

Limitations of the Study

The ideal strategy for evaluating interspecialty differences in obstetrical care would require randomizing matched patients prospectively to contrasting provider types. Although such a study has been performed within one hospital,¹³ this approach could not be accomplished in the United States on a wider basis because women choose providers because of who they are, how much they charge, and the types of settings in which they work. It is this nonrandom distribution of patients that potentially limits the extent to which the differences observed can be attributed only to specialty characteristics. The relatively small size of the sample and the limited outcome data also prevent us from drawing any firm conclusions about difference in quality of care across groups.

We attempted to ensure the biological equivalence of patients by restricting the study to a group of women who were low risk at entry into obstetrical care; all the women had insurance or Medicaid coverage, began care in the first trimester, and had an uneventful medical and obstetric history. Despite these restrictions, it is highly likely that some of the women who selected certified nurse-midwives did so specifically because they desired a low-intervention style of obstetrics. To the extent that patient preferences translate into actual practice patterns, the lower use of resources among certified nurse-midwives may be attributable to unmeasured patient characteristics. It is likely that the lower intervention rates of midwives are a product of their philosophical and clinical orientation toward childbirth and the fact that their practices have a greater proportion of women who share that approach.

How Does This Relate to Previous Research on the Rate of Cesarean Sections?

The rate of cesarean sections in the United States increased 48% between 1980 and 1987, leading to an intensive review of the appropriateness and impact

of this method of delivery.¹⁹⁻²⁴ A variety of factors have been found to predispose to cesarean section, including patient age, parity, and birthweight; hospital obstetrical volume; hospital ownership and teaching status; individual providers' practice styles; and the health insurance coverage of the patient.^{15-18,25-36} Numerous interventions have been designed to attempt to reduce the rate of unnecessary cesarean sections, some with modest success.^{18,37-49}

This study suggests that one contributing factor may be the training and orientation of the provider. A previous study showed significant variations in the tendency of obstetricians to use cesarean section to resolve dystocia, even among practitioners working in the same hospital setting.⁵⁰ Other investigators have demonstrated that women who delivered in birth centers have lower rates of cesarean sections than women who delivered in more technologically intensive settings.⁵¹⁻⁵³ The findings reported here support the conclusion that women who initiate care with certified nurse-midwives are less likely to have a cesarean section than women who initiate care with physicians, a finding that validates the results of earlier observational studies.^{12,54-56}

The results presented here have some important similarities with the report of Chambliss and colleagues in which patients were randomly allocated to physician or midwifery management.¹³ Although the cesarean section rates did not differ between midwives and physicians in the study by Chambliss et al., the total operative delivery rate (cesarean sections plus forceps and vacuum deliveries) was significantly higher for physicians than for midwives, a result similar to ours. Midwives were less likely to use oxytocin for augmentations, used less analgesia, and had fewer episiotomies in the Chambliss et al. report, results that were mirrored in our larger statewide study.

Why Is There Little Difference between Obstetricians and Family Physicians?

The major study hypothesis was that a systematic relationship existed between the degree of specialization of the obstetric attendant and the intensity of resources used in biologically equivalent patients. Although family physicians use a slightly different mix of services than obstetricians, the differences are relatively small. Moreover, the cesarean section rates and operative intervention rates for family

physicians and obstetricians are quite similar. What might explain the similarity in approach between these two physician specialties?

There has been little consensus about the optimal role for family physicians in obstetrics.⁵⁷ While in the past most family physicians practiced obstetrics, that situation is no longer true.⁵⁸ Although all family medicine residents learn some obstetric skills, most do not actively practice obstetrics after training.

Previous studies comparing obstetricians and family physicians have suggested that family physicians have a less intensive obstetric practice style than obstetricians.⁵⁹⁻⁶² However, these studies were all seriously flawed because they did not adequately control for differences in case mix between the two specialties. The lack of difference in this study suggests that at least with respect to low-risk patients, urban family physicians and obstetricians have similar clinical approaches, outcomes, and resource use.

Perhaps this finding should not surprise us. Most residency graduates (and 93.2% of our sample of family physicians had completed residencies) receive much of their obstetrical training from obstetricians, often in tertiary medical centers. All family physicians in this study practiced in hospitals where most babies were delivered by obstetricians and where obstetricians were used for both referral and consultation. It would thus appear logical that family physicians would follow the norms established by their more specialized colleagues.

Policy Implications: The Role of Midwives in the United States

Midwifery in the United States has never assumed the central role in the management of pregnant women that is the norm in most of Europe.⁶³ This discrepancy is the result of many factors, ranging from barriers imbedded in both licensure regulations and hospital privileging processes to differences in patient preferences and in the roles of the three obstetrically active disciplines in our society.^{64,65} Even though the number of active midwives has expanded rapidly in this country in recent years, most deliveries are attended by physicians, primarily specialist obstetricians.

One of the strongest rationales for increasing the role of midwives has been the repeated observation that their obstetrical approach leads to lower intervention rates without any demonstrable differences in outcome, particularly for low-

risk patients.⁸ Most of this work has been vulnerable to the criticism that previous comparisons are biased by biological differences between the obstetrical patients of midwives and physicians. Our study demonstrates that even after both biological and sociodemographic differences are controlled for, patients who initiate care with midwives have fewer intrapartum interventions and a lower cesarean section rate than patients who initiate care with physicians. The data are potentially more persuasive because they represent the experience of a random sample of all urban obstetrical providers in an entire state, not just professionals working within one institution or one city. Even though we were unable to randomize patients, it is unlikely that unmeasured differences in patients caused all the observed differences in practice style.

We know from a randomized clinical trial that obstetricians are capable of achieving cesarean section rates for low-risk patients that are as low as those achieved by midwives, even within a busy teaching hospital.¹³ It is interesting to note, however, that though cesarean section rates were the same for midwives and obstetricians in the Chambliss et al. study, midwives had fewer operative vaginal deliveries, used less oxytocin, used less epidural anesthesia, did fewer episiotomies, and caused less perineal trauma, findings consistent with our study. Taken in its totality, this body of knowledge suggests that the approach to low-risk obstetrics as used in the real world by midwives has significant advantages for patients. From a policy perspective, it might be possible to extend the application of this knowledge by expanding the proportion of deliveries attended by midwives or by transferring some of the skills and philosophy that undergird midwifery to the physicians who practice obstetrics. □

Acknowledgments

This research was financed by grant R01 HS06166 from the Agency for Health Care Policy and Research, Department of Health and Human Services.

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