

EDUCATION

Does the number of forceps deliveries performed in residency predict use in practice?

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OBJECTIVE: We aimed to determine whether a threshold number of forceps deliveries in residency predicts use of forceps in independent practice.

STUDY DESIGN: We surveyed obstetrics and gynecology residency graduates of 2 academic programs from 2008 through 2012 regarding the use of operative vaginal delivery in practice. At these programs, residents are trained in both forceps and vacuums. Individual case log data were obtained with the number of forceps deliveries performed by each respondent during residency. Respondents were grouped as currently using any forceps or vacuums alone. A logistic regression model estimated the probability of forceps use, predicted by the number of residency forceps deliveries. From the resulting receiver-operating characteristic curve, we assessed sensitivity, specificity, positive predictive value, and area under the curve.

RESULTS: The response rate was 85% ($n = 58$) and 90% ($n = 52$) practice obstetrics. Seventy-nine percent ($n = 41$) use forceps in practice. The mean number of forceps performed during residency was 22.3 ± 1.3 (mean \pm SE) in the any-forceps group and 18.5 ± 2.1 in the vacuums-only group ($P = .14$). Although the model performed only moderately (area under the curve, 0.61, 95% confidence interval [CI], 0.42–0.81), more than 13 residency forceps deliveries corresponded to a 95% sensitivity (95% CI, 84–99) and a positive predictive value of 83% (95% CI, 69–92) for using forceps in practice. The specificity of this threshold is 27% (95% CI, 6–61).

CONCLUSION: Although exceeding 13 forceps deliveries made it highly likely that obstetricians would use them in practice, further study is necessary to set goals for a number of resident forceps deliveries that translate into use in practice.

Key words: forceps, operative vaginal delivery, residency training

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Over the last 3 decades, the rate of operative vaginal delivery has declined more than 2-fold.¹ Additionally, the use of forceps in assisted vaginal deliveries has declined, corresponding to a rise in vacuum delivery rates.²

In July 2012, the Accreditation Council for Graduate Medical Education (ACGME) released newly established minimum thresholds for procedures by obstetrics and gynecology residents by the time of graduation.³ These numbers

are not meant to indicate competence in a particular procedure but to establish minimum numbers for program accreditation purposes. For operative vaginal delivery (combined forceps and vacuums), the minimum threshold was set at 15. However, the selection of this threshold was based on national resident experience numbers, not on likelihood to perform in practice. If thresholds are to be set by residency review committees, it would be ideal if the minimum experience numbers correlated with clinical practice. Thus, the purpose of this study was to determine whether there is a threshold number of forceps deliveries during residency that translates into performing forceps in independent practice.

MATERIALS AND METHODS

This is an ancillary analysis of a larger operative vaginal delivery survey study, which was sent to the last 8 years of

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TABLE 1
Demographic data of responders vs nonresponders

Variable	Responders (n = 52)	Nonresponders (n = 10)	P value
Sex			.60
Male	4 (8)	0 (0)	
Female	48 (92)	10 (100)	
Institution			.17
Number 1	34 (65)	4 (40)	
Number 2	18 (35)	6 (60)	
Graduation year			.41
2008	10 (19)	4 (40)	
2009	10 (19)	2 (20)	
2010	10 (19)	2 (20)	
2011	9 (17)	2 (20)	
2012	13 (25)	0 (0)	

Data are n (percentage) unless otherwise specified. Percentages may not add up to 100% because of rounding.

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graduates (2004–2012) of 4 academic obstetrics and gynecology residency programs in the United States. These programs were originally selected to encompass a spectrum of training patterns in

operative vaginal delivery (from exclusively forceps to almost all vacuums). The current ancillary study was restricted to the last 5 years of graduates (2008–2012) of the 2 programs that train residents in

both forceps and vacuums. Further details regarding survey development and participant recruitment can be found in the original manuscript.⁴ This ancillary study qualified for exempt status under the Colorado Multiple Institutional Review Board.

Basic demographic data including respondent sex, institution, and graduation year were collected. Survey respondents were queried about their subjective satisfaction with residency training in forceps. Additionally, respondents were asked whether they perform any forceps in their current practices. Graduates no longer practicing obstetrics or operative vaginal delivery were excluded from the analysis. All other participants were grouped as performing any forceps (either forceps alone or both forceps and vacuums) or only vacuums in practice.

Data from individual ACGME case logs were obtained from the residency programs to determine the number of forceps deliveries performed by each respondent by the conclusion of their 4-year residency. Study authors were blinded to delivery numbers for each individual; delivery numbers were associated with individual survey respondents by a third party. For each graduating residency class, the average number of forceps deliveries per graduating resident was also calculated.

A logistic regression model of the probability of any forceps use in practice was estimated, predicted by the number of forceps deliveries during training. To assess how well a threshold number of forceps deliveries in training predicts performing forceps in practice, we utilized receiver-operating characteristic methodology. We assessed sensitivity, specificity, positive predictive value, and area under the curve of a cutoff for predicting forceps use in practice identified from the receiver-operating characteristic curve. Respondent-level demographic characteristics and ACGME-reported measures from residency training (average volume and type of operative deliveries) were compared using χ^2 tests for categorical measures. A value of $P < .05$ was considered significant. All analyses were performed in SAS

TABLE 2
Demographics of survey respondents

Variable	Any forceps (n = 41)	Vacuums only (n = 11)	P value
Physician age (y), mean \pm SE	34.4 \pm 0.6	36.0 \pm 1.1	.23
Sex			.57
Male	4 (10)	0 (0)	
Female	37 (90)	11 (100)	
Institution			.07
Number 1	24 (59)	10 (91)	
Number 2	17 (41)	1 (9)	
Graduation year			.61
2008	8 (20)	2 (18)	
2009	6 (15)	4 (36)	
2010	8 (20)	2 (18)	
2011	8 (20)	1 (9)	
2012	11 (27)	2 (18)	

Data are n (percentage) unless otherwise specified. Percentages may not add up to 100% because of rounding.

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