Attrition in residents entering US obstetrics and gynecology residencies: analysis of National GME Census data

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OBJECTIVE: We sought to identify risk factors for attrition among obstetrics and gynecology residents.

STUDY DESIGN: We analyzed 2001-2006 American Medical Association Graduate Medical Education (GME) Census data for all residents who entered obstetrics and gynecology in 2001 to characterize residents who did not complete a 4-year training period in their initial programs ("attrition"). Multivariable logistic regression models identified predictors of attrition from among age, gender, race, Hispanic ethnicity, medical school type, and medical school graduation year.

RESULTS: Of 1055 residents entering obstetrics and gynecology in 2001, 228 (21.6%) were in the "attrition" group (133 changed obstetrics and gynecology programs and/or completed training on atypical cycles; 75 changed specialty; 20 discontinued GME). Residents who were older, underrepresented minority race, Asian race, osteopathic- or international medical school graduates were more likely to be in the "attrition" group (each $P < .05$).

CONCLUSION: Analysis of a national cohort of obstetrics and gynecology residents identified substantial attrition and demographic risk factors.

Key words: attrition, national GME Census, risk factors for resident attrition

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Over the past 10 years, the declining interest in obstetrics and gynecology training among US allopathic medical students has stimulated discussion regarding strategies to enhance recruitment of medical students into the specialty.[1] There is also concern over the relatively high levels of attrition of categorical residents from obstetrics and gynecology programs. One can consider attrition in residency to occur when a categorical resident advances through the 4-year training period on an atypical cycle, changes obstetrics and gynecology program during training, transfers to a different specialty, or entirely discontinues graduate medical education (GME). These different types of attrition vary in their impact on the size of the obstetrics and gynecology resident workforce. However, all types of attrition can adversely affect the educational environment for other residents in the program and pose particular challenges for program directors. When a resident departs prior to program completion or completes GME training requirements over an atypical cycle, the remaining residents may face increased work loads, as the program director faces pressures to comply with duty-hour regulations and diminished flexibility in providing appropriate coverage for other residents' planned short-term absences. Recruitment of qualified "replacement" residents is time and resource consuming, and may not be successful. Indeed, obstetrics and gynecology programs with particularly high levels of attrition may be at risk for accreditation citations for having an unstable learning environment.[2]

While the issue of attrition has been recognized in obstetrics and gynecology for many years, studies to date have been limited by small sample sizes, variable response rates in program director survey studies, or examination of attrition over a relatively short time frame.[3-5] Furthermore, the definition of "attrition" in the context of the resident workforce varies between studies. An accurate assessment of the extent to which attrition is occurring in obstetrics and gynecology residency programs can inform the development of strategies to reduce this instability. Therefore, we conducted a retrospective study of the American Medical Association's National GME Census to track the progress of a national cohort of obstetrics and gynecology residents who entered categorical training positions.

Materials and Methods

Our study sample included all categorical residents without prior US GME training who entered Accreditation Council on Graduate Medical Education (ACGME)-accredited obstetrics and gynecology residency programs in 2001. We analyzed annual GME Census records for 6 years, for each of these res-

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idents through the 2006-2007 survey, as most residents who had entered categorical obstetrics and gynecology training in 2001 could be expected to have completed their obstetrics and gynecology training by that time. For the purposes of our study, residents who remained in their initial programs for 4 years and completed obstetrics and gynecology training in 2005 comprised the "no attrition" group. All other residents (ie, who did not remain in their initial programs and/or complete obstetrics and gynecology training in 4 years) comprised the "attrition" group.

We further classified all residents in the "attrition" group as having "remained in obstetrics and gynecology" (changed obstetrics and gynecology program or were 'off cycle' within their original/different obstetrics and gynecology program), "changed specialty" (residents for whom there was documentation of their entry into another ACGME specialty-training program after leaving obstetrics and gynecology training prior to completion), or "discontinued GME" (residents reported as leaving their initial obstetrics and gynecology program prior to completion and for whom no further information in the GME Census was available for the years studied).

Bivariate tests measured the significance of associations between the "attrition" and "no attrition" groups and each of age, gender, race (white, underrepresented minorities [URM including black, Native Hawaiian/Pacific Islander, or American Indian/Alaskan native], Asian, other/unknown), Hispanic ethnicity, type of medical school (US/Canadian allopathic, osteopathic, international medical graduate [IMG]), and medical school graduation year). We used chi-square tests to measure the associations between "attrition" and each of the categorical predictor variables and used one-way analysis of variance to measure the difference in age between "attrition" and "no attrition." A multivariable binary logistic regression model identified independent predictors of "attrition" with "no attrition" as the reference group. Bivariate analyses also measured the significance of associations between the 3 categories of "attrition type" and predictor variables of interest described above. A multinominal logistic regression model identified independent predictors of each of these three "attrition" types compared with residents in the "no attrition" group.

For each of the logistic regression models, we report adjusted odds ratios (aOR) and 95% confidence intervals (95% CI). All P values are 2-sided. Statistical analyses were performed using SPSS version 14.0.2 (SPSS, Inc, Chicago, IL). This study was approved by the Human Studies Committee of the Washington University Medical Center.

Results

Over 95% of all obstetrics and gynecology residency program directors completed the 2001-2006 GME Census. Of 1055 residents reported entering categorical positions in obstetrics and gynecology programs without prior US GME training in 2001, 228 (21.6%) were classified in the "attrition" group. As shown in Table 1, each variable of interest, but gender, was associated with "attrition" in bivariate analyses. In addition, medical school graduation year was associated with age at entry into obstetrics and gynecology training ($r = -.520$, $P < .001$) and with medical school type, in which 94% of the 64 1971-1999 graduates had graduated from international medical schools, whereas 91% of the 956 2001 graduates had graduated from US and Canadian allopathic medical schools ($P < .001$). To reduce collinearity among predictor variables in the regression models, we excluded medical school graduation year from further analysis, because it was highly correlated with both age and medical school type.

Table 2 shows results of the multivariable logistic regression model to identify predictors of "attrition" compared with "no attrition" as the reference group. Residents who were older at entry into residency, URM race, Asian race, and graduated from an osteopathic or international medical school were more likely to be in the "attrition" group. Gender and Hispanic ethnicity were not significantly associated with attrition.

Table 1 shows the characteristics of the 228 residents in the "attrition" group according to attrition type. Age at entry into the program, race, ethnicity, medical school of origin, and graduation year were associated with "attrition type" ($P < .05$). Table 3 shows the demographic characteristics of the 133 residents who "remained in obstetrics and gynecology." The figure depicts the specialties entered for the 75 residents who "changed specialties."

Table 4 shows the results of the multinomial regression model to identify predictors of "attrition type" compared with remaining in the same obstetrics and gynecology program entered in 2001. Residents who left their initial program but "remained in obstetrics and gynecology" were older at entry into obstetrics and gynecology training, more likely to be URM or Asian race, and more likely to be international or osteopathic medical school graduates compared with residents who remained in the same obstetrics and gynecology program they entered in 2001 and graduated in 4 years. Residents whose Hispanic ethnicity was unknown were less likely to have "changed specialty" compared with non-Hispanic residents; and residents who were older at entry into obstetrics and gynecology training were more likely to have "discontinued GME" after leaving the obstetrics and gynecology program they entered in 2001.

Comment

Our analysis of the progress of the class of obstetrics and gynecology residents who entered training in 200l documented a substantial level of instability in obstetrics and gynecology residency programs. This is the first study to track the overall attrition rate for all types of attrition for a national cohort of obstetrics and gynecology residents over the duration of their training period. Our study cohort and design differed substantially from previously published studies of obstetrics and gynecology residents in several regards, as we tracked a single year of individual residents through 6 years of GME training rather than a cohort of residents at different lev-

TABLE 1
Characteristics of sample

	Total N = 1055 (%)	No attrition n = 827 (%)	Remained in OB-GYN n = 133	Changed specialty n = 75	Discontinued GME n = 20	*P* value[a]
Mean age at GME entry	28.1	27.7	30.0	28.1	29.8	< .001
Gender						
Male	269 (25.5)	198 (23.9)	41 (30.8)	24 (32.0)	6 (30.0)	.177
Female	786 (74.5)	629 (76.1)	92 (69.2)	51 (68.0)	14 (70.0)	
Race						
White	640 (60.7)	524 (63.4)	58 (43.6)	46 (61.3)	12 (60.0)	.004
URM	175 (16.6)	125 (15.1)	31 (23.3)	16 (21.3)	3 (15.0)	
Asian	156 (14.8)	110 (13.3)	32 (24.1)	10 (13.3)	4 (20.0)	
Others/unknown/missing	84 (8.0)	68 (8.2)	12 (9.0)	3 (4.0)	1 (5.0)	
Ethnicity						
Non Hispanic	229 (21.7)	161 (19.5)	39 (29.3)	23 (30.7)	6 (30.0)	.021
Hispanic	81 (7.7)	63 (7.6)	14 (10.5)	3 (4.0)	1 (5.0)	
Unknown/missing	745 (70.6)	603 (72.9)	80 (60.2)	49 (65.3)	13 (65.0)	
Medical school						
US/Canadian allopathic	884 (83.8)	721 (87.2)	85 (63.9)	63 (84.0)	15 (75.0)	< .001
Osteopathic	56 (5.3)	36 (4.4)	14 (10.5)	5 (6.7)	1 (5.0)	
IMG	115 (10.0)	70 (8.5)	34 (25.6)	7 (9.3)	4 (20.0)	
Medical school graduation year						
1971-1999	64 (6.1)	38 (4.6)	20 (15.0)	1 (1.3)	5 (25.0)	< .001
2000	35 (3.3)	24 (2.9)	7 (5.3)	4 (5.3)	0 (0.0)	
2001	956 (90.6)	765 (92.5)	106 (79.7)	70 (93.3)	15 (75.0)	

[a] Tests of significance are 2-tailed chi-square and one-way analysis of variance for age.

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els of training through a single academic year.[3-5] We evaluated 3 broadly conceived categories of "attrition" to fully describe the extent of the problem from the perspective of the individual obstetrics and gynecology program director. Our findings regarding the magnitude of attrition among obstetrics and gynecology residents should be considered in the context of other studies on attrition.

In 1989, Seltzer conducted a national survey of obstetrics and gynecology program directors, asking for the total number of residents at all levels who had left the programs over the prior 2 years. With a 90% response rate, she reported 6.9% left over 2 years, averaged to a 3.5% annual attrition rate across all training years. Although 88 of 1306 (1%) residents in that study reportedly transferred into other fields, they did not report the subsequent career paths of the remaining 211 departing residents.[3] Moschos reported the results of 2 surveys of obstetrics and gynecology program directors, conducted in 2001 and 2002 with 46% and 30% response rates, respectively. Program directors were asked to report the numbers of residents who left their programs between 1997 and 2001. The annual reported attrition rate in this study for residents in all years of training was also low at 3%.[4] The ACGME also collects data from all programs annually. For the 2004-2005 academic year during which most of our study group completed training, the ACGME reported that, for obstetrics and gynecology programs, 244 of 4754 (5.1%) residents did not complete training; of these, 19 were dismissed, 140 transferred, and 85 withdrew.[5] Providing annual attrition rates for the overall obstetrics and gynecology resident workforce (including senior residents who rarely leave) as described in each of the Seltzer, Moschos, and ACGME studies may underestimate the overall extent of attrition occurring among interns and second-year residents, as most attrition occurs in the first 2 years of training.[4] Furthermore, none of these studies described whether "transferring" residents moved to another obstetrics and gynecology program or changed specialties, or whether residents who were "dismissed" or "withdrew" pursued subsequent GME training elsewhere. Resident attrition is not a unique problem for obstetrics and gynecology; in the 2004-2005 academic year, the ACGME also reported attrition rates of 4.7% for family medicine, 2.1% for internal medicine,

TABLE 2
Independent predictors of attrition from OB-GYN training program entered in 2001

	aOR (95% CI)
Mean age at entry	1.09 (1.04-1.13)
Gender	
Female	(reference)
Male	1.31 (0.92-1.86)
Race	
White	(reference)
URM	2.13 (1.42-3.20)
Asian	1.86 (1.21-2.87)
Other/unknown/ missing	0.45 (0.12-1.72)
Ethnicity	
Non Hispanic	(reference)
Hispanic	2.08 (0.54-8.03)
Unknown/missing	0.75 (0.52-1.09)
Medical school	
US/Canadian allopathic	(reference)
Osteopathic	2.24 (1.23-4.10)
IMG	1.94 (1.21-10)

Logistic regression model comparing "attrition" with "no attrition" as the reference.

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TABLE 3
Characteristics of residents who 'remained in OB-GYN'

	Same program, off cycle n = 31 (%)	Changed OB-GYN program n = 102 (%)
Gender		
Male	10 (32.2)	31 (30.4)
Female	21 (67.8)	71 (69.6)
Medical school of origin		
US/Canadian allopathic	22 (71.0)	63 (61.8)
Osteopathic	3 (9.7)	11 (10.8)
IMG	6 (19.3)	28 (27.4)
Length of training		
3 years	6 (19.3)	0 (0)
4 years	0 (0)	92 (90.2)
4.5 years	0 (0)	2 (2.0)
5 years	24 (77.4)	4 (3.9)
Still in training in 2006	1 (3.2)	4 (3.9)

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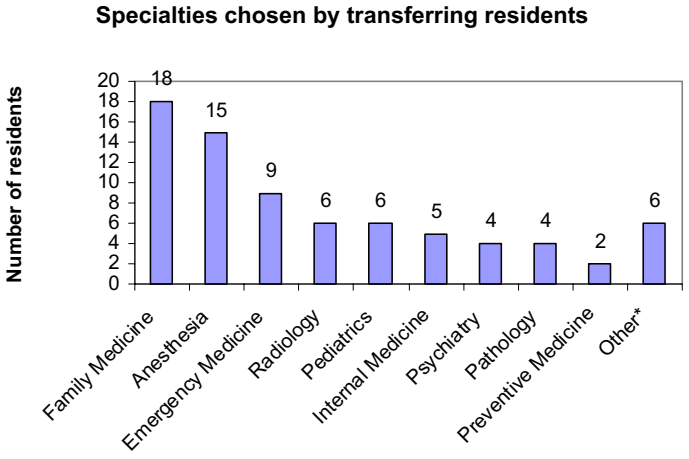
and 5.8% for general surgery.[5] The results of recently published studies seem to underestimate the magnitude of the problem that resident attrition creates for program directors. Our study indicates that the attrition rate of 21.6% that we observed for a given cohort of obstetrics and gynecology residents is much higher than the 5.1% annual rate reported by the ACGME for the 2004-2005 academic year for obstetrics and gynecology residents at all levels of training.

Our finding that Asian or URM race were each associated with increased likelihood of attrition overall, and of changing obstetrics and gynecology program or completing training "off cycle," in particular, is of concern. While it appears that, overall, these residents will remain in the obstetrics and gynecology workforce, these changes adversely affect their initial programs. Results of previous studies regarding a possible relationship between gender and attrition have been mixed.[4,6] Importantly, our finding that male gender was not associated with an increased likelihood of attrition suggests that, while it is challenging to attract male medical students into obstetrics and gynecology, those who enter obstetrics and gynecology training are just as likely as their female peers to remain in the programs they entered and complete training in a timely manner.

The associations observed between medical school of origin and likelihood of "attrition" should be of particular concern for our specialty. The proportion of non-US allopathic medical graduates among the overall obstetrics and gynecology resident workforce has steadily increased. In 1997, 91% of the obstetrics and gynecology resident workforce consisted of US/Canadian allopathic medical school graduates, 6.2% IMGs, and 2.8% osteopaths[7]; in 2006, 71.3% of the obstetrics and gynecology resident workforce consisted of US/Canadian allopathic medical school graduates, 21.2% IMGs, and 7.5% osteopaths.[8] Our findings of an increased risk of "attrition" overall among osteopaths and IMGs could reflect different learning needs of these graduates compared with US/Canadian allopathic graduates. As non-US allopathic medical school graduates will continue to comprise a substantial proportion of the obstetrics and gynecology resident workforce in coming years, recognition of the particular difficulties that may be faced by these "at risk" residents may allow program directors to design curricula to better support these residents and increase the chances that they will complete training in a timely manner in their initial obstetrics and gynecology programs. We recognize that residents who were included in "attrition" but "remained in obstetrics and gynecology" will not necessarily have a negative impact on the size of the emerging obstetrics and gynecology workforce. However, from a program director's perspective, these residents can pose challenges, as program directors must work to minimize the impact of schedule changes and work load shifts on other residents as well as integrate "replacement" residents into their programs. Although beyond the scope of our study, reasons for atypical training cycles might include academic difficulties necessitating longer training periods for remediation as well as extensions of training due to leaves of absence for illness, maternity, or other personal reasons.

FIGURE
Distribution of residents who 'changed specialties'



*Other = 1 each of Surgery, Ophthalmology, Radiation Oncology, Physical Medicine & Rehabilitation, Nephrology, and Hematology Oncology

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Forty-five percent (102/228) of residents in the "attrition" group transferred to another obstetrics and gynecology program. Family issues, dissatisfaction with the initial program, involuntary dismissal, and other "miscellaneous" reasons were cited by Moschos as reasons for leaving the initial obstetrics and gynecology program.[4] Additionally, residents may have academic/professional problems in their programs and may be allowed to voluntarily resign to train in a different program where they might be more successful. The ACGME reported only 19 of 244 (7.8%) departing residents as having been "dismissed" in the 2004-2005 academic year.[5] The reasons for changing programs also may vary by whether the program director or the departing resident is the source of information. In a study by van Zanten et al of residency programs with at least 25% IMGs, they found US graduates with a lower rate of termination and a higher transfer rate to other programs compared to IMGs.[10] Although the van Zanten et al study was not specifically focused on obstetrics and gynecology programs, the implications of these findings are likely the same for obstetrics and gynecology programs.

Our "attrition" group of residents was a heterogenous group that included some residents who remained in obstetrics and gynecology training as well as

TABLE 4
Independent predictors of 3 'attrition types' each compared with 'no attrition' (N = 1055)

	Remained in OB-GYN n = 133 aOR (95% CI)	Changed specialty n = 75 aOR (95% CI)	Discontinued GME n = 20 aOR (95% CI)
Age at entry to GME	1.106 (1.056-1.159)	1.026 (0.955-1.102)	1.111 (1.016-1.215)
Gender			
Male	(reference)	(reference)	(reference)
Female	0.816 (0.523-1.273)	0.646 (0.378-1.103)	0.858 (0.311-2.365)
Race			
White	(reference)	(reference)	(reference)
Others/unknown	0.451 (0.095-2.149)	0.525 (0.046-5.992)	0.507 (0.007-38.305)
URM	2.833 (1.702-4.717)	1.599 (0.863-2.964)	1.188 (0.323-4.374)
Asian	2.696 (1.586-4.584)	0.992 (0.472-2.085)	1.587 (0.471-5.352)
Ethnicity			
Non Hispanic	(reference)	(reference)	(reference)
Hispanic	3.806 (0.791-5.997)	0.610 (0.051-7.347)	1.155 (0.014-97.231)
Unknown/missing	0.895 (0.554-1.444)	0.557 (0.320-0.970)	0.795 (0.272-2.326)
Medical school			
US/Canadian allopathic	(reference)	(reference)	(reference)
IMG	2.818 (1.628-4.878)	0.849 (0.351-2.055)	1.667 (0.460-6.042)
Osteopathic	2.958 (1.459-5.997)	1.581 (0.585-4.273)	1.154 (0.144-9.228)

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residents who left the specialty entirely. It was interesting to find that the residents who "changed specialties" were similar in most regards to residents who stayed in their original obstetrics and gynecology training program and finished in 4 years. Although residents of unknown ethnicity were less likely to have "changed specialties," most program directors did not report Hispanic ethnicity in the census; thus, we cannot make conclusions about this demographic with regards to attrition. The only variable associated with discontinuing GME training was older age at entry into obstetrics and gynecology. Here, too, we do not know whether residents were dismissed or voluntarily left GME for other reasons.

We observed that 29 (39%) of the 75 residents who "changed specialties" transferred into primary care (including family medicine, internal medicine, and pediatrics), more than twice the rate reported in a study by Gilpin, in which only 15% of transferring obstetrics and gynecology residents transferred into a primary-care specialty.[11] Of note, the Gilpin study, a 2003 survey of obstetrics and gynecology program directors, and our own study report similar rates of transferring from 1 obstetrics and gynecology program to another—60% vs 57%, respectively. Only 1 resident in our study changed to surgery; however, 45 (61%) of the 75 residents who "changed specialty" transferred to specialties considered to be "controlled lifestyle,"[9] which tend to be more competitive and may require additional years of training. So, for these residents, the extra time for additional training does not appear to be a disincentive to changing specialties.

Our study has some strengths and limitations. A strength of our study is that we utilized a national database with a very high annual response rate by obstetrics and gynecology residency program directors. As there were 1125 obstetrics and gynecology positions in the 2001 National Residency Matching Program (NRMP),[12] our study sample included 93.8% (1055/1125) of all incoming obstetrics and gynecology residents. Tracking a single class of incoming first-year residents over time provides a unique perspective on attrition in the context of the full duration of categorical GME training for obstetrics and gynecology; as such, this study can serve as a template for others interested in specialty-specific attrition. Our study also can serve as a benchmark against which to compare attrition before and after the era of the 80-hour workweek and assess the possible impact of strategies implemented by obstetrics and gynecology program directors to decrease resident-workforce attrition.

A limitation of our study is the lack of information on causes for attrition from the initial obstetrics and gynecology training program. As noted earlier, it is very difficult to get accurate information on reasons for attrition, and reporting bias affects the results reported in published studies. All mechanisms for tracking the course of GME training have depended upon the program directors' mandatory or voluntary reporting of information about trainees. The definitions of "transferred" vs "withdrew" may vary between program directors. Reporting bias was likely a factor for our study, as only 5 of the 228 residents (2.2%) in the "attrition" group were listed as "dismissed," well below the rate reported by the ACGME. As we have no follow-up information on the 20 residents who "discontinued GME," it is possible that some program directors might not have reported residents has having been "dismissed," but simply no longer listed them as continuing in their program.

Our findings may be utilized to inform efforts to maximize retention of entering residents and improve the overall efficiency of obstetrics and gynecology training. Recognizing that certain groups may be at risk for attrition can alert program directors to the unique educational needs of these residents and help them to provide the support needed for these residents' success. Additionally, careful career counseling and meaningful educational experiences in obstetrics and gynecology for students can help them make more fully informed, durable specialty choices. Finally, program directors should make a concerted effort to provide accurate, updated information for the GME Census annually, as these data collectively provide valuable information about attrition issues. ■

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