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Promotion Rates for Assistant and Associate Professors in Obstetrics and Gynecology

William F. Rayburn, MD, MBA¹, Ronald M. Schrader, PhD², Anne M. Fullilove, MIS¹, Teresa L. Rutledge, MD¹, Sharon T. Phelan, MD¹, and Yolanda Gener, DMD³

¹Department of Obstetrics and Gynecology, University of New Mexico School of Medicine, Albuquerque, NM

²Clinical and Translational Science Center, University of New Mexico School of Medicine, Albuquerque, NM

³Association of American Medical Colleges, Washington, DC

Abstract

OBJECTIVE—To estimate promotion rates of physician faculty members in obstetrics and gynecology during the past 30 years

METHODS—Data were collected annually by the Association of American Medical Colleges from every school between 1980 and 2009 for first-time assistant and associate professors to determine whether and when they were promoted. Data for full-time physician faculty were aggregated by decade (1980–1989, 1990–1999, 2000–2009). Faculty were included if they remained in academia for 10 years after beginning in rank. Data were analyzed by constructing estimated promotion curves and extracting 6-year and 10-year promotion rates.

RESULTS—The 10-year promotion rates (adjusted for attrition) declined significantly for assistant professors from 35% in 1980–89 to 32% in 1990–99 to 26% in 2000–09 ($p < 0.001$); and for associate professors from 37% to 32% to 26% respectively ($p < 0.005$). These declines likely resulted from changes in faculty composition. The most recent 15 years saw a steady rise in the proportion of entry-level faculty who were women (now 2:1) and primarily on the non-tenure track. The rising number of faculty in general obstetrics and gynecology had lower promotion probabilities than those in the subspecialties (OR = 0.16, $p < 0.001$). Female faculty on the non-tenure track had lower promotion rates than males in the non-tenure track, males in the tenure track, and females in the tenure track (ORs = 0.8, $p < 0.01$).

CONCLUSION—A decline in promotion rates during the past 30 years may be attributable to changes in faculty composition.

Corresponding author: William F. Rayburn, MD, MBA, Department of Obstetrics and Gynecology, MSC10 5580, 1 University of New Mexico, Albuquerque, NM 87131; Phone: 505-272-6372, Facsimile: 505-272-3918; wrayburn@salud.unm.edu.

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Introduction

Approximately 10 percent of all Fellows and Junior Fellows in practice of the American College of Obstetricians and Gynecologists currently hold faculty positions in U.S. medical school departments.¹ This number is expected to increase. Faculty promotion has traditionally been viewed as a stabilizing component to an academic department's vitality. Promotion is an important measure of a department's ability to attract, encourage, financially support, and retain faculty who contribute to the teaching, scholarly, patient care, and service missions of academic medicine.

To provide benchmark information against which medical schools can compare their own promotion data, the Association of American Medical Colleges (AAMC) published an *Analysis in Brief* in 2010 which examined promotion outcomes of all faculty who became either assistant professors or associate professors for the first time between 1967 and 1997.² This report documented declining promotion rates and increasing average times to promotion for all medical school faculty, particularly women.² Those results were consistent with previous literature suggesting that women faculty are more likely than men to face a variety of challenges, which may include work-life balance issues, less mentoring, and unconscious gender bias.^{3,4}

Findings from that AAMC analysis have direct importance to academic departments of obstetrics and gynecology. We reported in 2010 that department sizes in obstetrics and gynecology nearly doubled in the past 30 years, largely because more clinical faculty are necessary to assume additional clinical responsibilities.¹ Furthermore, half of the current clinical faculty are now women with most being at lower rank levels.¹ For these reasons, the objective of the present investigation was to estimate trends in the promotion rates of first-time assistant professors and associate professors to determine whether these trends changed in recent years according to gender and track.

Materials and Methods

Faculty

This project was approved by the University of New Mexico Human Research and Review Committee (HRRC 08–442) and by the American Institutes for Research (approved number EX0008), the AAMC Institutional Review Board. Data about faculty in obstetrics and gynecology came from the AAMC's Annual Faculty Roster. This national database contains demographic background and employment records for more than 95 percent of full-time (1.0 full-time equivalent) faculty members at all accredited U.S. medical schools from academic year 1978–79 onward.⁵ We tracked promotions of MD, MD/PhD, or DO faculty only, rather than those with a PhD alone or other non-physician faculty. The data set did not include faculty names. Any information about voluntary or part-time faculty was excluded.

Our analysis began with academic year 1979–80, when the AAMC began to examine faculty promotion rates and ended with completion of the most recent academic year (2008–09) for which data were available. The AAMC Faculty Roster uniquely identifies each individual and tracks each individual at whatever medical schools the individual is on the faculty. The

roster helps ensure the accuracy of these unique identifiers with an algorithm that matches new information submitted on a faculty member with existing information on that member.

The duration in rank for a first-time faculty member was tracked from the beginning of his/her initial appointment as an assistant professor until promotion to the associate professor level or from his/her beginning as an associate professor until promotion to full professor. Faculty who left academia before promotion were retained in the data set but contributed censored observations. Because over half of medical schools do not have a promotion and tenure process that is simultaneous, we referred only to the promotion process, independent of its relationship to tenure.² Anyone who was tenure-eligible or already tenured was classified on the tenure track.

We cross-classified first-time faculty into the following groups: three decade cohorts (1980–1989, 1990–1999, and 2000–2009), four disciplines (general ob-gyn and the three board-certified subspecialties: gynecologic oncology, maternal-fetal medicine, and reproductive endocrinology and infertility), gender (female and male faculty), rank (assistant professor and associate professor), and track (tenure track, and non-tenure track).¹ Female pelvic medicine and reconstructive surgery was not recognized as a subspecialty by the AAMC during this period because of its lack of board certification process. Faculty trained in that area were, therefore, included in the general ob-gyn discipline group.

Promotion probability curves and rates

We chose promotion probability curves to be primary endpoints to measure. In order to properly account for faculty who left academia within the first 10-year window, discrete time survival analysis was used to calculate yearly promotion probability estimates (i.e., hazard functions) and cumulative promotion probability curves (i.e., survival curves) for each year in the first 10 years. Promotion curves calculated in this manner could be regarded as attrition-adjusted promotion curves.

We also selected promotion rates at 6 years and 10 years as secondary endpoints for promotion. Those two periods are critical in a faculty member's career development. As a minimum, we anticipated that an entry-level faculty member would become board-certified in obstetrics-gynecology within five years and be considered for promotion to the associate professor level between 6 and 10 years.

Statistical analysis

Calculations were performed in SAS (version 9.2; SAS Institute Inc., Cary, NC) and R (R Development Core Team, 2011, R: A language and environment for statistical computing, R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL <http://www.R-project.org/>) software. To model the promotion probability at each year that a faculty member could be promoted, a polynomial (up to cubic) was selected to capture nonlinear patterns. Computations were performed using logistic regression.^{7,8} Two-way interactions were fit to allow each decade cohort, gender, discipline, and track to have a unique shape of hazard function. The two levels of rank were fit separately. This model had a large number of terms to model all 24 hazard functions for each rank, so variable selection (stepwise) methods were employed to reach an interpretable subset. While it is possible to

use hazard ratios instead of odds ratios (OR) by using a complementary log-log link instead of a logit link, the fit to data was superior with the logit link. Wald chi-squared tests were used to measure the significance of effects. A p-value < .05 was considered to be statistically significant. A 95% Wald confidence interval was calculated for each odds ratio and promotion rate predicted value.

Results

First-time assistant and associate professors

Responses were received from all U.S. medical schools for each academic year from 1980 to 2009. The number of first-time faculty per year doubled during that 30-year period, and consisted predominantly of those in general obstetrics and gynecology. A total of 6,273 full-time physician faculty members in obstetrics-gynecology became first-time assistant (n = 4,349) or associate (n = 1,924) professors.

Table 1 displays the total number of faculty who became first-time assistant professors and first-time associate professors in each discipline during this 30-year period. Those in general obstetrics and gynecology constituted the highest percentage of first-time faculty who were either assistant (74.1%) or associate (53.9%) professors. A higher proportion of male than female faculty were in subspecialties than were in general obstetrics and gynecology as first-time assistant professors (33.3%, 745/2239 versus 18.2%, 384/2110; $p < .01$). A higher percentage of first-time associate professors were also subspecialists among the men than women faculty (48.6%, 650/1,337 versus 40.2%, 236/587; $p < .01$).

The number of first-time assistant and associate professors per year increased consistently between 1980 and 2009, especially among women. By 2009, the ratio of female-to-male faculty was 2:1 for first-time assistant professors and 1:1 for new associate professors. As shown in Figure 1, the increase in faculty in either rank was almost solely due to more being on the non-tenure track. The early 1990s was an era in which the number of first-time assistant and associate professors on the non-tenure track began to rise, while those on the tenure track continued to remain constant during this 30-year period. This difference between faculty in tenure status became more apparent in the most recent decade.

Promotion curves

Figure 2 displays the overall promotion curves for faculty members according to years as first-time assistant and associate professors. Promotion rates declined significantly by decade for assistant professors ($p < .001$) and for associate professors ($p < .005$). Recognizing this finding, estimated promotion curves for first-time faculty were determined by including consideration of discipline, gender, and track. No decade effect was found, so promotion curves for assistant professors and for associate professors were drawn using the combined data for all 30 years while factoring in discipline (generalist, subspecialist), gender, and track. The rising number of faculty in general obstetrics and gynecology had lower promotion probabilities than those in the subspecialties (OR = 0.16, $p < 0.001$).

Estimated promotion curves of first-time assistant professors are shown in Figure 3. Faculty in general obstetrics and gynecology were less likely to be promoted than those in any of the

subspecialties, regardless of gender. Individual promotion curves of the three subspecialties did not differ significantly from each other ($p = 0.08$). When data from the three specialties were combined and compared to the generalists, while factoring in gender and tenure track, there was a significantly lower rate of promotion for those in general obstetrics and gynecology ($p < 0.001$). The exact odds ratio was dependent upon the number of years post-appointment, with 6 years being an important mid-point; [6 year OR = 0.16 (95% CI 0.09 to 0.29) for generalists vs. subspecialists]. In all cases (same discipline and track), women faculty had a lower promotion probability (6 year OR = 0.8, 95% CI 0.69 to 0.93; $p = 0.004$). After controlling for gender and discipline, tenure track faculty had higher promotion probability than non-tenure track faculty (6 year OR = 1.31, 95% CI 1.12 to 1.53; $p < 0.001$). These differences are clearly reflected in Figure 3 showing that male faculty who were subspecialists on the tenure track were most likely to be promoted.

No differences were found in estimated promotion curves for first-time associate professors in the different disciplines ($p = 0.29$). For that reason, Figure 4 displays estimated promotion curves for associate professors, according to gender and track only. Tenure track faculty were significantly more likely to be promoted than non-tenure track faculty, particularly for men (6 year OR = 1.93; $p < 0.001$); for women, there was a tenure versus non-tenure track difference if all years were compared simultaneously ($p = 0.022$), but not for 6 years (OR = 1.2, 95% CI 0.81 to 1.78; $p = 0.37$). The promotion curves for tenure track versus non-tenure track in Figure 4 are much closer together for women than for men. Similar to the promotion of assistant professors, tenure track women faculty were less likely to be promoted than tenure track men (for all years OR = 0.62, 95% CI 0.45 to 0.85; $p = 0.003$). Gender was not a significant factor in promotion on the non-tenure track (all years OR = 1.00, 95% CI 0.71 to 1.40; $p > 0.99$).

Promotion rates

Predicted promotion rates for first-time assistant professors ranged from 8.2% to 31.9% at the first 6 years and from 25.8% to 46.7% for the first 10 years. The 10-year promotion rates (adjusted for attrition) declined significantly for all first-time assistant professors from 35% in 1980–1989 to 32% in 1990–1999, and to 26% in 2000–2009 ($p < 0.001$). Rates were highest if the faculty member was a man on the tenure track and lowest if the faculty member was a woman on the non-tenure track. Female faculty on the non-tenure track generally had lower promotion rates than the other three groups (male non-tenure track; male tenure track; female tenure track), with ORs 0.8 and $p < 0.01$. The rate of promotion was also higher among faculty in any subspecialty than in general obstetrics and gynecology, regardless of gender or track.

Unlike assistant professors, promotion of associate professors was not influenced by discipline. Rates continued to vary widely at 6 years (12.2% to 24.8%) and at 10 years (25.5% to 40.5%). The 10-year promotion rates (adjusted for attrition) declined significantly for all associate professors from 37% in 1980–1989 to 32% in 1990–1999 and to 26% in 2000–2009 ($p < 0.005$). Rates were highest if the faculty member was a man on a tenure track. Men were more likely than women to be promoted by 6 years or 10 years. Promotion

rates for women did not differ between the generalist or subspecialty disciplines, regardless of tenure status.

Discussion

Faculty promotion has served as recognition of faculty who provide excellence in many ways to an institution and as a stabilizing influence on department vitality. Growth in the number of first-time faculty in obstetrics and gynecology emphasizes an increasing pipeline for future promotions. Our findings document declining promotion rates during the three decades, with rates being considered by many to be lower than anticipated. Such failure to promote faculty members can be disconcerting, especially if promotions are infrequent or delayed because of unrealized or unrecognized career-building opportunities.

A feature of the present investigation was our ability to distinguish between faculty who were either in the board-certified subspecialties or in general obstetrics-gynecology. Subspecialists had protected time in fellowship training to learn to seek grant funding and conduct research which are important measureable endpoints for promotion on the tenure track. Findings in the present study showed that faculty in general obstetrics-gynecology were less likely to be promoted. Contributions of faculty engaged in patient care and teaching may not be as well defined in promotion guidelines and can be more difficult to measure compared with research grants and publications. If academic advancement is slower for clinician educators, reward structures should change to recognize excellence in clinical and educational endeavors.⁹

Women represent an increasing proportion of faculty, especially first-time assistant or associate professors.³ The female-to-male ratio of new obstetrics-gynecology faculty members increased steadily to now 2:1. The success and growth of women entering academic obstetrics and gynecology is tempered by the observation of lower promotion rates seen in our study. The reason for this discrepancy remains unclear, yet most previously reported data suggest institutional barriers to success, fewer being on the tenure track, conscious gender bias, and gender differences in career and life goals.^{3,10-12} Future research should evaluate the professional and personal aspirations of women and those of the newest generation of faculty, since promotion may remain difficult, especially on the non-tenure track.¹¹

An important observation was that the number of first-time ob-gyn faculty in tenure track positions plateaued with no growth during the past 20 years. Tenured faculty are more likely to be promoted especially in the subspecialties where there are fewer faculty and where research is emphasized and measureable.¹¹ For every new tenure-track faculty member, there are now three who are non-tenure track. This finding is identical to that reported by the AAMC in which 41% of newly hired full-time clinical M.D. faculty in 1985 were on tenure-eligible tracks compared with 28% in 2004.² This trend toward appointing clinical faculty on the non-tenure track will likely continue as the proportion of tenured faculty grows smaller with the retirement of those who hold tenure.

What constitutes a reasonable promotion rate? Compared with faculty in other combined clinical departments over approximately the same period, those in obstetrics and gynecology were as likely to be promoted. Using the same AAMC Faculty Roster data for all clinical physician faculty, Liu and Alexander reported that for all first-time assistant professors, the average 10-year promotion rates declined from 40.4% for the 1977–1986 cohort to 32.8% for the 1987–1996 cohort. For all first-time associate professors, the average promotion rate during their first 10 years declined across the groups (i.e., 42.6% for 1977–1996 to 38.6% for 1987–1996).

Why was there a shift in composition of additional faculty? During this 30-year period, medical schools expanded their clinical enterprises with the hiring of large numbers of faculty whose primary responsibility was patient care. These first-time faculty were increasingly appointed to non-tenure positions which impacted the numbers and percentages greatly. Such changes reflected an evolution of a financial model rather than the traditional academic model at most medical schools, since there was a more commonly accepted expectation for faculty members to be self-sufficient.¹³

This change in composition in faculty reflects a workplace that has become more complex, resulting in broadened demands for teaching, patient care, research, and administration. Despite the changing workplace environment, our findings support the impression that a typical faculty member's career trajectory is still quite linear and likely follows decades-old promotion policies. While such promotion policies may be acceptable to many, it is our supposition that there is great variation in faculty tracks and policies across institutions. Furthermore, compensation may be more on clinical productivity rather than on academic accomplishment. Tenure has less retroactiveness, since it does not guarantee security of employment or salary level.

A few limitations with use of the AAMC Faculty Roster data deserve our attention. The AAMC data do not allow for comparing specific promotion criteria between schools and what are the levels of support and mentoring for junior faculty. Secondly, the AAMC data included full-time faculty only. A part-time faculty member is defined by the Liaison Committee on Medical Education as being 0.75 FTE (full-time equivalent) or less, recognizing that this may still mean working more than 40 hours per week.¹⁴ Part-time faculty positions in obstetrics-gynecology are becoming more prevalent especially for those women starting families as they enter academia.¹ A new report released by the AAMC contains salient themes which provide insight into the issues that comprise workplace satisfaction for part-time faculty and to explore the unique concerns that they face.¹⁴ Thirdly, there were insufficient data about MD/PhD faculty and none about those in female pelvic medicine and reconstructive surgery to draw any conclusions about promotion rates. Lastly, this de-identified data set excluded a number of fields such as the medical school's name, ownership states (public vs. private), and regional location.

In summary, this study provides historical insight into the promotion of faculty in academic obstetrics and gynecology. When applied to the growing number of junior faculty, chairpersons and senior department faculty members need to address reasons for any lack of timely promotion and how to best align entry-level or junior faculty members with clear

expectations about advancement. We should focus more objectively on crediting for contributions in quality and safe patient care, excellence in education, revenue generation, and administrative contributions. It is also important to recognize that flexible work hours and lifestyle are also important for job satisfaction, with promotion being less important to certain faculty. As we plan ahead, a clearer understanding as to how to create satisfying careers will require more regular reviews of faculty members' performances as they progress along their individual pathway to advancement.

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References

1. Rayburn WF, Anderson BL, Johnson JV, McReynolds MA, Schulkin J. Trends in the academic workforce of obstetrics and gynecology. *Obstet Gynecol.* 2010; 115(1):141–146. [PubMed: 20027046]
2. Liu, CQ.; Alexander, H. AAMC Analysis in Brief. Vol. 9. Washington DC: Association of American Medical Colleges; 2010. Promotion rates for first-time assistant and associate professors appointed from 1967 to 1997; p. 1-2.
3. Wright AL, Schwindt LA, Bassford TL, et al. Gender differences in academic advancement: patterns, causes, and potential solutions in one U. S. college of medicine. *Acad Med.* 2003; 78:500–508. [PubMed: 12742788]
4. Corrice, AM. AAMC Analysis in Brief. Vol. 9. Washington DC: Association of American Medical Colleges; 2009. Unconscious bias in faculty and leadership recruitment: a literature review; p. 1-2.
5. Higgins, EJ.; Jolly, P. An assessment of the accuracy of the faculty roster at selected medical schools. Washington, DC: Association of American Medical Colleges; 1986.
6. Rayburn WF, Lang J, Fullilove AM, Phelan ST, Rayburn DT, Schrader R. Retention of entry-level faculty members in obstetrics and gynecology. *Am J Obstet Gynecol.* 2011; 204:540.e1–540.e 6. [PubMed: 21419389]
7. Singer, JD.; Willett, JB. Applied longitudinal data analyses: modeling change and event occurrence. New York: Oxford University Press; 2003.
8. Efron B. Logistic regression, survival analysis, and the Kaplan-Meier curve. *J Am Stat Assoc.* 1988; 83:414–25.
9. Buckley LM, Sanders K, Shih M, Hampton CL. Attitudes of clinical faculty about career progress, career success and recognition, and commitment to academic medicine – results of a survey. *Arch Intern Med.* 2000; 160:2625–9. [PubMed: 10999976]
10. Nattinger A. Promoting the career development of women in academic medicine. *Arch Intern Med.* 2007; 167:323–4.. [PubMed: 17325290]
11. Bunton, SA.; Corrice, AM.; Mallon, WT. Clinical faculty satisfaction with the academic medicine workplace. Washington DC: Association of American Medical Colleges; 2010.
12. Wenneras C, Wold A. Nepotism and sexism in peer-review. *Nature.* 1997; 387:341–3. [PubMed: 9163412]
13. Bunton SA, Mallon WT. The continued evolution for faculty appointment and tenure policies at U. S. medical schools. *Acad Med.* 2007; 82:281–9. [PubMed: 17327718]

14. Bunton, SA.; Corrice, AM. An exploration of part-time U. S. medical school faculty: a thematic overview. Washington DC: Association of American Medical Colleges; 2011.

B

Fig. 1. Number of first-time assistant professors (A) and first-time associate professors (B) beginning in each academic year, by track. The bottom line of each colored band is total for women, the top line is total for genders combined; the vertical width of the colored band gives total for men. NOTE: The dashed horizontal lines represent reference points for 50 first-time assistant professors per year (A) and 30 first-time associate professors per year (B).

A **B**

Fig. 2.
Estimated promotion curves by decade for first-time assistant (A) and first-time associate professors (B), with no adjustment for discipline, gender, and track

Fig. 3.
Estimated promotion curves for first-time assistant professors according to discipline, gender, and track, 1980–2009

Fig. 4.
Estimated promotion curves for first-time associate professors according to gender and track, 1980–2009

Table 1

Distribution of Faculty Who Became First-Time Assistant Professors and First-Time Associate Professors, According to Discipline, Track, and Gender, 1980–2009

Discipline	First-Time Faculty			
	Assistant professors n (% total)		Associate Professors n (% total)	
General obstetrics and gynecology	3,220	(74.1)	1,038	(53.9)
Nontenure track	2,193	(50.4)	659	(34.2)
Women	1,201	(27.6)	220	(11.4)
Men	992	(22.8)	439	(22.8)
Tenure track	1,027	(23.7)	379	(19.7)
Women	525	(12.1)	131	(6.8)
Men	502	(11.6)	248	(12.9)
Maternal–fetal medicine	548	(12.7)	421	(21.9)
Non-tenure track	245	(5.7)	204	(10.6)
Women	112	(2.6)	75	(3.9)
Men	133	(3.1)	129	(6.7)
Tenure track	303	(7.0)	217	(11.3)
Women	92	(2.1)	52	(2.7)
Men	211	(4.9)	165	(8.6)
Reproductive endocrinology	328	(7.6)	243	(12.7)
Nontenure track	127	(3.0)	102	(5.3)
Women	50	(1.2)	27	(1.4)
Men	77	(1.8)	75	(3.9)
Tenure track	201	(4.6)	141	(7.4)
Women	53	(1.2)	24	(1.3)
Men	148	(3.4)	117	(6.1)
Gynecologic oncology	253	(5.9)	222	(11.6)
Nontenure track	89	(2.1)	80	(4.2)
Women	30	(0.7)	24	(1.3)
Men	59	(1.4)	56	(2.9)
Tenure track	164	(3.8)	142	(7.4)
Women	47	(1.1)	34	(1.8)
Men	117	(2.7)	108	(5.6)
TOTAL	4,349	(100)	1,924	(100)