

Influences on Medical Student Career Choice

Gender or Generation?

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Hypothesis: We hypothesized that increased enrollment of female medical students and different priorities of the current generation of students would be important influences on the declining interest in surgical careers.

Design: Students scored statements on surgical careers on 5-point Likert scales regarding agreement and whether these statements encouraged them to pursue a career in surgery. Data were analyzed using the Mann-Whitney *U* test. Qualitative comments were iteratively coded using a constant comparative method.

Setting: Nine US medical schools.

Participants: A Web-based survey on the Association for Surgical Education server was e-mailed to medical students. A total of 1300 of the 1365 respondents stated their sex.

Main Outcome Measures: The survey asked questions pertaining to surgical life, surgical residency, surgeons as influence, equity, family, and other influences.

Results: A total of 680 (52%) of the 1300 respondents were male. Men and women disagreed about whether

surgeons lead well-balanced lives (68% and 77%, respectively) and saw this as a deterrent. A total of 35% of women (3% men; $P < .001$) were discouraged by a lack of female role models. Compared with students unlikely to study surgery, lower percentages of male (74% vs 65%) and female students (85% vs 58%) likely to study surgery agreed that career choice was influenced by their decision to have a family ($P = .01$ for men, $P < .001$ for women). Of medical students who agreed that their skill sets were compatible with surgical careers, similar percentages were likely (30% men vs 24% women) and unlikely (49% men vs 54% women) to study surgery. All differences between men and women were less apparent when students likely to study surgery were compared with students unlikely to study surgery.

Conclusions: The decision to have a family was a more significant influence for women than men, but family and lifestyle priorities were also important to male students, supporting our hypothesis that generation and gender are both important influences on career choices.

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ALTHOUGH THE 2004 SURGERY residency match results might have suggested a turnaround in the declining interest in medical student careers in surgery, general surgery matched 40 fewer US seniors in 2005, with a residency fill rate that decreased from 99.8% in 2004 to 99.3% in 2005, reversing the upward trend that had begun in 2002.¹ In the past, many authors have examined the factors that influence career choice in medical students.²⁻¹² These studies characterized students most likely to pursue a career in surgery as being interested in performing procedures, disinterested in primary care, desiring leadership roles and a prestigious career, and willing to sacrifice lifestyle to obtain their goals. Much has been written about the lifestyle priorities of the current genera-

tion of medical students who value protected time for family and friends in their working lives.^{2,4,6,13-15} Many students today have more diverse interests; therefore, when they apply for postgraduate

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training, they may prefer specialties in which a more flexible approach to training is an option to allow them to integrate other professional and family interests.^{15,16} However, some attribute the declining interest in general surgery at least in part to the increased number of women in medical schools.^{15,17} Women now constitute nearly half of medical students, and female sex has been demonstrated to be a strong negative predictor of pursuing a career in general surgery, with women rep-

representing only 24% of those registered in US general surgery training programs.¹⁸ Since a substantial portion of female students enter medical fields that do not offer a controllable lifestyle, in particular obstetrics-gynecology, a specialty with lifestyle demands similar to surgery,^{2,19} it seemed more reasonable to hypothesize that both gender and generational differences would be important influences on medical student career choices.

METHODS

The Association for Surgical Education (ASE) established an ad hoc committee to determine whether the declining interest in a career in surgery was related to gender or generational differences. The members of the ASE Curriculum Committee distributed a Web-based survey by e-mail to medical students in all years of training in 9 US medical schools (Case Western Reserve University Medical School [Cleveland, Ohio], Drexel University College of Medicine [Philadelphia, Pa], Jefferson Medical College [Philadelphia], Stanford University School of Medicine [Palo Alto, Calif], University of Tennessee College of Medicine [Chattanooga], University of Texas School of Medicine [Houston], University of Texas Southwestern School of Medicine [Dallas], University of Utah School of Medicine, and University of Virginia School of Medicine), regardless of expressed career interest. The survey (**Figure**) requested minimum demographic information and then asked questions pertaining to surgical life, surgical residency, surgeons as influence, equity, family, and other influences. Each survey question consisted of two 5-point Likert scales: one statement to evaluate agreement or disagreement and another to determine how much influence that statement had on encouraging or discouraging the individual toward a surgical career. An opportunity was provided to enter written comments in response to open-ended questions in each section. The survey was piloted on students in all years of medical school at Drexel University College of Medicine and at the University of Virginia. The data were housed in a password-protected database on the ASE server. Institutional review board approval was obtained from each of the 9 participating institutions before commencing the study. There were no individual or institutional identifiers.

Quantitative data were analyzed using the χ^2 test. Continuous data were found to have a nonnormal distribution and were analyzed using the Mann-Whitney *U* test. All variables were 2-tailed, and $P < .05$ was considered statistically significant. Two qualitative researchers (J.M.N.-Y. and Jo Oppenheimer, PhD) independently read and coded the written responses using constant comparisons of data and then engaged in joint discussions of emerging categories and ongoing revision of categories as patterns in the responses became evident. Discrepancies in the coding structure were resolved by consulting the data and reaching agreement as to the relationship of the data to the emerging categories and themes.

RESULTS

A total of 1365 responses were obtained from the 9 US medical schools. The response rate is unavailable, because the method of distribution precluded calculation of the total respondent denominator. Sixty-five students did not state their sex and were excluded from further analysis; 680 (52%) of the remaining 1300 respondents were male and 620 (48%) were female. Female respondents were more likely to be in the youngest cat-

Survey
Demographics
School
Age
Race
Married/single
Parent
Year of medical school
Estimated debt at end of medical school
Pre/during/post surgical clerkship
Likelihood of choosing surgery on a 1- to 5-point scale
Likelihood of choosing a surgical subspecialty on a 1- to 5-point scale
Please comment on why you are more likely to choose a subspecialty than general surgery
<i>For each of the following statements please indicate whether you agree or disagree. Then indicate whether the statement encourages you toward or discourages you from a career in surgery.</i>
Surgical Life
1. Surgeons enjoy prestige
2. Surgeons witness the results of their work immediately
3. More than other physicians, surgeons appear happy in their work
4. Surgeons have a higher income potential than nonsurgeons
5. Surgeons have rewarding careers
6. Surgeons who have completed their residency lead well-balanced lives
Residency Issues
7. The lifestyle of surgical residents is well balanced
8. Surgical residency places emphasis on service at the expense of education
9. Surgical residency is more demanding than residency in other specialties
Surgeons as Influence
10. Surgeons provide good role models for medical students
11. Clinical clerkship is an important influence on career choice
12. Personalities of people in the field influence my career choice
Equity Issues
13. Surgical residency is more demanding for women than men because of scheduling
14. Surgical residency is more difficult for women than men because of attitudes held within the surgical community
15. Surgeons have an "old boy" attitude
16. I am influenced by the lack of role models
17. Ethnic diversity is important to me in choosing a specialty
Family
18. Opinions of a spouse, a significant other, or family members are important to me in choosing a specialty
19. My specialty choice is influenced by my decision to have a family
Other
20. My own skill sets are comparable with those required for a surgical career
21. Competition for obtaining a residency position affects my choice of specialty
22. Debt at the end of medical school influences my career choice
23. Today's physician should be more committed to the primary care specialties
24. Enforcement of the 80-hour workweek is a positive development
25. How important are the following influences on career choice
a. Preconceived notions before medical school: 1-5
b. Concepts formed during my preclinical years: 1-5
c. Exposure to third-year clerkship: 1-5
Where 5 = very important and 1 = irrelevant

Figure. Study survey.

egory (21-25 years; $P < .001$), less likely to be married (26% vs 36%; $P < .001$), and less often white (73% vs 84%; $P < .001$). There were no differences between male and female students with regard to debt at graduation, with 46% of male and female students anticipating graduat-

Table 1. Responses of Male and Female Students to the Survey Sections on Surgical Life, Residency, and Surgeons as Influence*

Question	Agree		Disagree		Encourages Toward Surgery		Discourages From Surgery	
	Men (n = 680)	Women (n = 620)	Men (n = 680)	Women (n = 620)	Men (n = 680)	Women (n = 620)	Men (n = 680)	Women (n = 620)
	Surgeons							
Have prestige	584 (86)	555 (90)	22 (3)	11 (2)	267 (39)†	169 (27)	17 (2)	17 (3)
Witness results immediately	600 (88)	524 (85)	35 (5)	42 (7)	489 (72)†	365 (59)	9 (1)	9 (1)
Appear happy in their work	126 (19)	95 (15)	329 (49)	352 (57)	88 (23)	70 (21)	177 (47)	147 (45)
Have a higher income potential	474 (70)	452 (73)	107 (16)	81 (13)	289 (43)†	154 (25)	51 (8)	30 (5)
Have rewarding careers	561 (83)†	473 (76)	40 (6)	41 (7)	471 (70)†	346 (56)	43 (6)	43 (7)
Lead well-balanced lives	60 (9)	39 (6)	461 (68)	474 (77)	75 (11)	51 (8)	472 (70)	462 (75)
Surgical residents/residency								
Have a well-balanced lifestyle	16 (2)	3 (0.5)	613 (91)	583 (94)	26 (4)	12 (2)	525 (78)	531 (86)
Emphasizes service vs education	229 (34)	179 (29)	144 (21)	122 (20)	21 (3)	21 (3)	221 (33)	179 (29)
Is more demanding than others	597 (88)	538 (87)	32 (5)	35 (6)	30 (5)	30 (5)	343 (51)	377 (61)
Surgeons provide good role models	284 (42)	242 (39)	204 (30)	189 (31)	230 (34)	169 (28)	172 (26)	162 (27)
Clerkship is an important influence	589 (87)	565 (92)	13 (2)	7 (1)	248 (37)	206 (35)	143 (22)	129 (22)
Personalities influence career choice	609 (91)	574 (93)	23 (3)	12 (2)	233 (35)†	147 (24)	309 (44)†	345 (56)

*Data are presented as number (percentage) of survey respondents.

† $P < .001$ compared with corresponding female student group.

ing \$100 000 or more in debt. Respondents were equally distributed across the 4 years of medical school: 353 men (52%) and 322 women (52%) had not yet started their clerkship. The remaining students were either doing their clerkship or had completed it. A total of 24% of men and 15% of women were interested in pursuing a career in general surgery, and 22% of men and 18% of women were undecided. One or more descriptive comments were entered in the spaces provided after each section by 410 male students (60%) and 342 female students (55%). Most written comments demonstrated a negative opinion of surgeons and their lifestyle. Some comments were unprofessional and indicated a gender bias, but we report them verbatim because they are representative of the opinions expressed by the study participants. Unless otherwise stated, for each Likert scale question “agreed” represents the sum of agreed and strongly agreed and “disagreed” represents the sum of disagreed and strongly disagreed. The results are summarized in **Tables 1, 2, 3, and 4** and are discussed by survey section.

DEMOGRAPHICS

Approximately 20% of the data came from 1 school (Drexel), with the remaining 8 schools each contributing approximately 10%. The finding that women were less likely to be married is consistent with known social demographics in medicine,²⁰ but we do not have an explanation for the younger age of the women in our study. Although similar percentages (20%) of preclerkship and postclerkship students said they were likely to study surgery, the percentage unlikely to study surgery increased from 51% to 72% after clerkship at the expense of the undecided group. The percentage of women likely to study surgery increased from 11% in the preclerkship group to 18% in the postclerkship group, whereas the percentage of men decreased (30% to 20%). O'Herrin et al²¹ noted an increased interest in

surgical careers in postclerkship students in a much smaller study, but other investigators have shown that women compared with men are more frequently discouraged from a career in surgery by their clerkship experience.²² One questionnaire-based study reported that although student ratings of surgeon compassion and respect for surgeons increased during the clerkship, interest in surgical careers did not increase.²³

SURGICAL LIFE: SURVEY QUESTIONS 1 THROUGH 6

Men and women equally agreed and disagreed with statements on surgical life, but men were more encouraged to consider a surgical career than women by each statement (Table 1). Traditionally, men are more likely to be the primary breadwinner, which may explain the greater priority that male students attached to income potential in our study. Both men and women were most discouraged from a career in surgery by the statement that surgeons who have completed their residency do not lead well-balanced lives (Table 1). The written responses pertaining to surgical life from men and women were similar: “I want to enjoy my career; however, I also want to enjoy my life outside my professional setting. That includes, for me, having adequate time to pursue outside interests” (man).

Not all students were discouraged by negative perceptions of surgical life: “Having worked with surgeons, the only thing discouraging me is the endless hours at the hospital, but if you truly love what you are doing then it should not matter” (man).

“I have my priorities straight, so I will make my life balanced whichever residency I pursue” (woman).

“I feel that these challenges would make me *more* likely to pursue surgery” (woman).

Most preclerkship and postclerkship students demonstrated agreement with statements on surgical life, but

Table 2. Responses of Male and Female Students Unlikely to Study Surgery Compared With Those Likely to Study Surgery to the Survey Sections on Surgical Life, Residency, and Surgeons as Influence*

Question	Likely, Agree		Unlikely, Agree		Likely, Encourages to Consider Surgery		Unlikely, Discourages to Consider Surgery	
	Men	Women	Men	Women	Men	Women	Men	Women
	(n = 167)	(n = 90)	(n = 379)	(n = 421)	(n = 167)	(n = 90)	(n = 379)	(n = 421)
Surgeons								
Have prestige	145 (87)	82 (91)	322 (85)	383 (90)	91 (55)	46 (55)	14 (4)	12 (3)
Witness results immediately	154 (92)	81 (90)	325 (85)	347 (82)	148 (89)	72 (80)	6 (2)	7 (2)
Appear happy in their work	65 (39)†	31 (34)†	42 (11)†	42 (10)†	43 (26)	22 (24)	131 (35)	116 (27)
Have a higher income potential	112 (67)	60 (67)	257 (69)	308 (73)	85 (51)‡	35 (39)	38 (10)‡	22 (5)
Have rewarding careers	160 (96)†	86 (95)†	276 (73)†	292 (69)†	158 (95)	84 (93)	194 (51)‡	168 (40)
Lead well balanced lives	38 (23)†	17 (19)†	15 (4)†	14 (3)†	38 (23)	20 (22)	300 (79)	331 (79)
Surgical residents/residency								
Have a well balanced lifestyle	11 (7)	0 (0)	3 (1)	2 (0.5)	14 (8)	2 (2)	322 (85)	379 (90)
Emphasizes service vs education	41 (25)†	22 (24)	158 (42)†	139 (33)	5 (3)	7 (8)	150 (40)	143 (34)
More demanding than others	155 (93)	83 (92)	329 (87)	362 (86)	48 (29)‡	16 (18)	223 (59)‡	289 (69)
Surgeons provide good role models	110 (66)†	54 (60)†	115 (30)†	130 (31)†	98 (59)	50 (55)	139 (37)	134 (32)
Clerkship is an important influence	142 (85)	83 (92)	336 (87)	388 (92)	102 (61)	61 (68)	132 (35)	122 (29)
Personalities influence career choice	142 (85)	80 (89)	350 (92)	393 (93)	99 (59)	47 (52)	235 (62)†	279 (66)†

*Data are presented as number (percentage) of survey respondents.

† $P < .001$ comparing likely with unlikely by identical sex group.

‡ $P < .001$ compared with corresponding female group.

Table 3. Responses of Male and Female Students to the Survey Sections on Equity, Family, and Other Influences*

Question	Agree		Disagree		Encourages to Consider Surgery		Discourages to Consider Surgery	
	Men	Women	Men	Women	Men	Women	Men	Women
	(n = 680)	(n = 620)	(n = 680)	(n = 620)	(n = 680)	(n = 620)	(n = 680)	(n = 620)
Reason surgery is demanding for women								
Scheduling	263 (39)	437 (71)	136 (20)	86 (14)	7 (1.0)	9 (1.4)	10 (1)†	398 (65)
Attitudes within community	308 (46)†	464 (75)	126 (19)	63 (10)	4 (0.6)†	26 (4)	48 (7)†	315 (51)
Surgeons have "old boy" attitude	412 (62)†	497 (80)	240 (36)†	120 (19)	59 (8)	21 (3)	148 (22)†	355 (57)
Lack of female role models	30 (4)†	280 (45)	273 (41)	206 (33)	5 (1)	42 (7)	18 (3)†	217 (35)
Ethnic diversity is important	144 (22)†	198 (32)	242 (36)†	146 (23)	29 (4)	23 (4)	39 (6)†	75 (12)
Opinion of spouse or family	498 (74)	401 (65)	92 (14)	100 (16)	111 (17)	56 (9)	310 (46)	267 (44)
Decision to have a family	492 (73)	489 (79)	91 (13)	60 (10)	62 (9)	11 (2)	409 (61)†	464 (75)
Skill sets	515 (76)†	376 (61)	83 (12)†	157 (25)	444 (66)†	304 (50)	87 (13)†	154 (25)
Competition for residency	330 (49)	248 (40)	213 (32)	222 (36)	139 (21)†	66 (11)	121 (18)	114 (19)
Debt	212 (31)	144 (23)	309 (46)	319 (52)	140 (21)	70 (11)	45 (7)	37 (6)
Committed to primary care	233 (20)	113 (18)	265 (39)	233 (38)	67 (10)	33 (5)	70 (10)	70 (11)

*Data are presented as number (percentage) of survey respondents.

† $P < .001$ compared with corresponding female group.

the percentages were lower in the postclerkship groups for the statements that surgeons have higher income potential and rewarding careers (82% to 77% in both instances; $P < .001$). The percentage of students who disagreed that surgeons appear happy in their work was higher in the postclerkship group in this (46% vs 60%) and in similar studies.^{13,24-26} However, when the data were stratified by sex, there was a slight increase in the percentage of postclerkship women who agreed that surgeons appear happy in their work from 11% to 20%. This apparent increase may reflect the lower expectations of the preclerkship women.

A statistically significantly higher percentage of male and female students who were more likely to study sur-

gery agreed that surgeons appear happy in their work, have rewarding careers, and lead well-balanced lives compared with those students who were unlikely to study surgery (Table 2). Students unlikely to study surgery were most discouraged by the lack of balance in the lives of surgeons, whereas students intending to study surgery were most encouraged by the fact that surgeons have rewarding careers and witness the results of their work immediately (Table 2). These findings are consistent with data from other investigators.^{3,6,27,28} In this and other studies,^{11,15,29} women entering surgical fields more often cite factors such as prestige and job opportunities as contributing to their decision than female students not interested in surgery.

Table 4. Responses of Male and Female Students Unlikely to Study Surgery Compared With Those Likely to Study Surgery to the Survey Sections on Equity, Family, and Other Influences*

Question	Likely, Agree		Unlikely, Agree		Likely, Encourages to Consider Surgery		Unlikely, Discourages to Consider Surgery	
	Men	Women	Men	Women	Men	Women	Men	Women
	(n = 167)	(n = 90)	(n = 379)	(n = 421)	(n = 167)	(n = 90)	(n = 379)	(n = 421)
Reason surgery is demanding for women								
Scheduling	56 (33)†	59 (65)	160 (42)†	290 (69)	1 (0.6)†	3 (3)	9 (2)†	274 (65)
Attitudes within community	64 (38)†‡	72 (80)	183 (48)†‡	315 (75)	2 (1)†	7 (8)	34 (8)†	245 (58)
Surgeons have "old boy" attitude	95 (57)†	72 (80)	243 (64)†	344 (82)	24 (14)	10 (11)	99 (26)†	273 (65)
Lack of female role models	9 (5)†	39 (43)	18 (5)†	190 (45)	3 (2)†	20 (22)	11 (3)†	174 (41)
Ethnic diversity is important	41 (24)	29 (32)	74 (15)†	131 (31)	15 (9)	10 (11)	29 (8)	53 (13)
Opinion of spouse or family	127 (76)†	56 (62)	274 (72)	273 (65)	41 (25)	22 (24)	202 (53)	204 (48)
Decision to have a family	108 (65)§	52 (58)‡	280 (74)†	351 (84)†	24 (14)†	6 (7)	253 (67)†	342 (81)
Skill sets	161 (96)‡	84 (93)‡	246 (65)†‡	206 (49)†	156 (93)	84 (93)	83 (22)†	149 (35)†
Competition for residency	101 (60)‡	52 (58)‡	144 (38)‡	141 (33)†	58 (35)	25 (28)	65 (17)	69 (16)
Debt	60 (36)†	15 (17)	111 (29)	96 (23)	48 (29)†	15 (17)	33 (9)	33 (8)
Committed to primary care	18 (11)‡	8 (9)‡	93 (24)‡	81 (19)†	22 (13)	10 (11)	56 (15)	56 (13)

*Data are presented as number (percentage) of survey respondents.

† $P < .001$ compared with corresponding female group.

‡ $P < .001$ comparing likely with unlikely by identical sex group.

§ $P < .01$ comparing likely with unlikely by identical sex group.

Medical students applying to general surgery expect to have a higher income than students pursuing other specialties,³⁰ although a recent report²⁵ suggests that an increasing number of medical students believe the income of a typical surgeon is inadequate for the workload. This contention was supported by comments from some male students: "I was/am very interested in surgery, it was one of my favorite rotations. However, I am planning a residency in family practice since this will afford more time for a family as well as less time in residency for not that much less \$\$" (man).

"The hours are very long for compensation that does not parallel the workload" (man).

"Too much work for too little pay" (man).

RESIDENCY ISSUES: SURVEY QUESTIONS 7 THROUGH 10

Men and women expressed similar agreement and disagreement on issues pertaining to residency life (Table 1). The written comments reflected student disillusionment with the surgical environment, including working conditions, the psychological demands, and the surgical personality: "Long hours are not the problem. Repetitive service work (discharge planning, etc) disrespectful treatment from attendings and increasing lack of autonomy are the real problems" (man).

"A surgery residency is notorious for poor working conditions and egotistical co-workers. The poor working conditions may be true for other specialties as well, but unpleasant co-workers are not as likely to be part of the mix" (man).

"I think that after residency, surgeons have more of an opportunity to control the amount of time spent at work. However, for residency students are trapped into exhausting, unpleasant experiences that taint their views of themselves, their profession" (woman).

However, not all comments were negative: "The vast majority of surgical residents I have worked with have been well rounded, interesting, and motivated people who are dedicated to educating themselves and others" (man).

Women were more discouraged than men by the lifestyle of surgical residents and by the demands of residency, although some women were attracted by these same challenges: "I absolutely loved surgery, but had to look long and hard at my career choices [because] of the longer hours and more grueling residency programs versus non-surgical subspecialties. I finally decided on a surgical career *in spite of* the time commitment" (woman).

"The high demand and the fast pace of surgery are qualities I like about it" (woman).

Some expressed optimism about future change: "80-hr workweek is changing things, and hopefully programs are realizing the need to educate in those limited hours per week; it takes time to change the structure of educational programs and the culture will take even longer to change" (woman).

A higher percentage of students likely to study surgery agreed that a surgical residency is more demanding than other residencies (Table 2). A total of 32% of men and 39% of women likely to study surgery were discouraged by the demands of a surgical residency compared with 59% of men and 69% of women unlikely to study surgery ($P < .001$).

SURGEONS AS INFLUENCE: SURVEY QUESTIONS 10 THROUGH 12

Although only a small percentage of respondents (1%-8%) commented on surgical personalities and the training environment, these comments were almost entirely critical: "Highly malignant people, with exceptions" (male).

"I would not be able to stand these people for a whole career" (man).

“Patient-doctor relationships seem to be less important. Often times they do not interact very well with support staff (God complex)” (male).

“Most general surgeons that I have worked with seem like miserable individuals who like to take out their misery on whoever is closest” (male).

“Some of the most sadistic of all residents I encountered have been surgical residents. In fact, this was the only clerkship in which I encountered blatant cruelty” (male).

“Some of the surgeons I have met so far are OK, but there are also plenty that are malignant, disrespectful towards those below them while kissing up to those above them and feel that it is ok to treat medical students like dogs and to act unprofessionally” (woman).

“A less competitive mentality/environment would go a long way in encouraging less aggressive people to choose surgery for a career. Is it really necessary to be aggressive to become a technically gifted surgeon?” (woman).

Once again, not all the comments were negative: “All of the attendings and residents I worked with were excellent. They were all examples of great men and women and made me look more favorably on the specialty. I went into surgery with some preconceived notions that all turned out to be false” (man).

“Although the rare one or two surgeons I have met have made a lasting negative impression, the vast majority has strongly influenced my decision to become a general surgeon” (man).

“I think women surgeons tend to be very good role models because they appear to have more balanced lives, are more considerate of others, and work very hard” (woman).

“The good surgeons balance out the really bad surgeon types” (woman).

Other investigators have demonstrated that medical students may influence one another's career choices by “bad-mouthing” particular specialties.⁵ A total of 91% of students interested in surgery reported hearing negative comments about the specialty, and 17% of all respondents reported altering their career choice in response to these negative comments.⁵ In our study, 41% of students who had not yet taken their clerkship admitted to being discouraged from a career in surgery by the surgical personality, suggesting they had been influenced by critical comments. A number of studies^{3,12,31-35} support the hypothesis that students interested in studying surgery have many of the traits typically ascribed to practicing surgeons: they are aggressive, self-confident, competitive, more resistant to stress, and frequently male. Our data demonstrated that both male and female students intending to study surgery were more likely to be encouraged and less likely to be discouraged by the factors that adversely influence students not interested in surgery, particularly personalities in the field (Table 2). In addition, medical students encouraged by positive role models to pursue a surgical career are less likely to be discouraged by lifestyle, time commitment, call schedules, or length of residency.^{4,6}

EQUITY ISSUES: SURVEY QUESTIONS 13 THROUGH 17

As predicted, fewer men than women agreed with these statements and whether the statements discouraged them

from a career in surgery (Table 3). Many of the written comments supported these statements, with some men clearly understanding the issues faced by women: “I think that the ‘good old boy’ issue is highly institutionally dependent, but still a valid concern for women these days” (man).

“Women are not welcomed into surgery as frequently as men. When they do choose a residency they do not adjust to it as well as men, and as a result are seen as overcompensating by medical students” (man).

Other students (including some women) expressed some resentment: “I think things are too PC [politically correct] now and most women have it easier than the male residents. There are many strong women in surgery and I only think sex becomes an issue when females abuse the considerations that are given for menstruation or pregnancy” (man).

“Actually female surgeons that I met were much more mean than the men” (man).

“It is clear that women are treated differently than men . . . especially residents. There is either a lot of flirting or too much leniency. Women either get away with doing less work or they have to do more work to prove themselves depending on the attending” (woman).

“Most male doctors have both a challenging career and a family. Why should it be any different for me?” (woman).

The impact on family was raised: “I have many female role models in general surgery, but I would have to say that although they are very good at their jobs, they allow the job to take over their lives, and so that discourages me from wanting to join a field where I will turn out like them” (woman).

Some women perceived discrimination: “I have seen at more than one hospital how women are not taken very seriously as surgeons” (woman).

Yet, this was not always a deterrent: “The stubborn part of me was tempted to do surgery ‘just to show them’” (woman).

“The ‘old boys club’ attitudes made me want to do surgery just to dispel the current attitude” (woman).

Once again, the students likely to study surgery were less discouraged by each statement compared with those students unlikely to study surgery (Table 4). In this and other studies,^{23,36-38} women were discouraged by a lack of female role models. Neumayer et al³⁷ noted that female medical students' choice of surgery as a career was strongly associated with a higher proportion of women on the surgical faculty. A total of 88% of women in their survey who chose a career in surgery were from schools with 40% or more female surgeons. In addition, women applying for residency are more likely to consider the faculty sex composition of a program.^{23,37} Women are less likely to consider a career in surgery and more likely to be deterred from a surgical career while in medical school. Only 24% of women, but 50% of men, interested in studying surgery on entering medical school went on to match in surgery, a difference that appears unchanged since 1970^{16,22,39}; in addition, only 6% of women compared with 19% of men become interested in surgery during medical school.²² Reasons given by female students for rejecting a career in surgery include negative attitudes of surgeons, male bias, competition and lifestyle, and experience with sexual harassment while on a surgical service.⁴⁰⁻⁴²

FAMILY: SURVEY QUESTIONS 18 AND 19

Men and women were equally discouraged from a career in surgery by opinions of a spouse, family member, or significant other, but a higher percentage of women than men were discouraged by their decision to have a family (Table 3). Written comments from both men and women testified to the importance of family in making a career choice: "I feel that surgery and surgery residency would not facilitate my being a good husband/father" (man).

"I think the long hours of a surgeon are very hard on families, but I also think that I would not be happy doing anything else" (woman).

"The attitude of many surgery programs is that family should simply 'understand' that the resident is a surgeon and therefore not expect him or her to be home often. This is not conducive to creating or maintaining good relationships" (man).

"My husband disliked my clinical surgical clerkship so much that he does not want me to go into surgery at all. He never got to see me and when he did I was too tired to spend a lot of quality time with him" (woman).

"I have yet to see a female in general surgery with kids and raising them the way I hope to some day" (woman).

"While I plan to have a family, a large one, I do not have one at the moment and cannot make current life decisions on what might be in the future" (woman).

Those students interested in surgery were less likely to agree that their career choice was influenced by their decision to have a family; however, those interested in surgery were less likely to be married (25% vs 36%; $P < .001$), a finding consistent with other studies.^{2,3,28,43} Although married students may have different priorities, a lack of spousal support for a career in surgery may also be a deterrent. In our study, a higher percentage of women compared with men, regardless of career choice, was influenced by a decision to have children. These opinions confirm the findings of other authors with regard to gender priorities: men state that they are more likely to miss family activities because of job demands, whereas women are more likely to miss work activities because of family functions.^{2,44} A single-center study that looked at attrition among surgery residents found that men were 4 times as likely to leave for preference of another specialty, whereas women more frequently cited family reasons.⁴⁵

OTHER INFLUENCES: SURVEY QUESTIONS 20 THROUGH 23

Overall, more men than women agreed their skill sets were compatible with those required for a surgical career (Table 3). A total of 93% of men and women likely to study surgery said skill sets compatible with a surgical career encouraged them (Table 4). Of the total number of medical students who agreed that their skill sets were compatible with a surgical career, 30% of men (24% of women) said they were likely to study surgery and 49% of men (54% of women) said they were unlikely to study surgery. These differences were not statistically significant. The written responses in this final section echoed

concerns previously expressed about abusive training and environment, as well as the impact on family: "I am very interested in the field of general surgery, but *not* the lifestyle" (man).

"General surgeons are the best of all worlds from medical to surgical care, however the lines on all their faces tell the story that no ACGME [Accreditation Council for Graduate Medical Education] requirement will prevent. It is highly stressful" (man).

"I would rather open a vein" (man).

"It was fun, but not fun enough" (woman).

"No matter what everyone is trying to say, surgery is very hard for women with family goals and the residents are clearly miserable and exhausted and the female ones are all childless" (woman).

"Everyone passes the grief and malignancy down the food chain" (woman).

Some students found the demands of a surgical career attractive: "General surgery is an optimal career choice. The field should stay demanding and competitive to ensure the right kind of student follows through with the decision to be a general surgeon" (man).

Some expressed regret and offered suggestions for improvement: "If the surgical rotation was more about teaching and less about boot camp indoctrination, I might have had a more positive attitude towards a surgical career" (man).

"I like surgery; I liked being in the OR [operating room]. If humanism and compassion were emphasized more during surgeon training, the field would be more appealing" (woman).

"If I thought that work hours and residency were more compatible with having a family life and time for children I would definitely be more interested in general surgery" (woman). "I do think the field is changing, albeit slowly, and becoming more receptive to non-traditional residents, i.e., females, older students, non-white" (woman).

"Thanks for having this survey. I needed to vent, as I really had wanted to go into surgery but have been talked out of it" (woman).

COMMENT

Today both male and female medical students want flexible and protected time for family and friends in their working careers. This is a change from the priorities of medical students in the 1980s, who reported lifestyle and personal factors as being of least importance in making a career choice.⁴⁶⁻⁴⁸ The current literature suggests that these values, considerably different from those of the preceding "baby boomer" generation, may help explain the recent decline in applications to general surgery residencies.^{26,49} However, since female sex is known to be a negative predictor of a career in surgery, it seemed reasonable to attribute the declining interest in general surgery at least in part to the increased number of women in medical schools. Our data demonstrated that those men and women who choose surgical careers do so for similar reasons: they possess skill sets compatible with the specialty, and the content is inherently interesting to them. In addition, both male and female students are attracted to surgery by the demands and challenges of the specialty. It is worth emphasizing that

of those medical students in our study who agreed that their skill sets were compatible with a surgical career, similar percentages of both men and women said they were likely and unlikely to study surgery. The subset of students who decide not to study surgery despite compatible skills is worthy of further study, but this finding supports our hypothesis that both gender and generational differences influenced the declining interest in surgical careers. Our data have shown that in every category men and women have similar perceptions of surgeons and surgical careers, with one exception: male and female responses on gender equity were predictably and significantly different. However, our study has reaffirmed the work of others that men and women set different priorities in choosing their careers. Although men and women were equally discouraged from a career in surgery by the opinions of a spouse, family member, or significant other, a higher percentage of women than men were discouraged by their decision to have a family. Regardless of career choice, the written comments from both men and women bear testament to the importance that all students today attach to family and lifestyle, thus further supporting our hypothesis.

Although many studies have examined the factors that influence medical student career choice, our study is unique in terms of the large number of medical students surveyed, the breadth of student years, and the insightful comments from the medical students. Some student comments were clearly unprofessional and indicated a lack of tolerance toward diversity, and we trust and hope this will be addressed during medical school education. We also hope that surgical educators will learn from the negative comments regarding surgical personalities, working environment, and lifestyle restrictions. Many investigators^{4,13-15,48-50} have noted the increased popularity of lifestyle career choices and suggested that the surgical clerkship be modified to protect students from the realities of resident lifestyle, but not all program directors agreed.⁶ Apart from the fact that this would be misleading, it is not the solution, since our data show that lifestyle concerns extend beyond residency. We may be able to offset the declining interest in surgery by mentoring students early in medical school or offering a more flexible surgical residency to suit the priorities of this generation. It is clearly important to create surgical residency programs that will not alienate talented medical students. In the words of one medical student respondent, "Do something to change your programs so people like me who would love to go into surgery and, YES, work hard and excel can make such a choice without giving up everything else important in their life" (woman).

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Invited Critique

Assessing the motivation for the choice of surgery as a career is essential to sustaining the surgical workforce. Assumptions commonly differ from evidence. Sanfey and colleagues address factors that influence student choice.

Although this study reaffirms previous data documenting a sex difference in the selection of surgery as a career, it clearly shows that both men and women can be influenced by their experiences in medical school. Medical schools need reminding that exposure to the discipline early is important.

Interestingly, women were more likely to select surgery and men to deselect surgery after the clerkship. The reference citing women being discouraged from pursuing surgery as a career is from 2001. I believe that would and should be different today. The value of women role models is clear. Women need to be encouraged to pursue academic careers. Schools with few women role models need to develop a strategy for the exposure of students to women surgeons.

The strong influence the students placed on “do not lead well-balanced lives” and “decision to have a family” and their perception of our unhappiness speak clearly to their assessment of our lifestyle and their values. We can address issues such as parental leave, child care, and reduced work hours, which would improve lifestyle. We can complain less and show more our basic enjoyment of who we are and what we do.

These data show us that both sex and generation (ie, lifestyle) influence student choice. Many opportunities for change are obvious. Acknowledging the attitudes that influence student choice, rather than negating their opinions, and developing a plan to address these issues remain imperatives for surgeons.

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Correction

Error in Degree and Affiliation. In the Original Article by Sanfey et al titled "Influences on Medical Student Career Choice: Gender or Generation?" published in the November issue of the ARCHIVES (2006;141:1086-1094), an error appeared regarding the degree and affiliation of one of the authors. This author should have been listed as Ben Eidelson and his affiliation as Yale College, New Haven, Conn.