ORIGINAL ARTICLE

Part-time Training in General Surgery

Results of a Web-Based Survey

Alison R. Saalwachter, MD; Julie A. Freischlag, MD; Robert G. Sawyer, MD; Hilary A. Sanfey, MB, BCh

Hypothesis: The recent increase in female medical school enrollment and emphasis on lifestyle considerations for both men and women pose challenges for residency recruitment and retention. This study was designed to assess interest in part-time surgical training. We hypothesized that more women than men would be interested in this option.

Design: A Web-based survey soliciting demographic information and opinions about training priorities was distributed to medical students, surgery residents, fellows, and trained surgeons. Respondents were asked to express on a 5-point Likert scale interest in (and deterrents to) substituting 1 or more years of standard residency with a shorter workweek (< 80 hours but > 40 hours) in exchange for a proportionately overall longer length of training.

Setting: The survey was located on the American College of Surgeons Web site.

Participants: Medical students (482), surgical residents (789), fellows (179), and fully trained surgeons (2858) affiliated with at least 1 of 4 major surgical societies.

Results: There were 4308 respondents (76% male). Of physician respondents, 9.1% had taken time out of residency for nonresearch reasons. Thirty-six percent of female and 24% of male students agreed to increased interest in surgical careers if part-time training were an option ($P = .005$). Twenty-five percent of female and 13% of male residents ($P < .001$) expressed interest in this option. Prolonged training was cited as the primary deterrent.

Conclusions: Eleven percent to 36% of total male and female respondents expressed interest in pursuing part-time training. Significantly more women than men favored a part-time option.

Arch Surg. 2006;141:977-982

Author Affiliations: The University of Virginia Health System, Charlottesville (Drs Saalwachter, Sawyer, and Sanfey); The Johns Hopkins Hospital, Baltimore, Md (Dr Freischlag).

WHILE RECENT MATCH results might suggest a turnaround in the declining interest in surgery,[1] a 20% attrition rate has been reported.[2] In a survey of surgery program directors, Morris et al[3] noted that more than half the programs surveyed were affected by attrition and that 34% of these programs lost more than 1 resident. The most common reason cited for leaving was "lifestyle." This recent improvement in filling residency positions is encouraging but may be transient as more medical students, male and female, express interest in fields with controllable lifestyles[4-8] and apply for residencies in surgical subspecialties instead of general surgery.[8-11] Many of today's medical students have more diverse interests and, when they apply for postgraduate training, may prefer specialties in which a more flexible approach to training (ie, part-time, reduced hours, or extended periods of time off) is an option to allow them to integrate other professional and family interests.[12]

The increasing percentage of female medical school graduates offers new challenges to surgery residency recruitment and retention. Only 24% of general surgery residents are women[13]; therefore, the rate of increase in female applicants to general surgery residency programs has not kept pace with the increase in enrolled female medical students from 29.3% in 1982-1983 to 46.9% in 2002-2003.[7,11,14] Historically, careers in general surgery have been less appealing to women,[4,15] but with women now composing about half of medical school graduates, it is imperative that general surgery training programs attract women to their ranks in higher numbers.[16] A Canadian survey of fourth-year medical students reported that women's career choices were influenced by opportunities to work and possibly train part-time, although this was not the most important factor in that decision-making process.[4] In a single-institution study, Bergen and colleagues[17]

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found that women were twice as likely as their male counterparts to withdraw from a general surgical program. While the most common reason for men to leave was to change specialty, women (but some men) left most commonly for reasons related to the family. Since students of both sexes are increasingly selecting specialties with more controllable lifestyles than general surgery, efforts must be made to make general surgery more appealing to medical students of both sexes. Indeed, the recent American Surgical Association Blue Ribbon Committee Report on Surgical Education strongly recommended a more flexible approach to surgical training to facilitate parenting.[18] In addition to concerns about the adverse impact of the increasing number of women in medical school on recruitment to general surgery programs and contrary to earlier predictions of excess physicians by 2010, we appear to be on the threshold of a shortage in the physician workforce; Association of American Medical Colleges data have shown that the number of applicants to medical schools in the United States has declined by 25% since 1996.[18] These demographic changes will continue to impact both undergraduate and graduate medical/surgical education. The current study was designed to determine whether there is support to provide a more flexible approach to surgical training that would allow both male and female residents to train on a part-time basis for all or part of their training with the hypothesis that more women than men would favor this option.

METHODS

STUDY DESIGN AND PARTICIPANTS

A Web-based survey was initiated by the Council of the Association of Women Surgeons (AWS) and supported by the American College of Surgeons (ACS), the American Surgical Association, and the Association of Program Directors in Surgery. The University of Virginia Institutional Review Board for the Social and Behavioral Sciences approved this project (UVA 2003-0301-00). Participation was voluntary and consent was presumed with completion of the survey. No identifying information was collected. Following a pilot study, the survey was distributed, under the title "Future Training in Surgery," via electronic mail to members of the ACS (including members of the candidate, fellow, and initiate categories), AWS, American Surgical Association, and Association of Program Directors in Surgery and to surgical residents via their program directors. Survey recipients were encouraged to distribute it to medical students, residents, and other surgeons. A second e-mail request was sent after 30 days and the survey was made available online for a total of 90 days between October 2003 and January 2004.

The survey was divided into 4 sections: medical students, residents, fellows, and fully trained surgeons. Each section contained questions on basic demographic information and solicited opinions about training priorities, experiences, and career choices. Most questions were asked using a 5-point Likert scale (1=strongly disagree, 3=don't know, 5=strongly agree). Each section contained similar core questions and section-specific questions. The respondents were asked about interest in a more flexible approach to the length of training, and this was defined in the survey as the ability to train part-time by "substituting 1 or more years of the standard residency with a shorter workweek (<80 hours but >40 hours) in exchange for a proportionately overall longer length of residency." Additional questions asked more specific information with regard to the desirable total length of training and decrease in salary that might be acceptable in exchange for a shorter workweek and the opportunity to train part-time. While the respondents were not coded to prevent multiple responses from 1 individual, the length of the questionnaire likely discouraged repeat attempts. Data were housed on the ACS server.

STATISTICAL ANALYSIS

Categorical data were analyzed using the χ^2 test. Proportions with included values less than or equal to 5 were analyzed with the Fisher exact test. Continuous data were found to have a nonnormal distribution and were analyzed using the Mann-Whitney *U* test. Average age was calculated using the median age of the listed ranges on the questionnaire. All variables were 2-tailed and *P* values <.05 were considered significant.

RESULTS

A total of 4308 people responded to the survey: 482 medical students, 789 surgical residents, 179 surgical fellows, and 2858 fully trained surgeons in both academic and private practices. Because of the potential for overlap between memberships of different societies and personal invitations to participate as well as dependence on program directors to forward to their residents information about the presence of the survey on the web, an accurate number of potential responders is not available. Basic demographic information is provided in **Table 1**. Unless otherwise stated, "agreed" equals the sum of agreed and strongly agreed and "disagreed" equals the sum of disagreed and strongly disagreed.

Between 5% and 10% of resident, fellow, and fully trained surgeon respondents took time out of training for reasons other than research, with no statistically significant differences between men and women (**Table 2**). Female residents and female fully trained surgeons were more likely than male residents and male fully trained surgeons to have taken this time for "maternity/paternity leave" and male fully trained surgeons were more likely than their female counterparts to have taken time out for "nonresearch-related education or career break." Between 63% and 78% of male and female nonstudent responders participated (or planned to participate) in research during residency. Of those respondents who participated or planned to participate in research during residency, female residents and female fully trained surgeons were significantly more likely to perform full-time research (residents, 72% vs 63%; *P*=.05; fully trained surgeons, 66% vs 53%; *P*<.001), while male residents and male fully trained surgeons were more likely to perform research during clinical years. There was no correlation between having children and participating in full-time research for women. Overall, female residents were more likely than their male counterparts to agree with a statement that they were "not encouraged" to do research (13% vs 4%; *P*=.02), while female fully trained surgeons were more likely than their male counterparts to agree with the statement that they were "actively discouraged" (3% vs 1%; *P*=.004).

When asked if the availability of a more flexible approach to training (as defined earlier) would have a posi-

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Table 1. Demographic Details of Questionnaire Respondents*

	No. (%)†											
	Medical Students			Residents			Fellows			Trained Surgeons		
	Male	Female	*P* Value	Male	Female	*P* Value	Male	Female	*P* Value	Male	Female	*P* Value
Sample size	267 (55)	215 (45)	. . .	505 (64)	284 (36)	. . .	121 (68)	58 (32)	. . .	2363 (83)	495 (17)	. . .
Race												
White	194 (73)	131 (61)	.007	345 (68)	196 (69)	≥.05	84 (69)	42 (71)	≥.05	1986 (84)	415 (84)	≥.05
African American	13 (5)	26 (12)	.007	11 (2)	17 (6)	.01	4 (3)	5 (9)	≥.05	43 (2)	16 (3)	≥.05
Asian	30 (11)	32 (15)	≥.05	89 (18)	41 (14)	≥.05	18 (15)	7 (12)	≥.05	158 (7)	43 (9)	≥.05
Hispanic	16 (6)	15 (7)	≥.05	34 (7)	10 (4)	≥.05	10 (8)	3 (5)	≥.05	107 (5)	10 (2)	.01
Native American	2 (1)	3 (1)	≥.05	0	2 (1)	≥.05	1 (1)	0	≥.05	2 (<1)	1 (<1)	≥.05
None of the above	11 (4)	8 (3)	≥.05	26 (5)	16 (6)	≥.05	4 (3)	2 (3)	≥.05	59 (3)	9 (2)	≥.05
Median age, y	27	27	. . .	31	31	. . .	35	35	. . .	48	43	. . .
Relationship status												
Single	146 (55)	125 (58)	≥.05	140 (28)	142 (50)	.001	19 (16)	22 (38)	.002	90 (4)	118 (24)	<.001
Married/in a relationship	123 (46)	85 (40)	≥.05	360 (71)	130 (41)	.001	94 (78)	31 (53)	.002	2180 (92)	338 (69)	<.001
Divorced/separated	0	5 (2)	.02	12 (2)	6 (2)	≥.05	8 (7)	5 (9)	≥.05	91 (4)	37 (8)	<.001
Parents	41 (15)	19 (9)	.04	180 (35)	41 (14)	.001	77 (64)	15 (26)	.001	2096 (89)	262 (54)	.001

**P* values signify the comparison between male and female respondents within each section.
†Unless otherwise indicated.

Table 2. Information on Respondents Who Took Time Out From Residency*

	No. (%)								
	Residents			Fellows			Trained Surgeons		
	Male	Female	*P* Value	Male	Female	*P* Value	Male	Female	*P* Value
Took time out of residency for reasons other than research	34 (7)	28 (10)	≥.05	9 (7)	3 (5)	≥.05	230 (10)	43 (9)	≥.05
Reasons for taking time out									
Maternity/paternity leave	4 (8)	16 (57)	<.001	1 (11)	1 (33)	≥.05	5 (4)	18 (42)	.003
Personal illness or accident	5 (15)	2 (7)	≥.05	0	0	. . .	24 (18)	6 (14)	≥.05
Family reasons (nonpregnancy)	4 (12)	7 (25)	≥.05	1 (11)	1 (33)	≥.05	23 (17)	2 (5)	≥.05
Nonresearch-related education or career break	10 (29)	6 (21)	≥.05	2 (22)	1 (33)	≥.05	84 (62)	17 (40)	.02
None of the above	26 (76)	7 (25)	.002	NA	NA	NA	NA	NA	NA

Abbreviation: NA, not applicable.
**P* values signify the comparison between male and female respondents within each section.

tive effect on the decision to select a career in surgery, 24% of male and 36% of female medical students ($P = .005$) agreed, with similar trends for residents, fellows, and fully trained surgeons (**Table 3**). An increase in the length of primary residency to more than 7 years in exchange for the opportunity to train part-time had little attraction to participants, although an increase to more than 5 years was acceptable for about 20% to 30% of responders, with women more agreeable to this length of time than men ($P \leq .03$). Women were also more willing than men to accept a decrease in salary during the part-time training years (Table 3 and **Table 4**). As predicted, fully trained surgeon respondents who indicated an interest in part-time training, compared with fully trained surgeons who would not have been interested in part-time training, were significantly more likely to accept a reduction in benefits or salary during part-time training. These differences were not apparent in the resident group (Table 4). A higher percentage of female fully trained surgeons (but fewer female residents) was prepared to accept reduced salary and benefits during part-time training compared with male fully trained surgeons. While a lower percentage of female residents compared with male residents was prepared to make these sacrifices to train part-time, the numbers were small and not statistically significant. When asked to select top criteria accounting for a successful residency program, 18% of male and 20% of female residents included "flexible training program" ($P \geq .05$), although flexible training was not specifically defined in this particular question. Percentages were smaller for fellow and fully trained surgeon respondents (9%-15%).

When all male and all female respondents were compared, the deterrents to part-time training listed were similar and included "do not wish to prolong training" (men, 78% and women, 72%), "no need for a shorter week"

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Table 3. Interest in PTT*

	No. (%)								
	Residents			Fellows			Trained Surgeons		
	Male	Female	*P* Value	Male	Female	*P* Value	Male	Female	*P* Value
Agree to interest in PTT	67 (13)	70 (25)	<.001	18 (15)	9 (16)	≥.05	266 (11)	82 (17)	.001
No. of years would consider spending in PTT									
1	79 (16)	67 (24)	.006	15 (13)	11 (20)	≥.05	347 (15)	105 (22)	<.001
2	50 (10)	51 (18)	.002	11 (9)	7 (13)	≥.05	232 (10)	79 (16)	<.001
3	10 (2)	5 (2)	≥.05	4 (3)	2 (4)	≥.05	42 (2)	16 (3)	.05
None	354 (71)	152 (54)	<.001	85 (71)	36 (64)	≥.05	1649 (71)	281 (58)	<.001
Agree to accept reduction in benefits during PTT	28 (6)	19 (7)	≥.05	13 (11)	8 (14)	≥.05	241 (11)	69 (14)	.04
Agree to accept reduction in salary during PTT	46 (9)	48 (17)	.002	11 (9)	12 (21)	.05	339 (15)	137 (28)	<.001

Abbreviation: PTT, part-time training.
*The numbers listed are the total number of respondents per section that agreed or strongly agreed with the statements. *P* values signify the comparison between male and female respondents within each section.

Table 4. Willingness to Accept Reduced Benefits and Salary in Those Respondents Who Agreed to an Interest in PTT and Working Part-time Compared With Those Respondents Who Disagreed*

	No. (%)					
	Trained Surgeons			Residents		
	Male	Female	*P* Value	Male	Female	*P* Value
Interested in PTT	266 (11)	83 (17)	.001	67 (13)	70 (25)	<.001
Would accept reduced						
Benefits	52 (19)†	19 (23)†	≥.05	6 (9)	3 (4)	≥.05
Salary	69 (26)†	40 (48)†	<.001	11 (16)	8 (11)	≥.05
Not interested in PTT	1850 (78)	332 (67)	.001	388 (77)	178 (63)	.001
Would accept reduced						
Benefits	169 (9)†	38 (11)†	≥.05	25 (6)	9 (5)	≥.05
Salary	237 (13)†	237 (13)†	.001	44 (11)	19 (11)	≥.05
Interested in part-time work after training	344 (14)	212 (43)	<.001	NA	NA	NA
Would accept reduced						
Benefits	185 (54)†	124 (58)†	≥.05			
Salary	233 (68)†	176 (83)†	<.001			
Academic status	114 (33)†	84 (39)†	≥.05			
Not interested in part-time work after training	1719 (73)	213 (43)	<.001	NA	NA	NA
Would accept reduced						
Benefits	244 (14)†	41 (15)†	≥.05			
Salary	342 (20)†	66 (24)†	≥.05			
Academic status	191 (11)†	25 (9)†	≥.05			

Abbreviations: NA, not applicable; PTT, part-time training.
**P* values signify the comparison between male and female respondents within each section.
†*P* ≤.001 comparing those interested with those respondents not interested in PTT or part-time work in the corresponding group.

(men, 44% and women, 31%), "perception of receiving a second-class training" (men, 31% and women, 28%), "financial restrictions" (men, 29% and women, 31%), and "loan repayment" (men, 19% and women, 30%). Women responding to the resident and fully trained surgeon surveys cited "no need for a shorter week" significantly less than their male counterparts ($P<.001$), and female fully trained surgeons were more likely than male fully trained surgeons to express discouragement from both program directors and other residents as deterrents ($P\leq.003$). Fifteen percent of female fully trained surgeons compared with 8% of male fully trained surgeons agreed that the 80-hour workweek was 1 of the most significant advances in surgical training.

In response to questions about part-time work after completion of training, 11% of male and 30% of female fellows ($P=.003$) and 15% of male and 44% of female fully trained surgeons ($P<.001$) agreed to interest in this option. Of the fully trained surgeon respondents, fewer men than women agreed to accept a reduction in benefits (24% vs 39%, respectively; $P<.001$) and salary (32% vs 59%, respectively; $P<.001$) while working part-time. Only 17% of male and 25% of female fully trained surgeon responders agreed to accept a lower academic status while working part-time ($P<.001$). Reduction in academic status was the least popular sacrifice (Table 4). Again, as predicted, significantly more fully trained surgeons interested in working part-time were prepared to accept these

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reductions compared with fully trained surgeons not interested in reducing their full-time commitment (Table 4). There were no differences, however, in the number of fully trained surgeons currently working full-time, with 90% of men and 92% of women engaged in full-time employment ($P=.25$). One question unique to the fully trained surgeon section asked respondents to select their biggest regret about their time in residency. Men were most likely to deny any regrets (45% vs 35%; $P<.01$); however, 45% of women and 39% of men selected "impact on family life" ($P=.02$).

COMMENT

Male and female general surgery residents, fellows, and fully trained surgeons reported taking time out from training for various reasons and 11% to 25% expressed interest in flexible training options, with women expressing greater interest than their male counterparts. Even larger percentages of male and female medical students agreed to an increased interest in pursuing careers in general surgery if the residency training were more flexible. While women who took time out from residency more frequently cited reasons related to childbearing, the female respondents were less likely than the men to be married or to have children, confirming prior studies.[19,20] This may be related to the difficulties in sustaining a pregnancy and finding child care while in training or early in a career. Significantly more female than male residents and fully trained surgeons reported doing research full-time rather than during clinical rotations. Because full-time research usually requires fewer hours and is less stressful than clinical work, perhaps this is related to facilitating childbearing and raising a family, although our data did not clearly demonstrate this relation. Alternatively, women may feel this additional training could enhance their chances in fellowship placement and/or career advancement. Medical students may decide against general surgery careers because of potential conflicts with having a family. In an informal AWS survey, female surgeons expressed regret in waiting until after residency to start a family because of problems with infertility possibly related to advanced maternal age.[21] A more flexible approach to training may permit more women to complete surgical training on a part-time basis without sacrificing their desire for parenthood.

Although in the minority, a considerable percentage of both men and women agreed to interest in part-time training for part of their residency. Given the trend of the current generation toward selection of controllable lifestyle careers, it is not surprising that medical students had the highest interest in flexible training options. Medical students have already proven that they are willing to take advantage of such opportunities: 14% of the 2002 medical school graduates took time out of medical school education, 50% for an additional degree or study and 17% for personal, financial, or health reasons.[14]

While the 11% to 25% of physician responders who agreed to an interest in part-time training could be considered low, it is not expected that a majority of future residents would partake of this option. In a pediatric training program with a flexible option, only 8.5% of residents took advantage of this option during a 10-year period.[22] In addition, with the exception of the medical student respondents, the participants in our study were a select group because they were already committed to a career in surgery. Flexible options should be available for those who need it who might otherwise feel unable to pursue or continue in a surgical career. For example, the availability of protected time off could permit a surgeon in training to tend to a personal crisis or a family emergency, whereas, without this option, he or she may have to resign from a program with no guarantee of being able to finish training.

While this study suggests an interest in further exploring the need for a more flexible approach to surgical training, implementing such changes will require significant efforts. Changes in Medicare payment guidelines and residency requirements will have to be made to accommodate part-time trainees. The American Board of Surgery currently requires a minimum of 144 weeks of training in the first 3 years and 92 weeks in the last 2 years with the majority of the 12 months of the chief year served in the final year of the program.[23] Additionally, many respondents cited financial concerns as a deterrent to part-time training. As student debt continues to increase, the necessary reduction in salary that would accompany part-time training might be prohibitive. Indeed, this may explain the unwillingness of residents compared with fully trained surgeons to accept a reduction in benefits or salary in exchange for training part-time. Finally, concerns were expressed in this study by both potential part-time trainees and trainers of a perceived second-class training, potential for loss of benefits, and concern for going against a culture that equates dedication with the number of hours worked. Both cultural and infrastructural changes would need to be made to introduce a more flexible approach to surgical training in an effort to maintain the selectivity and high caliber of applicants to surgery programs. Among primary care physicians, part-time physicians have been found both to have higher-quality job satisfaction and the same performance and patient relations[24-26] as full-time physicians. Seventy-nine percent of residents who did not partake of a flexible option in a program that offered one agreed that it had a positive effect on morale.[22]

This study was carried out in the midst of implementing 80-hour workweek regulations, a likely cause for improved filling of surgery residency positions in the 2004 match. In 1 study of third- and fourth-year medical students, 55% agreed that these work-hour limitations alone increased their interest in considering a career in surgery.[27] Since the majority of participants in this study had completed or were close to completing their training, it is doubtful that the results, particularly in regard to part-time training, would be significantly influenced. Additionally, as with all questionnaire-based studies, these results are subject to responder bias. Such bias is minimized by the large number of respondents, the variety of groups approached to distribute the questionnaire, and the complete anonymity of the responses. Finally, this study is weakened by the inability to determine the total number of potential respondents in order to calculate a re-

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sponse rate. However, a large number of current medical students, residents, fellows, and fully trained surgeons have shared their opinions on training in general surgery and indicated that there is a role for further exploring a more flexible approach to surgical training.

CONCLUSIONS

Male and female medical students, residents, fellows, and fully trained surgeons have expressed interest in part-time training for diverse reasons including maternity/paternity leave, nonresearch educational pursuits, career breaks, and unforeseen commitments. In light of recent concerns about decreasing applications to general surgery training programs and a need to appeal to students with greater interest in controllable lifestyle careers, a more flexible approach to surgical training could boost interest and improve applicant caliber. The fact that most people would not avail of less than full-time training should not deter us from advocating change. A restriction on duty hours may be the first step in changing the culture of surgical residencies, but it is not the only step. Ultimately, however, the perception that part-time training is solely a women's issue or even a family issue will need to change and be redefined as an issue of flexibility and balance in the personal and professional lives of all surgeons.[28] Because the upcoming generation is less willing than previous ones to sacrifice quality of life, academic medicine will lose both women and men if greater work balance is not achievable.

Accepted for Publication: July 29, 2005.
Correspondence: Hilary Sanfey, MB, BCh, Transplant Division, PO Box 800709, University of Virginia Health System, Charlottesville, VA 22908-0709 (has9s@virginia.edu).
Author Contributions: *Study concept and design:* Freischlag and Sanfey. *Acquisition of data:* Sanfey. *Analysis and interpretation of data:* Saalwachter, Freischlag, Sawyer, and Sanfey. *Drafting of the manuscript:* Saalwachter and Sanfey. *Critical revision of the manuscript for important intellectual content*: Freischlag, Sawyer, and Sanfey. *Statistical analysis:* Saalwachter and Sawyer. *Administrative, technical, and material support:* Sanfey. *Study supervision:* Freischlag and Sanfey.
Previous Presentations: These data were presented in part at the Society of University Surgeons Annual Meeting; February 11, 2005; Nashville, Tenn.
Acknowledgment: We would like to acknowledge the support of the Association of Women Surgeons Council, the American College of Surgeons (Jim Losby, electronic production administrator), the Association of Program Directors in Surgery, and the American Surgical Association Blue Ribbon Committee.

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