The Market for Pediatric Surgeons: An Updated Survey of Recent Graduates

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Purpose: The aim of this study was to identify the demand for pediatric surgeons as perceived by recent graduates of North American pediatric surgery training programs.

Methods: A survey was mailed to every pediatric surgeon who completed a certified training program in North America between 1998 and 2000; 81% of 83 responded. Data from the previous survey of 1992 through 1997 graduates provided longitudinal comparisons. The data were analyzed using univariate and bivariate statistical analysis.

Results: The number of graduates was 28, 31, and 24 for 1998, 1999, and 2000, respectively, down from 35 graduates in 1997. All found positions in pediatric surgery, and first-year incomes continue to rise. Fewer graduates (54%) desired an academic position coupled with research compared with previous survey respondents (64%), and 69% were able to find such a position. A practice at a university children's hospital remained the most desired by over 80%, but only 38% obtained positions in this type of practice. However, 55% were able to find a position in a children's hospital (university or community), which had declined gradually to a low of 32% in 1997. The 1998 to 2000 graduates perceive a much stronger demand for pediatric surgeons compared with previous survey respondents (46% *v* 14%), and greater than 50% felt that too few pediatric surgeons were being trained.

Conclusions: The market demand for pediatric surgeons remains strong as measured by employment and income. The perception of the market by the 1998 through 2000 graduates is positive, which contrasts with the 1992 through 1997 graduates. However, there continues to be significant market changes including a proliferation of positions at community Children's hospitals.

INDEX WORDS: Health manpower, graduate medical education.

IN AN EFFORT to better understand the pediatric surgical workforce, we reported the results of a survey of recent graduates from certified training programs in the United States and Canada between 1992 and 1997.[1] Although the number of pediatric surgeons training during this period exceeded previous definitions of need, this group of pediatric surgeons had no trouble finding positions in pediatric surgery, and their first year incomes rose over the period of the study. However, just 54% of the graduates found a position in the type of hospital they desired, and the percent working in a children's hospital dropped from 65% in 1992 to 32% in 1997. This group of graduates perceived a decline in market demand with only 30% of the 1996 through 1997 graduates perceiving a strong market for pediatric surgeons.

Since 1997, the number of graduates of certified training programs has been relatively stable and is projected to remain at approximately 25 graduates per year through 2004 (Fig 1). Since 1974, the American Pediatric Surgical Association (APSA) has completed studies to evaluate pediatric surgical manpower needs and has updated this assessment every 5 years.[2-5] O'Neill et al[6] reported a longitudinal analysis of the pediatric surgical workforce in 2000 that, similar to other studies of the pediatric subspecialty workforce, showed an increasing number of pediatric surgeons relative to the pediatric population. During the past 25 years, the ratio of pediatric surgeons to the pediatric population has doubled to 1 per every 100,000 children in the 0- to 17-year age group. The methodologies used by O'Neill to predict the future pediatric surgical workforce have been fairly accurate with only slight underestimates of supply. The longitudinal study by O'Neill and the last survey study of recent pediatric surgical graduates show that the increased supply has been absorbed by a similar increase in the market demand for pediatric surgeons.

Our initial survey of recent graduates as well as work by others supports the use of this tool to provide a snapshot of current demand and allows monitoring of the

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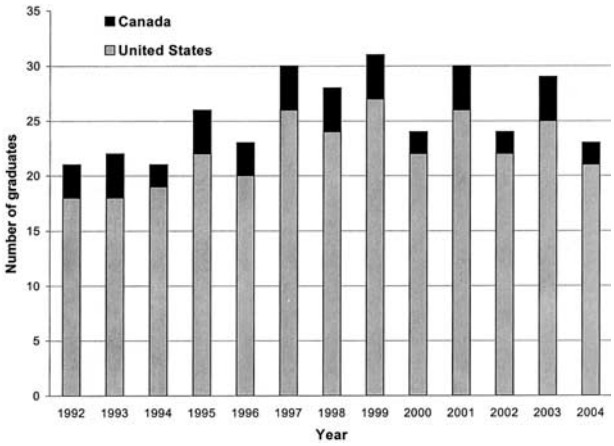

Fig 1. The number of graduates from certified pediatric surgical programs in the United States and Canada over the past 6 years with the expected number for 2002 through 2004.

changing market forces and their impact on professional opportunities.[7-9] In this study, we update our previous survey of recent graduates evaluating those who graduated from certified pediatric surgical training programs in 1998, 1999, and 2000, which provides further information regarding the evolution of the pediatric surgical workforce.

MATERIALS AND METHODS

Study Design

The study uses a retrospective longitudinal design based on each of the "graduating" classes of pediatric surgical programs over the period from 1998-2000. These data also were compared with the data from the study encompassing graduates from 1992-1997.

Study Population

The study population consisted of the 83 surgeons who had completed their training from 1998 through 2000 from certified pediatric surgical training programs as identified by the National Resident Matching Program (NRMP) match list for pediatric surgery and confirmed by their training programs.

Data Collection and Analysis

A 4-page survey questionnaire addressed fellowship training, position desired at the conclusion of training, the first position obtained, current position, market place assessment, and surgeon demographics. An additional question was added to evaluate the level of educational debt. Closed-ended questions were designed to guide respondents through their professional experiences while minimizing response bias. Open-ended questions were included toward the end of the questionnaire to encourage comments. After pretesting, the questionnaire was mailed to recent graduates.

Responses from 67 represented 81% of the study population. All survey responses were coded and handled confidentially.

The SPSS statistical program was used to analyze the data using both univariate and bivariate statistics. Comparison of means and cross tabulations relied on t test and χ^2 test statistics, respectively. For some analysis, the data were stratified into cohorts by years. Qualitative content analysis was used to extract from written comments from the open-ended questions.

Measurement

Twenty-five questions of opinion or satisfaction used a 5-point Likert scale ranging from negative to positive. Depth of clinical practice scope was measured by the percent of time spent in pediatric surgery and by the total number of procedures performed in the previous 12 months. In some cases, these responses were transformed into categorical variables for clarity of presentation or statistical management.

Breadth of clinical practice for pediatric surgeons was assessed by determining their conduct of key representative index procedures and complex cases in a given year. To assess operative scope, performance of these 9 index procedures and management of 4 key complex cases were queried during a resident's fellowship, first year of practice, and the past 12 months. The 9 representative index procedures from which clinical breadth was assessed included (1) pull-through Hirschsprung's disease, (2) repair esophageal atresia or tracheoesophageal fistula, (3) thoracotomy for congenital lung disorder, (4) excision of neuroblastoma, (5) excision of Wilms' tumor, (6) thoracoscopy, (7) laparoscopy, (8) endoscopy for a foreign body, and (9) extracorporeal membrane oxygenation (ECMO) cannulation. The 4 complex management or critical care cases included (1) management of the multiply injured trauma patient, (2) management of a pediatric ventilator, (3) management of a neonatal ventilator, and (4) management of an ECMO patient.

RESULTS

Similar to the results of the 1992 through 1997 survey, graduates from 1998 through 2000 were positive about their preparation for practice. When queried about how satisfied they were with their training programs when completed, 96% rated their satisfaction as very high or high. Despite the fact that over 95% indicated that their training program had prepared them well for clinical practice (4 to 5 on a scale of 1 to 5), 68% indicated they desired some additional training. This increased 22% from the 1992 through 1997 cohort. In the open comments section, respondents wrote 60 comments specifying additional areas of training desired; 42% more exposure to minimally invasive surgery, 28% more urology experience, 23% more head and neck including airway reconstruction and bronchoscopy, and 23% other training.

The percentage of women completing pediatric surgical training programs has increased to 29% in the 1998 through 2000 cohort from 6.5% of 1992 through 1994 cohort ($P = .001$; Fig 2). This compares with general surgery in which 48.9% of those under 35 years of age were women in 1999.[10]

For the first time in this survey we queried graduates as to their degree of total educational debt, including, for those married, that of their spouse. After completing all training, 66% of the 1998 through 2000 graduates reported having some debt with the mean debt incurred postgraduation being $51,200.

Pediatric surgical graduates must consider a number of factors in job placement. These include various degrees of responsibilities in clinical practice, teaching, and re-

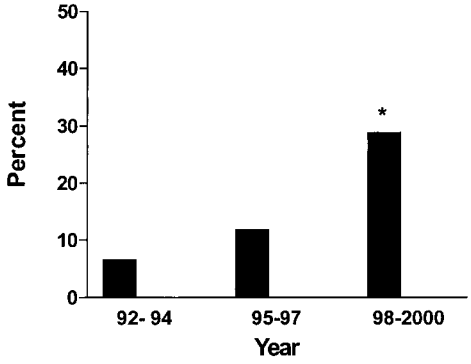

Fig 2. The percentage of women completing pediatric surgical training programs from 1992 through 2000 grouped by 3-year cohorts (*$P = .001$).

search. Other factors include the type of hospital, community and region of the country, and the practice structure. Nearly 90% of the 1998 through 2000 graduates are still in their first position, and all continue to practice clinical pediatric surgery the majority of their time. The graduates interviewed for a mean of 4 positions and received an average of 3 job offers.

Respondents were asked what type of practice was most desired. It appears that fewer (54%) of the 1998 through 2000 graduates desire academic careers including research compared with the previous survey respondents (65%). Of the 54% that desired an academic position with research, 69% were able to find such a position. After graduation, 54% of the 1998 through 2000 graduates found clinical practice positions with teaching, whereas 6% found positions with pure clinical practice.

Similar to the 1997 survey, respondent's practice at a University Children's Hospital was desired by 79% of the graduates. However, only 37% of the 1998 through 2000 graduates actually found positions in University Children's Hospitals (Fig 3) the 1998 through 2000 graduates are covering a mean of 2.4 $\pm$ 1.6 hospitals, which is significantly less than the mean number of hospitals covered by the 1992 through 1997 graduates (3.3 $\pm$ 3.5; $P = .05$). The practice arrangements of the 1998 through 2000 group were organized as faculty, 42%; single-specialty group, 24%; hospital employee, 23%; multispecialty group, 9.0%; military, 1.5%; and solo practice, 1%. The most significant difference in practice arrangement for the 1998 through 2000 graduates compared with the 1992 through 1997 graduates was a doubling of the number who are hospital employees from 11% to 23%.

The 1998 through 2000 graduates established practices in 35 different states, although not necessarily relative to the population clinical need as defined by O'Neill at al.[6] From the standpoint of obtaining employ-

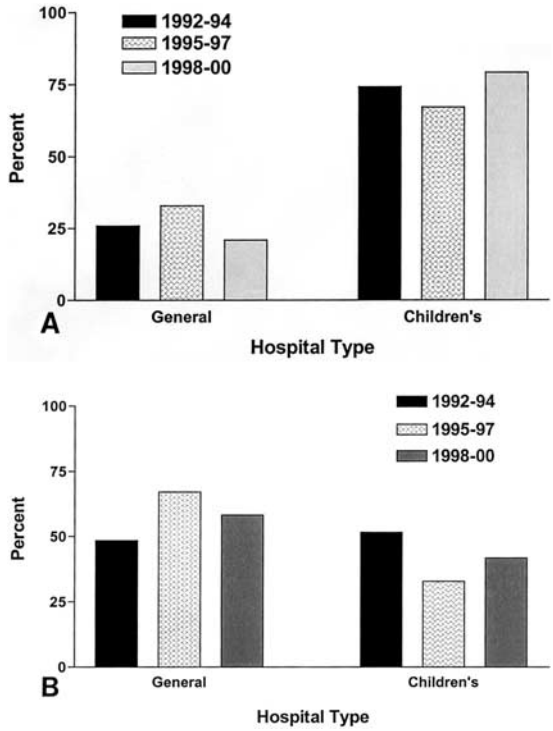

Fig 3. The percent of graduates desiring a position in a specific hospital practice (A) (Children's refers to University Children's; General refers to community children's or community hospital) versus the percent practicing in the each type of hospital (B).

ment in pediatric surgery, there was no evidence that the demand for pediatric surgeons is decreasing. All of the 1998 through 2000 graduates obtained positions in pediatric surgery and are practicing pediatric surgery essentially 100% of the time.

First-year incomes continued to rise for pediatric surgeons. We normalized the income to 2000 dollars for the respondents of this survey as well as the 1992 through 1997 surveys.[11] The percent with first-year incomes greater that $200,000 has increased from 3.1% in the 1992 through 1994 cohort to 18.3% for the 1998 through 2000 cohort (Fig 4). This appears to be in contrast to

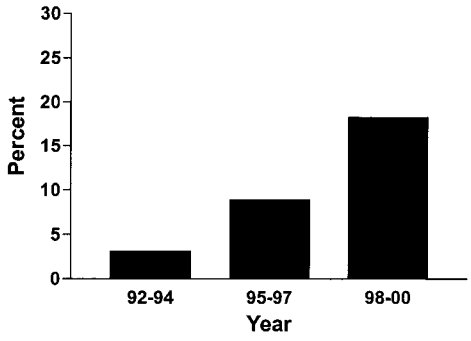

Fig 4. Percentage of first year incomes greater than $200,000 for pediatric surgeons graduating 1992 through 2000; normalized to year 2000 dollars.

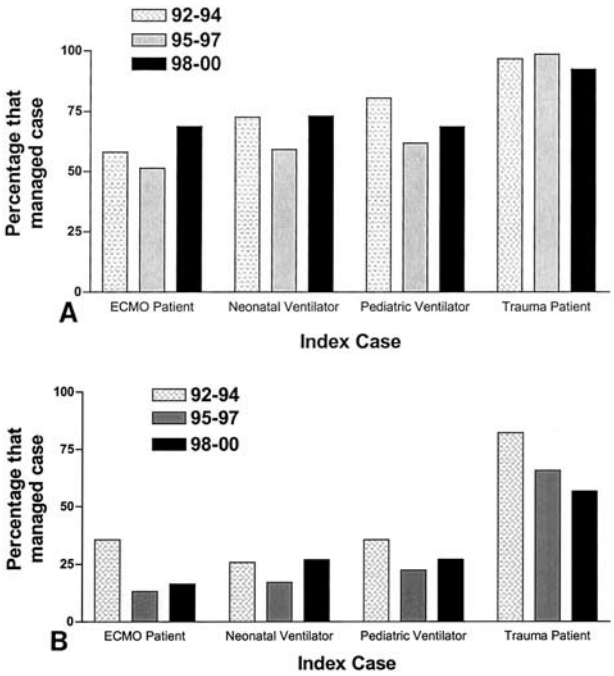

Fig 5. The percentage of graduates (1992 through 2000, grouped in 3-year cohorts) who managed specified complex cases during their fellowship (A), and in the current year of practice (B). The decrease in trauma care for the current year of practice is specific ($P = .002$).

general surgery, which has seen a relative decrease in income over the same period.[10]

In the 1998 through 2000 survey, we again assessed the performance of 9 index procedures and the management of 4 key complex clinical situations both during fellowship and the first year of practice. We had reported previously a decline in the percentage completing 8 of 9 of the index procedures by year. However, for the 1998 through 2000 cohort, this trend has not continued, and 64% of the 1998 through 2000 group reported doing 8 of 9 of the index cases.

The complex management in critical care cases followed a somewhat different pattern. The percentage of the 1998 through 2000 respondents managing complex cases during fellowship has not changed significantly from the 1992 through 1997 survey. In the current year of practice, the percentage of the 1998 through 2000 graduates completing complex patient management continues to be low with only 16% treating an ECMO patient and 27% managing a pediatric ventilator. Only 56.7 percent of the 1998 through 2000 graduates have treated a pediatric trauma patient in the last year down from 82.3% for the 1992 through 1994 graduates ($P = .002$; Fig 5). Together, these data on complex case management appear to indicate ongoing erosion of the responsibility by pediatric surgeons in critical care management and the management of pediatric trauma patients. Despite these changes, the majority (80%) of the

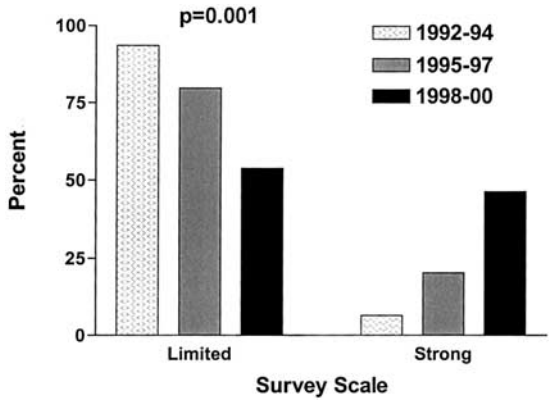

Fig 6. The percentage of graduates (1992 through 2000, grouped in 3-year cohorts) that perceived a strong demand for pediatric surgeons.

1998 through 2000 graduates were satisfied with their scope of practice, reporting 4 or 5 on the 5-point scale and 39% reporting the highest satisfaction of 5 of 5.

One of the most significant findings of the 1992 through 1997 survey was the pediatric surgeon's perception of a diminished demand for their services. The majority indicated that the demand for pediatric surgeons was limited. The perception of the market is dramatically different for the 1998 through 2000 cohort, with 46% foreseeing a strong demand for pediatric surgeons, which has increased significantly for each 3-year cohort back to 1992 ($P = .001$; Fig 6).

In addition, when we had asked in the 1992 through 1997 survey whether the right number of pediatric surgeons were being trained, 87% of the 1992 through 1994 graduates indicated we were training too many. Only 44% of the 1998 through 2000 graduates indicated too many pediatric surgeons were being trained, and 56% indicated that we were training too few ($P = .001$; Fig 7). The 1998 through 2000 graduates' satisfaction with the

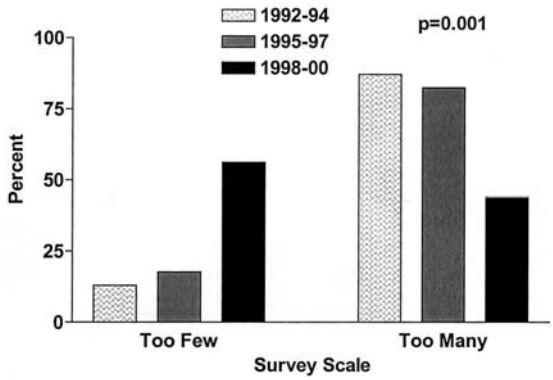

Fig 7. The percentage of graduates (1992 through 2000, grouped in 3-year cohorts) who indicated that the correct numbers of pediatric surgeons were being trained.

quality of available positions has not changed significantly from that of the 1992 through 1997 survey groups.

In the open comment area of the survey, respondents were asked to indicate what changes they expect in pediatric surgery in the next 5 years. Forty-five percent answered the question with 23% giving more than one answer. More than a third (37%) expressed concerns related to the increased number of pediatric surgical specialists and for further narrowing of the practice of pediatric surgery because of competition from other pediatric surgical specialist as well as nonsurgical specialist (interventional radiology). Thirty-seven percent expected to cover larger geographic areas in their practice, and 13% expect to see more procedures done with a minimally invasive approach.

DISCUSSION

For those who study the physician workforce, 2000 was an important year, because it was the year in which it was generally accepted, and by some feared, that there would be a large surplus of physicians and especially of subspecialist.[12-16] The number of certified pediatric surgical training programs has stabilized over the last several years, and it is not anticipated that there will be any significant increase in the number of training program graduates over the next 5 years. However, even with the current number of training programs, it is estimated that the pediatric surgical workforce will grow approximately 1.7 times the rate of the pediatric (0 to 17 years of age) population. The APSA committee on workforce sought to supplement O'Neill's longitudinal model[6] with a survey of recent graduates of pediatric surgical training programs entering the market. In this study, we update our previous survey of 1992 through 1997 graduates[1] with an updated survey of the 1998 through 2000 graduates.

The involvement of the pediatric surgical trainees in complex critical care management during their fellowships has not changed significantly with still more than a third of graduates never managing a pediatric ventilator, neonatal ventilator, or ECMO patient. The 1998 through 2000 graduates, similar to the 1992 through 1997 graduates, appear to have reduced involvement in direct critical care management with 27% managing pediatric or neonatal ventilators and 16% managing ECMO patients in the most current year of practice. Surprisingly, only 57% of the 1998 through 2000 graduates treated a trauma patient in the last year. This may be in large part explained by the type of hospital in which recent pediatric surgical graduates are practicing. With more pediatric surgeons working at community hospitals, there is a more narrowed scope of practice and less involvement with complex critical care management and care of trauma patients. Over one third of the 1998 through 2000 graduates expressed concern for narrowing of the scope of pediatric surgical practice because of competition from other pediatric surgical specialties as well as nonsurgical specialties such as interventional radiology. The impact of these changes plus potential changes in the pediatric surgical case load of practicing general surgeons should be quantified with future workforce studies.

The current survey results show a significant increase in the number of women entering the pediatric surgical workforce, up to 26% for the 1998 through 2000 graduates. It is anticipated that the number of women in pediatric surgery will continue to increase, although the rate certainly is slower than what has been seen in general surgery. In other physician workforce studies, the work effort of women physicians has been approximately 15% less than that of men, and the differential widens among older physicians.[17,18] The effect of gender on the pediatric surgery workforce is unknown and will need to be evaluated with future studies. Most (66%) of the 1998 through 2000 graduates finished their training with educational debt, but the mean of $51,200.00 is surprisingly not any higher than that reported for pediatric graduates that only have 3 years of training.[9]

The 1998 through 2000 graduates continue to desire to practice at a university children's hospital (79%), although only 37% of the 1998 through 2000 graduates found positions at university children's hospitals. There has been significant growth in community children's hospitals or pediatric specialty centers over the last 10 years that has provided an increased demand for more pediatric surgeons in community practice and also most likely contributed to the doubling of pediatric surgeons who are employed by hospitals.

A decreasing number of the 1998 through 2000 graduates (54%) compared with the 1995 through 1997 graduates (67%) were interested in an academic position, including research, with 40% able to find such positions. This may relate to the fact that lifestyle has become a major issue for younger surgeons, both men and women, who, like their counterparts in other specialties, are seeking more balance between their personal and professional lives. It is likely that physician work effort and the intensity of practice will decrease further in the future as has been seen in other specialties.[9,19,20]

There are number of signs from the recent survey that show strong market demand for pediatric surgeons. The 1998 through 2000 graduates had an average of 3 job offers and all are employed in clinical pediatric surgery and are practicing their specialty the majority of their time. The relative starting salaries continue to increase, with 18% earning over $200,000.00 in their first year during a time when salaries for other specialties such as general surgery actually decreased.[10] One of the most dramatic results of this study is the change in the 1998 through 2000 graduates' perception of the market de-

mand. Nearly half (46%) felt that there was a strong demand for pediatric surgeons up from only 14% of the 1992 through 1997 graduates. In addition, 56% believe that too-few pediatric surgeons currently are being trained, which compares with over 80% of the 1992 through 1997 respondents who felt too many pediatric surgeons were being trained.

Cooper et al[21] have developed a model for physician workforce planning based primarily on the concept that economic expansion as measured by the real gross domestic product (GDP) is the dominant factor that drives demand for health care. They describe a long-term relationship in the United States between growth of GDP and growth of the physician supply. The 3 other trends they consider in their workforce analysis include population growth, physician work effort, and the services provided by nonphysician clinicians, which has increased for primary care specialties. The Trend Model projects that continued growth of the US GDP and thus demand for health care and physicians actual will lead to physician shortages of 50,000 in 2010 and a deficit that is projected to exceed 200,000 physicians by 2020. This is despite significant increases in the supply of physicians in relation to the growth of the population. It is quite possible that the recent strong market demand for pediatric surgeons has been driven by such economic expansion and has been invested in new centers to deliver pediatric specialty care and has thus created a need for more pediatric subspecialists.

The impact of continued increases in the supply of pediatric surgeons based on increases in the market demand for pediatric surgeons without consideration for the actual needs of the pediatric population could be detrimental to the quality of patient care and lead to further narrowing of the clinical practice of pediatric surgery. It is important to define the need for a pediatric surgical workforce in terms of the patient, not in terms of the job opportunities for pediatric surgeons. Few data are available on the relationship between physician supply and quality of care,[22,23] but this type of analysis should be done in future studies of the pediatric surgical workforce.

The data from this study reveal how rapidly changes can occur in the market for pediatric surgeons and the importance of continuing and enhancing workforce studies to better understand the complex market dynamics. Achieving the appropriate size of the pediatric surgical workforce remains critical not only to the future quality of patient care, but the future of pediatric surgery.

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Discussion

D. Caniano (Columbus, OH): This is a really very fascinating study. My question relates to the area of compensation and salary. Did you look at differences in the individuals who chose academic positions versus community hospital positions and is there any difference in their compensation?

J. Geiger (response): We did break that out. The numbers were too small to have any degree of statistical significance between those 2 groups. Really, the actual difference, even though it was not statistically significant, is quite small between the 2 groups. And women—by the way we looked at that too—on average received greater compensation than the men, but again not statistically significant.

J. O'Neill (Nashville, TN): I think that this study by Geiger and the manpower committee is precisely what we hoped would happen with serial assessment of workforce over many years. This particular approach, which looks at the opinions and the history of graduates, I think gives us additional information over and above the other studies that continue to be done, which actually surveys the workforce and practice and economic factors that are related. There have been some very real changes in training programs and output in the last couple of years, and those changes have made some of the differences, which you see here. They are: 2 training programs that have been discontinued, although there are some on the horizon, and a marked decrease in the number of Canadian graduates who are returning to the United States because there are more individuals needed in Canada, and so those factors will be expected to have at least a short-term effect on the number of individuals entering the field in the United States. It is interesting that many of the demographic changes seen in this study and continued from the previous one, reflect financial considerations in the health care system and the survival of surgeons economically because of the types of patients we see. It will only be seen in the future whether these changes shifting care to community hospitals are good for children, and those are factors that should be brought into the equation in the future. This is an important study. I think we will all look forward to seeing this published, and I appreciate the fact that the group is continuing this in such a fine fashion.

J. Geiger (response): Thank you for those eloquent comments, Dr O'Neill. I think the last comment is the very important thing and is consistent with Larry Moss' and others study plans to look at quality. We must assess quality and how quality changes as the pediatric surgical work force potentially continues to increase relative to the pediatric surgical population. I think if I had to state my own opinion I would say that our production of pediatric surgeons currently right now is probably quite adequate, the right amount, but there are a lot of changes that are happening out there. I am not sure Children's hospitals are going to continue to proliferate. We have seen recently a number of major health care systems completely drop pediatrics, and this has put a number of pediatric subspecialists literally out on the street with a few weeks' notice. We might be at a new time in our market and therefore it merits continued close watching.

P. Guzzetta (Dallas, TX): When I was a member of the manpower committee of the APSA program directors chaired by Keith Georgeson, we actually looked at the ages and the makeup of APSA. You said that there were 750 members of APSA but you have to realize 150 of those members are not practicing pediatric surgery. The APSA membership also includes honorary members, and the actual number of members of APSA who were practicing pediatric surgery as of 2 years ago was 460. Do you know how many people are actually practicing pediatric surgery? Obviously, there are some that are practicing pediatric surgery that are not members of APSA. We all owe a great debt to Dr O'Neill for his work, but one of the factors in his manpower study was the retirement age that was reported is from the SOSSUS data, which were from the early 1970s, and then the average age of retirement was 70. I think many of us know that that is not the average age of retirement for pediatric surgeons now. Again, if you look at the age of the people in APSA there are 75 members of APSA who are 65 of years age or older who are practicing. I just encourage you to pay careful attention to how many people are practicing pediatric surgery and how many are leaving practice each year earlier because it is my guess that the attrition rate that you will see is going to be pretty close to 25 people gained each year. Do you follow the number of people who are actually practicing pediatric surgery in the country?

J. Geiger (response): Thank you, Dr Guzzetta. First of all, Dr O'Neill's work has specifically looked at those actively practicing pediatric surgery. We will follow his model and repeat that study to get a handle on that number. The number I showed on that graphic was what is called regular APSA members or active APSA members. It did include retired, honorary, or international members, so it is somewhat of a subset. Not all of them are practicing pediatric surgery. That is a given.

I think that your last comments are very important, and I agree completely with them, that is, what people refer to as the "effective" work force is changing. This is in part because of gender. Women do contribute approximately 15% less to the work force than men in all studies that have been done. In addition men, and all surgeons in

general, are undergoing lifestyle changes which make them not want to commit the same number of hours that were committed by those of past generations to their practice. Also, because of some of the pressures of malpractice and other charges in medicine, there is probably going to be an earlier retirement age. I think all those are important factors again as to why it is so important for us to continue to try to look at our workforce from multiple different ways.

A. Dilley (Menai, N.S.W): I enjoyed your paper, and a lot of the changes that you discussed are mirrored in our country. One of the equations that has been fairly interesting is the number of pediatric surgeons for the number of children in the country. The thing that has been missing from that equation is the reduced number of general surgeons that are willing to look after children, and a lot of the newer general surgery graduates are not interested either clinically or from a medicolegal perspective in looking after children. That burden is falling onto pediatric surgeons. We currently are not training enough pediatric surgeons to cope with that rapidly increasing proportion of patients that had been treated by general surgeons. Have you looked at that at all for the United States?

J. Geiger (response): We have not specifically looked at it, at least not recently, and we need to. I think your comments are probably true in the United States, that recent graduates of general surgery programs are much less likely than say graduates of 20 years ago, to do say a small baby's hernia or other cases, a pyloromyotomy for instance, but we need to get specific data on that and we actually have access now to some of the insurance company data where we hope to look at some of those issues.

S. Stylianos (New York, NY): You described a clear change in the type of job desired. Can you expand a little on job satisfaction and overall contentment?

J. Geiger (response): I think it is a mixed message because people are finding jobs, first of all, which in some specialties has been at times difficult. Secondly, they are finding jobs with very satisfactory salaries. Most of them are very happy with their salaries, but if they really—when you push them and ask them, what job did you really want, still the majority did want to work in a university children's hospital, and those jobs are just not as prevalent for this group. I think it is a mixed picture. As far as looking in detail at scope of practice, most of them expressed relative happiness. Again, some of that may reflect change in lifestyle—that people are willing to accept better lifestyle even though they may not be as busy. I think it is a very difficult thing to get a complete handle on.

B. Pearl (Peoria, IL): Having worked in a very large training center and now working in a community children's hospital, my view of this is different. I think it depends on which end of the telescope you are looking through. Have you considered doing 2 other things in terms of examining these data: for instance, population-based information. It does not take a rocket scientist to look at the state distribution of pediatric surgeons around the country to know that they are more interested in living in New York or California than in Nebraska, but if you look at the population versus the number of pediatric surgeons by region I think some very interesting information could be gleaned from that. The second thing you might want to look at is asking surgeons and chiefs of hospitals around the country of their perceptions of recruiting difficulty or ease and what they need in their communities to look at the other end of the spectrum of recruiting.

J. Geiger (response): I appreciate the question. I also work a portion of my time in a community children's hospital so I am well aware of some of the issues there. Dr O'Neill's paper that was published in *Annals of Surgery* did look at demographic data in relation to the ratios of pediatric surgeons in different population areas. It certainly is not balanced. It is not for any medical specialty period, and that is, again, people choose to live in certain sites for different reasons. Whether that imbalance though really impacts care has not been looked at because maybe the patients just find their way to the appropriate care facility. I do think that the changes that we have seen or some of the market demand for pediatric surgeons has been driven by the health care systems and wanting to keep all patients within their system and then starting up a community children's hospital. That is the trend that I am not sure will continue, but we keep trying to look at as much information as we can to understand what is happening.

C. Reyes (Pensacola, FL): I enjoyed your paper, and it is very important information that you brought to us. I have to challenge you on one comment that you made and that is that we are training enough pediatric surgeons. I know this is a controversial issue, but I just have to stand here and say that if you speak with the physicians, the pediatric surgeons in large community hospitals, they are having a very difficult time recruiting. I have been in the recruiting efforts for about 2 years now. We have an excellent hospital, wonderful support for the Morris Children's Clinic, and it has been very difficult. I have found that the larger academic centers clearly can fill these positions quickly, and basically these are the centers that have control over the production of pediatric surgeons. I would like to just echo to you that, looking from the other side of the telescope as was mentioned earlier, there is a need for more pediatric surgeons. Parents are more educated today, parents are on the internet, and parents now would prefer to have their

children operated on by pediatric surgeons. I think we also are losing a lot of subspecialty cases in ENT, urology, and thoracic surgery to subspecialists because we just do not have enough pediatric surgeons to perform those cases. It just may be something to think about when we decide how many pediatric surgeons we should be producing yearly.

J. Geiger (response): I agree with those comments. What is clear I think from our data is that the market demand is still quite strong for pediatric surgeons, no question about that. The question that is more difficult is that should enough pediatric surgeons be trained to meet that market demand irrespective of the work load of those pediatric surgeons and irrespective of the quality that those pediatric surgeons are able to provide. I think this is where it gets into a much more complicated issue. Currently, we are generating more pediatric surgeons than the growth of the pediatric population in the United States, so unless dramatic changes in retirement and other changes in "effective" work force occur, we will continue to have more pediatric surgeons relative to the pediatric population in the United States. That may change, but, saying that, we still need to understand better if we should meet the demand that is out there. There is clearly a demand right now, but do we increase the number of training programs to answer that demand? There also is, as I mentioned, some contracture in some areas now as the cost of having a full-service children's effort in one of these hospitals is extreme, and if it does not start to pay the bottom line as hospitals are squeezed tighter, pediatric subspecialists may be turned out on the street.