



Original articles

Pediatric surgery workforce: supply and demand

Don K. Nakayama^{a,*}, Randall S. Burd^b, Kurt D. Newman^b

^a*Mercer University School of Medicine, Macon, GA 31201, USA*

^b*Children's National Medical Center, Washington, DC 20010, USA*

Received 17 February 2009; revised 24 March 2009; accepted 25 March 2009

Key words:

Pediatric surgery;
Surgical workforce;
Pediatric surgical practice

Abstract

Introduction: Recent studies report a shortage of pediatric surgeons in the United States. We surveyed members of the American Pediatric Surgical Association (APSA) to estimate current workforce and demand and to provide data for workforce planning.

Methods: We conducted a survey of 849 APSA members to provide workforce data on their communities as follows: the number of active, retired, or inactive APSA surgeons; non-APSA fellowship graduates; surgeons without accredited fellowship training; and the estimated demand for additional pediatric surgeons. Internet search engines identified surgeons and practices offering pediatric surgical services. The US Census Metropolitan Statistical Areas (MSAs) defined service areas with populations of 100,000 or more.

Results: Of 137 MSAs with APSA members in practice, we obtained data from 113 (83%), with 247 (29%) of 849 surgeons responding. We estimate that the current pediatric surgical workforce consists of 1150 surgeons, with APSA members in active practice (60%) forming the single largest group, followed by general surgeons (21%). The percentage of active APSA surgeons was greater than the percentage of general surgeons in the 50 largest MSAs (76% vs 2%, respectively), whereas the opposite was observed in the smaller MSA ranked more than 51 in population (37% vs 46%, respectively). American Pediatric Surgical Association respondents estimated a national demand for 280 additional pediatric surgeons. Active APSA surgeons plan to delay retirement (8% of respondents) because it would leave their group or community shorthanded; 2% reported that retirement would leave the community without a pediatric surgeon.

Discussion: Workforce shortage in pediatric surgery is a problem of number and distribution. Incentives to direct trainees to underserved areas are needed. General surgeons provide pediatric services in many communities. Surgical training should include additional training in pediatric surgery.

© 2009 Elsevier Inc. All rights reserved.

There is a shortage of pediatric surgeons that parallels the perceived shortage of medical and surgical providers in the United States [1-3], especially in surgery [3] and pediatric subspecialties [4,5]. Both a pediatric and surgical specialty, the pediatric surgery workforce reflects forces that have led to shortages in both fields. As noted by Cooper et al [2], the starting point in all workforce assessments is an estimate of the current physician workforce. Assessments of the shortage

* Corresponding author. Department of Surgery, Medical Center of Central Georgia, Macon, GA 31201, USA. Tel.: +1 478 633 1367; fax: +1 478 633 5153.

E-mail address: nakayama.don@mccg.org (D.K. Nakayama).

have depended on economic and demographic trends that impact on physician supply [2] and estimates from data banks from physician and surgical organizations (eg, the American Medical Association and the American Board of Surgery) [3].

Pediatric surgery is a small field where one may reasonably estimate supply of active clinicians and surgical demand. A comprehensive study of a smaller field, pediatric rheumatology, gave an estimated supply of 200 trained clinicians, a total demand for 337, and a deficit of 135 to 145 [5]. Two recent studies of pediatric surgeons used population per surgeon, one reported in 2000 [6] and the other in 2008 [7]. The 8-year interval may explain their opposite conclusions—that there was an impending oversupply [6] or a great shortage [7] of pediatric surgeons. A comprehensive study, ideally done at 5-year intervals, is overdue.

Our goal was to provide an accurate assessment of the pediatric surgical workforce. As noted by others, physician workforce planning is an imprecise endeavor but one that depends on reliable data [4]. Because the American Pediatric Surgical Association (APSA) is the dominant organization of pediatric surgeons in the United States, we felt that its membership would be a good starting point for an assessment of the supply of the field. To estimate demand, we felt the logical first step was to simply ask whether a demand for additional surgeons existed in the respondents' practice groups and communities, and how many. Accessibility of electronic Internet-based databases allows identification of surgeons practicing pediatric surgery and whether they have additional training in the field.

Our hypothesis was 2-fold. First, large US communities with extensive networks of pediatric surgeons and pediatric surgical practices continue to have a demand for additional surgeons. Second, smaller communities rely on a surgical community that includes pediatric surgeons outside the mainstream APSA organization and general surgeons to provide pediatric surgical services.

1. Materials and methods

We collected data from 2 sources. First, we surveyed current members of APSA. We sent an Internet-based questionnaire (Zoomerang, San Francisco, Calif) to the current members of APSA by electronic mail sent twice at a 1-month interval (June and July 2008) to maximize responses. Nonrespondents received a direct email from the primary author as a third request (November 2008). Those without an email on the APSA membership directory were sent a letter, and responses were returned by facsimile transmission. Respondents gave the city or community where their practices were located. Locations were assigned to the December 2006 US Census Bureau Metropolitan Statistical Areas (MSAs) and Components for the purposes of the study [8].

Second, we used Internet search engines (Google, Menlo Park, Calif; Microsoft, Redmond, Wash) using the name of the community and "pediatric surgery" to identify surgeons and practices offering pediatric surgical services in all MSAs with greater than 100,000 population. Surgeons who identified themselves as pediatric surgeons were further investigated using the information on their own Web sites and existing health service background engines (HealthGrades, Golden, Colo; American College of Surgeons, Chicago, Ill) for their training in pediatric surgery and their board certification status. For example, using the Google search engine, typing "pediatric surgery Macon Ga" gives a link to "pediatric surgery in Macon, Georgia, pediatric surgeon" on the HealthGrades Web site where 5 surgeons are identified, all listed with as covering both general surgery and pediatric surgery. From the APSA members' directory and the American College of Surgeons (ACS) database, 4 are pediatric surgeons with training in accredited programs. One is no longer in the area, and one is no longer in practice, leaving 2 identified pediatric surgeons. The fifth surgeon is in a group practice in cardiovascular surgery, thereby,

Table 1 Supply of pediatric surgeons in MSAs, more than 100,000 population (2008)

Category	Total (%)	MSAs ranked 1-50 in total population (%)	MSAs ranked higher than 50 in total population (%)	<i>P</i>
Total surgeons practicing pediatric surgery	1150 (100)	665 (100)	485 (100)	
All current US APSA members	821	609	212	
Nonactive APSA members (retired, nonclinical activities)	137	102	35	
APSA members in active practice	684 (60)	507 (76)	177 (37)	<.0001
Graduates of accredited US/Canadian fellowships, not APSA members	125 (11)	86 (13)	39 (8)	.011
Graduates, nonaccredited US/Canadian fellowships	24 (2)	12 (2)	12 (3)	.57
Graduates, non-US/Canadian programs	42 (4)	37 (6)	5 (1)	<.0001
Identified as pediatric surgeon, training not known	38 (3)	10 (2)	28 (6)	.0001
General surgeons without pediatric surgical training	237 (21)	13 (2)	224 (46)	<.0001

Comparison was done by χ^2 , MSAs 1 to 50 vs MSAs higher than 50. Population ranking was obtained from April 1, 2000, US census. Percentages refer to percentage of total surgeons practicing pediatric surgery (totals exceed 100 because of rounding). Percentages refer to percentage of total pediatric surgical workforce.

identifying him as a general vascular surgeon who also performs pediatric surgery. In sum, for the purposes of the study, the MSA in Macon, Ga, has one active APSA member, one inactive APSA member, one pediatric surgeon with accredited training who is not an APSA member, and one general surgeon providing some pediatric surgical services. Data were collected in December 2008 and January 2009.

American Pediatric Surgical Association members identified fellow members who were clinically inactive through retirement or change in profession. Frequently, retired and inactive APSA members verified their own status, confirming the estimates of our respondents. We requested the numbers of new graduates of fellowships accredited by the Accreditation Council of Graduate Medical Education. Other important groups identified by APSA members were other active US and Canadian fellowship-trained surgeons who were not members of APSA, surgeons who trained in fellowships either in North America or abroad who were not accredited by the Accreditation Council of Graduate Medical Education, and general surgeons without additional pediatric training who were providing pediatric surgical services. Because of the potential impact of physician extenders in the provision of services, we asked whether nurse practitioners or physician assistants worked with their practices.

We received more than one response from surgeons in several MSAs. In these cases, we used the mean of the responses as estimates for the community. To estimate demand, we asked whether their practice, or other practices in their communities, was looking to hire additional pediatric surgeons. As a reflection of a shortage of surgeons, we asked whether one was delaying retirement because it would leave the practice or community short of surgeons. We used the exact numbers in the practice estimates and the average of responses for a given MSA.

We made comparisons between the 50 largest MSAs in population (2000 US census; no. 1, New York-New Jersey-Long Island, to no. 50, Salt Lake City), and smaller MSAs ranked higher than 50 (no. 51, Bridgeport-Stamford-Norwalk, Conn, to no. 373, Roseburg, Ore) with populations of more than 100,000. χ^2 Analysis was used to test for significance at $P < .05$.

2. Results

We sent surveys to 849 members of APSA in the United States. Nearly all (821 [97%]) live in 137 (37%) of the 373 MSAs with a population of more than 100,000. The remaining 246 MSAs (63%) have no APSA member in residence.

We received 247 responses from individual surgeons (overall response rate of 29%) residing in 113 MSAs—all 50 (100%) of the 50 most populous MSAs and 63 (72%) of the 87 smaller MSAs. Overall, we had survey responses from 113 (83%) of the 137 MSAs with active APSA members.

On the basis of survey responses, we estimated the total pediatric surgical workforce in the United States at 1150

surgeons—665 in the top 50 MSAs and 485 in the remainder (Table 1). The APSA members in active practice comprise nearly 60% of the workforce, 76% in the 50 largest MSAs

Table 2 Pediatric surgical workforce in selected MSAs

Rank	US MSA	Population
Ten largest MSAs with a general surgeon providing pediatric surgical services, without an identified pediatric surgeon		
61	Oxnard-Thousand Oaks-Ventura, Calif	753,197
70	Bakersfield, Calif	661,645
78	Youngstown-Warren-Boardman, Ohio-Pa	602,964
83	Scranton-Wilkes-Barre, Pa	560,625
98	Santa Rosa-Petaluma, Calif	458,614
99	Lansing-East Lansing, Mich	447,728
110	Canton-Massillon, Ohio	406,934
112	Salinas, Calif	401,762
115	Vallejo-Fairfield, Calif	394,542
118	York-Hanover, Pa	381,751
Ten largest MSAs with no pediatric or general surgeon providing pediatric surgical services		
75	Poughkeepsie-Newburgh-Middletown, NY	621,517
79	Sarasota-Bradenton-Venice, Fla	589,959
82	Stockton, Calif	563,598
92	Lakeland-Winter Haven, Fla	483,924
95	Palm Bay-Melbourne-Titusville, Fla	476,230
96	Lancaster, Pa	470,658
100	Modesto, Calif	446,997
101	Deltona-Daytona Beach-Ormond Beach, Fla	443,343
102	Ogden-Clearfield, Utah	442,656
120	Provo-Orem, Utah	376,774
Ten smallest MSAs with an active APSA member or a graduate of an accredited US or Canadian training program who is not a member of APSA		
216	Charlottesville, Va	174,021
223	Lebanon, NH-Vt	167,387
229	Rochester, Minn	163,618
234	Jackson, Mich	158,422
252	Eau Claire, Wis	148,337
260	Bangor, Me	144,919
282	Iowa City, Iowa	131,676
294	La Crosse, Wis-Minn	126,838
303	Madera, Calif	123,109
317	Grand Junction, Co	116,255
Ten smallest MSAs with an identified pediatric surgeon, any training background, excluding those MSAs listed above		
132	Reno-Sparks, Nev	342,885
138	Killeen-Temple-Fort Hood, Tex	330,714
219	Muskegon-Norton Shores, Mich	170,200
221	Prescott, Ariz	167,517
226	Anderson, SC	165,740
253	Panama City-Lynn Haven, Fla	148,217
265	El Centro, Calif	142,361
292	Mansfield, Ohio	128,852
307	Odessa, Tex	121,123
335	Morgantown, WV	111,200

Ranks and population were obtained from 2000 US census.

Table 3 Delayed retirement among pediatric surgeons, by MSA

I am delaying retirement because (n = total number of respondents)	Response	Total (%)	MSAs ranked 1-50 in total population (%)	MSAs ranked higher than 50 in total population (%)	<i>P</i>
... it will leave my group shorthanded (n = 246)	Yes	19 (8)	9 (5)	10 (16)	.003
	No	227 (92)	175 (95)	52 (84)	
... it will leave the community shorthanded (n = 245)	Yes	19 (8)	6 (3)	13 (21)	<.001
	No	226 (92)	177 (97)	49 (79)	
... it will leave the community without a pediatric surgeon (n = 247)	Yes	5 (2)	0 (0)	5 (8)	.001
	No	222 (98)	184 (100)	58 (92)	

Comparison was done by χ^2 , MSAs 1 to 50 vs MSAs higher than 50.

but only 37% in the smaller MSAs ($P < .001$). After pediatric surgeons, general surgeons were the next largest group (21%). General surgeons were the largest group of surgeons (46%) providing pediatric surgical services in smaller MSAs. Pediatric surgeons from accredited US and Canadian fellowship programs who were not APSA members were more likely to practice in the 50 largest MSAs ($P = .011$), as were those who trained in non-US and Canadian programs ($P < .0001$).

Ninety-eight MSAs (of 373 [26%]) had one or more general surgeons providing primary pediatric surgical services in their communities, without an identifiable surgeon who practiced primarily pediatric surgery (MSA rank no. 61, Oxnard-Thousand Oaks-Ventura, Calif, to no. 372, Hammond, La; Table 2). One hundred twenty-seven MSAs (34%; no. 75, Poughkeepsie-Newburgh-Middletown, NY, to no. 373, Roseburg, Ore) had no surgeon, either pediatric or general, identified as providing pediatric surgical services.

The APSA respondents estimated a total demand of 280 additional pediatric surgeons. No additional pediatric surgeons were thought necessary in only 3 (6%) of the 50 largest MSAs. Among the respondents from MSAs ranked higher than 51, only 6 believed there was no demand for additional pediatric surgeons in their communities (6/63 [11%] MSAs with respondents). Both groups estimated a demand for 1 to 5 additional pediatric surgeons in their MSAs.

Responding APSA surgeons are delaying retirement because it would leave their practices or their communities shorthanded (8% for both, Table 3). In 2% of cases, their retirement would leave the community without a pediatric surgeon.

Nurse practitioners and physician assistants were in most of the respondents' practices (156/232 [67%] respondents who answered the question). There were a total of 504 physician extenders, an average of 3.2 per surgeon who had them.

3. Discussion

Our study confirms a shortage of pediatric surgeons in US metropolitan areas. We identified a pediatric surgical workforce of 1150 surgeons. More than 7 in 10 are active APSA

members or have fellowship-level training in pediatric surgery in accredited and nonaccredited programs in the United States and Canada. The APSA members responding to our survey estimated a demand for 280 additional pediatric surgeons. We found that some APSA surgeons are reluctant to retire because their absences would leave their communities shorthanded or without pediatric surgical coverage.

Even in the largest cities with many fellowship-trained pediatric surgeons, other surgeons with less complete training and credentials provide pediatric surgical care. Similar substitutes for fellowship-trained specialists have been documented in pediatric rheumatology, where primary pediatricians and adult rheumatologists care for children with rheumatic disease [5]. Many communities, particularly smaller ones, rely on pediatric surgeons whose backgrounds are out of the mainstream and general surgeons who are willing to take on pediatric patients. The situation is a reflection of the workforce shortage. In a previous report [9], we found that general surgeons with an interest or experience in pediatric surgery generally confine their practice to common conditions in older infants and children such as inguinal hernia, umbilical hernia, soft tissue abscesses, pediatric trauma, and appendicitis. They rarely perform hernia repair on newborns or prematurely born infants. General surgeons, although an important part of the community of surgeons serving infants and children, do not address important areas of the field.

Metropolitan statistical areas differ with respect to population, geographic size, proximity to other population centers, demographics, and cultural and recreational amenities. All have no doubt affected the distribution and number of practicing pediatric surgeons. For example, Poughkeepsie, NY, has long-standing referral patterns to Albany and Syracuse and appears to be well served. Florida population centers have more geriatric than pediatric inhabitants so the demand for pediatric specialty services would be less.

Some argue that it makes little sense for a pediatric surgeon to practice in smaller cities with populations between 100,000 and 200,000. However, APSA members have responded to a demand for pediatric surgical services in a handful of such cities that are the centers of remote areas hours away from larger cities (Johnson City, Tenn; Grand Junction, Colo; Danville, Pa). A pediatric surgery practice

would be able to supply the demand for services to small cities that are relatively nearby (Florence and Myrtle Beach, SC; Wilmington, Fayetteville, and Greenville, NC). As the examples show, such communities are often in high growth areas of the country and, combined, often have populations that approach those of cities with established pediatric surgical practices with several surgeons (Florence and Myrtle Beach, population: 389,784, no pediatric surgeons; Pensacola, Fla, population: 412,153, 3 pediatric surgeons).

Some urge increased regionalization of pediatric services, where a major center provides pediatric surgical services to a network of communities. Thus, Ann Arbor, Mich, a small community, is home to a major medical center and supports pediatric surgical services to a wide region of Michigan and northwestern Ohio. A similar arrangement has developed in Chapel Hill, NC, where another university medical center in a small community provides coverage to a number of cities in the state. However, medical centers in smaller communities frequently have the staff and facilities to provide a wide range of pediatric surgical services, providing families care locally without the disruptive travel of long distances. Successful practices in such cities as Huntsville, Ala, and Asheville, NC, show the beneficial effect of a pediatric surgeon in smaller cities that otherwise may have been transferred to a larger city (Birmingham, Ala, and Charlotte, NC, respectively).

Other problems contributing to the shortage are distribution and recruitment. Many new graduates are attracted to academic practices that often have several pediatric surgeons on staff [10]. The learning curve in pediatric surgery, like all of medicine, extends into the years after formal training. New trainees no doubt find comfort in entering practice with an experienced mentor that is more likely to be available in established practices of several surgeons. Moreover, the selection process for pediatric surgical fellowships favors candidates with academic backgrounds and research productivity [11]. When the trainees graduate, many decide to continue careers in academic surgery, an expected choice given their backgrounds and those of their mentors [12]. Thus, most new surgeons are attracted to the largest population centers, increasing the imbalance in the distribution of surgeons toward the biggest cities and medical school positions where several surgeons are pursuing academic interests in addition to their clinical practices.

Medical schools address the shortage of rural physicians by recruiting and selectively admitting medical students with backgrounds and interests that predict rural primary care [13]. A similar recruitment may be in order for the training of pediatric surgeons with a similar desire to practice in smaller communities and clinical settings. The lead time, however, is long—11 to 13 years from acceptance to medical school and ultimately finishing a pediatric surgical fellowship (4 years of medical school, 5-6 years of general surgery, and 2-3 years of pediatric surgery training). Identifying a surgical resident likely to locate in an underserved area (such as Macon, Ga) is also long, 4 to 8 years (2-5 years to complete a general

surgical residency, followed by 2-3 years in pediatric surgical training). It requires acceptance into a pediatric surgical fellowship, an uncertain path given the competition for training positions. Regionalization of pediatric surgical services, with identified centers of excellence aligning with smaller practices within a given area, provides the most immediate solution to the workforce problem. A relationship with a regional pediatric surgical center would provide necessary consultation and backup—a model of practice that is already established [14] and in existence in several communities [15].

The impact of practicing in an underserved area provides job satisfaction that is unusual in a metropolitan area in the United States. One of the attractions of pediatric surgery lies in the “big cases,” the unusual tumors and challenging clinical problems that make pediatric surgery fascinating and challenging. Smaller practices may lack the volume of such cases, but the personal experience of one of the authors (DKN) indicates that the interesting cases still come in a smaller venue.

Our survey did not reach the 235 MSAs without an APSA member, the major blind spot in our study. We attempted to correct this by using established Internet and health information databases. These resources identified many of the surgeons in a community, the types of practices they have, and their training and credentials. Thus, we were able to find pediatric surgeons who were not members of APSA and any surgeons who included pediatrics as part of their general surgical practices. From the various sources, we were able to get data on all 373 US MSAs with populations greater than 100,000 and cross check numbers using different data sources.

Expanding the number of general surgeons with expertise in pediatric surgery may be a possible strategy in providing care in communities that are short of formally trained pediatric surgeons or do not have one at all. It will be important to increase the training opportunities in common pediatric conditions beyond the 20 cases presently required by the American Board of Surgery. Training should cover the common conditions listed above, the workup and initial management of important symptoms such as bilious vomiting and gastrointestinal hemorrhage, and the basics of airway management and critical care.

Using general surgeons may not be a sufficient strategy, however. A reviewer of this article for the *Journal of Pediatric Surgery* notes that the current generation of new trainees is unlikely to have the same range of skills as a general surgeon with 20 years' experience working in a rural community. A prior APSA survey indicates that opportunities for general surgery trainees to gain experience in common pediatric operations such as pyloromyotomy is limited [16]. The overall operative experience among residents in general surgery has been decreasing, making it likely that residents are getting fewer, rather than more, pediatric surgical cases during their training [17]. Having a pediatric surgeon is no guarantee of the quality of pediatric

surgical care. A recent position paper by the Workforce Committee of APSA emphasizes that additional expertise outside of those provided by a pediatric surgeon is necessary for the successful outcome [18]. Are there adequate anesthesia and postoperative monitoring and care? Are there the necessary nursing and intensive care areas with sufficient numbers of experienced providers? Meeting the pediatric surgical needs of presently underserved regions will be a continuing challenge for years to come. It will require the attention of multiple areas of the APSA community, including the Workforce, Family and Community Relations, and Education Committees, and the Association of Pediatric Surgery Training Program Directors.

References

- [1] Cooper RA. The coming era of too few physicians. *Bull Am Coll Surg* 2008;93:11-8.
- [2] Cooper RA, Getzen TE, McKee HJ, et al. Economic and demographic trends signal an impending physician shortage. *Health Affairs* 2004; 21:140-54.
- [3] Sheldon GF, Schroen AT. Supply and demand—surgical and health workforce. *Surg Clin N Am* 2004;84:1493-509.
- [4] Jewett EA, Anderson MR, Gilchrist GS. The pediatric subspecialty workforce: public policy and forces for change. *Pediatrics* 2005;116: 1192-202.
- [5] U.S. Department of Health and Human Services, Health Resources and Services Administration. Report to Congress. The pediatric rheumatology workforce: a study of the supply and demand for pediatric rheumatologists. February; 2007.
- [6] O'Neill Jr JA, Gautam S, Geiger JD, et al. A longitudinal analysis of the pediatric surgeon workforce. *Ann Surg* 2000;232:442-53.
- [7] Nakayama DK, Newman KT, Nakayama DK, et al. Pediatric surgery workforce: population and economic issues. *J Pediatr Surg* 2008;43: 1426-31.
- [8] U.S. Census Bureau. Census 2000 PHC-T-29. Ranking tables for population of metropolitan statistical areas, micropolitan statistical areas, combined statistical areas, New England city and town areas, and combined New England city and town areas: 1990 and 2000 (areas defined by the Office of Management and Budget as of June 6, 2003). <http://www.census.gov/population/www/cen2000/briefs/phc-t29/tables/tab01a.xls> [Accessed February 4, 2009].
- [9] Nakayama DK, Burd RS, Newman KD. Clinical and financial characteristics of pediatric surgery practices. *J Pediatr Surg* [in press].
- [10] Geiger JD, Drongowski RA, Coran AG. The market for pediatric surgeons: an updated survey of recent graduates. *J Pediatr Surg* 2003; 38:397-405.
- [11] Hirthler MA, Glick PL, Hassett Jr JM, et al. Comparative analysis of successful and unsuccessful candidates for the pediatric surgical matching program. *J Pediatr Surg* 1992;27:142-8.
- [12] Lessin MS, Klein MD. Does research during general surgery residency correlate with academic pursuits after pediatric surgery residency? *J Pediatr Surg* 1995;30:1310-3.
- [13] Glasser M, Hunsaker M, Sweet K, et al. A comprehensive medical education program response to rural primary care needs. *Acad Med* 2008;83:952-61.
- [14] Coran AG, Blackman PM, Sikina C, et al. Specialty networking in pediatric surgery: a paradigm for the future of academic surgery. *Ann Surg* 1999;230:331-9.
- [15] Von Allmen DC. Personal communication, February 7 2009.
- [16] Cospser GH, Menon R, Hamann MS, et al. Residency training in pyloromyotomy: a survey of 331 pediatric surgeons. *J Pediatr Surg* 2008;43:102-8.
- [17] Kairys JC, McGuire K, Crawford AG, et al. Cumulative operative experience is decreasing during general surgery residency: a worrisome trend for surgical trainees? *J Am Coll Surg* 2008;206:804-13.
- [18] Stolar CJH, the Workforce Committee. American Pediatric Surgical Association. http://www.eapsa.org/surgeons/workforce_statement.cfm 2008 [Accessed March 24 2009].