Workforce Trends and Analysis of Selected Pediatric Subspecialties in the United States

Mary E. Rimsza, MD; Holly S. Ruch-Ross, ScD; Conrad J. Clemens, MD, MPH; William B. Moskowitz, MD; Holly J. Mulvey, MA

From the American Academy of Pediatrics, Division of Workforce & Medical Education Policy (Drs Rimsza, Ruch-Ross, and Mulvey), Elk Grove Village, Ill; Department of Pediatrics & Public Health, University of Arizona College of Medicine (Dr Clemens), Tucson, Ariz; and The Children's Hospital of Richmond at Virginia Commonwealth University (Dr Moskowitz), Richmond, Va
The authors have no conflicts of interest to disclose.
Address correspondence to Mary E. Rimsza MD, FAAP, 4751 West Crestview Dr, Tucson, AZ 85745 (e-mail: mary.rimsza@gmail.com).
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Abstract

Objective: To update pediatric subspecialty workforce data to support evidence-based legislation and public policy decisions by replicating the American Academy of Pediatrics' 1998 Future of Pediatric Education (FOPE II) workforce survey.

Methods: A descriptive and comparative analysis of survey responses from 9950 US pediatric subspecialists who completed an electronic survey.

Results: Pediatric subspecialists are working fewer hours and spending less of their time in direct patient care than they did in 1998 but the mean hours worked differs significantly according to subspecialty. Most subspecialists continue to be board-certified, white, non-Hispanic men, although the percentage who are women and from minority groups has increased. The proportion of subspecialists practicing in an academic medical center has increased since 1998. Thirty percent of pediatric subspecialists reported appointment wait times of >2 weeks and pediatric subspecialists in developmental pediatrics, endocrinology, and neurology identified much longer wait times than other subspecialists.

Conclusion: The demographic and practice characteristics of pediatric subspecialists have changed since the FOPE II survey and access to subspecialty care in a family's community remains a challenge. However, pediatric subspecialties are not monolithic and solutions to workforce shortages will need to take into account these differences to improve access to subspecialty care.

Keywords: academic pediatricians; access; pediatric subspecialists; physician workforce

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What's New

Pediatric subspecialists today are spending less time in clinical care and teaching and more time on research and administration than in 1998. Their demographic and practice characteristics also have changed but subspecialists are not monolithic and these changes vary according to specialty.

There have been dramatic changes in the nature of pediatric practice and the pediatric population in the United States, but limited research on the pediatric medical subspecialists and surgical specialists (hereafter referred to as the subspecialists) workforce.[1–4] The most comprehensive pediatric subspecialist workforce survey was conducted more than 18 years ago when the American Academy of Pediatrics (AAP) examined the practice characteristics of pediatric subspecialists in the United States as part of the Future of Pediatric Education (FOPE II) project.[1] A recent survey of the pediatric subspecialty workforce[3] investigated only the subpopulation of medical subspecialists that are certified by the American Board of Medical Subspecialists and who participated in the American Board of Pediatrics Maintenance of Certification program in 2013 and 2014. This survey did not include pediatric surgical specialists or medical subspecialists who are certified by other boards.

One of the key findings of the FOPE II survey was that pediatric subspecialists were facing strong competitive pressures for their clinical services from other subspecialists. Other findings were that pediatric subspecialists perceived that patient complexity was increasing; that most subspecialists were working in urban academic settings; and that most subspecialists were white, non-Hispanic men.[4] Since the FOPE II survey, an increasing number of women have entered medicine, the predicted oversupply of pediatric subspecialists due to managed care never occurred, and the health care delivery system has changed dramatically.[5] Updated workforce data are vital to making evidence-based legislation and public policy decisions regarding the physician workforce. Health care deliberations too often focus on adult medicine and overlook the unique needs of pediatricians and the pediatric population that they serve. The objective of this article is to update pediatric subspecialty workforce data to enable evidence-based legislation and public policy decisions regarding the physician workforce.

METHODS

An electronic survey was developed by the AAP Division of Workforce and Medical Education Policy in collaboration with AAP sections. Sections are formally organized groups of AAP members interested in and/or trained in a pediatric medical subspecialty, a pediatric surgical specialty, or a multidisciplinary area. The first 20 sections that volunteered to participate in this survey project (from 2010 to 2015) comprised phase I. The remaining sections will be included in phase II, beginning in 2018.

Phase I specialties included 4 surgical specialties (pediatric orthopedics, urology, surgery, and otolaryngology) and 16 medical subspecialties (adolescent medicine, cardiology, child abuse, critical care, developmental–behavioral pediatrics, emergency medicine, endocrinology, hospital medicine, hospice/palliative medicine, infectious disease, internal medicine/pediatrics, nephrology, neurology, pulmonology, rheumatology, and sports medicine). The target list of survey participants included all of the members of each participating AAP section. In addition, 14 subspecialties collaborated with related specialty societies or other professional associations to develop survey content and to include nonsection members. The names and e-mail addresses of the nonsection members were obtained from the specialty's professional associations (eg, the Child Neurology Society) and their specialty board (eg, the American Board of Pediatrics). This was intended to be a sample of pediatric subspecialists in the United States and not a census of all pediatric subspecialists in the United States.

Each subspecialty's survey included a common set of questions on demographic characteristics, board certification, type of employment, and practice characteristics. Most of the common questions had been part of the FOPE II survey. In addition to the common questions, each subspecialty had the opportunity to add questions (range: 14–68 additional questions) on topics of interest to them (eg, physician burnout, career satisfaction, and training). Findings from these subspecialty-specific questions have already been described in the literature by a number of the subspecialty workgroups (https://www.aap.org/en-us/_layouts/15/WopiFrame.aspx?sourcedoc=/en-us/Documents/SOSpublicationsSep152016.docx&action=default).[6–9]

There was some variation in the distribution of the surveys, but nonresponders received at least 3 reminder e-mail messages, and most surveys were in the field for at least 3 months. Survey administration was staggered over 3 years, with the first subspecialist survey fielded in May 2012.

The present analysis is confined to the data from all participating subspecialties related to the common questions. Question responses were analyzed for each of the participating subspecialties. The responses to questions included in FOPE II as well as the current survey were compared.

Data were analyzed using SPSS 18.0 (SPSS Inc, Chicago, IL). Statistical significance of association with subspecialty was tested using chi-square for categorical data and Student *t* test or analysis of variance for continuous variables, as appropriate. All variables reported in this article contrasted significantly by subspecialty to at least the $P < .001$ level. This study was deemed exempt by the institutional review board of the AAP.

RESULTS

There were 10,686 respondents to the survey. Subspecialty-specific response rates ranged from 32% (cardiology, n = 767) to 68% (urology, n = 240); the overall mean response rate was 51% and the median was 50%. Respondents who identified that they spent >50% of their time in training, did not have a US zip code or were not physicians were excluded from further analysis. The final study cohort consisted of 9950 US subspecialists. Seventy-five percent of the physicians were white (non-Hispanic), 54.2% were men, and 95.6% were board certified. The gender of respondents ranged from a high of 87% male in urology to 31.3% male in child abuse/neglect and adolescent medicine (Figure). The mean number of years since medical school was 23.6 (Table 1). Most respondents reported working in an urban area. Only 5.6% of the respondents worked in a rural area (ranging from 1.4% for rheumatologists to 16.7% for internal medicine/pediatrics; Table 1).

The overall mean hours worked per week reported by respondents was 53, but this varied significantly according to subspecialty ($P < .001$), Respondents spent, on average, 60.6% of their time in direct patient care, 13.5% of their time in administration, 9.6% of their time in teaching, and 9.9% of their time in research (Table 2). Pediatric subspecialists who worked in academic medical centers spent 52.2% of their time in direct patient care while those working in other settings spent 69.1% of their time in direct patient care ($P < .0001$). Surgical specialists spent more time in direct patient care and less time in research and administration than did medical subspecialists ($P < .001$).

Approximately 13% of respondents worked as hospitalists but this percentage varied significantly according to subspecialty ($P < .001$), ranging from 95.7% of the hospital medicine subspecialists to <1% of the 4 surgical specialties (urology, otolaryngology, orthopedics, and pediatric surgery). Approximately 25% of the internal medicine/pediatrics, 23% of the hospice/palliative care, and 9% of the infectious disease medicine subspecialists work as hospitalists; <4% of the other pediatric medical subspecialists work as hospitalists (data not shown).

Most subspecialists work in an academic medical center. Three percent were in solo practice and 1.7% worked in a health maintenance organization. Surgical specialists were more likely to work in a group practice setting and less likely to be working in an academic medical center than medical subspecialists ($P < .001$; Table 3).

To assess current experiences, respondents were asked about referral patterns and changes in the volume and complexity of their patients in the past 12 months. Among the respondents who provided direct patient care and received referrals, 29.5% reported an increase in referral volume and 27.3% reported an increase in referral complexity. Hospice and palliative care subspecialists reported the highest increase in referral volume (55.6%) as well as complexity

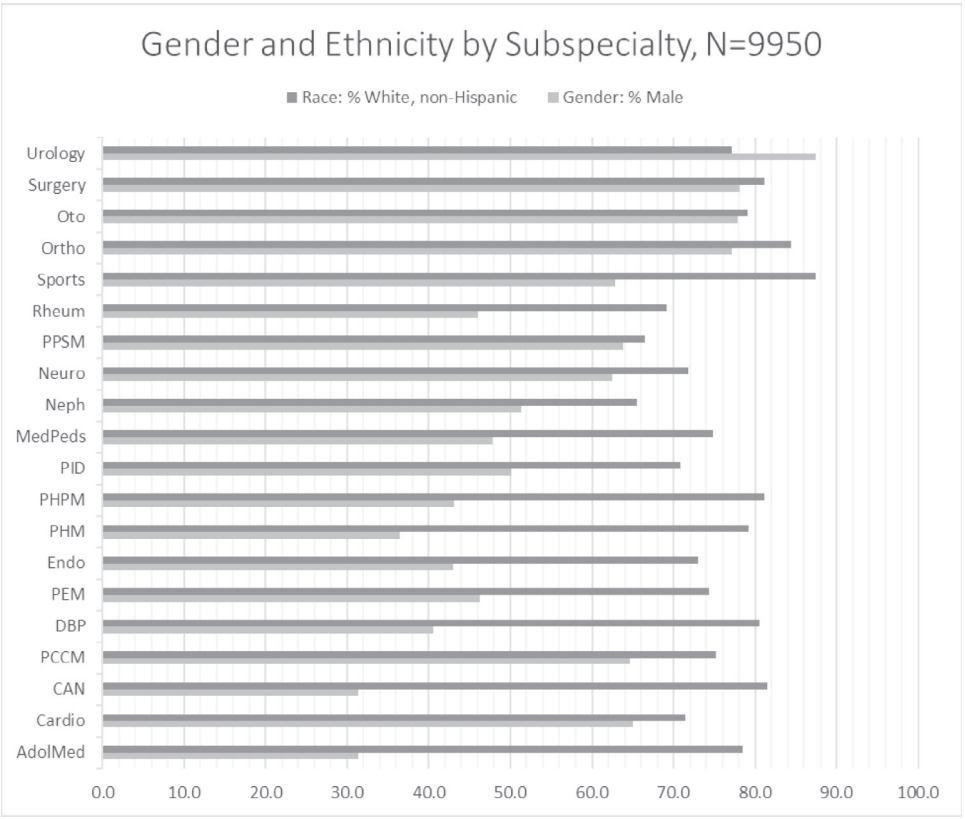

Figure. *The percentage of pediatric medical and surgical subspecialists who are white, non-Hispanic, and men varied according to subspecialty. Oto indicates otolaryngology and head and neck surgery; Ortho, orthopedics; Sports, sports medicine and fitness; Rheum, rheumatology; PPSM, pulmonology and sleep medicine; Neuro, neurology; Neph, nephrology; MedPeds, internal medicine/pediatrics; PID, infectious diseases; PHPM, hospice and palliative medicine; PHM, hospital medicine; Endo, endocrinology; PEM, emergency medicine; DBP, developmental–behavioral; PCCM, critical care medicine; CAN, child abuse and neglect; Cardio, cardiology and cardiac surgery; and AdolMed, adolescent medicine.*

(58.3%; Table 4). Except for cardiology subspecialists, most respondents did not use telemedicine (data not shown).

Fifty-five percent of respondents reported that they faced competition for their clinical services and 28.6% reported that they had modified their practice because of this competition. Surgical specialists were significantly more likely to report that they faced competition than medical subspecialists ($P < .001$). The most common source of competition was other pediatric subspecialists (Table 5).

Respondents were asked about the appointment wait time for new, nonemergency patients. Seventy percent of respondents indicated that wait times for these patients were 2 weeks or less; this varied according to subspecialty ($P < .001$; Table 6).

The participant responses to the demographic and workforce questions of the current survey were compared with FOPE II survey responses (Table 7). Because not all subspecialties participated in both surveys, a second comparison of only the subspecialties that participated in both surveys was done. The findings from this comparison were similar to those shown in Table 7. There were statistically significant differences between the 1998 FOPE II and current survey respondents in demographic characteristics, board certification rate, employment setting, practice location, mean hours worked, and distribution of work (all at $P < .001$). There were also significant differences in changes in the complexity and volume of referrals and perceived competition (all at $P < .001$).

DISCUSSION

DEMOGRAPHIC CHARACTERISTICS

The proportion of women entering pediatrics has steadily increased since 1998, and subspecialty careers have become more popular for men as well as women.[10] Our survey revealed that the percentage of women subspecialists has increased since the 1998 AAP survey of subspecialties (FOPE II).[1] However, only a small percentage of surgical subspecialists are women. Since the 1998 survey, the percentage of minorities in subspecialties has increased. The apparent increase in the percentage of subspecialists who are from minority groups is encouraging and suggests some progress in reducing the racial and ethnic gap between pediatric patients and their subspecialists. Nevertheless, these gaps persist.[11]

With the increase in absolute numbers of pediatric subspecialists over the past 2 decades, it had been postulated that more subspecialists would move out of urban academic settings and establish private practices in suburban or rural communities.[2] However, our survey revealed that the percentage of subspecialists practicing in an academic medical center has increased since the FOPE II survey,

Table 1. Demographic Information According to Subspecialty (N = 9950)

	Response Rate, %	N	Years Since Medical School Graduation, Mean (99% CI)	Board Certified, %*	Community Type			
					Urban/ Inner City, %	Urban/Not Inner City, %	Suburban, %	Rural, %
Pediatric medical subspecialties								
Adolescent medicine	48.2	260	26.8 (±2.0)	97.7	39.3	37.2	18.8	4.6
Cardiology and cardiac surgery	31.5	767	23.4 (±1.1)	97.9	33.3	46.9	17.3	2.6
Child abuse and neglect	57.4	327	28.5 (±1.9)	98.2	36.9	39.5	14.1	9.5
Critical care medicine	49.7	892	24.1 (±0.8)	97.4	37.8	44.8	13.6	3.9
Developmental–behavioral	49.8	534	29.3 (±1.4)	96.8	27.1	39.4	24.5	9.0
Emergency medicine	50.6	874	21.8 (±0.8)	97.7	47.4	36.2	14.8	1.6
Endocrinology	44.6	469	25.1 (±1.3)	99.1	30.8	46.0	20.3	2.9
Hospital medicine	42.4	523	16.2 (±1.1)	95.2	30.0	41.6	22.3	6.1
Hospice and palliative medicine	57.3	137	24.1 (±2.4)	97.8	38.6	37.9	16.7	6.8
Infectious diseases	50.2	851	25.5 (±1.1)	93.7	37.6	41.4	17.6	3.3
Internal medicine/pediatrics	38.9	1238	16.5 (±0.6)	92.2	23.9	27.8	31.6	16.7
Nephrology	65.8	473	26.8 (±1.5)	96.2	38.1	42.8	15.1	4.1
Neurology	49.0	506	26.3 (±1.6)	96.4	37.6	40.6	19.5	2.3
Pulmonology and sleep medicine	50.4	442	26.7 (±1.4)	97.7	34.6	45.4	17.5	2.4
Rheumatology	62.8	150	21.3 (±2.5)	98.7	39.6	43.2	15.8	1.4
Sports medicine and fitness	53.7	140	22.8 (±2.5)	98.6	20.8	30.0	41.5	7.7
All medical subspecialties combined		8583	23.3 (±0.3)	96.3	34.5	39.7	20.0	5.9
Pediatric surgical specialties								
Orthopedics	58.9	489	24.7 (±1.6)	87.3	30.7	45.9	20.0	3.4
Otolaryngology and head and neck surgery	48.8	81	22.6 (±3.0)	92.6	39.5	44.7	11.8	3.9
Surgery	53.1	557	26.1 (±1.4)	96.2	33.2	48.5	13.2	5.2
Urology	67.5	240	27.2 (±2.3)	87.9	33.5	50.2	14.4	1.9
All surgical specialties combined		1367	25.6 (±0.9)	91.4	32.8	47.7	15.8	3.9
Total		9950	23.6 (±0.3)	95.6	34.2	40.8	19.4	5.6

CI indicates confidence interval.
*In one or more specialties.

Table 2. Reported Distribution of Work Time According to Subspecialty (N = 9950)

	Total Hours Worked Per Week, Mean (99% CI)	Direct Patient Care, Mean %	Administration, Mean %	Teaching, Mean %	Research, Mean %	Other, Mean %
Pediatric medical subspecialties (n = 8583)						
Adolescent medicine	46.7 (±2.4)	53.5	18.5	14.2	7.7	5.5
Cardiology and cardiac surgery	56.5 (±1.3)	66.2	12.1	8.0	9.1	3.2
Child abuse and neglect	48.1 (±2.1)	53.6	17.1	10.6	6.5	11.4
Critical care medicine	62.1 (±1.4)	56.2	16.9	10.2	10.1	5.3
Developmental–behavioral	46.6 (±1.9)	60.9	13.1	9.3	7.7	8.2
Emergency medicine	42.6 (±1.2)	59.7	16.2	11.2	7.0	4.8
Endocrinology	50.9 (±1.7)	61.6	9.2	8.0	15.9	4.1
Hospital medicine	50.4 (±1.7)	61.7	15.5	13.1	4.0	5.1
Hospice and palliative medicine	56.3 (±3.6)	59.4	17.9	9.4	7.1	5.6
Infectious diseases	51.0 (±1.3)	37.0	16.3	10.6	23.6	11.5
Internal medicine/pediatrics	51.6 (±1.1)	72.5	11.3	7.9	4.3	3.4
Nephrology	54.7 (±1.9)	55.8	12.5	9.5	16.0	5.0
Neurology	54.5 (±1.6)	62.2	10.6	8.1	13.7	4.1
Pulmonology and sleep medicine	54.9 (±1.7)	62.8	12.6	7.9	11.4	4.3
Rheumatology	52.9 (±2.6)	53.7	10.6	8.7	21.8	4.7
Sports medicine and fitness	48.5 (±3.0)	72.6	8.7	9.6	4.2	4.5
All medical subspecialties combined	52.0 (±0.4)	59.7	13.8	9.6	10.4	5.6
Pediatric surgical specialties (n = 1367)						
Orthopedics	58.7 (±1.9)	72.5	8.8	9.0	5.0	3.3
Otolaryngology and head and neck surgery	57.8 (±3.2)	68.9	12.6	9.0	5.0	3.4
Surgery	65.4 (±1.9)	59.6	14.8	10.6	8.2	5.0
Urology	59.4 (±2.7)	69.8	9.2	8.5	7.5	3.4
All surgical specialties combined	61.5 (±1.2)	66.6	11.6	9.6	6.8	4.0
Total	53.3 (±0.4)	60.6	13.5	9.6	9.9	5.4

CI indicates confidence interval.

Table 3. Distribution of Employment Setting According to Subspecialty (N = 9950)

	Solo Practice, %	Group Practice, %	HMO Practice, %	Academic Medical Center, %	Community Hospital, %	Other Site, %*
Pediatric medical subspecialties (n = 8583)						
Adolescent medicine	0.9	19.4	2.3	58.5	3.2	15.7
Cardiology and cardiac surgery	3.4	24.1	1.8	64.5	2.6	3.6
Child abuse and neglect	3.6	14.2	1.7	60.3	7.9	12.3
Critical care medicine	0.7	20.2	0.6	61.7	11.9	4.9
Developmental–behavioral	8.6	27.7	1.8	43.9	3.9	14.0
Emergency medicine	0.1	13.0	0.5	67.3	13.5	5.6
Endocrinology	3.8	23.0	2.7	59.5	5.1	5.8
Hospital medicine	0.2	8.1	3.5	55.9	28.0	4.3
Hospice and palliative medicine	0.8	11.2	0.0	65.6	13.6	8.8
Infectious diseases	2.0	14.5	1.4	61.5	4.9	15.6
Internal medicine/pediatrics	5.5	29.7	2.9	30.8	14.6	16.5
Nephrology	1.4	16.8	2.1	69.9	3.7	6.2
Neurology	6.8	23.7	1.5	57.6	4.4	5.9
Pulmonology and sleep medicine	4.2	31.3	2.0	54.3	3.9	4.4
Rheumatology	0.0	12.9	0.0	78.6	4.3	4.3
Sports medicine and fitness	3.8	46.6	1.5	38.9	3.1	6.1
All medical subspecialties combined	3.1	21.0	1.8	56.2	9.1	8.8
Pediatric surgical specialties (n = 1367)						
Orthopedics	4.0	40.2	1.9	42.4	5.0	6.4
Otolaryngology and head and neck surgery	0.0	30.0	1.4	62.9	2.9	2.9
Surgery	1.2	35.2	1.2	52.4	5.3	4.7
Urology	1.9	41.9	1.9	50.2	1.4	2.8
All surgical specialties combined	2.3	37.9	1.6	49.1	4.4	4.9
Total	3.0	23.2	1.7	55.3	8.5	8.3

*Other response options included nonprofit community health center or health department, uniform services clinic, and "other."

Table 4. Referral Patterns According to Subspecialty (N = 9950)

	Do Not Receive Referrals, %	Reported Referral Changes in Previous 12 Months*					
		Referral Volume			Referral Complexity		
		Increase, %	Decrease, %	Not Changed, %	Increase, %	Decrease, %	Not Changed, %
Pediatric medical subspecialties (n = 8583)							
Adolescent medicine	22.6	39.2	6.3	54.5	46.0	0.0	54.0
Cardiology and cardiac surgery	7.3	22.1	4.6	73.2	19.4	3.0	77.5
Child abuse and neglect	10.8	39.0	2.0	59.1	31.6	0.4	68.0
Critical care medicine	30.9	29.1	6.3	64.6	33.9	2.4	63.7
Developmental–behavioral	6.4	35.9	1.7	62.4	38.8	0.2	61.0
Emergency medicine	41.5	32.9	1.3	65.8	28.7	0.2	71.1
Endocrinology	3.4	38.9	2.1	59.0	22.0	3.1	74.9
Hospital medicine	40.3	43.3	1.8	54.9	40.2	1.1	58.7
Hospice and palliative medicine	14.1	55.6	2.8	41.7	58.3	0.0	41.7
Infectious diseases	13.1	25.0	5.4	69.5	27.1	1.6	71.3
Internal medicine/pediatrics	50.2	19.1	2.9	77.9	20.0	0.9	79.1
Nephrology	7.5	35.9	5.0	59.1	26.3	1.9	71.8
Neurology	4.4	35.9	1.6	62.5	28.1	2.8	69.1
Pulmonology and sleep medicine	1.9	31.8	6.7	61.5	34.6	0.3	65.2
Rheumatology	0.7	27.4	0.7	71.9	20.3	1.5	78.2
Sports medicine and fitness	17.1	37.7	2.8	59.4	39.0	1.0	60.0
All medical subspecialties combined	22.2	31.7	3.6	64.7	29.4	1.5	69.1
Pediatric surgical specialties (n = 1367)							
Orthopedics	1.4	22.8	5.2	72.0	16.6	4.7	78.7
Otolaryngology and head and neck surgery	0.0	11.1	8.3	80.6	15.3	4.2	80.6
Surgery	1.5	18.0	8.8	73.2	17.3	5.1	77.7
Urology	2.0	12.2	8.7	79.1	13.2	8.1	78.7
All surgical specialties combined	1.5	18.3	7.5	74.3	16.2	5.4	78.4
Total	19.4	29.5	4.2	66.2	27.3	2.1	70.6

*The 2086 respondents who reported no direct patient care or no referrals were excluded.

Table 5. Reported Experience With Workforce Competition According to Subspecialty (N = 9950)

	Those Who Face Competition, n = 4953			
	Face Competition for Your Services, %	Face Competition With Other Pediatric Subspecialists, %	Face Competition With Physicians Trained in Adult Medicine in My Subspecialty, %	Modified Practice as a Result of Competition, %
Pediatric medical subspecialties (n = 8583)				
Adolescent medicine	28.9	72.1	14.7	29.4
Cardiology and cardiac surgery	78.6	93.0	16.7	43.4
Child abuse and neglect	27.9	71.1	2.4	19.3
Critical care medicine	69.1	85.7	4.4	23.8
Developmental–behavioral	34.2	86.3	1.8	18.1
Emergency medicine	55.9	68.5	29.1	23.4
Endocrinology	64.6	95.5	21.4	26.1
Hospital medicine	43.3	58.7	2.9	27.9
Hospice and palliative medicine	46.5	81.7	8.3	24.6
Infectious diseases	42.7	86.6	14.1	19.9
Internal medicine/pediatrics	31.3	32.8	15.4	19.8
Nephrology	62.4	91.7	19.6	37.1
Neurology	57.0	93.2	12.2	25.6
Pulmonology and sleep medicine	66.2	91.2	15.3	31.2
Rheumatology	58.3	92.6	29.6	18.8
Sports medicine and fitness	63.8	63.0	46.9	33.3
All medical subspecialties combined	52.1	80.1	15.3	27.5
Pediatric surgical specialties (n = 1367)				
Orthopedics	75.3	89.1	40.8	30.4
Otolaryngology and head and neck surgery	76.3	74.1	44.8	29.3
Surgery	76.7	89.3	15.6	35.9
Urology	67.8	88.7	26.2	38.6
All surgical specialties combined	74.6	88.1	28.2	34.0
Total	55.0	81.5	17.6	28.6

Table 6. Reported Typical Wait Time for Nonemergency New Patients According to Subspecialty* (N = 9950)

	2 Weeks or Less, %	15 Days to 8 Weeks, %	>8 Weeks to 16 Weeks, %	>16 Weeks, %
Pediatric medical subspecialties (n = 8583)				
Adolescent medicine	72.7	25.6	1.3	0.4
Cardiology and cardiac surgery	82.9	15.3	1.6	0.1
Child abuse and neglect	89.5	7.7	2.4	0.3
Critical care medicine	92.4	6.4	0.5	0.7
Developmental–behavioral	23.2	27.0	20.9	28.9
Emergency medicine	91.9	7.2	0.5	0.3
Endocrinology	28.9	48.9	15.5	6.8
Hospital medicine	89.5	9.9	0.6	0.0
Hospice and palliative medicine	82.3	12.4	2.7	2.7
Infectious diseases	89.3	9.9	0.2	0.6
Internal medicine/pediatrics	73.9	21.0	3.9	1.2
Nephrology	61.9	31.3	5.8	1.0
Neurology	22.4	47.7	20.4	9.5
Pulmonology and sleep medicine	51.9	38.3	9.7	0.0
Rheumatology	47.8	35.5	12.3	4.3
Sports medicine and fitness	88.1	11.1	0.8	0.0
All medical subspecialties combined	68.9	21.6	6.0	3.6
Pediatric surgical specialties (n = 1367)				
Orthopedics	71.2	25.1	3.0	0.7
Otolaryngology and head and neck surgery	60.8	36.5	2.7	0.0
Surgery	94.0	5.8	0.2	0.0
Urology	63.5	32.0	3.5	1.0
All surgical specialties combined	78.5	19.2	1.9	0.4
Total	70.3	21.2	5.4	3.1

*$P < .001$, surgical versus medical subspecialties.

Table 7. Comparison of 2015 and 1998 FOPE II Survey Respondents*

Characteristic	2015 AAP Survey (N = 9950)	1998 FOPE II Survey (N = 11,811)
Male gender	54.2%	67.6%
White non-Hispanic	75.6%	78.1%
Mean years since medical school graduation	23.5	21.6
Board certification	95.6%	94.3%
Employment setting		
Solo practice	3.0%	11.9%
Pediatric group practice	4.3%	5.2%
Specialty group practice	9.4%	17.5%
Multispecialty group practice	9.5%	6.1%
HMO practice	1.7%	2.7%
Academic medical center	55.3%	38.2%
Community hospital	8.5%	3.7%
Other	8.3%	14.8%
Community type		
Urban/inner city	34.2%	29.4%
Urban/not inner city	40.8%	38.7%
Suburban	19.4%	22.2%
Rural	5.6%	5.6%
Mean hours worked per week	53.3	58.0
Distribution of work time		
Direct patient care, mean	60.6%	66.7%
Administration, mean	13.5%	10.7%
Research, mean	9.9%	8.5%
Teaching, mean	9.6%	10.3%
Other, mean	3.8%	3.5%
Volume/complexity of referrals has changed in past 12 months	38.0%	56.5%
Face competition	55.0%	65.9%

FOPE II indicates Future of Pediatric Education; AAP, American Academy of Pediatrics.
*All comparisons in this table are statistically significant at $P < .001$.

and the percentage working in rural areas has remained low (Table 7).[1] There are many factors besides supply that can affect the geographic distribution of subspecialists, including location of training, financial viability of practice location, limited availability of other physicians to share call and provide consultative services, and lack of employment opportunities for other family members. In addition, a subspecialist who is interested in teaching and research is likely to have limited opportunities to pursue these interests outside of an urban academic center. Because subspecialty care is concentrated in urban areas, it has been estimated that 10% to 30% of families must travel >80 miles to access subspecialists.[5,12–14] In a 2010 study of primary care pediatricians (PCPs) regarding satisfaction with subspecialty care for their patients, 83% of rural PCPs reported that long travel distance was a barrier to obtaining needed subspecialty care for their patients, compared with 29% of PCPs working in nonrural areas; significantly more rural PCPs than nonrural PCPs reported that there was a shortage of subspecialists in their community.[15] Although it has been suggested that telemedicine can be used to provide access to subspecialty care in shortage areas,[16–18] our survey showed that most pediatric subspecialists surveyed were not using telemedicine.

PRACTICE CHARACTERISTICS

Compared with the FOPE II survey, the percentage of time spent in teaching and direct patient care (which included medical records and office paper work) is lower, and the percentage of time spent in research and administration (eg, activities related to hospital planning and management) is higher (Table 7). These findings suggest that subspecialists today might be less available for patient care because of increased administrative and research responsibilities.

Hospitalists and hospice/palliative care subspecialists reported the largest increase in volume as well as complexity in the past 12 months. This finding might be because of an increase in the number of PCPs who are transferring care to hospitalists and an increase in the complexity of hospitalized patients.

Compared with the FOPE II survey, fewer of our respondents reported that they faced competition for their services. In part, this difference might be because of the current shortage of pediatric medical subspecialists, because the most common source of competition identified by this group in FOPE II was other pediatric medical subspecialists.[1] Surgical specialists compared with pediatric medical subspecialists were more likely to report competition from physicians trained in adult medicine. Ample numbers of subspecialists trained in adult medicine[19] might help explain why a higher percentage of surgical specialists reported that they faced competition. Medical as well as surgical subspecialists responding to this survey reported relatively low levels of competition from other sources (eg, nonphysician medical personnel).

Wait times for appointments can be a measure of physician supply as well as access to care. In this survey, wait

times varied significantly according to subspecialty. Subspecialists in developmental/behavioral pediatrics, endocrinology, and neurology reported the longest wait times for appointments. These findings are consistent with a recent survey, which showed that most PCPs perceived a shortage of developmental–behavioral pediatricians (86.6%), pediatric neurologists (66.7%), and pediatric endocrinologists (58.8%) in their communities.[15]

There are some limitations to this analysis. The subspecialties included in this analysis are not identical to those included in the FOPE II analysis because the AAP has added new subspecialty sections since 1998 and not all specialties are included in phase I. However, we examined the data for the 11 subspecialties included at both time points and found the trends to be the same as those observed for the total sample. Although our overall response rate exceeds expectations for surveys of subspecialist physicians,[20] sampling strategies and response rates varied according to subspecialty.[21] We cannot rule out biases introduced by this variation; specific differences among subspecialties must be interpreted with caution.

CONCLUSION

Collectively, our findings highlight continued concerns about access to care especially at a time when the prevalence of chronic conditions among children is increasing.[22] Efforts to improve access to pediatric subspecialty care will need to take into account the variation in practice characteristics (eg, work hours, percentage of time in direct patient care, practice location) among the subspecialties that we have noted. In addition, it is clear that pediatric subspecialties are not monolithic. Thus, solutions to workforce challenges will need to take into account these differences to improve access to subspecialty care. Additional study is warranted to determine the long-term health and financial effects of lack of access to pediatric care on the US adult patient population and the implications of our findings on the future workforce needs of pediatric specialties.

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