

International Medical Graduates in the Pediatric Workforce in the United States

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abstract

BACKGROUND AND OBJECTIVES: To describe the supply, distribution, and characteristics of international medical graduates (IMGs) in pediatrics who provide patient care in the United States.

METHODS: Cross-sectional study, combining data from the 2019 Physician Masterfile of the American Medical Association and the Educational Commission for Foreign Medical Graduates database.

RESULTS: In total, 92 806 pediatric physicians were identified, comprising 9.4% of the entire US physician workforce. Over half are general pediatricians. IMGs account for 23.2% of all general pediatricians and pediatric subspecialists. Of all IMGs in pediatrics, 22.1% or 4775 are US citizens who obtained their medical degree outside the United States or Canada, and 15.4% (3246) attended medical school in the Caribbean. Fifteen non-US medical schools account for 29.9% of IMGs currently in active practice in pediatrics in the United States. IMGs are less likely to work in group practice or hospital-based practice and are more likely to be employed in solo practice (compared with US medical school graduates).

CONCLUSIONS: With this study, we provide an overview of the pediatric workforce, quantifying the contribution of IMGs. Many IMGs are US citizens who attend medical school abroad and return to the United States for postgraduate training. Several factors, including the number of residency training positions, could affect future numbers of IMGs entering the United States. Longitudinal studies are needed to better understand the implications that workforce composition and distribution may have for the care of pediatric patients.

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Dr Duvivier conceptualized and designed the study and drafted the initial manuscript; Dr Boulet conceptualized and designed the study, collected data, and conducted the initial analyses; Dr Gusic conceptualized and designed the study and supervised data analysis; and all authors reviewed and revised the manuscript and approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

DOI: <https://doi.org/10.1542/peds.2020-003301>

Accepted for publication Sep 11, 2020

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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WHAT'S KNOWN ON THIS SUBJECT: International medical graduates (IMGs) play an important role in the US physician workforce. Pediatrics is among the specialties with the highest proportions of IMGs entering postgraduate training. Despite this, concerns exist about maldistribution and access to care for pediatric patients.

WHAT THIS STUDY ADDS: Constituting 23.2% of general and subspecialty pediatricians, IMGs are more likely to be in solo practice than group- or hospital-based practice. A total of 22.1% of all IMGs in pediatrics are US citizens who return to the United States for postgraduate training

To cite: Duvivier RJ, Gusic ME, Boulet JR. International Medical Graduates in the Pediatric Workforce in the United States. *Pediatrics*. 2020;146(6):e2020003301

International medical graduates (IMGs) make up a substantial proportion of the United States physician workforce. Over the last several decades, this proportion has steadily increased.¹ Although the opportunity to train and practice in the United States is undoubtedly a factor, the numbers of US medical graduates (MGs) have not been sufficient to fill available Graduate Medical Education (GME) positions.²⁻⁴ As a result, IMGs have filled the gap in physician trainees.^{5,6} Current data indicate that ~1 in 4 residents have obtained their medical degree outside the United States.⁷ Moreover, in recent years, pediatrics has been among the specialties with the highest proportions of IMGs entering postgraduate training.^{8,9}

Although projections by the Association for American Medical Colleges suggest physician shortages in the upcoming decades,¹⁰ particularly in primary care specialties, the situation for pediatrics is somewhat different. With the inclusion of IMGs, preliminary analyses show an appropriate supply of trainees entering pediatrics residency programs.^{11,12} Nevertheless, concerns exist that the maldistribution of pediatricians may negatively affect access to care.¹³⁻¹⁵ This is particularly worrisome for pediatric subspecialists; a 2013 policy statement from the American Academy of Pediatrics concluded that “there is currently a shortage of pediatric medical subspecialists in many fields.”¹⁶ Concurrently, data from the National Resident Matching Program show that ~10% of all postgraduate year 1 applicants match into pediatric programs (11.5% in 2008 vs 9.9% in 2018¹⁷). As a result, projections concerning the adequacy of the overall pediatric workforce must, at least for now, take into account the role of IMGs in meeting both general pediatric and subspecialty pediatric care needs.¹⁸

Our purpose with this study is to provide an overview of the role of IMGs in the US pediatric workforce. This information should be considered when assessing workforce supply and could help to inform specialty-specific training and certification policies. Although many studies of workforce trends in pediatrics exist,^{14,15,19-21} none have examined the supply of IMGs, their characteristics, and their geographical distribution. Additional studies have examined IMGs in general,²² IMGs from specific regions,^{23,24} and the distribution of IMGs in other specialties.²⁵ To date, analyses of the role of IMGs in pediatrics in the United States have been lacking. In this study, we seek to address this gap using current publicly available data to describe the characteristics of IMGs in pediatrics in the United States.

METHODS

On the basis of combined data from the 2019 American Medical Association (AMA) Physician Masterfile and the Educational Commission for Foreign Medical Graduates (ECFMG) database, we employed a cross-sectional study design to describe the pediatric workforce in the United States. We used unique identifiers for individuals allowing for data linkage between information sources. Given that our data represented the population of physicians in the United States, descriptive statistical analyses were performed.

Data Sources

AMA Physician Masterfile

The AMA Physician Masterfile includes information on physicians who currently practice in the United States.²⁶ Individuals are included in the Masterfile either when they enter an allopathic medical school accredited by the Liaison Committee on Medical Education (US-MGs) or when they enter a residency training

program accredited by the Accreditation Council for Graduate Medical Education (includes physicians who attended osteopathic medical schools and IMGs). Additional information is added from primary sources and surveys of the physicians listed in the Masterfile. The Masterfile includes demographic information and career details, such as year of graduation, specialty, practice location, and type of practice.

We selected individuals who indicated pediatrics as their specialty or a specific pediatric subspecialty, based on American Board of Pediatrics (ABP) descriptions for pediatric (sub)specialty certificates.²⁷ Individuals who specified combined programs, including internal medicine and pediatrics; pediatrics, physical medicine, and rehabilitation; pediatric psychiatry and child psychiatry; and pediatrics and emergency medicine, were included. We excluded surgical specialties that focus on providing care for children (eg, pediatric cardio-thoracic surgery), because these subspecialties are generally not considered in discussions about the pediatric workforce or the distribution of pediatric providers.¹³⁻¹⁶

We excluded all physicians whose status in the Masterfile was “inactive”: individuals who report that they are (semi)retired, temporarily not in practice, or not active for other reasons. We included residents, full-time hospital staff, physicians in office-based practice, locum tenens, and individuals whose self-designated major professional activity was research, administration, or medical teaching. We did not make adjustments for part-time work, because that information is not consistently available.

ECFMG Database

ECFMG is the certifying body for all IMGs who wish to obtain an accredited residency position in the

United States; ECFMG certification requirements are described elsewhere.²⁸ To obtain an unrestricted license to practice medicine in any US jurisdiction, an IMG must complete at least 2 years, and often 3 years depending on the licensing authority, of residency training. Data from ECFMG used in this study include country of citizenship at the time of entry into medical school, country of medical school training, and medical school attended.

IMGs were defined as those individuals who graduated from a medical school located outside of Canada or the United States, regardless of citizenship.²⁹ Graduates of medical schools in Canada and the United States accredited by the Liaison Committee on Medical Education and graduates of US medical schools accredited by the Commission on Osteopathic College Accreditation do not have to be certified by ECFMG to enter residency programs or practice medicine in the United States. For the purposes of this investigation, they are considered as US-MGs. Canadian citizens who did not graduate from medical schools in Canada or the United States were classified as IMGs. We further specified IMGs as either US citizens who graduated from a medical school located outside of Canada or the United States (US IMGs) or non-US citizen IMGs (non-US IMGs). The US IMG versus non-US IMG categorization was based on citizenship at entry to medical school. This information is obtained as part of the ECFMG application process.

Once the AMA and ECFMG data were combined via a unique identifier, an anonymized data set was constructed.

Analysis

We used descriptive statistics to determine the characteristics and distribution of the pediatric workforce in the United States; inferential statistics are not

appropriate because the data pool includes the whole population of pediatricians in active practice. Individual physicians are able to specify how their information in the AMA Masterfile can be used (ie, accessed by third parties for marketing or research). For ECFMG, as part of the application for certification process, candidates must agree to allow their data to be used for research. This was a secondary analysis of data under license from AMA and ECFMG; the Internal Research and Data Review Committee of ECFMG deemed this study exempt from additional ethics review.

RESULTS

The 2019 AMA Masterfile includes 92 806 physicians who are in the United States and work in pediatrics (based on primary self-designated practice specialty). The total active physician workforce consisted of 992 446 physicians. A breakdown of the pediatric physician workforce is provided in Table 1.

Overall, general pediatricians and pediatric subspecialists make up 9.4% of the entire US physician workforce. Table 2 shows the self-designated specialty of pediatricians. Based on a self-designated specialty of “pediatrics,” over half the pediatric cohort could be considered to be general pediatricians.

IMGs (*n* = 21 611) represent 23.2% of the pediatric workforce, of which 4775 (22.1%) are US citizens who

obtained their medical degree outside the United States or Canada.

The majority of physicians in pediatrics are female (60.5%; male 39.5%), with a similar sex balance for US-MGs (60.5% vs 39.5%) and for IMGs (56.5% female and 43.5% male). Compared with US-MGs in active practice in pediatrics, IMGs are, on average, older (IMG; mean age = 52.7 years; SD = 13.8: US-MG; mean = 47.3 years; SD = 13.1).

Type of Practice

The most common major professional activity for IMG pediatricians is direct patient care (*n* = 18 103, 83.8%), with an additional 2304 IMGs in residency or fellowship programs (10.7% of IMGs in pediatrics; 24.0% of the total 11 901 residents and fellows in pediatrics). The remainder of IMG pediatricians designated medical teaching (*n* = 244; 1.1%), research (*n* = 187; 0.9%), or administration (*n* = 146; 0.7%) as their major professional activity. Based on employment data from the Masterfile, IMGs in active practice in pediatrics are less likely to work in group practice (*n* = 7238; 33.5%) or hospital-based practice (*n* = 5300; 24.5%) when compared with US-MGs (*n* = 29 589; 41.6% and *n* = 19 197; 27.0% respectively). IMGs are more likely to be in self-employed solo practice (*n* = 3441; 15.9%) or are full or part owner of a 2-physician practice (*n* = 718; 3.3%). For US-MGs, 4.9% (*n* = 3460) are in solo practice; 1.7% (*n* = 1175) are in 2-physician practice. No information on practice

TABLE 1 Pediatric Physician Workforce (2019)

Type	<i>n</i>	%
All IMGs	21 611	23.3
US citizen IMG	4775	5.1
Non-US citizen IMG	16 182	17.4
Unknown IMG	654	0.7
All US-MGs	71 195	76.7
US MD	67 152	72.3
US DO	4043	4.4
All Pediatrics	92 806	100

DO, osteopathic physician.

TABLE 2 US Pediatric Workforce (Based on Self-Designated Pediatric Specialty)

Self-Designated Specialty	US-MGs	%	IMGs	%	Total
Pediatrics	49 370	75.7	15 839	24.3	65 209
Pediatric cardiology	2293	76.0	723	24.0	3016
Pediatric critical care medicine	1945	73.8	692	26.2	2637
Pediatric hematology and oncology	2347	77.7	672	22.3	3019
Internal medicine and pediatrics	5682	89.9	636	10.1	6318
Pediatric endocrinology	1067	66.6	535	33.4	1602
Pediatric gastroenterology	1030	67.3	501	32.7	1531
Pediatric anesthesiology (pediatrics)	1844	82.7	386	17.3	2230
Pediatric pulmonology	720	68.4	332	31.6	1052
Pediatric emergency medicine (pediatrics)	1576	83.6	310	16.4	1886
Pediatric nephrology	522	63.5	300	36.5	822
Pediatric infectious diseases	685	74.0	241	26.0	926
Adolescent medicine (pediatrics)	583	85.5	99	14.5	682
Developmental-behavioral pediatrics	361	78.5	99	21.5	460
Pediatric rheumatology	286	76.5	88	23.5	374
Pediatric allergy	78	71.6	31	28.4	109
Pediatrics and physical medicine and rehabilitation	95	76.0	30	24.0	125
Pediatric psychiatry and child psychiatry	222	91.4	21	8.6	243
Sports medicine (pediatrics)	171	90.0	19	10.0	190
Pediatrics and medical genetics	73	80.2	18	19.8	91
Pediatrics and emergency medicine	85	86.7	13	13.3	98
Pediatric transplant hepatology	27	71.1	11	28.9	38
Child abuse pediatrics	104	92.0	9	8.0	113
Neurodevelopmental disabilities (pediatrics)	23	82.1	5	17.9	28
Medical toxicology (pediatrics)	2	66.7	1	33.3	3
Hospice and palliative medicine (pediatrics)	4	100.0	0	0.0	4
Total	71 195	76.7	21 611	23.3	92 806

type was available for 4110 IMGs (19.0%), which is comparable to 22.9% of missing or unclassified data for US-MGs.

Practice Locations of IMGs

IMGs are in active practice in all states. The states with the largest numbers of IMGs are shown in Table 3 (top 10). As noted, IMGs make up >25% of the pediatric workforce in 5 of these states.

Origin Countries of IMGs

Citizenship at time of matriculation to medical school was available for 20 956 (95.6%) of the IMGs in pediatrics. The top 20 countries of citizenship are presented in Table 4. Nearly 23% ($n = 4774$) of IMG pediatricians were US citizens at entry to medical school.

Table 5 shows the top 20 countries where IMGs in active practice completed medical school. For 527 IMGs, this information was not

available, leaving the analysis possible for 21 804 IMGs. Information on the school from which the participants' medical degree was granted was available for 21 047 (97.4%) of all IMGs in pediatrics.

In total, 3246 IMGs in active practice in pediatrics attended medical school in the Caribbean* (15.4% of IMG pool). Table 6 provides the top 15 provider schools: 5 are located in the Caribbean; 4 in the Philippines; 2 in Mexico; and 1 in India, Israel, Lebanon, Mexico, Syria, and Pakistan each. Together, these 15 schools account for 29.9% of the degrees granted to all IMGs who are in active practice in pediatrics.

DISCUSSION

In this article, we present data summarizing the contribution of IMGs to the US pediatric workforce. Among the most important findings is the fact that IMGs make up nearly one-fourth (23.2%) of the pediatric workforce. Our detailed analyses show diversity in terms of country of medical school training, citizenship, and (sub)specialty discipline. The largest numbers of IMGs in pediatrics are from the Indian subcontinent (1 in 4), Caribbean (1 in 6), Philippines (1 in 10), and Mexico (1 in 20). Combined, these source countries account for 54.8% of all IMGs in the pediatric workforce. These patterns are consistent with the wider migration of IMGs from these regions to the United States.³⁰ From a US physician workforce perspective, IMGs provide a substantial contribution to the pediatric workforce in a number of states. For

TABLE 3 IMGs in Pediatrics (Top 10 States)

State	All Pediatrics	IMGs in Pediatrics	% IMG
California	10 933	2649	24.2
New York	7748	2959	38.2
Texas	6928	1827	26.4
Florida	5039	2131	42.3
Ohio	4026	719	17.9
Pennsylvania	3756	676	18.0
Illinois	3593	929	25.9
Massachusetts	3456	486	14.1
New Jersey	3193	1546	48.4
North Carolina	2753	347	12.6

* Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Bonaire, Sint Eustatius, Saba, British Virgin Islands, Cayman Islands, Cuba, Curaçao, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Saint-Barthélemy, Saint Kitts and Nevis, Saint Lucia, Saint Martin (French part), Saint Vincent and the Grenadines, Sint Maarten (Dutch part), Trinidad and Tobago, Turks and Caicos Islands, United States Virgin Islands.

TABLE 4 Citizenship at Entry to Medical School for IMGs in Pediatrics (Top 20)

Country of Citizenship	Frequency	Percentage
United States	4774	22.8
India	4243	20.3
Philippines	1756	8.4
Pakistan	943	4.5
Nigeria	486	2.3
Syria	410	2.0
Egypt	381	1.8
Colombia	353	1.7
Canada	341	1.6
Iran	306	1.5
China	299	1.4
Former Soviet Republics	295	1.4
Dominican Republic	252	1.2
Lebanon	237	1.1
Peru	237	1.1
Jordan	235	1.1
Mexico	219	1.1
Cuba	212	1.0
Germany	207	1.0
United Kingdom	190	0.9

example, in Florida and New Jersey, 40% to 50% of the active pediatric workforce are IMGs. Taken together, these descriptive results of the present-day workforce indicate that pediatric patient care is heavily reliant on IMGs.

Our findings have a number of implications for workforce planning. First, our study adds to what previous authors had called a “near vacuum”

for credible specialty-specific workforce data.²¹ Understanding the current status of the workforce and how it changes over time is essential to assess whether the pipeline is meeting the workforce needs.^{31,32} Indeed, concerns exist that there may be shortages in some pediatric subspecialties. Moreover, geographic maldistribution of subspecialists may affect access to care in certain areas.¹³ It is clear, however, that IMGs

are an integral part of both the general pediatric and pediatric subspecialty workforces and can play a role in addressing current or future shortages.

Although authors of recent studies reporting on the largest sample of pediatricians do not specifically address the role of IMGs, their findings provide meaningful context to our study.²¹ In particular, the authors identified trends in the workforce patterns beyond simple head counts. For example, 25% of general pediatricians work part-time compared with 10% of subspecialists.³³ Furthermore, retirement rates are likely to rise in the near future, because 50% of subspecialists and 32% of generalists have been out of training for >20 years.³⁴ These findings, which identify both an older workforce and a movement to reduced hour work arrangements, may mean that there will be a future need for increased numbers of pediatricians to maintain the same level of patient care, education, and research productivity.³⁵ Should this gap exist, IMGs may be needed to help fill it. Although IMGs are, on average, 5.4 years older than US-MGs, we do not know whether they are closer to retirement or if they will continue to work at older ages compared with US-MGs. From a workforce planning perspective, focused research on the future practice plans of older pediatricians is certainly warranted.

The country of citizenship was presented for IMGs, because previous research indicated that the country of medical school is not a good proxy for IMG nationality.^{24,25} Citizens of the United States make up the largest share of the IMG pediatric workforce (22.1% of all IMGs in pediatrics). In total, 1 in 20 physicians in the pediatric workforce is a US citizen who obtained their medical degree outside the United States or Canada. These US IMGs most frequently attended medical school in India or

TABLE 5 Medical School Country for IMGs in Pediatrics (Top 20)

Country of Medical School	<i>n</i>	% of all IMGs in Pediatrics
India	4285	20.3
Philippines	1942	9.2
Grenada	1220	5.8
Mexico	960	4.6
Pakistan	941	4.5
Dominican Republic	924	4.4
Barbados	755	3.6
Israel	564	2.7
Nigeria	501	2.4
Egypt	430	2.0
Syria	406	1.9
Colombia	365	1.7
Sint Maarten	347	1.7
Poland	279	1.3
Spain	262	1.2
Germany	249	1.2
Iran	249	1.2
Russia	237	1.1
Lebanon	234	1.1
Peru	233	1.1

TABLE 6 Medical School Attended for IMGs in Pediatrics (Top 15)

Medical School	Country	Number	Percentage	Aggregate Percentage of All IMGs in Pediatrics
St. George's University School of Medicine	Grenada	1215	5.8	—
Ross University School of Medicine	Dominica	716	3.4	9.2
University of Santo Tomas Faculty of Medicine and Surgery	Philippines	639	3.0	12.2
Universidad Autónoma de Guadalajara Facultad de Medicina Guadalajara	Mexico	514	2.4	14.7
University of the Philippines Manila College of Medicine	Philippines	366	1.7	16.4
American University of the Caribbean School of Medicine	Sint Maarten	347	1.7	18.0
Sackler School of Medicine, Tel Aviv University	Israel	347	1.7	19.7
Universidad Central del Este Facultad de Medicina	Dominican Republic	293	1.4	21.1
University of the East/Ramon Magsaysay Memorial Medical Center College of Medicine	Philippines	293	1.4	22.5
Far Eastern University Institute of Medicine, Nicanor Reyes Medical Foundation	Philippines	282	1.3	23.8
University of Damascus Faculty of Medicine	Syria	269	1.3	25.1
Dow Medical College	Pakistan	256	1.2	26.3
Seth Gordhandas Sunderdas Medical College	India	215	1.0	27.3
American University of Beirut Faculty of Medicine	Lebanon	167	0.8	28.1
University of the West Indies Faculty of Medical Sciences	Jamaica	157	0.8	28.9

—, not applicable.

the Caribbean. Similar patterns were seen in IMGs who practice other specialties (eg, family medicine,²⁵ psychiatry³⁶). The fact that a large proportion of the IMG pediatrician cohort were US citizens at entry to medical school is important because these individuals are more likely to practice in primary care roles but are less likely to be board certified.³⁷ This is notable given that board certification has been correlated with positive outcomes related to the quality of clinical care.³⁸ Longitudinal studies would enable an investigation of the likelihood that IMG pediatricians who are currently in residency training programs achieve board certification.

Although a large number of IMG pediatricians were US citizens at entry to medical school, many were not. Although some medical schools

in some countries educate physicians for other areas of the world,³⁹ the migration of MGs from some areas, both to the United States and elsewhere, represents a loss to the local health care system in those countries. There continues to be a large number of US IMGs who complete their medical degree outside of the United States or Canada but return to the United States to pursue GME training. For workforce studies, especially those concerning the United States, this pattern needs to be accounted for. Otherwise, migration numbers and, by extension, estimates of “brain drain”⁴⁰ are likely to be distorted. Similarly, albeit difficult to estimate, rates of IMGs returning to their country of origin after residency and/or fellowship training need to be taken into account.

Nevertheless, from a diversity perspective, there might be benefits to US citizens attending schools in other countries. A more diverse pool of physicians with increased cultural humility and the ability to speak other languages can help address the needs of the US patient population.⁴¹ Diversity in the physician workforce is associated with improved patient outcomes and better educational experiences for trainees.⁴²

At present, a large proportion of all residents in pediatric programs, both residencies and fellowships, are IMGs. The number of US-MGs has increased, however,⁷ as a result of both the expansion of existing medical programs⁴³ and the establishment of new medical schools.⁴⁴ Unfortunately, there has been a limited increase in the number of available residency positions,⁴⁵ and many programs give priority to US-MGs,^{46,47} likely leading to a greater competition for GME.

Provided that IMGs complete their training and continue to be in active practice in the United States, their contribution to the pediatric workforce will continue, at least in the near term.^{48,49} However, there is a downward trend in the number of IMGs applying for residency positions through the National Resident Matching Program Match.⁹ In addition, recent (proposed) changes in US immigration policies are likely to make it more difficult to obtain work visas,^{50,51} a requirement for non-US citizens seeking postgraduate training in the United States. The role of IMGs in the US workforce, both in pediatrics and in other specialties, may therefore ebb in the future.^{3,4,52} To the extent that IMGs had filled specific gaps in pediatric care that incoming US-MGs do not respond to in the future, the distribution of, and access to, pediatric care could be impacted. Although the data sources used in this study do not contain information about the rates of non-US IMGs returning to their country of citizenship after graduate medical

training, future research to explore this issue as well as the potential impact of immigration policies will help to further understand the contribution of IMGs to the pediatric workforce.⁵³

Limitations

Our study has a number of limitations. First, the AMA Masterfile has been reported to have inconsistencies (ie, under- or over-represent different specialties).^{54,55} In addition, osteopathic physicians in practice are undercounted. A comparison between AMA Masterfile data and US Census Bureau Current Population Survey statistics revealed a margin of error of ~10%, which was attributable to reporting lags in the underlying data sources. The distorting effects of an oversupply as well as an undersupply of physicians in certain (sub) specialties or geographic areas highlights the need for accurate data sources.⁵⁶

Second, we used variables that rely on self-reports (eg, primary self-designated specialty) that may be subject to error. The self-designated practice specialties listed on the AMA Physician Masterfile have been created by the organization; the fact that a physician chooses to designate a given specialty or area of practice does not necessarily mean that the physician has been trained or has special competence to practice the specialty.⁵⁷ Freed et al⁵⁵ found in a direct comparison between ABP data and the AMA Masterfile that at least 40% of the physicians listed in the AMA Masterfile as pediatric cardiologists had not completed training in this subspecialty or did not practice pediatric cardiology. No such direct comparison is available for other pediatric subspecialties. Determining the number of physicians practicing in a particular (sub)specialty is complex.⁵⁸ There are currently 3 common sources to determine supply and distribution of

physicians by specialty: (1) board certification reported by the American Board of Medical Specialties and its certifying boards, such as ABP; (2) specialty designation collected during (state) licensing and renewal; and (3) the AMA Masterfile. The latter 2 use self-reports to collect specialty designation and have listed designations that are not recognized by the 24 American Board of Medical Specialties boards. Indeed, the AMA Masterfile has expanded the number of designations to describe a more varied clinical scope of practice⁵⁷; they might be more accurately conceptualized as “descriptors” rather than specialties. Hence, there could be errors in the reported numbers of (sub)specialists in this study; the likelihood of misattribution is also possible. Moreover, for osteopathic physicians included in this investigation, board certification can only be captured if the individual was certified by an American Board of Medical Specialties member board. Many osteopathic physicians would be certified by an American Osteopathic Association specialty certifying board. This dilemma cannot be solved unless there is a single, authoritative and comprehensive source with the accurate number of physicians in the United States and their practice specialties and locations.

Many researchers have relied on the AMA Masterfile to explore workforce issues, and there is no indication that individual physicians would purposefully distort their responses or introduce any other form of bias. The fragmentation of pediatrics as a specialty with many different subspecialties is problematic, however, in terms of correct categorization. Some individuals may have indeed been incorrectly categorized: the category of “pediatrics” could include those who practice primary care as well as those who practice hospital-based pediatrics (hospitalists),⁵⁹ and

residents in a pediatric training program could go on to a career in subspecialty pediatrics. A recent study of medicine-pediatrics physicians revealed that although they are likely to include pediatric care in their practices, the contribution of combined internal medicine and pediatrics physicians to pediatric primary care has decreased.⁶⁰ In fact, more recent graduates of combined internal medicine and pediatrics training programs are more likely to become specialists and to identify as hospitalist physicians. In addition, we did not include surgeons who provide care to pediatric patients.

A final limitation is that our analysis was cross-sectional in nature; longitudinal tracking of ECFMG application trends and IMG contributions to pediatrics could improve any projections concerning the future composition of the US workforce.

CONCLUSIONS

The current US pediatric workforce is highly dependent on IMGs. Limitations in the data used and, in particular, in the categorizations for pediatric subspecialties support the need to better define the variables in workforce databases. Longitudinal studies are needed to understand what implications the workforce composition and distribution may have for the care of pediatric patients.

ABBREVIATIONS

ABP: American Board of Pediatrics
AMA: American Medical Association
ECFMG: Educational Commission for Foreign Medical Graduates
GME: Graduate Medical Education
IMG: International Medical Graduate
MG: medical graduate

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

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Pediatrics originally published online November 5, 2020;

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