

Assessing the Value of Pediatric Graduate Medical Education in Meeting State and National Needs

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I. Introduction

The goal of this analysis was to identify metrics to assess the value of pediatric graduate medical education (GME) programs at the state and national level. This study aligns with efforts by federal and state policy makers, payers, professional associations, and regulators who seek to improve the return on investment of medical education. Policies that support GME have goals of increasing the proportion of program graduates who remain in generalist practice and, for pediatrics, in subspecialties supported through the Children's Hospital Graduate Medical Education Program (CHGME). Policy attention has also focused on promoting practice in primary care health professional shortage areas, and in rural and micropolitan counties. The ultimate goal of this work is to develop outcome metrics that can be used to evaluate the value of pediatric GME investments in producing the workforce that meets state and national health care needs.

National workforce priorities include expanding primary care and there is concern that there will not be sufficient pediatric generalists in the US to meet this goal¹. Such a shortage would be disproportionately felt in rural and underserved areas, which are priority populations for Health Resources and Services Administration in the US Department of Health and Human Services (HRSA) programs.

Pediatric GME outcomes are of particular interest to HRSA as it administers the Children's Hospitals Graduate Medical Education (CHGME) program which supported more than 7,100 residents and fellows in 2017 in 58 free-standing hospitals in 29 states, the District of Columbia and Puerto Rico.² HRSA is currently in the process of developing a quality bonus system for the CHGME program, whereby hospitals that meet established standards are eligible for additional payments.³ In the recent past, the federal government and the states have expressed

Conclusions & Policy Implications

- The Congressional Research Office (2018)² General Accounting Office (2018)⁴, and the National Academy of Medicine (2018)⁵ have noted that available data limit the ability to assess the value of GME in meeting national and state workforce priorities.
- In this analysis, we examined the degree to which pediatric residency programs produce generalist and specialist pediatricians, retain graduates in the state in which they trained, and produce a workforce that practices in health professional shortage areas (HPSAs) and rural areas.
- On average, more than half of pediatricians move from their state of residency but retention varies by state and training program. A relatively small number of programs train pediatricians who practice in rural or small town counties and even fewer programs train practitioners who practice in HPSAs or participate in the National Health Service Corps (NHSC) program.
- Future research could combine data in this brief with CHGME data reported to HRSA to further develop and refine metrics for evaluating CHGME program outcomes

¹ Basco, W. T. and M. E. Rimsza (2013). "Pediatrician Workforce Policy Statement." *Pediatrics* 132(2): 390-397.

² Congressional Research Office (2018). Children's Hospitals Graduate Medical Education (CHGME). October 16, 2018. <https://fas.org/sgp/crs/misc/R45067.pdf>

³ Health Resources and Services Administration, "Proposed Standards for the Children's Hospitals Graduate Medical Education Payment Program's Quality Bonus System," 83 *Federal Register* 29796-29798, June 26, 2018.

a desire for more transparency and accountability for public funds invested in graduate medical education (GME)^{4,5}. The majority of states in the US fund some component of GME training through Medicaid, with others using state-appropriated dollars to support GME⁶. Although individual states have spent millions of dollars annually on residency training, it has become apparent that they have little knowledge of what their investment yields in terms of producing a physician workforce that includes sufficient generalists and subspecialists that practice in underserved locations. A few states, including Ohio and South Carolina, have discussed redistributing GME funds to divert resources to programs that produce physicians who remain in state or practice in primary care or rural areas⁷. Tracking GME outcomes at the training program level is in its formative stage and comparisons of individual program performance have not been published⁸.

To support this project, we developed a “value framework” that could be used to organize metrics and compare the outputs of residency programs. That framework is described in a previous report to HRSA⁹ and proposes four domains in which GME value can be measured including the: 1) patient, 2) health care delivery system, 3)

professional, and 4) community perspectives. While this approach would provide the most comprehensive assessment of value, the development of indicators for each would require a significant amount of data and analysis beyond the scope of this report. Below, we describe, using more readily available data, how pediatric GME programs affect the supply and distribution of pediatricians.

II. Methods

The analysis population includes all physicians identified as graduating from one of the approximately 220 Advisory Commission on Graduate Medical Education (ACGME)-approved general pediatrics residency training programs in the United States¹⁰ in the 2005 AMA Masterfile® and who were in active practice in the 2016 Masterfile. We included pediatricians less than 80 years of age, in active practice,

Table 1. Pediatricians Trained as of 2005 in Practice in 2016*

By specialty	Number (% of all 75,227 Pediatricians)
General Pediatricians	46,625 (62%)
Pediatric Specialists	12,037 (16%)
Other Generalists (Family Practice, Gen. Internal Medicine)	1,145 (2%)
Other Specialty	15,420 (21%)
Practicing in a HPSA	767 (1%)
By county type	
Practicing in a Metro County	71,437 (95%)
Practicing in a Rural or Micro County	3,657 (5%)
General Pediatricians by State	Number (% of all 46,625 General Pediatricians)
In Residency State	21,794 (47%)
In Other State	24,831 (53%)
Pediatric Specialists by State	Number (% of all 12,037 Pediatric Specialists)
In Residency State	7,813 (65%)
In Other State	4,224 (35%)

*Total MDs trained in pediatrics by 2005 (active, < 80 years of age, with NPI)

⁴ US Government Accountability Office (GAO). 2018. Physician Workforce: HHS Needs Better Information to Comprehensively Evaluate Graduate Medical Education. GAO-18-240. Washington, DC.

⁵ National Academies of Sciences Engineering and Medicine (2018). Graduate Medical Education Outcomes and Metrics: Proceedings of a Workshop. Washington, DC, The National Academies Press.

⁶ Fraher EP, Spero J, Bacon T, 2017. State-Based Approaches to Reforming Medicaid-Funded Graduate Medical Education. Chapel Hill: Carolina Health Workforce Research Center. January 2017
http://www.shepscenter.unc.edu/workforce_product/state-based-approaches-reforming-medicare-funded-graduate-medical-education/

⁷ Fraher EP, Spero J, Bacon T, 2017 Ibid.

⁸ National Academies of Sciences Engineering and Medicine (2018) Op. Cit.

⁹ Ricketts TC. 2018 Searching for Value in the Health Care Workforce: A Report to HRSA. Chapel Hill, NC. Cecil G. Sheps Center for Health Services Research. November 2018.

¹⁰ The number of residency programs varies from year to year as new ones are established and old ones close or are suspended

and with a non-missing NPI in their record (n=75,227) (see Table 1). The NPI was used to identify pediatricians more likely to be in active practice and for merging purposes. We merged county-level data from the 2016-7 Area Health Resources File (HRSA) based on the county FIPS code of each physician's practice address to characterize his or her 2016 practice location. Codes in the Masterfile identifying residency programs were merged with ACGME data to identify the institution.

III. Findings

Residency programs varied widely in the degree to which they trained physicians who practiced in general pediatrics, rural, or underserved areas and retained residents in the state they trained. The 205 residency programs active as of 2016 vary widely in size, from 20 or fewer graduates to as many as 2,530, with the largest 25 programs accounting for one-third of all pediatricians trained in the analysis population (Table 2). On average across programs, more than half of pediatricians move from their state of residency but retention varies by state/territory (Table 3: range 7.6% to 71.2%) and training program (Table 4: range 4.4% to 93.0%). There is also variation across programs in the tendency of graduates to remain in general pediatrics (Table 5: range 46.2% to 96.8%) and practice in a non-metro location (Table 6: range 1.6% to 14.0%) or HPSA (Table 7: range 2.3% to 10.6%). Almost all programs train pediatricians who practice in rural or small-town counties with only 11 having trained 5 or fewer. Slightly more than half of the programs have trained at least one graduate who practiced in a HPSA or participated in the National Health Service Corps (NHSC) program (Tables 6 - 8).

IV. Conclusions and Policy Implications

This cross-sectional analysis examined the practice characteristics in 2016 of physicians who graduated from pediatric residency training programs on or before 2005. The long-term policy goal of the project is to serve as an initial step in developing indices to assess the degree to which GME programs are producing the workforce needed to meet national and state policy goals. As the Congressional Research Office noted in a recent report, the outcomes of federally funded graduate medical education programs are an issue of "Congressional interest", and the outcomes of CHGME are of particular interest given HRSA's current efforts to develop the quality bonus program. By statute, the CHGME program is required to report data on the number of types of residency training programs by specialty; the number of residents supported in each specialty; the training programs that provide care to diverse and underserved children; and the number of residents from each training program that practice in the service area where they trained. Future research could combine data in this brief with those reported by the CHGME program as well as data describing patient mix and participation in public insurance to further develop and refine metrics for the CHGME program.

Appendix Tables of Data Describing ACGME Pediatrics Programs

Table 2. Top 25 Programs by Number of Graduates in Analysis File (**italic*=Affiliated Institution receives CHGME funds, N=14)

ACGME Pediatrics Program	Number in File	Percent of Total	Cumulative Percent
<i>Children's Hospital/Boston Medical Center*</i>	2,530	3.46%	3.46%
<i>Cincinnati Children's Hospital Medical Center*</i>	1,465	2.01%	5.47%
<i>Baylor College of Medicine (Houston)*</i>	1,374	1.88%	7.35%
<i>Children's Hospital of Philadelphia*</i>	1,347	1.84%	9.19%
<i>Children's National Medical Center*</i>	1,091	1.49%	10.69%
<i>University of Colorado*</i>	965	1.32%	12.01%
SUNY Health Science Center at Brooklyn	955	1.31%	13.32%
<i>University of California (San Francisco) Benihoff*</i>	953	1.30%	14.62%
New York Presbyterian Hospital (Cornell)	944	1.29%	15.91%
Hofstra Northwell at Cohen Med Center	917	1.26%	17.17%
Icahn School of Medicine at Mount Sinai	899	1.23%	18.40%
<i>UPMC Medical Education*</i>	896	1.23%	19.63%
UCLA David Geffen School of Medicine/UCLA	863	1.18%	20.81%
St Louis University School of Medicine	848	1.16%	21.97%
New York University School of Medicine	810	1.11%	23.08%
<i>Children's Hospital of Los Angeles*</i>	789	1.08%	24.16%
<i>Indiana University School of Medicine*</i>	746	1.02%	25.18%
<i>St Christopher's Hospital for Children*</i>	729	1.00%	26.18%
Case Western Reserve Univ/Univ Hosps Cleveland	715	0.98%	27.16%
<i>University of Washington*</i>	704	0.96%	28.12%
Yale-New Haven Medical Center	700	0.96%	29.08%
Bronx-Lebanon Hospital Center	679	0.93%	30.01%
Rutgers Robert Wood Johnson Medical School	679	0.93%	30.94%
Detroit Wayne County Health Authority	668	0.91%	31.85%
Los Angeles County- Harbor-UCLA Medical	663	0.91%	32.76%

Table 3. Percentage of Pediatricians Remaining in the State Where They Were Enrolled in Graduate Medical Education Training, by State or Territory, 2016*

State/ Terr	Total	In State	%Instate	State/ Terr	Total	In State	%Instate	State/ Terr	Total	In State	%Instate
PR	1019	726	71.25%	SC	662	289	43.66%	WV	285	102	35.79%
CA	8241	5574	67.64%	NJ	2118	918	43.34%	MO	1828	649	35.50%
FL	2476	1447	58.44%	AZ	855	370	43.27%	MD	1899	672	35.39%
TX	4679	2567	54.86%	AL	707	302	42.72%	KS	332	115	34.64%
GA	1118	589	52.68%	WA	886	361	40.74%	VA	1444	499	34.56%
IN	780	399	51.15%	NM	264	106	40.15%	CT	1208	403	33.36%
OR	383	193	50.39%	WI	1012	405	40.02%	IA	536	165	30.78%
ND	2	1	50.00%	MS	415	165	39.76%	NV	84	24	28.57%
LA	992	491	49.50%	NC	1697	674	39.72%	RI	428	120	28.04%
ME	142	67	47.18%	NY	12378	4856	39.23%	NH	143	37	25.87%
AR	431	203	47.10%	CO	1118	437	39.09%	DE	127	27	21.26%
IL	3728	1752	47.00%	TN	1380	535	38.77%	SD	6	1	16.67%
MA	3121	1429	45.79%	VT	141	54	38.30%	DC	1814	138	7.61%
KY	750	342	45.60%	OH	3912	1495	38.22%	AK	0	0	0.00%
OK	523	238	45.51%	HI	339	127	37.46%	ID	0	0	0.00%
MN	1155	519	44.94%	UT	452	167	36.95%	MT	0	0	0.00%
MI	2553	1135	44.46%	PA	4160	1523	36.61%	WY	0	0	0.00%
NE	323	143	44.27%					Total	75046	33551	44.71%

*Residency includes subspecialty fellowships, includes all pediatricians who completed GME residency or fellowship.

Table 4. Percentage of Pediatricians Remaining in the State Where They Were Enrolled in Graduate Medical Education Training, by Program, 2016. (highest and lowest 20% of programs)

20 Programs with Highest Percent of Graduates in State	Total Grads	% in State
White Memorial Medical Center	247	93.0%
Kaiser Permanente Southern California (Los Angeles)	306	81.1%
CHILDREN'S HOSPITAL OF ORANGE COUNTY PROGRAM	266	79.7%
Kaiser Permanente Northern California	469	78.3%
Ramon E Betances Hospital Mayaguez	141	76.3%
Morehouse School of Medicine	58	75.8%
University of California (San Francisco)/Fresno	195	74.1%
Texas A&M College of Medicine-Scott and White Medical Center (Temple)	228	74.0%
UCLA David Geffen School of Medicine/UCLA Medical Center	1629	72.6%
University of Southern California/LAC+USC Medical Center	1237	72.3%
University of California (Irvine)/Children's Hospital of Orange County	1075	72.3%
Children's Hospital- Oakland	1087	72.3%
San Juan City Hospital	759	71.7%
Driscoll Children's Hospital/Texas A&M College of Medicine	389	71.4%
University of California Davis Health	571	71.0%
University of Puerto Rico	655	70.1%
Loma Linda University Health Education Consortium	851	68.8%
Hospital Episcopal San Lucas/Ponce School of Medicine	232	68.1%
Children's Hospital of Los Angeles	1494	67.3%
Los Angeles County- Harbor-UCLA Medical Center	1263	66.8%

20 Programs with Lowest Percent of Graduates in State	Total Grads	% in State
Johns Hopkins All Children's Hospital	762	29.8%
Brown University	545	29.5%
University of Nevada Las Vegas (UNLV) School of Medicine	111	29.1%
Naval Medical Center (San Diego)	344	28.8%
University of Virginia Medical Center	535	28.3%
St Barnabas Hospital	51	27.5%
University of Iowa Hospitals and Clinics	627	27.2%
Mary Hitchcock Memorial Hospital/Dartmouth- Hitchcock	210	26.5%
Crozer-Chester Medical Center	80	25.0%
San Antonio Uniformed Services Health Ed Consortium	466	22.6%
Madigan Healthcare System	278	20.3%
Naval Medical Center (Portsmouth)	249	18.6%
Valley Children's Healthcare	154	14.9%
Woodhull Medical and Mental Health Center	104	14.3%
Children's National Medical Center	1437	12.9%
Tripler Army Medical Center	164	12.3%
Keesler Medical Center	174	10.8%
National Capital Consortium	562	9.6%
Georgetown University Hospital	494	9.1%
University of Alabama Medical Center	550	4.4%

Table 5. Proportion of Program Graduates Identifying Their Specialty as General Pediatrics by Program, 2016 (15 highest and lowest percentages)

15 Programs with Highest Proportion of Graduates in General Pediatrics	%	15 Programs with Lowest Proportion of Graduates in General Pediatrics	%
Lehigh Valley Health Network/University	96.8%	<i>McGaw Medical Center of New Jersey*</i>	61.2%
Ramon E Betances Hospital Mayaguez, PR	95.7%	<i>University of Texas Southwestern*</i>	60.8%
Medical Center of Central Georgia/Mercer	95.3%	<i>University of Washington*</i>	60.7%
Crozer-Chester Medical Center	92.1%	Albert Einstein Medical Center	59.7%
<i>University of Illinois College of Medicine*</i>	91.9%	<i>University of Colorado*</i>	59.6%
Puerto Rico Children's Hospital	91.5%	University of Michigan	58.9%
Woodhull Medical and Mental Health Ctr	90.9%	Mayo Clinic	58.8%
Brooklyn Hospital Center	90.9%	<i>Baylor College of Med (San Antonio)*</i>	58.2%
<i>Driscoll Children's Hospital/Texas A&M*</i>	90.7%	<i>National Capital Consortium*</i>	57.5%
White Memorial Medical Center	90.6%	<i>Children's Hospital of Philadelphia*</i>	56.5%
St Vincent Hospital and Health Care Center	90.2%	Duke University Hospital	52.1%
<i>San Juan City Hospital*</i>	90.2%	<i>New York Presb Hospital (Cornell)*</i>	50.6%
Greenville Health System/Univ of So Car	90.1%	<i>Johns Hopkins University*</i>	50.2%
Central Iowa Health Syst. (Iowa Methodist)	90.1%	University of South Dakota	50.0%
Jersey Shore University Medical Center	89.8%	Washington Univ/B-JH/SLCH Cons.	46.2%

**italic*=Program has an affiliated institution that receives CHGME funds, N=12

Table 6. Programs with highest and lowest proportion graduated pediatricians practicing in rural and “Micropolitan” (OMB Nonmetro or Micropolitan Counties) areas

15 Programs* with LOWEST Proportion of Graduates in Rural (non-metro) Counties	%	15 Programs with HIGHEST Proportion of Graduates in Rural (non-metro) Counties	%
University of Maryland	1.6%	Marshfield Clinic	34.3%
Ramon E Betances Hospital Mayaguez	1.4%	Mary Hitchcock Mem Hosp/Dartmouth	31.5%
Montefiore Med Center/Albert Einstein	1.4%	University of South Dakota	25.0%
New York Presb Hospital (Columbia)	1.3%	University of Kentucky Coll of Med	23.9%
Stanford Health Care	1.3%	East Tennessee State University	22.6%
Brown University	1.3%	University of Mississippi Medical Center	22.1%
New York Presb Hospital (Cornell)	1.2%	University of Vermont Medical Center	17.4%
Puerto Rico Children's Hospital	1.1%	Medical Center of Cen. Georgia/Mercer	16.3%
UCLA David Geffen School of Med	1.0%	Marshall University School of Medicine	16.1%
Case Western Reserve (MetroHealth)	0.9%	West Virginia University	16.0%
Children's Hospital of Los Angeles	0.7%	Vidant Medical Center/East Carolina	15.7%
Kaiser Permanente So California (LA)	0.7%	Central Iowa (Iowa Methodist)	15.4%
University of Florida (Orlando)	0.6%	University of Tennessee	14.8%
McGaw Medical Center of Northwestern	0.6%	Woodhull Medical	14.8%
University of California (San Diego)	0.4%	University of Kansas	14.0%

*With more than 25 program completers in file.

Table 7. Numbers and Proportions of all Graduate Pediatricians (Including Subspecialists) Practicing in Health Professions Shortage Areas (HPSAs), 2016

Program	NonHPSA	whole	part	% in whole HPSA
University of Mississippi Medical Center	11	30	243	10.6%
Marshfield Clinic	6	6	60	8.3%
Charleston Area Medical Center/West Virginia	6	5	82	5.4%
Vidant Medical Center/East Carolina Univ	15	8	142	4.8%
Driscoll Children's Hospital/Texas A&M C	9	11	207	4.8%
University of New Mexico School of Medicine	6	14	275	4.7%
Spectrum Health/Mich State University/Health	4	3	66	4.1%
Memorial Health Univ Med Center/Mercer Univ	3	2	45	4.0%
Richmond University Medical Center	12	3	70	3.5%
Indiana University School of Medicine	164	27	616	3.3%
Woodhull Medical and Mental Health Center	7	3	81	3.3%
Texas A&M College of Medicine-Scott and	38	4	89	3.1%
Lehigh Valley Health Network/University	1	1	31	3.0%
San Antonio Uniformed Services Health Educ.	38	11	331	2.9%
Madigan Healthcare System	19	6	197	2.7%
Louisiana State University	24	17	605	2.6%
University of Oklahoma School of Comm.	4	3	114	2.5%
Geisinger Health System	16	3	109	2.3%
Medical Center of Central Georgia/Mercer	3	1	40	2.3%
University of South Alabama	12	4	161	2.3%

Table 8. Number of NHSC Scholarship Recipients by Pediatric GME Programs.

ACGME Program Name	NHSC Graduates
University of Florida	13
Children's Hospital/Boston Medical Center	12
Jacobi Medical Center/Albert Einstein College	12
Children's National Medical Center	9
University of Nevada Las Vegas (UNLV)	9
Cincinnati Children's Hospital Medical Campus	8
Jackson Memorial Hospital/Jackson Health	8
SUNY Health Science Center at Brooklyn	8
Albert Einstein Medical Center	7
Indiana University School of Medicine	7
New York Presbyterian Hospital (Cornell	6
New York University School of Medicine	6
Baylor College of Medicine (Houston)	5
Detroit Wayne County Health Authority	5
Icahn School of Medicine at Mount Sinai	5
San Juan City Hospital	5
University of California (San Diego) Med	5
University of Puerto Rico	5
Children's Hospital of Los Angeles	4
Loma Linda University Health Education Center	4
Maine Medical Center	4
St Louis University School of Medicine	4
University of Florida (Orlando)	4
University of Tennessee	4
21 programs with 3 NHSC graduates	3
27 programs with 2 graduates	2
55 programs with 1 graduate	1
78 programs with no graduates	0
TOTAL	331