

# The American Society of Pediatric Hematology/Oncology workforce assessment: Part 2—Implications for fellowship training

P. J. Leavey<sup>1</sup>  | J. M. Hilden<sup>2</sup> | D. Matthews<sup>3</sup> | C. Dandoy<sup>4</sup>  | S. M. Badawy<sup>5</sup>  | M. Shah<sup>6</sup> | A. S. Wayne<sup>7</sup> | J. Hord<sup>8</sup>  | on behalf of the American Society of Pediatric Hematology/Oncology Workforce Advisory Taskforce

<sup>1</sup>Department of Pediatrics, University of Texas Southwestern Medical Center, Dallas, Texas

<sup>2</sup>Children's Hospital Colorado, Denver, Colorado

<sup>3</sup>Fred Hutchinson Cancer Research Center, Seattle Children's Hospital, Seattle, Washington

<sup>4</sup>Cincinnati Children's Hospital, Cincinnati, Ohio

<sup>5</sup>Ann and Robert Lurie Children's Hospital of Chicago, Chicago, Illinois

<sup>6</sup>Texas Children's Hospital, Houston, Texas

<sup>7</sup>Children's Hospital Los Angeles, The Norris Comprehensive Cancer Center, Keck School of Medicine, University of Southern California, Los Angeles, California

<sup>8</sup>Children's Medical Center of Akron, Akron, Ohio

## Correspondence

Patrick Leavey, Department of Pediatrics, University of Texas Southwestern Medical Center, 5323 Harry Hines Blvd, Dallas, TX 75390-9063.

Email: Patrick.leavey@utsouthwestern.edu

## Funding information

Grant sponsor: NCI; Grant number: P30CA014089.

## Abstract

The American Society of Pediatric Hematology/Oncology (ASPHO) solicited information from division directors and fellowship training program directors to capture pediatric hematology/oncology (PHO) specific workforce data of 6 years (2010–2015), in response to an increase in graduating fellows during that time. Observations included a stable number of physicians and advanced practice providers (APPs) in clinical PHO, an increased proportion of APPs hired compared to physicians, and an increase in training-level first career positions. Rapid changes in the models of PHO care have significant implications to current and future trainees and require continued analysis to understand the evolving discipline of PHO.

## KEYWORDS

fellowship training, pediatric hematology/oncology, workforce

## 1 | INTRODUCTION

The number of pediatric hematology/oncology (PHO) subspecialty trainees has more than doubled in the last 12 years.<sup>1,2</sup>

The Accreditation Council for Graduate Medical Education (ACGME), the American Board of Pediatrics (ABP) and the National Residency Matching Program (NRMP) provide annual reports relevant to PHO workforce and its trainees. There are, however, differences in the sources of these data. ACGME trainee data<sup>3</sup> do not include

those fellows who, upon graduation from 3-year ACGME-accredited PHO fellowship, enter nonaccredited subspecialty training in areas such as coagulation. The ABP, which has collected standardized data for many years, depends on information reported to them by training program directors for fellows potentially eligible to take subspecialty boards and also directly from diplomates at the time of certifying examinations in general and subspecialty pediatrics. The NRMP requires at least 75% participation of all programs and 75% of all available positions for a subspecialty to participate in the match process and summarizes results for pediatric subspecialties each year. Aggregate data comparing ABP workforce reports and NRMP reports suggest that 88% of first-year fellowship positions for PHO have been offered through the NRMP (82–98%; 2002–2015). Similar to ACGME,

Abbreviations: ASPHO, American Society of Pediatric Hematology/Oncology; APPs, advanced practice providers; PHO, pediatric hematology/oncology; ACGME, Accreditation Council for Graduate Medical Education; ABP, American Board of Pediatrics; NRMP, National Residency Matching Program; FPD, fellowship program director

NRMP does not provide data for fellows who enter nonaccredited subspecialty PHO training.

Despite these differences, each data source has demonstrated the same trend. The ACGME resource book academic year 2015–2016<sup>3</sup> reported 72 accredited PHO training programs in 2016, an 11% increase since 2011, and a 12.5% increase in the number of PHO trainees over the same 5 years. The 2016 ABP workforce report<sup>1</sup> provided information on 537 ABP registered fellows-in-training in PHO fellowship programs (a 2.3-fold increase over 230 trainees in 1998).<sup>2</sup> The NRMP end-of-match summary report demonstrated a 23% increase in the number of certified programs in 2016 (from 55 in 2001), and over the same 15-year time period demonstrated an increase in the number of matched applicants entering their first fellowship year (from 83 to 163). According to the 2017 NRMP end-of-match report, 153 applicants matched to PHO. While this was reduced from 2016, it still represented an 84% increase in matched applicants since 2001. This growth has occurred in parallel with ever-increasing difficulty in identifying graduate medical education funds to support trainees, an exceptionally competitive environment for research funds<sup>4</sup> and in the setting of an overall predicated shortfall in pediatric subspecialists in certain regions of the United States.<sup>5</sup>

National statistics from the Surveillance, Epidemiology, and End Results program at the National Cancer Institute suggest the number of children with oncology diagnoses is not increasing significantly, but long-term risks of cancer are well recognized and long-lasting.<sup>6,7</sup> Treatment strategies for children with malignancy have increased in complexity, and the challenges of genomic-driven and personalized cancer care are rapidly evolving.<sup>8</sup> Survival after hematopoietic stem cell transplantation has improved, although often involving increased complexity of transplant care, as exemplified by the higher rates of acute and chronic GVHD after mismatched or unrelated transplants.<sup>9</sup> Concomitantly, there has been a significant increase in rates of thrombosis and stroke in children.<sup>10,11</sup> In the midst of such evolutions in PHO practice landscape, the workforce effect of other changes is uncertain. There has been an increase in the ratio of female-to-male pediatric subspecialist providers,<sup>12</sup> an increase in the number of advanced practice providers (APPs) and pediatric hospitalists working in PHO,<sup>13,14</sup> and an evolution in the work life balance expectations of pediatric specialists and subspecialists.<sup>15,16</sup>

The American Society of Pediatric Hematology/Oncology (ASPHO) responded to a gap in objective PHO-specific workforce information by conducting a series of surveys and organizing a PHO workforce taskforce and strategy advisory group. The objective of this article is to report data from two different surveys conducted by ASPHO of PHO division directors and PHO fellowship training program directors.

## 2 | METHODS

As of November 2016, ASPHO represented 1,984 members, of whom 22% were fellows in training, 69% were practicing PHO subspecialty physicians (4% were in their first postfellowship year), 3% were allied members in PHO specialty (includes APPs), and 6% were emeritus,

international and honorary members. Through its program and training committees, ASPHO collected workforce-related data over a 6-year timeline.

### 2.1 | Division director survey

ASPHO distributed an annual workforce survey to all identifiable PHO division directors, their equivalent, or their designee, irrespective of their ASPHO membership. The list of Division Director email addresses, which had been assembled by ASPHO administrative staff over a period of many years, was updated annually. Division directors were asked to report on the number of open and filled positions over the previous 3 years for physicians and APPs in surveys completed in 2013, 2014, and 2015. Surveys were developed using SurveyGizmo and distributed by email. Respondents were asked to identify their city and practice type, and only the primary survey reviewer (J.H.) and ASPHO administrative staff were able to view these identifying elements. Data were tabulated and are presented in deidentified fashion. The survey was open for response for an average of 30 days during the first 4 months of each year. Division directors received a reminder email approximately 2 weeks before the survey closed and a final reminder email approximately 1 week before the survey closed. Members of the ASPHO Practice Committee developed all surveys through consensus. There were 81 total questions in the survey distributed in 2015, which given a logic-based question format resulted in a minimum of 52 questions requiring response. Text-based responses were required for 47 questions, including identifying elements for the program. Surveys were not formally validated, but annual improvements to the format of questions were made, allowing additional questions to be included each year as necessary without changing the overall purpose of the survey (Supplementary Material).

### 2.2 | Fellowship program director survey

ASPHO made direct calls to all ACGME-accredited PHO fellowship program director (FPD) in July 2014. FPD contact data are available through the ACGME website. A group of five people (included authors P.J.L. and M.S.) was identified to make calls. Calls were made to FPDs irrespective of their individual ASPHO membership status. Respondents were not anonymous to the caller and the caller collected all data on a template sheet, which was then shared with the primary review for this survey (P.J.L.). All FPDs contacted were notified of the purpose of the data collection and the intent to deidentify all data. Only the primary survey reviewer (P.J.L.) and ASPHO administrative staff were able to view the complete set of data including identifying elements. Data were tabulated and are presented in deidentified fashion. Information was requested regarding fellows who graduated June 2014. Briefly FPDs were asked if graduating fellows were staying in their training institution or had left, and the nature of the position upon graduation (fourth-year fellow, subspecialty fellow, assistant professor, instructor/assistant instructor, pharmaceutical industry, PHO hospitalist, PHO private practice, and other). Callers did not develop a single definition but accepted institutions interpretation of each of these categories. ASPHO repeated a direct call to the same program

directors in July 2015 when FPDs were asked to provide information for fellows who graduated from 2010 to 2015. For the purpose of this document and given the heterogeneity of positions filled by fellow graduates (academic vs. non-academic; training vs. independent practice), we will refer to the first job secured by graduating fellows as a "position" and we will refer to all fellows for whom we received information as "graduates" of their 3-year program, even if they stayed in fourth-year training positions.

### 3 | RESULTS

#### 3.1 | Division director survey

Of the 125 division directors or their designee who completed at least one survey, 48 completed only 1, 34 completed 2, 22 completed 3, and 21 completed the survey in all 4 years (demographic information summarized in Table 1). For the survey years 2013, 2014, and 2015, division directors reported that the total number of physician recruitments for the previous 3 years was 179, 146, and 141, respectively, and that each year 50% of physician recruitments were to replace vacated positions. For the survey years 2013, 2014, and 2015, division directors also recorded that the total number of APP recruitments for the previous 3 years was 123, 126, and 131, respectively, and that 50%, 20%, and 50% of these recruitments were to fill vacated positions, respectively.

#### 3.2 | Fellowship program director survey

Sixty-two FPDs, representing 90% of PHO fellowship programs in 2014, and 56 FPDs (82%) in 2015 provided information on fellow graduates. Since the 2014 data overlapped with data provided in 2015 by FPDs on graduates between the years 2010 and 2015, and since we received information on 141 fellow graduates in 2014, but on 142 fellow graduates for the year 2014 in the survey year 2015, we used data from 2015 survey for this report. Complete data were provided for 546 graduates (representing 60% of predicted ABP-certified third-year fellows for the same time period). Forty-nine percent of graduates left their training institution upon graduation, the type of position being notably different for those who stayed (Table 2). Twenty-two percent of graduates who left were in a training position (fourth-year or subspecialty fellow) compared to 29% of those who stayed. More-strikingly, 41% of graduates who left took assistant professor level positions at graduation while only 20% of graduates who stayed had a similar level position. When evaluated over time, there was a continued increase in number of trainee-level positions (fourth-year and subspecialty fellow), a recent increase in number of PHO hospitalist positions, and a reversal in distribution of assistant professor versus trainee-level positions (with the latter increasing over time) (Table 3; Fig. 1).

In an effort to understand the transition from first position to subsequent positions for graduates, we asked FPDs what position those who graduated on or before June 30, 2014, were in starting July 2015. Data regarding positions acquired after an initial position as fourth-year or subspecialty fellow were available for 83 graduates. Fifty-three (64%)

were assistant professors at least 1 year after their initial training level position, while 18 (19%) were still in training-level positions. Data regarding positions acquired after an initial appointment as assistant instructor/instructor were available for 84 graduates. Thirty (36%) were assistant professors at least 1 year after their first position, while 55% remained in assistant instructor/instructor positions at least 1 year later.

### 4 | DISCUSSION

Data from fellowship program directors demonstrate that 25% of graduates remain in training for at least the first year after fellowship graduation and that this trend has increased from 16% to 37% (from 2010 to 2015). Data also suggest a reversal in the percent of graduates going directly into an assistant professor position as compared to those continuing in a trainee position. Respondents to the division director survey indicated that for every one physician hired, 0.8 APPs are also hired to provide PHO care.

The American Academy of Pediatrics workforce policy statement, published in 2013, described a shortage of many pediatric subspecialists and pediatric surgical subspecialists, and a maldistribution of primary care pediatricians.<sup>5</sup> The ABP in a series of manuscripts documented an increase in pediatric subspecialty trainees, including PHO, over the last decade.<sup>17-20</sup> These trends have not been universal and workforce has continued to evolve across pediatric subspecialties. Six groups representing the subspecialty of Pediatric cardiology highlighted the competitive environment for pediatric cardiology first-career positions and recommended the consideration of a suspension of further increases in trainees pending further data.<sup>21</sup> Pediatric nephrology has experienced an undersupply of trainees and providers<sup>22,23</sup> while in pediatric rheumatology as many as 20% of fellows may not complete their subspecialty training,<sup>24</sup> which compares to 11.2% for PHO (calculated from ABP workforce data). PHO-specific workforce data are provided by the ABP in its annual workforce report, a PHO-specific report from the ABP in 2006<sup>2</sup> and also a report from ASPHO, focused on workplace and provider demographics, and published in this journal issue. Pediatric fellowship training renders a financial burden for most subspecialties over the life-time of the pediatric subspecialist including PHO.<sup>25</sup> In fact, only three pediatric subspecialties (cardiology, critical care, and neonatology) provided an opportunity for positive financial return to pediatric subspecialists compared to practice in general pediatrics.<sup>25</sup> Seventy-five percent of practicing PHO physicians reported symptoms of burnout<sup>26</sup> and significant career, compensation and satisfaction disparities have been reported for PHO between women and men and between minority and majority faculties.<sup>12</sup>

The data presented in this report, suffer from the limitations of retrospective reporting and survey-acquired data, with risk for recall bias and selection bias. Although only 10% of division directors completed all four workforce surveys, the average response was 30% per year and the aggregate number of physicians and APPs represented each year was approximately 650. Responses from greater than 80% of FPD

**TABLE 1** Division director workforce survey demographic results

	Years (total # of division directors who received surveys)			
	2012 (215)	2013 (212)	2014 (202)	2015 (212)
Total response (% response)	76 (35)	72 (34)	65 (32)	61 (29)
Total physicians (% part-time)	669 (12)	731 (10)	736 (10)	635 (10)
Total physician cFTE <sup>a</sup>	442	463	432	387
Total APPs (% part-time)	388 (18)	372 (20)	409 (19)	380 (19)
Total APP cFTE <sup>a</sup>	296	319	351	340
Number Fellowship programs (median # of fellows; range)	31 <sup>b</sup>	35 (5; 1–24)	32 (6; 0–44)	33 (6; 1–24)
Median number of new oncology patients annually (range)	70 (12–800)	70 (10–730)	86 <sup>b</sup>	75 (5–409)
Mean number of bone marrow transplants annually (range)	22 (0–115)	20 (0–110)	20 (0–95)	24 (0–65)

APP, advanced practice provider.

<sup>a</sup>cFTE = Division directors were asked to estimate the clinical time for physicians and APP and report cFTE equivalent positions separately from total number of people in these positions.

<sup>b</sup>Data not available or question not asked.

**TABLE 2** Fellowship program director surveys: positions achieved by fellow graduates as reported in 2014 and 2015

Position	Graduate stayed at training institution		Total
	No (%)	Yes (%)	
Fourth-year fellow	7 (3)	53 (19)	60
Subspecialty fellow	51 (19)	28 (10)	78
Assistant professor	112 (41)	56 (20)	168
Instructor/assistant instructor	10 (4)	127 (46)	137
Other <sup>a</sup>	36 (13)	4 (1)	40
Pharmaceutical industry	4 (1)	–	4
PHO hospitalist	10 (4)	6 (2)	16
PHO private practice	43 (16)	–	43

<sup>a</sup>Other included the following types of positions: primary advocacy, military, FDA, medical oncology fellowships, mixed hospitalist positions of subspecialty and pediatrics, and exclusive pediatric hospitalist.

**TABLE 3** Fellowship program director surveys

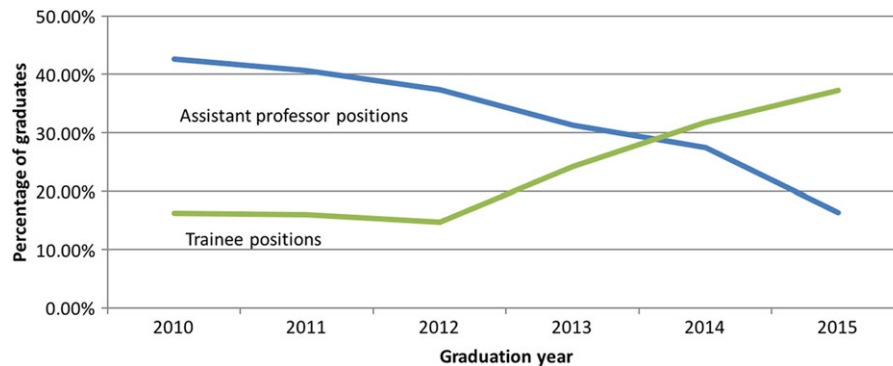
	Graduation year						Total
	2010	2011	2012	2013	2014	2015	
Fourth-year fellow	3	3	5	8	22	19	60
Subspecialty fellow	8	8	6	12	23	22	79
Assistant professor	29	28	28	26	39	18	168
Instructor/assistant instructor	19	15	24	22	33	24	137
Other <sup>a</sup>	3	6	3	5	9	14	40
Pharmaceutical industry	0	0	0	2	1	1	4
PHO hospitalist	0	1	1	0	9	5	16
PHO private practice	6	8	8	8	6	7	43
Total	68	69	75	83	142	110	547

<sup>a</sup>Other included the following types of positions: primary advocacy, military, FDA, medical oncology fellowships, mixed hospitalist positions of subspecialty and pediatrics, and exclusive pediatric hospitalist.

were received representing 60% of potential graduates in a 6-year window. Of note, the average number of fellows/year in the programs that did not respond to FPD surveys was 2 with a range of 1–6, which was not different from those who did respond 2 (0–8).

The data here are important for the PHO community to consider. They suggest that graduates of fellowship programs are increasingly

not moving directly into the types of faculty positions that have historically been a mainstay. Multiple factors may be contributing to this apparent change including increased competition for research funding from the NIH and other granting institutions,<sup>27</sup> an increased role in the provision of clinical care by APPs and hospitalist physicians,<sup>13,14</sup> changes in medical reimbursement that has



**FIGURE 1** Data presented from FPD survey acquired in 2015. Trainee position includes fourth-year fellowship and subspecialist fellow positions. Data demonstrate reversal of the percentage of trainees taking assistant professor positions versus trainee positions over time

in some cases led to a reduction in funding to support clinical faculty salaries,<sup>27</sup> evolving requirements for primary and subspecialty training that has raised questions about trainee readiness in other specialties,<sup>28</sup> and a dramatic and near continuous increase in primary subject matter that PHO trainees must learn (e.g., genomics and immunotherapy).

It appears that new strategies are increasingly being employed to counter these changes and further enhance the professional development of PHO fellows. For example, extending fellow clinical and research training in fourth-year positions has the potential to make trainees more competitive for funding and academic faculty positions. Similarly, nonaccredited advanced training programs promote additional expertise and graduated independence in focused areas of PHO such as neurooncology and coagulation. Masters level training can afford PHO-relevant knowledge in areas such as clinical investigation and education. There are also new opportunities for enhanced training in growth areas including, but not limited to cancer genomics, “precision/personalized medicine”, adolescent and young adult oncology, women and blood disorders, immunotherapy, and vascular anomalies.

The rapid changes in the models of PHO care and the demands of training have significant implications to current and future trainees. Fellowship program directors in PHO might consider these data and identified opportunities to optimize future training goals. Also, it will be critical to continue to follow and analyze these trends and to develop and implement approaches to meet the challenges associated with the evolving discipline of PHO. In response to these changes, ASPHO has identified workforce as one of five major priorities in its strategic plan for the next 5 years, and will be accountable to its membership for its responsibility to identify and advocate for integrative solutions responding to changing workforce dynamics.

## ACKNOWLEDGMENTS

The American Society of Pediatric Hematology/Oncology Workforce Advisory committee includes the following participants: Patrick J. Leavey (co-Chair), Alan S. Wayne (co-Chair), Joanne M. Hilden, A. Kim Ritchey, Caroline Hastings, Jeff Hord, Janice Olsen, Mark Atlas, Sherif Badawy, Mona Shah, Carl Allen, Glen Lew, Dana Matthews, George

Buchanan, and Susan Sencer. A.S.W. was supported in part by NCI award P30CA014089.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## REFERENCES

1. Pediatrics ABo. Pediatric physicians workforce data book. Chapel Hill, NC: American Board of Pediatrics; 2016:2015–2016.
2. Althouse LA, Stockman JA, 3rd. Pediatric workforce: a look at pediatric hematology-oncology data from the American Board of Pediatrics. *J Pediatr*. 2006;148(4):436–437.
3. Data Resource Book Academic Year 2015–2016. Chicago, IL: Accreditation Council for Graduate Medical Education; 2016.
4. American Academy of Pediatrics, Committee on Pediatric Workflow, Shipman SA, Pan RJ. Financing graduate medical education to meet the needs of children and the future pediatrician workforce. *Pediatrics*. 2008;121(4):855–861.
5. Basco WT, Rimsza ME, Committee on Pediatric Workflow, American Academy of Pediatrics. Pediatrician workforce policy statement. *Pediatrics*. 2013;132(2):390–397.
6. Mertens AC, Yong J, Dietz AC, et al. Conditional survival in pediatric malignancies: analysis of data from the Childhood Cancer Survivor Study and the Surveillance, Epidemiology, and End Results Program. *Cancer*. 2015;121(7):1108–1117.
7. Oeffinger KC, Mertens AC, Sklar CA, et al. Chronic health conditions in adult survivors of childhood cancer. *N Engl J Med*. 2006;355(15):1572–1582.
8. Scollon S, Bergstrom K, Kerstein RA, et al. Obtaining informed consent for clinical tumor and germline exome sequencing of newly diagnosed childhood cancer patients. *Genome Med*. 2014;6(9):69.
9. Mateos MK, O'Brien TA, Oswald C, et al. Transplant-related mortality following allogeneic hematopoietic stem cell transplantation for pediatric acute lymphoblastic leukemia: 25-year retrospective review. *Pediatr Blood Cancer*. 2013;60(9):1520–1527.
10. Krishnamurthi RV, deVeber G, Feigin VL, et al. Stroke prevalence, mortality and disability-adjusted life years in children and youth aged 0–19 years: data from the global and regional burden of stroke 2013. *Neuroepidemiology*. 2015;45(3):177–189.
11. Gillespie MA, Lyle CA, Goldenberg NA. Updates in pediatric venous thromboembolism. *Curr Opin Hematol*. 2015;22(5):413–419.
12. Fruge E, Lakoski JM, Luban N, et al. Increasing diversity in pediatric hematology/oncology. *Pediatr Blood Cancer*. 2011;57(1):147–152.

13. Freed GL, Dunham KM, Loveland-Cherry C, et al. Nurse practitioners and physician assistants employed by general and subspecialty pediatricians. *Pediatrics*. 2011;128(4):665–672.
14. Freed GL, Dunham KM, Switalski KE, et al. Assessing the value of pediatric hospitalist programs: the perspective of hospital leaders. *Acad Pediatr*. 2009;9(3):192–196.
15. Cull WL, O'Connor KG, Olson LM. Part-time work among pediatricians expands. *Pediatrics*. 2010;125(1):152–157.
16. Starmer AJ, Frintner MP, Freed GL. Work-life balance, burnout, and satisfaction of early career pediatricians. *Pediatrics*. 2016;137(4).
17. Althouse LA, Stockman JA, 3rd, American Board of Pediatrics. Pediatric workforce: a look at neonatal-perinatal medicine data from the American Board of Pediatrics. *J Pediatr*. 2006;148(6):727–729.
18. Althouse LA, Stockman JA, 3rd. Pediatric workforce: a look at pediatric critical care medicine data from the American Board of Pediatrics. *J Pediatr*. 2006;149(3):390–392.
19. Althouse LA, Stockman JA, 3rd. Pediatric workforce: a look at pediatric gastroenterology data from the American Board of Pediatrics. *J Pediatr*. 2006;149(4):560–562.
20. Althouse LA, Stockman JA, 3rd. Pediatric workforce: a look at pediatric cardiology data from the American Board of Pediatrics. *J Pediatr*. 2006;148(3):384–385.
21. Ross RD, Srivastava S, Cabrera AG, et al. The United States Pediatric Cardiology 2015 Workforce Assessment: a survey of current training and employment patterns: a report of the American College of Cardiology, American Heart Association, American Academy of Pediatrics Section on Cardiology and Cardiac Surgery, and Society for Pediatric Cardiology Training Program Directors. *J Am Coll Cardiol*. 2017;69(10):1347–1352.
22. Althouse LA, Stockman JA, 3rd. Pediatric workforce: a look at pediatric nephrology data from the American Board of Pediatrics. *J Pediatr*. 2006;148(5):575–576.
23. Ferris M, Iglesia E, Ko Z, et al. Wanted: pediatric nephrologists!—why trainees are not choosing pediatric nephrology. *Ren Fail*. 2014;36(8):1340–1344.
24. Riebschleger M, McGuinness G, Currin L, et al. Noncompletion in pediatric rheumatology fellowships. *J Grad Med Educ*. 2014;6(1):158–161.
25. Rochlin JM, Simon HK. Does fellowship pay: what is the long-term financial impact of subspecialty training in pediatrics? *Pediatrics*. 2011;127(2):254–260.
26. Roth M, Morrone K, Moody K, et al. Career burnout among pediatric oncologists. *Pediatr Blood Cancer*. 2011;57(7):1168–1173.
27. Bender E. Cancer centers prepare for sequestration cuts. *Cancer Discov*. 2013;3(4):OF11.
28. Ceresnak SR, Axelrod DM, Sacks LD, et al. Advances in pediatric cardiology boot camp: boot camp training promotes fellowship readiness and enables retention of knowledge. *Pediatr Cardiol*. 2017;38(3):631–640.

## SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

**How to cite this article:** Leavey PJ, Hilden JM, Matthews D, et al. The American Society of Pediatric Hematology/Oncology workforce assessment: Part 2—Implications for fellowship training. *Pediatr Blood Cancer*. 2018;65:e26765. <https://doi.org/10.1002/pbc.26765>