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Global Health Training in Pediatric Residency Programs

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What's Known on This Subject

According to a 1995–1996 survey, 25% of North American pediatric residency programs provided global health electives. In 1999, the AAP developed consensus guidelines for global health electives and suggested 4 main components: prerequisites, preceptorship, preparation, and evaluation.

What This Study Adds

Fifty-two percent of pediatric residency programs offer global health electives. Observance of AAP guidelines varies. Larger residency programs, university/academic settings, and greater reported resident interest and faculty involvement in global health were associated with increased resident participation in global health.

ABSTRACT

OBJECTIVE. Our goal was to describe current resident interest, participation, curricula, resources, and obstacles related to global health training within pediatric residency programs.

METHODS. We conducted a cross-sectional survey of the 201 accredited pediatric residency programs in the United States, Puerto Rico, and the Caribbean from October 2006 to January 2007. Survey topics included resident interest and participation in electives, training opportunities, program support, and educational curricular content related to global health.

RESULTS. Of the 201 surveyed pediatric residency programs, 106 (53%) responded. Fifteen percent of responding programs reported that a majority of their residents were interested in global health. Fifty-two percent offered a global health elective within the previous year, and 47% had formally incorporated global health into their training curricula. Six percent of the programs reported a formalized track or certificate in global health. The median number of residents per program participating in global health electives within the previous year was 0 during postgraduate year 1, 1 during postgraduate year 2, and 2 during postgraduate year 3. The median number of all residents per program participating in a global health elective in the previous year was 3 (7.4% of program size). Among programs that offered a global health elective, support to participating residents included prerequisite clinical training (36%), cultural orientation (36%), language training (15%), faculty mentorship (82%), and postelective debriefing (77%). Fourteen percent of the programs provided full funding for resident electives. Characteristics of pediatric residency programs that were significantly associated with higher resident participation in a global health elective were larger program size, university affiliation, greater reported resident interest, and faculty involvement in global health.

CONCLUSIONS. More than half of the pediatric residency programs surveyed offered a global health elective in the previous year. An American Academy of Pediatrics survey 10 years earlier had shown 1 of 4 programs with global health electives. Observance of American Academy of Pediatrics consensus guidelines for global health electives varied widely among programs, and additional efforts should focus on resident preparation, mentorship, and funding. *Pediatrics* 2008;122:28–33

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Key Words

resident education/training, international child health

Abbreviations

AAP—American Academy of Pediatrics
PGY—postgraduate year
IQR—interquartile range

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OVER THE LAST 4 decades, a significant reduction in childhood mortality has been accomplished globally. However, rates of decline in child mortality have decelerated in the past decade, and 9.7 million children under the age of 5 years still die annually, largely as a result of treatable diseases including neonatal conditions, diarrhea, pneumonia, malaria, AIDS, and measles.¹ Furthermore, the vast majority of these deaths are concentrated in low-income nations, with 90% of deaths occurring in only 42 countries.²

The shortage of health care workers in these regions is a significant barrier to health and has reached crisis proportions; an estimated 11% of the world's population is served by only 3% of the world's health care workers.³ This is particularly noted in sub-Saharan Africa, which has been devastated by the HIV/AIDS pandemic and currently requires an additional 4 million health care workers to reach the UN Millennium Development goals.⁴

The future generation of US-trained pediatricians may play an important role in global child health. Over the past decade, medical student and resident interest and participation in global health have been increasing at remarkable rates.⁵ The proportion of medical students who completed a global health elective likewise increased from 6% in 1980 to 22.3% in 2004.⁶ Medical schools are beginning to integrate global health into their curricula, clinical rotations, and research opportunities.⁷ Meanwhile, there has also been significant interest in global health among US pediatric residents and pediatric training programs. A survey completed in 1996 among US and Canadian pediatric residency programs revealed that 25% of the surveyed programs offered global health electives.⁸ An additional 42% of programs that did not have global health electives at the time expressed interest in developing an elective.

Pediatric training in global health may benefit residency training by exposing residents to a wide spectrum of disease states, improving physical examination skills, decreasing reliance on laboratory tests and imaging, enhancing awareness of costs and resource allocation, fostering cultural sensitivity, and challenging residents to work in different health care systems.^{7,9} Even beyond the immediate benefit of clinical skills and service, residents who have participated in global health electives are more likely in the future to serve underserved or multicultural communities, work overseas, pursue public health careers, and perform community service.¹⁰

A survey of pediatric residency programs conducted in 1995–1996 revealed that the educational structure of international health electives was often inadequate. In 1999, the American Academy of Pediatrics (AAP) Section on International Child Health developed consensus guidelines for international child health electives during residency training.⁸ These guidelines stress 4 principles for a meaningful international experience: (1) prerequisite clinical training; (2) adequate pretravel orientation and preparation; (3) preceptorship by host and US faculty; and (4) formal posttravel evaluation and feedback. These criteria were developed with the goal of optimizing the experience for both the resident and host institution.

To determine the current scope and content of training opportunities for pediatric residents in global health, we conducted a cross-sectional survey among all pediatric residency programs accredited by the Accreditation Council for Graduate Medical Education (ACGME). Our primary objective was to identify and describe current resident interest, participation, curricula, resources, and obstacles related to global health training. We also examined factors associated with resident participation in a global health elective.

METHODS

Participants

All 201 ACGME accredited pediatric residency programs in the United States, Puerto Rico, and the Caribbean were invited to participate in this survey. An initial invitation was sent by e-mail to each residency director

and included a Web link to the online survey instrument. Reminder invitations were sent to nonrespondents via e-mail, followed by postcards and, finally, follow-up telephone calls.

Instrument

The online survey consisted of 24 primarily closed-response questions that assessed resident interest in global health, available global health opportunities, number of residents who recently participated in global health electives, presence of a formal global health track, curricular content, support provided for participating residents, faculty involvement in global health, and amount of call-free elective time available to residents. A global health elective was defined as participation in health care delivery or clinical research in a developing country or resource-limited setting abroad. For certain questions, such as those related to patient demographics (eg, proportion of total patient population that was uninsured, Medicaid recipients, or immigrants/refugees), closed-response answer choices in the form of quintile categories were provided to decrease respondent burden.

Analysis

Survey responses were analyzed by using descriptive and inferential analyses. Characteristics of pediatric residency programs were described by using percentages for categorical variables, means/SDs for normally distributed continuous data, and medians/ranges for nonnormally distributed continuous and discrete variables. Global health interest and opportunities in pediatric residency programs were described by using similar methods.

χ^2 analysis and Fisher's exact tests (for small cell counts) were used to examine which residency characteristics were associated with resident participation in a global health elective within the previous 12 months. Because the majority of variables were categorical, several of the ordinal variables (eg, size of residency program, number of international medical graduates) were transformed to categorical variables to facilitate clear data presentation. Distributions of these variables were examined and used to transform the variables and, in most cases, the median value was used to create a dichotomous variable because of limited variability and nonnormal distributions.

All analyses were performed by using SAS 9.1 for Windows (SAS Institute, Inc, Cary, NC). This study was approved by the Boston University Medical Center Institutional Review Board.

RESULTS

Characteristics of Responding Programs

Of the 201 accredited pediatric residency programs invited to participate in the survey, 106 (53%) programs responded. Participating programs ranged in size from 11 to 132 (median: 40) total residents. Eighty-one percent of the programs identified themselves as categorical, whereas 27% characterized themselves as primary care. Responding programs were chiefly urban (90%) and

TABLE 1 Current Global Health Interest, Participation, and Training Opportunities Among 106 Pediatric Residency Programs

Resident interest in global health, <i>n/N</i> (%)	
Programs in which majority (>50%) of residents have considerable interest	11/98 (11)
Programs in which majority of residents have at least minimal interest	15/98 (15)
Resident participation in global health, <i>n/N</i> (%)	
Programs in which majority of residents participated in global health experience before residency	24/94 (26)
Programs with resident participation in global health elective in previous 12 mo	55/106 (52)
Prevalence among programs of global health training opportunities, <i>n/N</i> (%)	
Global health electives	55/106 (52)
Formal training curriculum	50/106 (47)
Global health lectures	43/106 (41)
Global health case reports	40/106 (38)
Global health readings or independent study	25/106 (24)
Global health journal club	9/106 (8)
Formal global health track	6/100 (6)
Prevalence among programs of global health topics, <i>n/N</i> (%)	
HIV/AIDS	58/106 (55)
Cultural awareness	58/106 (55)
Tuberculosis	55/106 (52)
Parasitic diseases	45/106 (42)
Malnutrition and micronutrient deficiencies	44/106 (42)
Travel medicine	43/106 (41)
Malaria	40/106 (38)
Human rights	25/106 (24)
Population-based interventions	23/106 (22)
Health system development and management	19/106 (18)
Complex humanitarian emergencies	17/106 (16)
Residents per program participating in global health electives in previous 12 mo	
PGY1 (intern year), median (IQR), <i>n</i>	0 (0–0)
PGY2 (junior year), median (IQR), <i>n</i>	1 (0–2)
PGY3 (senior year), median (IQR), <i>n</i>	2 (0–4)
Total No. of residents participating per program, median (IQR)	3 (1–7)
Residents participating per program, median (IQR), %	7.4 (1.7–12.3)

most frequently associated with a university hospital (58%) or university-affiliated community hospital (39%). Medicaid recipients comprised a majority (>50%) of the patient population for 78% of programs. Fifteen percent of respondents reported that a majority of their patients were immigrants, defined as individuals who themselves have moved to the United States from another country. Twenty-two percent of the programs reported having no uninsured patients.

Resident Interest and Participation in Global Health Electives

Fifteen percent of residency programs reported that a majority of their residents were interested in global health (Table 1). Eleven percent stated that a majority of their residents had “considerable interest,” defined as having significant international experience and planning a career with a focus in global health. Furthermore, 26% of the programs reported that at least half of their residents had participated in a global health experience before the start of residency. Fifty-two percent of responding programs had at least 1 resident participate in a

global health elective within the previous 12 months. The median number of residents participating in a global health elective per residency program was none during postgraduate year 1 (PGY1) (interquartile range [IQR]: 0–0), 1 during PGY2 (IQR: 0–2), and 1 during PGY3 (IQR: 0–4), for a median total of 3 residents per program for all 3 years of residency (IQR: 1–7). In the past year, the median percentage of residents per program participating in a global health elective was 7.4% (IQR: 1.7%–12.3%).

Training Opportunities Offered by Residency Programs

Fifty-two percent of pediatric residency programs offered a global health elective (Table 1). Nearly half of the programs had formally incorporated global health into their training curricula, for which didactic lectures (47%) and case reports (41%) were the most common formats for presentation. A majority of programs covered HIV/AIDS, cultural awareness, and tuberculosis in their curricula. Fewer programs reported providing training in public health topics such as human rights, population-based interventions, health system management, and humanitarian emergencies. A small number of pediatric residencies (*n* = 6 [6%]) offered formalized programs in global health, including either a global health track or certificate program. However, an additional 7 (7%) programs reported plans to implement a global health track or certificate within the next 2 years.

Of the 74 programs with residents who have had a global health experience during the previous year of residency, 36% provided prerequisite clinical training (eg, lectures or rotations on disease management in resource-limited settings), as recommended in the AAP consensus guidelines. With regard to other AAP recommendations, predeparture preparation was offered in the form of pretravel vaccinations and medical consultations (78%), pretravel briefing (55%), medical evacuation insurance (50%), cultural orientation (36%), and language training (15%). Eighty-two percent of the programs provided faculty mentorship. Lastly, 77% held resident debriefing sessions after the global health experience.

Potential Barriers to Resident Participation in Global Health

The median amount of call-free elective time provided during the first, second, and third year of residency was 1 week (IQR: 0–4), 4 weeks (IQR: 1–6), and 4 weeks (IQR: 2–8), respectively. Furthermore, only 14% of the programs reported that a majority of their residents’ global health electives were fully funded. Some degree of funding was offered by 42% of residency programs with global health electives.

Factors Associated With Resident Participation in Global Health

Characteristics of pediatric residency programs that were found to be significantly associated with resident participation in a global health elective were larger size of residency program (>60 total residents) (*P* = .01), university/academic setting (*P* < .0001), greater reported

TABLE 2 Factors Associated With Pediatric Resident Participation in a Global Health Elective in the Previous Year

	Resident Participation in a Global Health Elective		<i>P</i> ^a
	Yes, n/N (%)	No, n/N (%)	
Size of residency program			.01 ^b
Small (<30 residents)	14/75 (19)	11/24 (46)	
Medium (30–60 residents)	37/75 (49)	11/24 (46)	
Large (>60 residents)	24/75 (32)	2/24 (8)	
Residency type ^c			
Categorical	65/75 (87)	19/24 (79)	.51
Primary care	20/75 (27)	9/24 (38)	.31
Residency location ^c			
Urban	72/75 (96)	22/24 (92)	.59
Rural	8/75 (11)	3/24 (13)	.73
Type of hospital ^c			
Community hospital	7/75 (9)	12/24 (50)	<.0001 ^b
University hospital	54/75 (72)	4/24 (17)	<.0001 ^b
University-affiliated community hospital	28/75 (37)	11/24 (46)	.46
Military hospital	4/75 (5)	1/24 (4)	.99
Patient population			
Majority uninsured	3/75 (4)	2/23 (9)	.41
Majority insured by Medicaid	56/75 (75)	20/23 (87)	.76
Majority immigrant/refugee	12/75 (16)	3/23 (13)	.09
Weeks of call-free electives			
>1 wk during PGY1 (intern year)	33/75 (44)	7/24 (29)	.20
>4 wk during PGY2 (junior year)	21/75 (28)	3/24 (13)	.17
>4 wk during PGY3 (senior year)	27/75 (36)	6/24 (25)	.32
International medical graduates, >3 international medical graduates	27/75 (36)	17/24 (71)	.003 ^b
Resident interest in global health			
Majority have considerable interest	11/75 (15)	0/23 (0)	.02 ^b
Majority have minor/moderate interest	4/75 (5)	0/23 (0)	.004 ^b
Majority have no interest	16/75 (21)	15/23 (65)	.0003 ^b
Resident participation in a global health experience before residency, majority of residents participated	15/72 (21)	9/22 (41)	.0003 ^b
Formal global health track present	35/75 (47)	15/24 (63)	.18
Faculty involved in global health activities			
>2 faculty members involved in global health research	36/67 (54)	3/21 (14)	.01 ^b
>2 faculty members involved in global health clinical care	53/72 (74)	8/22 (36)	.02 ^b
>2 faculty members involved in global health consulting	45/68 (66)	6/21 (29)	.008 ^b
>2 faculty members involved in global health policy	23/70 (33)	1/19 (5)	.006 ^b

^a χ^2 analysis was used to examine associations, except in the case of small cell counts, for which the more conservative Fisher's exact test was used.

^b Statistically significant ($P < .05$).

^c Percentages sum to >100% because the categories are not mutually exclusive.

resident interest in global health ($P \leq .02$), and increased faculty involvement in global health activities ($P \leq .01$) (Table 2). Residency type, program setting, vulnerable patient populations, call-free elective time, and the presence of a formal global health track were not significantly associated with resident participation.

DISCUSSION

This study supports the argument of increasing interest and participation in global health among pediatric resi-

dency programs over the last decade. Fifty-two percent of responding programs reported that a resident had participated in a global health elective within the previous year. An additional 4% of programs anticipated implementing global health electives into their pediatric residency program within the next 2 years. In comparison, a survey completed by the AAP in 1996 revealed that only 1 of 4 residency programs offered a global health elective.⁸

In the setting of growing interest of pediatric trainees in global health, there seems to be an imbalance between the level of resident interest and the amount of global health opportunities and support available to residents. One of 4 residency programs reported that a majority of their residents had participated in an international health elective before residency, and 11% of the programs indicated that a majority of their residents had "considerable interest" in global health, such that these residents had significant international experience and were planning a career with a focus in global health. Although approximately half of pediatric residency programs now provide global health electives and incorporate global health into their curriculum, only 6 programs (6%) currently offer a formalized global health track. Moreover, lack of funding may be a barrier to residents pursuing interests in global health, given that the majority of electives are not financially supported by residency programs and are, therefore, the financial responsibility of the individual residents. Within only 14% of programs with global health electives was full funding available to a majority of participating residents. Limited call-free elective time may also restrict opportunities for pediatric residents to travel abroad and may diminish any initial resident interest. The median amount of call-free elective time for second- and third-year residents was 4 weeks each year, which is the minimum length recommended by the AAP for an international elective.⁸ For residents to participate in an elective abroad, they may currently find themselves sacrificing limited vacation time to maximize their experience. Nevertheless, the relationship in this study between call-free elective time and resident participation in global health electives was not of statistical significance.

The 1999 AAP consensus guidelines for global health electives proposed 4 key elements for a successful resident experience: prerequisites, preparation, preceptorship, and evaluation. Prerequisites and preparation are meant to prepare residents for a global health experience in which they are likely to be exposed to differences in culture, language, resources, medical conditions, and clinical care standards and protocols. Mentorship provides essential resident guidance and instruction and should be available both domestically and in-country. Evaluation assists the host and sponsoring institutions in determining whether they have achieved their goals in quality medical education and medical care.

Many of the residency programs with global health electives observed elements of these 4 principles promoted by the AAP consensus guidelines. A large majority of the programs facilitated resident participation in global health electives through faculty preceptorship and

TABLE 3 Select Resources for Training Pediatric Residents in Global Health

Web sites

- Global Health Education Consortium (www.globalhealth-ec.org; includes an annotated list of useful resources)
AAP (www.aap.org) and its Section on International Child Health (www.aap.org/sections/ich)
Disease Control Priorities Project (www.dcp2.org)
Medact: "Global Health Studies: Proposals for Medical and Nursing Undergraduate Teaching" (www.medact.org/pub_curriculum.php)
Centers for Disease Control and Prevention (wwwn.cdc.gov/travel/default.aspx)
United Nations Children's Fund (www.unicef.org; including their annual report, *State of the World's Children*)

Articles

- "Child Survival Series." *The Lancet*. June and July 2003, volumes 361–362 (www.thelancet.com)
"Neonatal Survival Series." *The Lancet*. March 2005, volume 365 (www.thelancet.com)
"International Child Development Series." *The Lancet*. January 2007, volume 369 (www.thelancet.com)

Reference materials

- World Health Organization. *Pocket Book of Hospital Care for Children: Guidelines for the Management of Common Illnesses With Limited Resources*. Geneva, Switzerland: World Health Organization; 2005
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Werner D, Thuman C, Maxwell J. *Where There Is No Doctor: A Village Health Care Handbook*. Berkeley, CA: Hesperian Foundation; 1992
Médecins Sans Frontières (Doctors Without Borders) reference books (www.refbooks.msf.org)
World Health Organization and United Nations Children's Fund. *Integrated Management of Childhood Illness (IMCI)* (www.who.int/child_adolescent_health/topics/prevention_care/child/imci/en)
African Medical and Research Foundation. *Child Health and Clinical Management for Health Centres and Dispensaries* (www.amref.org/index.asp?PageID=28)
Baylor International Pediatric AIDS Initiative. *HIV Curriculum for the Health Professional* (<http://bayloraids.org/curriculum>)
International Center for AIDS Care and Treatment Programs, Columbia University Mailman School of Public Health. *The Columbia Clinical Manual: Care and Treatment of HIV/AIDS in Resource-Limited Settings* (www.columbia-icap.org/resources/supporttools/files/clinicalmanual/clinical_manual.pdf)

posttravel debriefing. However, additional efforts can be made in preparing residents for working in resource-limited settings; prerequisite clinical training was provided by only 36% of the residency programs with global health electives, whereas pretravel briefing was offered by 55% of them. Improved predeparture preparation could include specific clinical knowledge for the region of work, fundamental language skills, personal safety, and cultural orientation. Medical and evacuation insurance was offered by only half of the programs and may be a relatively straightforward means of helping protect personal safety. Furthermore, ensuring the quality and adequacy of host-institution mentorship should be a program priority.

We identified certain characteristics of residency programs that may facilitate greater resident participation in global health activities. Larger residency programs (>60 residents), university/academic residency programs, programs with greater report of resident interest in global health, and programs with more full-time faculty involved in global health activities were each independently associated with a greater number of residents being involved in global health electives. Explanations for these findings may include increased scheduling flexibility within larger residency programs, which more easily allows residents to participate in rotations abroad during residency training. In addition, mentorship and camaraderie among residents and faculty interested in global health likely lend themselves to a supportive environment that encourages global health as a viable career pursuit.

As residency programs further develop global health training opportunities, attempts should be made to address potential obstacles to resident participation. More flexible scheduling may be necessary to increase call-free elective time and, thus, provide sufficient opportunity

for resident work abroad. Programs should also consider developing specific clinical sites for their residents by cultivating long-term relationships with partnering institutions in developing countries. Such a pediatric global health site should provide a mutually beneficial experience for both host institution and visiting residents. A domestically based component of global health training may include structured teaching, mentoring, and, if possible, delivery of care to local international populations such as refugees and new immigrants. Table 3 includes a list of select articles, Web sites, and reference materials that pediatric residency programs may find helpful in the further development of global health training opportunities for their residents.

There exist limitations to our study. First, our survey response rate included only 53% of accredited pediatric residency programs. However, this response rate is comparable to typical values for mail surveys^{11,12} and twice the usual response rate of 25% for electronic surveys.^{13,14} Furthermore, the demographic diversity of our respondents helps mitigate significant concern for selection bias. Second, a selection bias may have resulted had programs with greater involvement in global health been more likely to respond to the survey. A final limitation stems from the inherent difficulty imposed on residency directors to accurately characterize resident interest levels and global health opportunities available within their program. Therefore, residency directors were invited, if they preferred, to select a designee (who may be more directly involved in global health training) to complete the survey questionnaire on behalf of the program.

CONCLUSIONS

Fifty-two percent of pediatric residency programs in our study reported offering a global health elective. A survey

conducted by the AAP in 1996 revealed that 25% of programs had an elective. Pediatric residency programs are beginning to incorporate global health into their formal curricula and conferences; however, few pediatric residency programs offer a formal global health track integrated into residency training. Factors that were associated in our study with greater resident participation in global health were large pediatric residency programs, university/academic settings, and full-time faculty involved in global health. Despite the AAP consensus guidelines for global health electives, resident preparation and mentorship still vary widely between programs, and increasing efforts may focus on ensuring adequate resident preparation and support.

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IN UNITED STATES, MORE MOTHERS NOW BREASTFEED

"Atlanta—More than three out of four new mothers breastfeed their infants, the highest rate in the United States in at least 20 years, according to a government report. About 77% of new mothers breastfeed, at least briefly, up from 60% in 1993–1994, the Centers for Disease Control and Prevention said. 'It looks like it is an all-time high,' based on CDC surveys since the mid-1980s, said Jeff Lancashire, a CDC spokesman. Experts attributed the rise to education campaigns that emphasize that breast milk is better than formula at protecting babies against disease and childhood obesity. A changing culture that accommodates nursing mothers may also be a factor. The percentage of black infants who were breastfed rose most dramatically, to 65%. Only 36% were ever breastfed in 1993–1994, the study found. For whites, the figure rose to 79%, from 62%. For Mexican-Americans, it increased to 80%, from 67%."

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