

An International Health Track Is Associated With Care for Underserved US Populations in Subsequent Clinical Practice

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Abstract

Background Recent efforts to increase insurance coverage have revealed limits in primary care capacity, in part due to physician maldistribution. Of interest to policymakers and educators is the impact of nontraditional curricula, including global health education, on eventual physician location. We sought to measure the association between graduate medical education in global health and subsequent care of the underserved in the United States.

Methods In 2005, we surveyed 137 graduates of a family medicine program with one of the country's longest-running international health tracks (IHTs). We compared graduates of the IHT, those in the traditional residency track, and graduates prior to IHT implementation, assessing the anticipated and actual involvement in care of rural and other underserved populations, physician characteristics, and practice location and practice population.

Results IHT participants were more likely to practice abroad and care for the underserved in the United States in the first 5 years following residency than non-IHT peers. Their current practices were more likely to be in underserved settings and they had higher percentages of uninsured and non-English-speaking patients. Comparisons between pre-IHT and post-IHT inception showed that in the first 5 years following residency, post-IHT graduates were more likely to care for the underserved and practice in rural areas and were likely to offer volunteer community health care services but were not more likely to practice abroad or to be in an academic practice.

Conclusions Presence of an IHT was associated with increased care of underserved populations. After the institution of an IHT track, this association was seen among IHT participants and nonparticipants and was not associated with increased long-term service abroad.

Editor's Note: The online version of this article contains the survey instrument used in this study.

Introduction

One of the lessons from the universal insurance mandate in Massachusetts is the need to address primary care infrastructure.¹ Nearly 75% of US counties are health professional shortage areas and/or medically underserved areas. Geographic deficits and primary to specialty care ratio imbalances will not be successfully addressed by medical school expansion without curricular and policy changes that promote equitable workforce distribution.^{2,3} A recent Cochrane review found little evidence that existing educational, financial, and regulatory strategies were effective.⁴

At the same time, some evidence supports the impact of strategies that include targeted recruitment of rural-born individuals, individuals from underrepresented minorities, and those with primary care exposure on primary care specialty choice and underserved practice location.^{5,6}

As health care reform measures may double the capacity of federally qualified health centers (FQHCs) for the second time in a decade, the absence of sufficient primary care physicians working in underserved areas is glaring.⁷⁻⁹ Funding of medical education expansion lacks targeted approaches to changing

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BOX SURVEY COMPONENTSPhysician demographics

Gender
 Ethnic background
 State/country of birth
 Medical school attended
 Year of graduation from UCFM
 Involvement in IHT

Practice characteristics
 Current practice setting
 Current patient population traits
 Current volunteerism

Knowledge and attitudes
 Factors in choosing UCFM
 Longitudinal attitudes and actions
 International health knowledge

Abbreviations: IHT, international health track; UCFM, University of Cincinnati Family Medicine Residency Program.

Refer to online supplementary material for survey instrument.

for an underserved population, practice in a community health care center including the Indian Health Service, nonprofit clinics, missionary clinics, or practice at an FQHC) and demographic information were developed by the research team (BOX). The instrument was refined after field testing on 5 individuals who graduated from the residency program in years not included in our study and is available as an online supplement.

Three options for completion were offered: Web-based, mailed, and telephone interview. The same instrument was used for all 3 options, and each required 10 to 20 minutes to complete. No incentives were offered to encourage participation.

This study was granted exempt status by the Institutional Review Board of the University of Cincinnati Medical Center.

Analysis

Descriptive data analysis, including measures of central tendency, frequencies, cross-tabulations, and correlations was conducted. Group comparisons were performed using χ^2 and Mann-Whitney *U* tests.

Future practice plans (prior to residency graduation) and actual practice behaviors (during the 5 years following graduation) were compared for IHT versus non-IHT and pre-IHT versus post-IHT graduates. Comparisons of the current practice characteristics at the time the survey was completed were made between these same subgroups, plus pre-IHT versus IHT and pre-IHT versus non-IHT.

Results

Eighty-nine graduates participated in the study, yielding a 65% response rate (TABLE 1).

IHT Compared With Non-IHT

In their first 5 years postresidency, IHT participants were more likely to practice abroad and care for the underserved in the United States than their non-IHT peers (TABLE 2). Differences in practice settings were consistent with differences between the groups in career goals reported in medical school and residency. Although a difference remained between the IHT and non-IHT groups in both areas during their progression from medical school to early practice, the degree of significance diminished as time progressed. There was no difference between groups in the percentage entering rural practice.

IHT graduates were more likely to provide care for the underserved and had a higher percentage of uninsured patients and non-English-speaking patients than their non-IHT peers. There was no difference between IHT (47%, *n* = 16) and non-IHT (43%, *n* = 15) participants in the percentage offering community service in a health care setting outside of their primary office, and there was no difference with respect to the proportion or extent of involvement in volunteer activities (TABLE 3).

the distribution of the workforce toward underserved areas.¹⁰ This results in a need to identify and implement educational interventions that can affect the proportion of the workforce caring for underserved populations.

In 1994, The University of Cincinnati Family Medicine Residency Program initiated an international health track (IHT) to meet residents' demand for global health training. The basic structure consists of 3 components: (1) international health didactics, (2) clinical and public health experiences in developing nations, and (3) travel medicine training.

A survey of graduates was undertaken to determine if there was an association between participating in the IHT and caring for underserved populations in the United States. We investigated whether IHT graduates were more likely to care for underserved populations compared with nonparticipants (non-IHT) and whether all graduates following inception of the IHT (post-IHT), regardless of individual participation in the IHT, were more likely to enter practices caring for the underserved than graduates prior to its inception (pre-IHT). The study was conducted as part of a survey that also investigated 2 other questions: (1) changes in skills, knowledge, and attitudes regarding international health and (2) the effectiveness of the IHT as a recruitment tool for University of Cincinnati Family Medicine Residency Program (published elsewhere).¹¹

Methods

Participants

The study population included graduates between 1989 and 2003 (*N* = 137). Subpopulations included IHT graduates (*N* = 43), non-IHT graduates (*N* = 52), and graduates during the 5 years prior to IHT implementation (*N* = 45).

Survey

Knowledge and attitude questions on the survey were adapted, with permission, from previous surveys of IHT graduates at Duke University and Yale University.^{12,13} Other questions, including practice descriptions (practice caring

TABLE 1		DEMOGRAPHIC DATA ON SURVEY RESPONDERS ^a					
		Pre-IHT Graduates Responding n = 20 (44%)		Post-IHT Graduates Responding n = 69 (73%)			
				Non-IHT Participants n = 35 (67%)		IHT Participants n = 34 (79%)	
Mean age, years (SD)		38	(7.3)	37	(5.9)	36	(6.1)
Sex, n (%)	Male	9	(45)	16	(45.7)	13	(38.2)
	Female	11	(55)	19	(54.3)	21	(61.8)
Race, n (%)	Asian/Pacific Islander	1	(0.5)	4	(11.4)	3	(8.8)
	Hispanic	0	(0.0)	0	(0.0)	1	(2.9)
	Non-Hispanic black	1	(0.5)	1	(2.9)	2	(5.9)
	Non-Hispanic white	18	(90.0)	29	(82.9)	25	(73.5)
	Other	0	(0.0)	0	(0.0)	2	(5.9)
	Unknown	0	(0.0)	1	(2.9)	1	(2.9)

Abbreviation: IHT, international health track.

^a Percentages listed in the headings indicate the response rate within each subgroup; those listed in the tabular data indicate the percent of the respective subgroup in each demographic category. The demographic composition of all residency graduates remained constant between the pre-IHT and post-IHT study periods: 49% male, 51% female, 80% non-Hispanic white.

Pre-IHT Compared With Post-IHT

Compared with residents graduating prior to implementation of the IHT, post-IHT graduates were more likely to care for the underserved or practice in a rural area during their first 5 postgraduate years. There were no differences between the groups in interest or plans in these areas during medical school or residency (TABLE 4) or with respect to practice abroad.

Practice characteristics at the time of the survey (TABLE 3) indicated that post-IHT graduates were more likely to provide care for the underserved than their pre-IHT counterparts and also were more likely to be practicing in health professional shortage areas or medically underserved areas. There was no difference in the presence of a sliding fee scale between any of the practices. The subpopulations of graduates practicing in FQHCs were insufficient to provide adequate power for analyses.

Post-IHT residents (45%) were more likely than pre-IHTs (16%) to offer volunteer community health care services ($P < .0001$). There were no differences in the proportion or extent of involvement in volunteer activities overall (TABLE 3). Significantly more pre-IHTs pursued academic careers (25%, $n = 5$) than post-IHTs (10%, $n = 7$), $P < .004$, regardless of participation in the IHT.

Discussion

Recent health care reform has focused policymaker and academic attention on a looming shortage of physician supply. However, the debate has failed to address another persistent and central problem: a maldistribution of

physician workforce geographically and across specialties. The solution to this problem is more complex than producing more physicians or even pairing increased production with financial incentives that encourage better distribution. One policy solution entails fostering or developing social responsibility in residents that might prompt them to practice in the areas of significant need.¹⁴ Family physicians are more likely than other providers to serve in health professional shortage areas,¹⁵ and this might be further encouraged as defensible as a social good. Our findings add to a literature suggesting that the presence of a residency-based IHT should be considered among these means.

Our findings show that graduates of a residency with an IHT were more likely to provide care for the underserved. The effect was not limited to participants in the IHT but also included nonparticipants. This suggests that the presence of an IHT, beyond providing specific didactic and practical opportunities, could influence the professional, educational, and philosophical culture within the residency. How this affects non-IHT residents is uncertain, and our findings should not infer that an IHT changes their orientation and alters their ultimate career destination. Identifying the components responsible for potential program-wide impact of an IHT track is an intriguing avenue for further inquiry.

There may be other explanations for the differences after the implementation of the IHT track. It is conceivable that the priorities and philosophy of applicants in the late 1980s and early 1990s differed from that of later applicants.

TABLE 2 MEDICAL SERVICE CAREERS, NON-IHT VERSUS IHT PARTICIPANTS^a

Survey Items (Scale 1–5; Strongly Agree [1] to Strongly Disagree [5])		Non-IHT Participants N = 35 (50.7%)	IHT Participants N = 34 (49.3%)	P Value		
During medical school, I:						
a) Volunteered in community activities regularly	Median	3	(2–4)	2	(1–3.25)	.021
	Mean	2.97	–1.22	2.26	–1.38	
b) Planned to work extensively with underserved populations after graduating residency	Median	4	(2–5)	2	(1–3)	<.001
	Mean	3.57	–1.34	2.18	–1.27	
c) Planned to work regularly in developing nations after graduating residency	Median	5	(4–5)	2	(1–3.25)	<.001
	Mean	4.6	–0.78	2.41	–1.33	
d) Planned to work in a rural area after graduating residency	Median	4	(3–5)	4	(3–5)	.606
	Mean	3.77	–1.46	3.71	–1.24	
During residency, I:						
a) Volunteered in community activities regularly	Median	3	(2–4)	3	(2–4)	.772
	Mean	3.11	–1.23	3.03	–1.17	
b) Planned to work extensively with underserved populations after graduating residency	Median	4	(2–5)	2.5	(1–3)	.002
	Mean	3.49	–0.36	2.41	–0.37	
c) Planned to work regularly in developing nations after graduating residency	Median	5	(4–5)	2	(1–4)	<.001
	Mean	4.46	–0.98	2.53	–1.35	
d) Planned to work in a rural area after graduating residency	Median	5	(3–5)	3	(2–5)	.111
	Mean	3.91	–1.36	3.44	–1.31	
During the first 5 years after graduating residency, I:						
a) Volunteered in community activities regularly	Median	3	(2–4)	3	(2–4)	.305
	Mean	3.17	–1.25	2.85	–1.31	
b) Worked extensively with underserved populations after graduating residency	Median	3	(2–5)	2	(1–3.25)	.028
	Mean	3.17	–1.56	2.35	–1.48	
c) Worked regularly in developing nations after graduating residency	Median	5	(5–5)	4	(2–5)	<.001
	Mean	4.69	–0.99	3.5	–1.5	
d) Worked in a rural area after graduating residency	Median	5	(1–5)	4.4	(2–5)	.603
	Mean	3.38	–1.88	3.68	–1.55	

Abbreviation: IHT, international health track.

^a Median (intergroup range) and mean (SD) are shown. Response of 1 = strongly agree and 5 = strongly disagree. Significant between-group differences ($P < .05$) are shown in bold. N = 69.

We believe this is less likely, in light of the similarity of plans between the 2 groups during medical school and residency, followed by differences in practice after graduation (TABLE 4) and level of volunteerism in their current practices (TABLE 3). The presence of an IHT during residency was associated with an increased likelihood of providing service to underserved populations, regardless of the applicants' intentions prior to completion of residency.

Unexpectedly, though the IHT is associated with increased care of underserved populations, it was not associated with an increased likelihood of long-term service abroad (TABLE 4). There was a difference between IHT participants and non-IHTs in service abroad (TABLE 2), which may represent segregation of those with a global health interest into the IHT once it became available, rather than attracting a higher proportion of applicants with a

TABLE 3 PRACTICE LOCATION CHARACTERISTICS,^d PRACTICE POPULATION TRAITS, AND PHYSICIAN CHARACTERISTICS^{c,f}

	Providing Care to the Underserved, ^e % (n)	Mean Percent of Patients on Medicaid	Mean Percent of Patients Uninsured	Mean Percent of Patients Non-English-Speaking	Practicing in an HPSA/MUA, % (n)	Volunteerism	
						% (n)	(mean h)
IHT	59 (20)^a	21.6	20.8^a	18.4^a	24 (8)	35 (12)	7.8
Non-IHT	42 (15)	18.1	10.4	5.0	29 (10)	23 (8)	7.4
Pre-IHT	37 (7)	21.8	15.6	10.7	10 (2)	25 (5)	3.1
Post-IHT	50 (35)^b	19.8	15.3	12.4	26 (18)^b	29 (20)	7.6

Abbreviations: HPSA, health professions shortage area; IHT, international health track; MUA, medically underserved area.

^a $P < .05$ compared with non-IHT (χ^2 test).

^b $P < .05$ compared with pre-IHT (χ^2 test).

^c Bold indicates statistically significant differences.

^d Practice location characteristics, including primary and secondary (when applicable) practice locations.

^e *Underserved* is defined as a rural location, practice within a community health care center (including the Indian Health Service, nonprofit clinics, missionary clinics, etc), or practice at FQHCs.

^f Physician characteristics: percent of respondents involved in volunteer medical service activities and mean hours per month engaged in volunteer activities by those so involved.

global health interest. Although beneficial in promoting care of domestic underserved populations, this IHT did not appear to increase interest in foreign service. A common objection raised by critics of IHTs is that it is not appropriate to devote educational time and tax dollars to a program that benefits foreign populations rather than domestic constituencies. The evidence reported here suggests that this concern may be unfounded.

The finding that pre-IHT graduates were more likely to enter academic practice was not surprising. Most of those in academic family medicine gain practice experience prior to pursuing faculty positions¹⁶; a higher likelihood of an academic position would be expected of those whose graduation was remote than of graduates earlier in their career. Academic practice by itself is not defined as targeting the underserved, yet many academic primary care settings do provide care for these populations. It was interesting to note that in our survey data, 100% of the academic practices entered by IHT graduates were also FQHCs, while none of the academic practices among the pre-IHT group classified as FQHCs.

It is worth noting the trends from anticipated practice to actual practice (FIGURE). Among pre-IHTs, interest in serving foreign, rural, or underserved populations diminished between training and practice, while interest in practicing in rural and underserved communities increased among the non-IHT graduates after IHT implementation. IHT graduates exhibited constant levels of interest in rural and underserved communities, though their interest in international involvement decreased. The decreased interest in caring for underserved populations among pre-IHT graduates occurred despite an essentially unchanged involvement in regular volunteer activities. This loss of idealism in the course of medical education, which has been

documented previously,^{17–19} appeared to be inhibited—or perhaps even reversed—by the presence of the IHT.

Limitations of this study include the potential that persons interested in care for the underserved may have served these populations regardless of which residency they chose. Additionally, socially conscious individuals may select a residency with an IHT, regardless of personal participation in the track, because of perceived congruence of personal and program values. We investigated these possibilities by asking questions related to graduates' attitudes prior to residency, while in residency, and after graduation and found no differences in early anticipated career features yet there was significant difference in actual practice following completion of the residency once the IHT was in place. This should have reduced the impact of self-selection as an explanation for the differences.

Our study was subject to recall bias. The dependence on self-reporting introduced some degree of subjectivity into the data. This may have made it more likely for individuals with an interest in the IHT to complete the survey.

Although the survey instrument was drafted using a number of sources, its psychometric properties have not been externally validated. We consulted with experienced survey authors to attempt to make our instrument as usable and informative as possible.

International health training is incorporated into many medical school curricula and residencies.^{20–25} Medical student interest in international rotations is increasing. The percentage of graduating medical students who had participated in international rotations was 27.2% in 2006, up from 15.3% in 1989 and 6.2% in 1984.²⁰ Although family medicine residency programs have seen a sharp decline in applications in recent years, interest in IHT at

TABLE 4 MEDICAL SERVICE CAREERS, PRE-IHT VERSUS POST-IHT^a

Survey Items (Scale 1–5, Strongly Agree [1] to Strongly Disagree [5])		Pre-IHT Residents N = 20 (22.5%)		Post-IHT Residents N = 69 (77.5%)		P Value
During medical school, I:						
a) Volunteered in community activities regularly	Median	3	(1.25–4)	3	(1–4)	.552
	Mean	2.85	–1.46	2.26	–1.34	
b) Planned to work extensively with underserved populations after graduating residency	Median	3	(2–5)	3	(1.5–4)	.485
	Mean	3.15	–1.6	2.88	–1.47	
c) Planned to work regularly in developing nations after graduating residency	Median	4.5	(3.25–5)	4	(2–5)	.363
	Mean	3.9	–1.48	3.52	–1.54	
d) Planned to work in a rural area after graduating residency	Median	3.5	(1–5)	4	(3–5)	.267
	Mean	3.2	–1.77	3.74	–1.32	
During residency, I:						
a) Volunteered in community activities regularly	Median	4	(2–5)	3	(2–4)	.36
	Mean	3.35	–1.6	3.07	–1.19	
b) Planned to work extensively with underserved populations after graduating residency	Median	3.5	(2–5)	3	(2–4)	.235
	Mean	3.4	–1.5	2.96	–1.46	
c) Planned to work regularly in developing nations after graduating residency	Median	4	(3–5)	4	(2–5)	.432
	Mean	3.85	–1.39	3.51	–1.52	
d) Planned to work in a rural area after graduating residency	Median	4	(2–5)	4	(3–5)	.718
	Mean	3.5	–1.61	3.68	–1.35	
During the first 5 years after graduating residency, I:						
a) Volunteered in community activities regularly	Median	2.5	(1.25–4)	3	(2–4)	.418
	Mean	2.75	–1.45	3.01	–1.28	
b) Worked extensively with underserved populations after graduating residency	Median	3.5	(3–5)	2	(1–4)	.049
	Mean	3.55	–1.4	2.77	–1.56	
c) Worked regularly in developing nations after graduating residency	Median	5	(4.25–5)	5	(3–5)	.346
	Mean	4.4	–1.23	4.1	–1.4	
d) Worked in a rural area after graduating residency	Median	5	(5–5)	5	(1.25–5)	.029
	Mean	4.4	–1.35	3.53	–1.71	

Abbreviation: IHT, international health track.

^a Median (intergroup range) and mean (SD) are shown. Response of 1 = strongly agree and 5 = strongly disagree. Significant between-group differences ($P < .05$) are shown in bold. Overall N = 89, 20 Pre-IHT, 69 Post-IHT.

these residencies has increased,¹¹ and the availability of IHT experiences has been successfully used in recruiting.

Despite this, few studies have assessed the effect of IHTs or international student electives,^{26–27} and there are few reports

that objectively qualify or quantify the outcomes of these programs. Although previous studies in internal medicine focused primarily upon attitudes and knowledge rather than practice outcomes,^{12,13} they offered some indirect evidence that

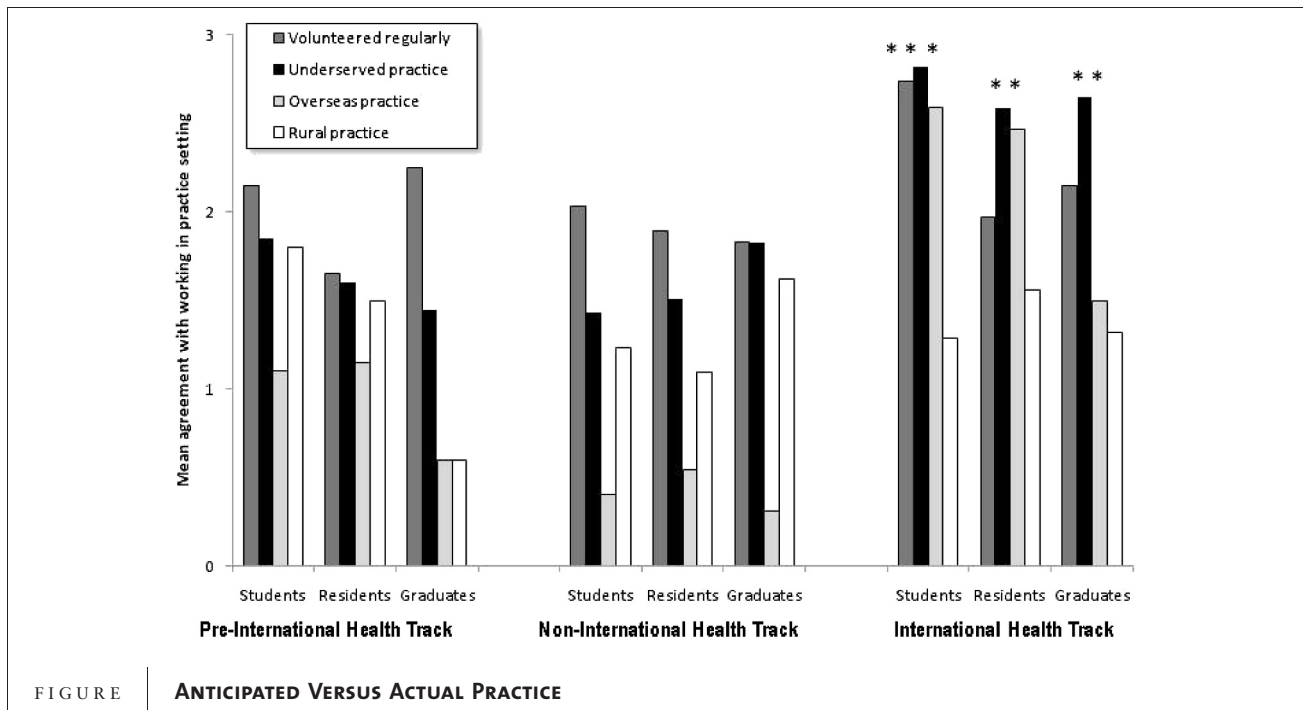


FIGURE | ANTICIPATED VERSUS ACTUAL PRACTICE

A comparison between medical school, residency, and practice. *Underserved, overseas, and rural* denote (1) envisioned future practice settings while in medical school and residency and (2) actual practice settings after graduation. "Mean agreement with working in practice setting" is derived as the inverse of survey responses so that higher numbers indicate a higher intent or realization of intent to work in the practice setting. * $P < .05$ compared with non-IHT graduates.

participants in these electives were more likely to enter practices that care for the underserved.¹³

Conclusions

We report here the first investigation to specifically quantify the effects of an IHT curriculum on ultimate practice outcomes. Our educational intervention was associated with a shift in primary care physician workforce toward underserved populations. This shift appeared to be independent of their original orientations. At a time when there are growing numbers of patients who cannot access the health care system, and a shortage of physicians willing to serve those patients, any interventions that increases the likelihood of medical providers entering a career of caring for these populations is valuable. More widespread implementation of IHT in residency training, with the goal of increasing the health care workforce among the underserved, may be warranted. Further investigations of the components of IHT responsible for the associations reported in our study and the transferability of our findings to other programs are indicated.

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