Evaluating the Teaching Health Center Graduate Medical Education Model at 10 Years: Practice-Based Outcomes and Opportunities

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ABSTRACT

Background Since 2011, the Teaching Health Center Graduate Medical Education (THC GME) program has sought to expand access to care by training residents in safety net settings.

Objective To examine impact on physician scope, location, and patient population served using a unique data set.

Methods Using 2017-2020 data from the American Board of Family Medicine National Graduate Survey, we compared demographics, practice location, populations served, and scope of practice between graduates of THC GME programs and graduates of other family medicine programs.

Results Our sample comprised 8608 (out of 13 465) eligible family medicine graduates 3 years after completion of residency training, for a response rate of 63.9%. THC graduates were significantly more likely than other graduates to practice in a rural location (17.9% to 11.8%), within 5 miles of their residency program (18.9% to 12.9%), and to care for medically underserved populations (35.2% to 18.6%). Their scope of practice was wider than other graduates and more likely to comprise services like buprenorphine prescribing, behavioral health care, and outpatient gynecological procedures. Regression results suggest that THC training is independently correlated with a broader scope of practice.

Conclusions Graduates of THC programs were significantly more likely than graduates of other programs to practice close to their training sites and in rural areas, and to care for underserved patients while maintaining a broader scope of practice than other graduates.

Introduction

The Affordable Care Act was passed in 2010 with a principle aim of expanding access to health care, in part responding to a primary care shortage that is projected to exceed 38 000 physicians by 2025.[1,2] The Affordable Care Act supported health care workforce expansion through initiatives such as the 2011 Teaching Health Center Graduate Medical Education (THC GME) program, which provides community-based primary care residency training anchored in Federally Qualified Health Centers (FQHCs), as opposed to the traditional hospital-based model of GME.[1,3,4] Ten years into the THC GME funding model, examining practice outcomes of THC program graduates provides useful context for future development of GME models and potential funding allocation guidance.

In addition to the growing shortage of primary care physicians, the uneven distribution of primary care further compromises access to services, with rural and underserved urban areas having the most severe shortages.[5] More than half of the THCs participating in THC GME are in medically underserved areas, defined by the Health Resources & Services Administration (HRSA) as areas or populations determined to have too few primary care professionals or areas with high infant mortality, a high elderly population, or high poverty with barriers to access to care.[6] Additionally, 70% are located in federally designated high-need areas, as such, THC GME programs provide a significant opportunity to expose physicians to these underserved areas and populations.[7] Previous studies suggest that family medicine graduates of THC programs are more likely to work in safety net clinics[5] and that more than half go on to practice within 100 miles of training,[8] meaning that training location has a large impact on workforce distribution. Furthermore, there is evidence that residents who train in safety net settings are more likely than others to practice in similar settings.[9,10] This suggests that THC GME programs might have a lasting impact on access to care for communities they serve, not only during training but afterward.[11] However, there has been little formal investigation of the practice patterns of THC GME graduates, including their geographic

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dispersion, practice characteristics, and scope of practice compared to graduates of other training models.

In 2020-2021, THC GME funded the training of 769 residents in 60 primary care residency programs across 25 states. Thirty-nine of the programs train residents in family medicine, and the remaining programs include internal medicine, obstetrics and gynecology, pediatrics, and psychiatry.[6] To date, THC GME has supported more than 1100 primary care clinicians.[12] While THC GME educates physicians across specialties, 65% of THC GME residency programs are family medicine training sites, making family medicine the discipline most characteristic of the THC model.[6] The broad nature of family medicine GME means that graduates are, by definition, trained to provide pediatric, obstetrical and gynecological, and some mental health care. For the purposes of our investigation, we compare THC GME graduates to other program graduates, where "other" describes programs funded through streams other than THC GME. The vast majority of these other programs are funded through the Centers for Medicare & Medicaid Services by way of Medicare allocation for direct graduate medical education and indirect medical education allotments.[13,14]

Using a detailed sample of early career family physicians who represent more than half of the overall THC GME trainees, this study seeks to specifically characterize THC graduates and compare them to peers who graduated from other residency programs. By investigating the practice scope, location, and patient population of these THC graduates compared to their peers who graduated from other programs, our analysis will inform THC GME program impact and considerations of continued support of the program.

Objectives
To investigate differences in practice outcomes of family medicine Teaching Health Center Graduate Medical Education (THC GME) graduates compared to their peers.

Findings
THC GME graduates were more likely to practice in rural or underserved areas and provide more clinical services than their peers.

Limitations
Family medicine represents only two-thirds of all THC GME training programs.

Bottom Line
Family medicine THC GME graduates are meeting the goals of the program by providing more services to underserved populations than their peers, which supports continued funding of this program.

Methods

We used 2017-2020 data from the American Board of Family Medicine (ABFM) National Graduate Survey, administered to family medicine graduates 3 years after residency.[15] Demographic data and residency training information were obtained from ABFM administrative databases and responses to an examination registration questionnaire. Authors were granted research access to these sources under contract with the ABFM. We used publicly available HRSA data to identify family medicine residency programs with matched Accreditation Council for Graduate Medical Education (ACGME) ID.[6]

Using ABFM demographic data at the diplomate level, we obtained the ACGME ID of the residency program a diplomate graduated from and the THC GME program list to create a THC GME indicator variable. With National Graduate Survey data, we determined self-reported practice setting. This was further described using geographic radius from the training program to the practice location (categorized as <5 miles, <50 miles, and <100 miles), rurality (defined by Rural-Urban Continuum Code [RUCC] >4), primary care Health Professional Shortage Area (partial/full), and medically underserved practice setting (FQHC or FQHC look-alike, Federally Qualified Rural Health Clinic, Indian Health Service site, or non-federal government clinic). The RUCC classification system measures the metro area population size of metro counties and the adjacency to metropolitan area and degree of urbanization of nonmetropolitan counties.[16] The RUCC and primary care HPSA designations were derived from county-level indicators based on geocoded practice location. We also used the Individual Scope of Practice (I-SOP) variable, derived from 22 individual survey questions representing elements of medical scope and scaled from 0 to 30 with a higher score representing a broader scope.[17]

We used 2-sided testing to investigate differences between THC graduates and other graduates on demographic variables including age (mean), gender (male/female), medical degree (MD/DO), international medical graduate (IMG) status (yes/no), race (Asian, Black, White, or Other), and ethnicity (Hispanic or Non-Hispanic). We analyzed differences in practice location, including distance from the training program, rurality, location in a primary care HPSA, and medically underserved practice setting. Finally, a bivariate analysis compared I-SOP score between our populations and looked at differences on specific elements of scope, including behavioral health care, buprenorphine provision, outpatient gynecological procedures, HIV/hepatitis C care, outpatient pediatric care, and obstetrical care and deliveries.

TABLE 1
Physician Demographics by Teaching Health Center (THC) Graduate Status

Demographic	THC Program Graduates (n=264), %	Other Program Graduates (n=8344), %	*P* Value
Mean age (SD)	36.36	35.71	.016
Gender			
Female	56.44	56.21	.94
Male	43.56	43.79	
Medical degree			
MD	82.58	80.84	.48
DO	17.42	19.16	
International medical graduate			
Yes	23.11	32.07	***.002***
No	76.89	67.93	
Race			
Asian	16.94	22.34	***.044***
Black or African American	4.84	7.35	.13
White	75.00	67.32	***.011***
Other	3.22	2.99	.83
Ethnicity			
Hispanic	8.87	8.37	.78
Non-Hispanic	91.13	91.63	

Note: *P* values in bold italics are statistically significant.

We investigated rates of procedure provision, as well as training received during residency in each of these areas.

Lastly, we created a multivariate linear regression model to measure association between the dependent variable, scope of practice (represented by the I-SOP score), and the independent variable of interest (THC graduate status). Covariates included gender, degree type (MD/DO), IMG status, rural practice location, race, ethnicity, and work in a medically underserved practice setting.

Statistical analysis was conducted using Stata 17 (StataCorp LLC, College Station, TX). This study was approved by the American Academy of Family Physicians Institutional Review Board.

Results

The final sample consisted of 8608 total respondents to the 2017-2020 National Graduate Survey (out of 13 465 eligible recent family medicine graduates, for a response rate of 63.9%), of which the percentage of respondents from THC programs increased from 2.8% to 3.3% between 2017 and 2020. THC program graduates notably differed from other graduates on some demographic characteristics, including slightly older age (36.36 to 35.71 years, *P*=.0162). There was no significant difference between THC graduates and other graduates in terms of gender composition or medical degree (MD vs DO); however, THC graduates were less likely to be IMGs (23.11% vs 32.07%, *P*=.021). There was also a statistically significant difference between the self-reported race of members of the 2 groups: THC graduates were less likely to be Asian (16.94% to 22.34%, *P*=.0438) and more likely to be White (75.00% to 67.32%, *P*=.011). Self-reported ethnicity did not significantly vary between the 2 groups (TABLE 1).

THC graduates were more likely than other graduates to remain within 5 miles of the training location 3 years after residency completion (18.94% to 12.88%, *P*=.004). Graduates of THC training programs were also more likely to practice in a designated rural area (RUCC $\geq$4) (17.86% to 11.83%, *P*=.004). There was no significant difference in rates of practice in a primary care HPSA. We did, however, find that THC graduates were nearly twice as likely (35.29% to 18.63%) to practice in any medically underserved setting, a discrepancy that appears to be driven largely by practice in the FQHC or FQHC look-alike setting, which was the primary practice location of 26.70% of THC graduates compared to 11.69% of other graduates ($P \leq .001$; TABLE 2).

We were also able to compare practice patterns between graduates of the THC program and other diplomates. Using the I-SOP scaled measure of practice scope, we found that there was a significant

TABLE 2
Physician Practice Location by Teaching Health Center (THC) Graduate Status

Primary Practice Location	THC Program Graduates, %	Other Program Graduates, %	*P* Value
Within geographic radius of training program			
100 miles	41.29	44.12	.36
50 miles	34.47	37.04	.39
5 miles	18.94	12.88	***.004***
Rural area (RUCC ≥4)	17.86	11.83	***.004***
Primary care Health Professional Shortage Area (HPSA)			
2017–complete	0	3.38	.15
Partial	96.55	92.09	.21
2018–complete	1.45	3.17	.42
Partial	92.88	95.65	.38
2019–complete	2.70	3.07	.86
Partial	95.95	93.51	.40
2020–complete	5.88	4.62	.67
Partial	100	93.52	.06
Medically underserved practice setting (MUPS)			
Any MUPS	35.29	18.63	<***.001***
FQHC or look-alike	26.70	11.69	<***.001***
Federally Qualified Rural Health Clinic	4.07	4.57	.73
Indian Health Service	1.81	0.99	.23
Non-federal government clinic	2.71	1.39	.10

Abbreviations: RUCC, Rural-Urban Continuum Code; FQHC, Federally Qualified Health Centers.
Note: *P* values in bold italics are statistically significant.

difference between the average scope of a THC graduate (17.22) and the average scope of a graduate of a non-THC program (16.06, $P \leq .001$). This was also reflected in individual scope components, where THC graduates were more likely to offer the following services: behavioral health care (92.19% to 86.89%, $P=.013$), buprenorphine prescribing (27.34% to 12.30%, $P \leq .001$), and outpatient gynecological procedures comprising endometrial biopsy, intrauterine device placement/removal, other long-acting reversible contraceptive placement, and colposcopy (64.06% to 50.24%, $P \leq .001$). THC graduates were also more likely to have trained in each of the practice components we measured, including behavioral health care, buprenorphine prescribing, outpatient gynecological procedures, as well as HIV/hepatitis C care (43.51% to 32.25%, $P=.0001$) and outpatient pediatrics (94.66% to 90.94%, $P=.038$). THC graduates were roughly twice as likely to report they were currently delivering babies (27.73% to 13.33%, $P \leq .001$), and indicated that they had undertaken more deliveries in residency training (TABLE 3).

In multivariate modeling using scope of practice (I-SOP) as the outcome of interest, THC graduate status was found to be correlated with higher scope score (coefficient 0.817, $P<.001$). Other covariates positively correlated with scope included MD degree, rural practice location, and underserved practice location. Covariates negatively related to scope included female gender, IMG status, self-identified Black, Asian, or Other race, and self-identified Hispanic ethnicity.

Discussion

In 2022, the Department of Health and Human Services announced plans to provide for a $19.2 million expansion of the THC GME program, representing roughly 120 additional full-time resident positions.[18] However, the reliance of THC funding on periodic federal reauthorization and appropriated funding may limit establishment of further training programs, so it is especially important to consider outcomes of the program's first 10 years.[19] Our results suggest that THC graduates practice in distinct policy-relevant ways compared to peers who did not train in THC settings, which has implications for patient access to primary care particularly in rural and otherwise medically underserved communities.

Graduates of THC programs may contribute to alleviating physician shortages in the most affected areas and expanding access to care to those patients in greatest need through a variety of distinctions in their

TABLE 3
Physician Practice Patterns by Teaching Health Center (THC) Graduate Status

Practice Patterns (Self-Reported)	THC Program Graduates, %	Other Program Graduates, %	*P* Value
Practices outpatient continuity care	83.33	81.05	.36
Scope of care (I-SOP score)	17.22	16.06	***<.001***
Behavioral health care–trained	91.98	87.47	***.029***
Behavioral health care–practicing	92.19	86.89	***.013***
Buprenorphine–trained	29.39	11.25	***<.001***
Buprenorphine–practicing	27.34	12.30	***<.001***
Outpatient gynecological procedures (endometrial biopsy, IUD insertion/removal, other LARC, colposcopy)–trained	96.95	90.22	***.0003***
Outpatient gynecological procedures–practicing	64.06	50.24	***<.001***
HIV/hepatitis C care–trained	43.51	32.25	***.0001***
HIV/Hepatitis C care–practicing	27.73	22.53	.050
Outpatient pediatric care–trained	94.66	90.94	***.038***
Outpatient pediatric care–practicing	80.08	76.29	.16
Obstetrical care			
Estimated deliveries in residency 1≤20 2=21-40 3=41-60 4=61-80 5=81-100 6≥100	4.30 categorical avg. Where 4=61-80 and 5=81-100	3.62 categorical avg. Where 3=41-60 and 4=61-80	***<.001***
Currently delivering babies	27.73	13.33	***<.001***

Abbreviations: I-SOP, Individual Scope of Practice; IUD, intrauterine device; LARC, long-acting reversible contraceptive.
Note: *P* values in bold italics are statistically significant.

training model and medical practice. In our population, they were 1.5 times as likely to practice in a rural area, twice as likely to practice in medically underserved settings, and more likely to practice within 5 miles of their training site (18.9% to 12.9% for other graduates). By comparison, earlier research studying physician practice location between 2000 and 2006 found that 19.1% remained within 5 miles of their training site, suggesting that overall location continuity may have decreased in the interim while remaining stable among THC graduates.[8] These findings together are particularly significant in terms of the long-term impact of THC graduate medical education programs, as the majority of THC GME sites are within federally designated underserved areas.[7]

Practice scope findings from our sample suggest that THC graduates are more likely to receive training in key health services, and more likely to continue providing these interventions in independent practice, caring for patients across the age spectrum and a wide variety of medical needs. Importantly, THC graduates in our sample were more likely to report that they had received training in every domain we investigated, including behavioral health, buprenorphine prescribing, outpatient gynecological procedures, HIV/hepatitis C care, and outpatient pediatrics. Their scope of training also translated into a larger average scope of practice than their peers who graduated from other programs. They were more likely to provide behavioral health care, buprenorphine prescribing, and outpatient gynecological procedures, and were around twice as likely to deliver babies as part of their routine practice. In addition, it is noted some THCs receive THC GME funding for only a few residents, and others receive funding for all residents.[6] Our study looked at all THC graduates and demonstrated the findings above, suggesting that receiving any degree of THC GME funding contributes to these findings. Based on our study, investment in the THC program may yield greater sustained benefit for patients in the local community, which is often a community of disproportionate need.[7]

However, it should also be noted that our study indicated that THC graduates differed from other graduates across several demographic measures that present cause for consideration. THC graduates are significantly less likely to be IMGs than their peers (23.11% to 32.07%), indicating that there is further opportunity for these programs to attract international graduates, perhaps by targeted recruitment. THC graduates are also more likely than their peers to be White (75.00% to 67.32%) and less likely to be

TABLE 4
Scope of Practice Linear Regression Results

Family Physicians (n=6521)	Coefficient	*P* Value
THC graduate status		
Yes	0.817	<***.001***
No	Ref	
Gender		
Female	-0.136	.042
Male	Ref	
Medical degree		
DO	Ref	
MD	0.159	.06
International medical graduate		
Yes	-0.878	<***.001***
No	Ref	
Race		
Asian	-1.04	<***.001***
Black or African American	-1.13	<***.001***
White	Ref	
Other	-0.222	.26
Ethnicity		
Hispanic	-0.657	<***.001***
Non-Hispanic	Ref	
Rural practice setting		
Yes	1.75	<***.001***
No	Ref	
Underserved practice setting		
Yes	0.824	<***.001***
No	Ref	

Abbreviation: THC, Teaching Health Center.
Note: *P* values in bold italics are statistically significant.

Asian (16.94% to 22.34%), suggesting that there may be specific structural barriers that influence a physician's decision to care for underserved populations. Given that clinician diversity is needed in health care delivery, this is a finding that merits further investigation. Studies indicate that patients from racial minority groups who share identity markers with their medical care team may benefit from better communication, enhanced trust, greater satisfaction, and less perception of systemic mistreatment.[20] For this and other reasons, it is crucial to prioritize opportunities for physicians from underrepresented minority backgrounds in THC training.

Although this study is well-positioned to address many questions regarding THC outcomes, several limitations should be considered. First, while family medicine programs make up 65% of all THC GME funded training sites, our study does not represent the remaining 35% of THC physician trainees, and there may be differences in demographics, practice type, and location between these and the family medicine graduates we studied. Furthermore, our sample comprises people who graduated residency between 2014 and 2017, where 2014 notably represents the first year the THC program produced graduates. However, there has been an increase in THC GME sites since 2017, which is not captured in the present data set but would be a relevant topic for future study. Finally, our practice pattern and scope of practice variables are limited by their self-reported nature.

Our findings suggest that THC GME programs produce physicians with broader scope of practice, who are more likely to remain near their residency training site and work with underserved patients. Future research could include outlining outcomes of all THC primary care specialties in addition to family medicine, determining the impact on health outcomes of communities served by THCs, as well as quantifying the economic impact of this program in improved management of chronic conditions and emergency department diversion. Suggested programmatic interventions include focusing on recruitment of physicians from underrepresented in medicine backgrounds to the THC GME program and applying specific elements of the THC model to other GME programs to increase patient access to primary care.

Conclusions

In this study, we used data on practice outcomes of early career family physicians who graduated from the THC program in the years directly following its inception and found benefits of the program in retaining graduates in local communities, training physicians who are more likely to provide care in underserved settings, and providing a wider variety of medical services to patients regardless of their age or specific medical needs.

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