Comparisons of Emergency Medicine Residency Programs in Their Inclusion of Allopathic and Osteopathic Graduates

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Abstract

Residents entering residency come from two lines of medical education, allopathic (MD) and osteopathic (DO). While schooling is nearly identical, there is a discrepancy between the specialties in which these graduates enter. In 2018, emergency medicine residency programs were made up of three-quarters allopathic graduates and one-quarter osteopathic graduates. This study sought to better understand the diversity of emergency medicine programs as it relates to their location, duration, and credentials of members.

Introduction

In the US, two systems of medical education exist: allopathic and osteopathic. Currently, the two residency programs have separate accrediting organizations - ACGME and AOA, respectively - but by 2020, all programs will be accredited by the ACGME. While a majority of DO students enter primary care specialties, there has been an increase of DO applicants to traditionally MD-laden specialties. This project sought to analyze the numbers of MD, DO, and international students into emergency medicine within the US.

Methods

Dara was gathered from 240 separate emergency medicine programs (226 ACGME and 14 AOA) during June-July 2018 using EMRA website. The numbers of resident graduates from MD, DO and international medical schools were counted, along with faculty and program director credentials. Data was analyzed using univariate and multivariable logistic regression, Wilcoxon rank sum to compare continuous variables, and Fisher's exact to compare categorical variables

Results

234 out of 240 programs were used for data analysis. 226 were ACGME-accredited and 14 were previously solely AOA-accredited. The median number of graduates from an osteopathic school was 4.

There was no statistical significance of the number of DO residents between 3-year and 4-year programs.

Programs were categorized into five regions: New England, Mid/South Atlantic, North Central, South Central, Mountain/Pacific/Territory. There were 14, 93, 64, 30, and 33 programs in each region respectively. New England was used as the reference range as it had the lowest percentage of DO residents. Only the North Central had more than the median of four DO residents (p=0.03). Logistic regression identified:

- For every 1 MD resident, 8% less likely to have 4 DOs.
- For every 1 MD faculty, 4% less likely to have 4 DOs.
- For every 1 DO faculty, 37% more likely to have 4 or more DOs.
- For every 1% increase of DO to MD faculty members, 8% increased likelihood of having 4 or more DO residents.
- If program director a DO, 32-fold increase in having 4 or more DO residents.

Positive predictive values:

- Having DO faculty.
- Higher percentage of DO faculty, specifically in 4-year programs.
- DO program director

Descriptive Stats

Variables	Overall	OR (95% CI)	P-value[1]
Region (n, %) (n=234)			
New England	14 (5.98)	REF	
Mid/South Atlantic	93 (39.7)	2.34 (0.69, 8.01)	0.17
East, West North Central	64 (27.4)	4.17 (1.17, 14.8)	0.03
East, West South Central	30 (12.8)	2.50 (0.64, 9.76)	0.19
Mountain, Pacific, Territory	33 (14.1)	1.42 (0.37, 5.56)	0.61
Program Length (n, %) (n=236)			
3	167 (70.8)	REF	
4	69 (29.2)	1.13 (0.65, 1.98)	0.67
Number of MD's (mean, SD) (n=219)	24.4 (18.6)	0.92 (0.91, 0.94)	<0.001
Number of DO's (mean, SD) (n=219)	8.04 (10.5)	N/A	
AOA Initial Accreditation (yes, %)	54 (22.8)	110.3 (14.8, 820.1)	<0.001
Number of International Residents (mean, SD) (n=219)	1.23 (3.58)	0.96 (0.89, 1.04)	0.43
Percent DO's (mean, SD) (n=219)	31.1 (38.1)	N/A	
Number of MD Faculty (mean, SD) (n=224)	24.8 (23.9)	0.94 (0.92, 0.96)	<0.001
Number of DO Faculty (mean, SD) (n=224)	3.59 (4.44)	1.37 (1.23, 1.54)	<0.001
Percent DO Faculty (mean, SD) (n=224)	21.8 (28.4)	1.08 (1.05, 1.12)	<0.001
DO Resident Directors (n, %) (n=234)	56 (23.9)	32.2 (9.68, 107.4)	<0.001

[1]Univariate Logistic regression with no adjustments.

Variables stratified by program length

	3-Year Programs N=167	4-Year Programs N=67	P-value[1]
Region (n, %) (n=234)			
New England	8 (4.85)	6 (8.82)	0.04
Mid/South Atlantic	70 (42.4)	23 (33.8)	
East, West North Central	45 (27.3)	18 (26.5)	
East, West South Central	25 (15.2)	5 (7.35)	
Mountain, Pacific, Territory	17 (10.3)	16 (23.5)	
Number of MD's (mean, SD) (n=219)	24.3 (15.1)	24.9 (25.1)	0.79
Number of DO's (mean, SD) (n=219)	6.34 (3.98)	12.0 (14.8)	0.07
AOA Initial Accreditation (yes, %)	20 (11.9)	33 (47.8)	<0.001
Number of International Residents (mean, SD) (n=219)	1.38 (3.98)	0.91 (2.42)	0.42
Percent DO's (mean, SD) (n=219)	23.6 (30.3)	0.47 (47.9)	0.05
Number of MD Faculty (mean, SD) (n=224)	23.3 (18.3)	28.7 (33.9)	0.44
Number of DO Faculty (mean, SD) (n=224)	3.11 (7.76)	4.69 (5.65)	0.12
Percent DO Faculty (mean, SD) (n=224)	17.3 (25.0)	31.5 (32.8)	0.03
DO Resident Directors (n, %) (n=234)	25 (15.2)	30 (44.1)	<0.001

[1]Wilcoxon Rank Sum to compare continuous variables while Fisher's Exact to compare categorical variables.

Logistic Regression Ascertaining the likelihood of > 4 DO residents within their respective EM residency programs

Variables	Overall		3-Year Programs		4-Year Programs	
	OR (95% CI)	P-value[1]	OR (95% CI)	P-value[1]	OR (95% CI)	P-value[1]
Number of DO Faculty	1.34 (1.15, 1.56)	<0.001	1.31 ()1.12, 1.53)	0.001		
Number of MD Faculty	0.96 (0.94, 0.98)	0.001	0.96 (0.93, 0.98)	0.004		
AOA Initial Accreditation	21.3 (2.60, 173.9)	0.004	N/A		449.5 (38.7, 5226.1)	<0.001
Area Under the Curve	0.86		0.79		0.95	

Multivariable Logistic Regression ascertaining the likelihood of having >4 DO residents following a backwards variable selection.

Discussion

While ACGME and AOA programs have recently merged into a common system, there is a gap in representation of MD and DO residents. Data collection highlighted a negative correlation between MD and DO residents, as the number of DOs dropped with every MD added. Based on 2016 and 2017 allopathic and osteopathic graduate numbers, one would expect to have a ratio of 1 osteopathic resident for every 3.27 to 3.50 allopathic residents. With an increase in DO faculty, more DO graduates were part of that respective residency program. The largest predictor of a high number of DO residents was having a DO program director. While these trends make logical sense, it highlights the importance of having solid representation of DO faculty and staff to the diversity of DO-graduate inclusion into residency programs.

Conclusions

There continues to be a wide discrepancy between the number of DO graduates accepted into emergency medicine programs versus the number of MD graduates. This bias has the potential to change, however, as the ACGME and AOA organizations have merged residency programs. While there are factors that seem to predict a higher number of DO residents, it seems to rely on the diversity of faculty and staff.

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