Increasing the Number of Integrated Vascular Residency Positions is Necessary to Address the Impending Shortage of Vascular Surgeons in the United States

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- No disclosures
Introduction

- With an aging population, and a longer life expectancy, the demand for vascular surgeons is predicated to dramatically increase.\(^1,2\)

- In 2003, it was predicted that 160 vascular surgeons would need to enter practice every year in order to avoid a critical shortage.\(^3\)

- By 2030, there is a predicated shortage of 399 vascular surgeons in the United States.\(^1\)

Introduction

- In March 2005, the ACGME approved the vascular surgery primary certificate and the first integrated vascular surgery residencies were approved shortly thereafter.

- 48 programs and 56 positions were offered in the 2015 match (for matriculation July 2016)

NRMP Historical Reports. http://www.nrmp.org/match-data/nrmp-historical-reports/
Despite initial concerns regarding this shortened training structure, studies have demonstrated equivalent case volumes and job opportunities for integrated vascular residents and vascular fellows at the completion of their training.

Primary Aim

- As integrated vascular surgery residency graduates have begun to enter the workforce, we sought to determine if the demand for integrated vascular residency position has reached its peak.

- Additionally, we sought to evaluate the changes in supply and demand for integrated vascular residency positions, changes in the quality of applicants, and the total number of vascular surgeons being trained per year.
The Association of American Medical Colleges (AAMC) was petitioned for data on applicants to integrated vascular surgery residencies (2008-2015) and vascular surgery fellowships (2007-2016).

Variables included:
- Total number of applicants
- Sex
- US medical graduate vs. Foreign medical graduate
- Applications per program
- Number of applicants per position
- Number of publications
- Alpha Omega Alpha (AOA) status
Methods

- Publically available match data from 2008 through 2015 were available on the National Resident Matching Program (NRMP) website.

- De-identified national average USMLE Step 1 and Step 2CK scores among applicants who have matched in their preferred specialty were obtained through the NRMP Charting Outcomes in the Match.

- All applications received through the Electronic Residency Application Service (ERAS) are processed for residency matriculation the following year (i.e. ERAS 2008 is processed for matriculation in 2009)

NRMP Historical Reports. http://www.nrmp.org/match-data/nrmp-historical-reports/
Methods

- All applications received at the University of Massachusetts Medical School Integrated Vascular Surgery Residency were reviewed from the 2009 through 2016 matriculation.

- All data was reviewed by two blinded abstractors (EA, DJ)

- Variables examined:
  - Total applicant number
  - Sex
  - United States vs Foreign medical graduate
  - Number of publications
  - AOA honor society membership status
  - USMLE Step 1 and Step 2CK scores

- Reviewed and approved for an exemption from further review by the UMass Medical School IRB
National Integrated Vascular Residency Program Review
Number of Integrated Vascular Surgery Residency Programs and Positions by Year of ERAS Application

- **Number of Vascular Programs**
- **Number of Vascular Positions**
Supply and Demand for Integrated Vascular Surgery Residencies

- **Number of Integrated Vascular Surgery Residency Applicants**
- **Number of Integrated Vascular Surgery Residency Positions**

Legend:
- Blue line: Number of Integrated Vascular Surgery Residency Applicants
- Red line: Number of Integrated Vascular Surgery Residency Positions
Total US Applicants for Integrated Vascular Surgery Residency
Average US/Canadian and Foreign Applications per Program

- Average US and Canadian Applications per Program
- Average Foreign Medical Applications per Program
Percentage of Women Applicants for Integrated Vascular Surgery Residency
Number of Applicants per Integrated Vascular Surgery Residency Position
Percentage of Integrated Vascular Surgery Residency Applicants with Concurrent General Surgery Residency Application
National Vascular Surgery Fellowship Review
<table>
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Supply and Demand for Vascular Surgery Fellowships

Number of Vascular Surgery Fellowship Positions

Number of Vascular Surgery Fellowship Applicants
University of Massachusetts
Integrated Vascular Residency Program Review
Percentage US Medical Graduates to UMass Integrated Vascular Surgery Residency

- UMass USMLE Step 1 Score
- UMass USMLE Step 2 CK Score
National Mean USMLE Step 1 and Step 2CK Scores Among Matched US Applicants in Their Preferred Specialty

- **National Mean USMLE Step 1 Score**
- **National Mean USMLE Step 2CK Score**

**Graph:**
- Linear trend lines with R² values of 0.8833 and 0.9416.
- Data points for years 2008 to 2015.
Average UMass and National USMLE Step 1 Scores Among US Applicants

- UMass USMLE Step 1 Score
- National Mean USMLE Step 1 Score
Average UMass and National USMLE Step 2CK Scores Among US Applicants

- UMass USMLE Step 2CK Score
- National Mean USMLE Step 2CK Score
Conclusions

- The increasing demand for integrated vascular surgery residency positions is predominately driven by US medical school graduates and women applicants.

- Overall, the supply continues to be outnumbered by the number of applicants, with increasing applicant-to-position ratios to 7.8 in 2015.

- Therefore, approximately 90% of applicants continue to rank at least one categorical general surgery residency position in order to improve their odds of a successful match.
Conclusions

Meanwhile, the total number of vascular surgery fellowships positions and applications have remained stable, with a supply to demand near 1:1, and unfilled positions occurring every year.
Conclusions

- On an objective national scale, medical students applying to integrated vascular surgery residencies remain in the top tier of applicants.

- Therefore, an expansion in the number of integrated vascular surgery residency positions is unlikely to compromise the quality of the matriculated applicants.
Conclusions

▪ As the societal need for vascular surgeons continues to expand, it is imperative that we continue to increase the number of integrated vascular surgery residencies.

▪ With the opportunity to introduce new clinicians into the workforce after five years of training, vascular surgery will be in a position to decrease the projected future deficit.
Thank You