

# Report on the 1990 – 2018 John A. Burns School of Medicine Medical Student Specialty Match and Residency Position Data

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## Abstract

*The physician shortage is expected to worsen both in Hawai'i and nationally, with primary care remaining the most needed medical specialty. The University of Hawai'i John A. Burns School of Medicine (JABSOM) plays a critical role in physician workforce development through its undergraduate (Medical School) and graduate medical education (Residency) programs. This report summarizes the Residency match results of all JABSOM Medical School graduates, their trends over time, and the total number of positions available in the JABSOM Residency programs between 1990 and 2018. Overall, 1652 JABSOM Medical School graduates successfully matched into Residency between 1990–2018. There was a negative trend of JABSOM Medical School graduates matching into all 3 primary care Residency programs during this reporting period. The total number of JABSOM Residency positions decreased during the study period, while there was an increase in the number of primary care JABSOM Residency positions. Alignment of the increasing JABSOM Medical School class size with the available JABSOM Residency positions in Hawai'i will be an important health workforce development strategy going forward.*

## Keywords

*primary care, health workforce, medical education, residency match*

## Abbreviations

JABSOM = University of Hawai'i John A. Burns School of Medicine  
Medical School = undergraduate medical education program  
NRMP = National Resident Matching Program  
Residency = graduate medical education program

## Introduction

There is a physician shortage across all medical specialties nationally and in Hawai'i, and it is expected to worsen.<sup>1,2</sup> Primary care continues to be the greatest physician workforce shortage across Hawai'i, with a current shortage of 412 full-time equivalent providers.<sup>1</sup> A recent study of over 3000 counties in the United States found that a greater primary care physician supply was associated with increased life expectancy.<sup>3</sup> Robust health care systems for primary care have also been shown to “prevent illness and death” and are associated with a “more equitable distribution of health in populations.”<sup>4</sup> The University of Hawai'i John A. Burns School of Medicine (JABSOM) has a key mission “to teach and train high-quality physicians, biomedical scientists, and allied health workers for Hawai'i and the Pacific.”<sup>5</sup> JABSOM, with its undergraduate medical education (Medical School) and graduate medical education (Residency) program of graduates and faculty, represent half of the practicing

physicians in Hawai'i today and ranks first in the nation in the retention of combined Medical School and Residency graduates practicing in the state.<sup>6</sup> JABSOM has Residency training programs in three specialties that can produce primary care physicians, Family Medicine, General Internal Medicine, and General Pediatrics, as well as numerous other needed specialties in Hawai'i: Psychiatry, General Surgery, Orthopedic Surgery, Obstetrics and Gynecology, and Pathology.<sup>7,8</sup> While primary care is a critical need in Hawai'i, it does not exist in a vacuum and is one component of a robust health care system. There is a critical gap in the literature related to JABSOM Medical School physician specialty production and the availability of JABSOM Residency program positions that are needed for Hawai'i health care workforce planning. The purpose of this report is to summarize the JABSOM Medical School graduate specialty data between 1990 and 2018, to identify specialty trends for JABSOM Medical School students, and to summarize the JABSOM Residency positions during the same period.

## Methods

The JABSOM fourth-year medical student Residency match results for the 1990 to 2018 academic years were collected from the JABSOM Office of Student Affairs. This timeframe was chosen due to the public availability of Residency match results. “The Match,” or National Resident Matching Program (NRMP), is a private, non-profit organization that provides a fair mechanism for pairing United States fourth-year medical student Residency applicants with their Residency preferences.<sup>9</sup> The JABSOM match lists analyzed in this report are a result of the national matching process. Those JABSOM Medical School graduates who did not apply for Residency, were off-cycle, or matched in a subsequent year were not included in the match data distributed by JABSOM; therefore, they could not be included in this report. Of note, the JABSOM Medical School class size has increased during this reporting period, from roughly 50 students in 1990 to 82 students in 2018.<sup>10</sup> The JABSOM match results were then sorted by Residency match specialty. The percentage of each JABSOM class between 1990 and 2018 that matched into each Residency specialty per year was plotted to determine whether a positive or negative trend in matching had occurred using Microsoft Excel, Version 16.16.7 (Microsoft Corporation, Redmond, WA). Linear trendlines based on the percentage of students successfully matching into each specialty per year were multiplied by 1000 for ease of comparison.

The total number of JABSOM Residency positions available in Hawai‘i during the reporting period, published by “The Match,” was assessed, in total and by specific Residency specialty.<sup>9</sup> During this reporting period, additional primary care Residency programs outside of the JABSOM system were established, including the Hawai‘i Island Family Medicine Residency (Hilo, Hawai‘i) and the Kaiser Permanente Hawaii Residency Program (Honolulu, Hawai‘i). Those non-JABSOM Residencies and the Tripler Army Medical Center military Residency programs were excluded from this report. The report was submitted to the University of Hawai‘i Institutional Review Board and found to not qualify as human studies research and therefore exempt (IRB 2017–00575).

## Results

Overall, 1652 JABSOM Medical School graduates successfully matched into Residency between 1990 and 2018, as seen in Table 1. The largest number matched into Internal Medicine (25%),

Family Medicine (12.5%), and Pediatrics (9.5%). Throughout the 29 years of data included in this report, Internal Medicine continually had the largest number of successfully matching students, with an average of 14.8 students per year. There was an overall negative trend of JABSOM Medical School graduates matching into Pediatrics, Family Medicine, Obstetrics and Gynecology, Internal Medicine, and Physical Medicine and Rehabilitation during the reporting period. The remaining Residency specialties had positive matching trends: Surgery, Emergency Medicine, and Anesthesiology, having the largest positive trend values in this reporting period. Between 1990 and 2018, there was a decrease in the total number of JABSOM Residency positions in Hawai‘i from 75 to 63. During the same time, there was an increase in JABSOM Residency primary care positions, with the largest positive increase occurring in Internal Medicine (Figure 1). Of note, between 2010 and 2018, 18 additional civilian Residency positions became available outside of the JABSOM Residency programs with 17 being in primary care positions.<sup>11</sup>

Match Specialty <sup>a</sup>	Number of Students (Percentage of Total)	Average Matching into Each Specialty Per Year <sup>f</sup>	Linear Trendlines for Each Specialty <sup>g</sup>
Internal Medicine	413 (25%)	14.8	-0.4
Family Medicine	207 (12.5%)	7.4	-1.2
Other <sup>b</sup>	181 (11%)	6.5	n/a
Pediatrics	157 (9.5%)	5.6	-2.2
Surgery <sup>c</sup>	123 (7.4%)	4.4	2.5
Obstetrics and Gynecology	88 (5.3%)	3.1	-0.7
Emergency Medicine	85 (5.1%)	3.0	1.6
Psychiatry	75 (4.5%)	2.7	0.02
Anesthesiology	68 (4.1%)	2.4	1.4
Radiology <sup>d</sup>	66 (4.0%)	2.4	0.2
Pathology	50 (3.0%)	1.8	0.08
Multiple Program <sup>e</sup>	49 (3.0%)	1.8	n/a
Neurology	28 (1.7%)	1.0	0.4
Ophthalmology	26 (1.6%)	0.9	0.2
Physical Medicine and Rehabilitation	21 (1.3%)	0.8	-0.4
Dermatology	15 (0.9%)	0.5	0.6
Total	1652		

<sup>a</sup> Listed by the number of JABSOM Medical Student graduates successfully matching into each Residency specialty.

<sup>b</sup> Those who matched into preliminary programs, matched into Canadian resident programs, did not participate in the Match, or insufficient data was available.

<sup>c</sup> Includes General, Orthopedic, Neurological, Plastic, Vascular, Otolaryngologic, and Urologic Surgery.

<sup>d</sup> Includes Diagnostic, Nuclear, Oncology, and Neuroradiology.

<sup>e</sup> Includes Internal Medicine and Pediatrics; Family Medicine and Psychiatry; Internal Medicine and Psychiatry; and Pediatrics and Psychiatry.

<sup>f</sup> Total number of students matching into each specialty divided by 28 years of match data available.

<sup>g</sup> Linear trendlines are based on the percentage of students successfully matching into each specialty per year. Each value was multiplied by 1000 for ease of comparison.

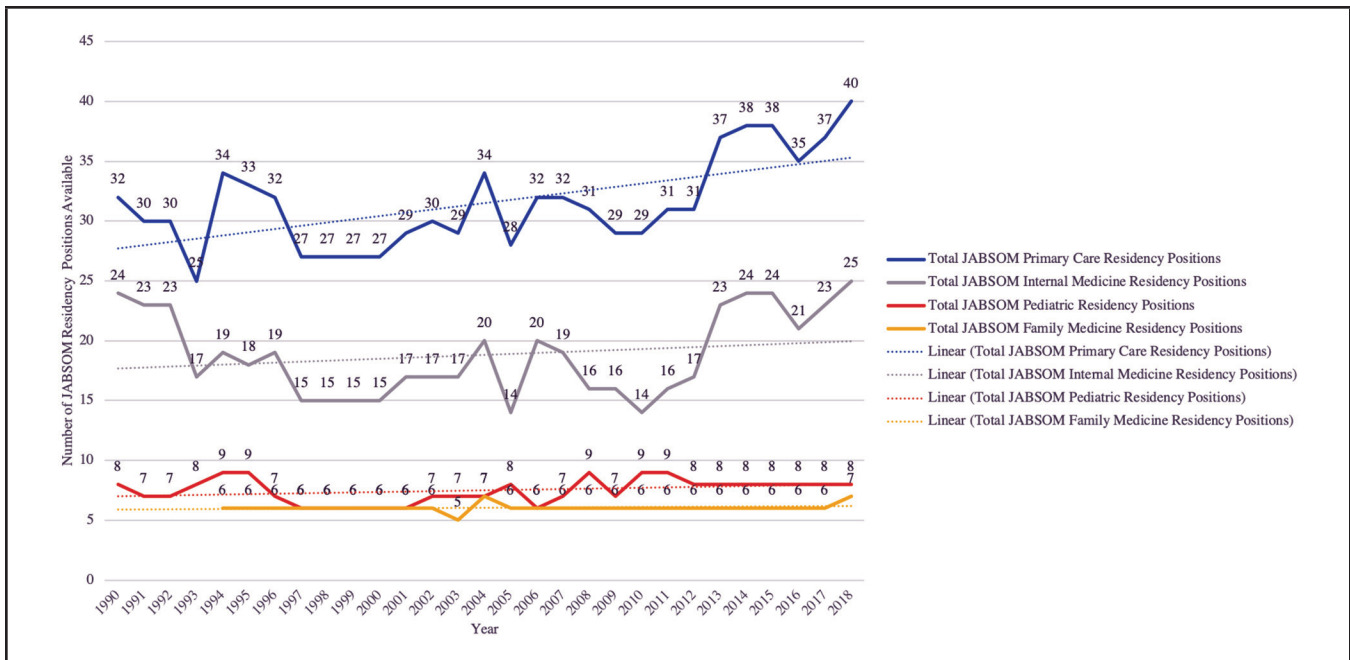


Figure 1. The Number of Available JABSOM Primary Care Residency Program Positions in Hawai‘i, Per Year. Data is based on NRMP Main Residency Match Data from 1990 to 2018.<sup>9</sup> All JABSOM Family Medicine, Internal Medicine, and Pediatric Residency available NRMP positions are included in the above data. The JABSOM Family Medicine and Preliminary Internal Medicine Programs both started accepting residents in 1994. This data excludes the JABSOM Internal Medicine Pediatrics Combination Residency, Kaiser Permanente, Hilo Medical Center, and Tripler Army Medical Center NRMP Residency positions. Linear trendline slopes for total Primary Care Residency, Family Medicine, Internal Medicine, and Pediatric Residency positions available are 0.27, 0.01, 0.08, and 0.03, respectively.

## Discussion

This report showcases the importance of the JABSOM Medical School on the generation of physicians for Hawai‘i and the nation. During the last 29 years, JABSOM has successfully matched 1652 medical students into Residency, excluding off-cycle graduates. Although JABSOM is successfully matching many graduates into Residency, there is an overall negative trend for all 3 primary care specialties over the last 29 years. Despite Internal Medicine having the largest number of matching Medical School students, Pediatrics, Family Medicine, and Internal Medicine all have individual negative trends in JABSOM Medical School graduate match rates during the study period. It is important to note that for each of the possible primary care specialties, various future fellowship opportunities exist for all three specialties that often result in non-primary care clinical practice in the future. Internal Medicine and Pediatrics are pathways to 20 fellowship training programs and subspecialty boards following Residency training; 6 possible fellowship programs may follow family Medicine.<sup>7</sup> Therefore, although Internal Medicine continues to be the largest matching Residency specialty for JABSOM Medical School graduates, this does not necessarily mean they will be entering General Internal Medicine practice upon completion of Residency training.

The overall decrease in the total number of JABSOM Residency positions available at JABSOM during this time is also problematic as, based on trends seen in other states, students who complete Residency training in Hawai‘i are more likely to stay and practice in the state.<sup>12-14</sup> As JABSOM Medical School class size increases without a concomitant increase in Hawai‘i Residency positions, more JABSOM Medical School graduates will by necessity need to complete their Residency training on the continent.<sup>6,15,16</sup> Despite the decreasing total number of JABSOM Residency positions, there has been a positive increase in the number of primary care JABSOM Residency positions between 1990 and 2018, which will help to improve the primary care physician shortage statewide. Careful alignment of JABSOM Medical School size and the available JABSOM Residency opportunities in Hawai‘i will be a critical workforce development strategy going forward. In 2013, Hawai‘i was in the lowest quintile nationally for the number of Medicare-funded residency positions per 100,000 populations.<sup>17</sup> The loss of 12 JABSOM Residency positions between 2013 and 2018 is therefore alarming, although the increase in 18 civilian Residency positions outside of the JABSOM Residency programs since 2010 is somewhat reassuring. In 2018, these 18 civilian positions were split between the Hawai‘i Island Family Medicine Residency Program with 6 Family Medicine

residency positions; Kaiser Permanente Hawai'i Residency Program with 5 Internal Medicine residency positions; Tripler Army Medical Center Internal Medicine Residency Program with 6 Internal Medicine residency positions; and the Tripler Army Medical Center Diagnostic Radiology Residency Program with 1 Diagnostic Radiology residency position.<sup>11</sup> Nevertheless, any increase in the total number of JABSOM Medical School positions should directly correlate with an increase in JABSOM Residency positions.

## Conclusion

JABSOM, through its Medical School and Residency programs, continues to produce a significant number of both primary care and non-primary care physicians for Hawai'i and the nation. This report fills the gap related to the JABSOM Medical School physician specialty production and JABSOM residency program positions in Hawai'i. Although JABSOM has increased its Medical School positions to help offset the physician shortage both locally and nationally, it is concerning to find a decrease in the total number of JABSOM Residency positions during the same time frame. The overall increase in primary care JABSOM Residency positions during this study period, along with the creation of two additional non-JABSOM Residency programs during this study period, is encouraging as primary care continues to be the greatest physician workforce shortage across Hawai'i.<sup>1</sup> Important health care workforce areas of future study include the retention rate of JABSOM Residency graduates in Hawai'i upon completion of Residency training and strategies to recruit JABSOM Medical School graduates who train in the continental United States to return to practice in Hawai'i upon completion of their Residency.

## Conflict of Interest Statement

We certify that we have no financial affiliation/interest (eg, stock holdings, consultantships, honoraria) in the subject matter, materials, or products mentioned in this manuscript. None of the authors of this article have any conflict of interest to report, nor any interests represented with any products discussed or implied.

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