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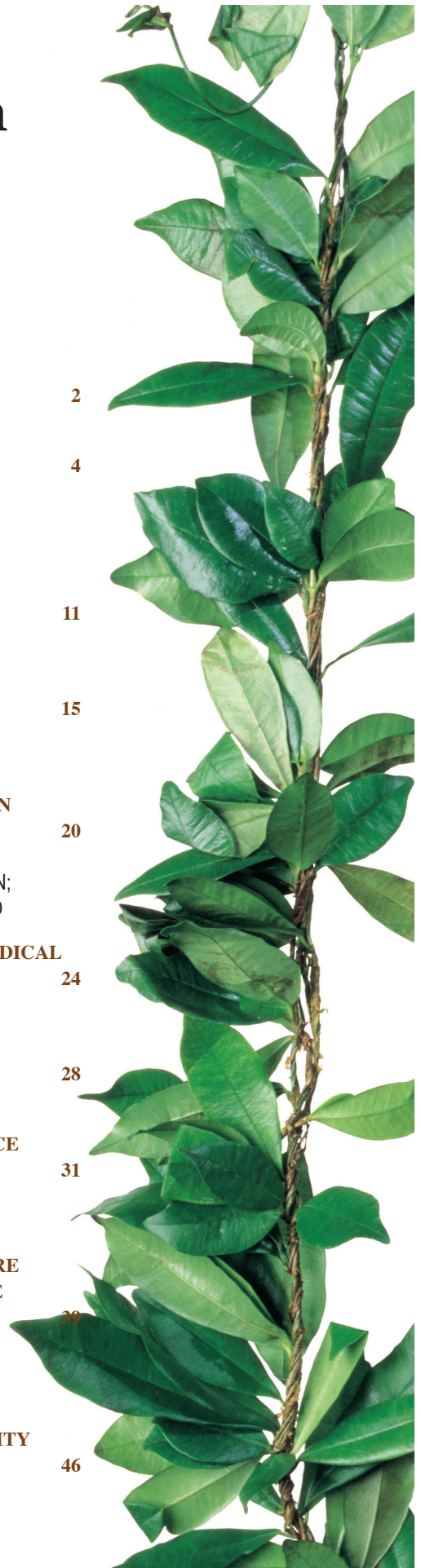
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# Guest Editors' Message: Hawai'i's Health Care Workforce

Teresa Schiff-Elfalan MD; Vanessa S. Wong MD, MS (Co-Guest Editors)

Dear Readers,

This special edition of the HJH&SW focuses on the shortage of health care professionals across the state of Hawai'i, which follows previous workforce supplements published in 2017 and 2012. This edition shares the critical work being done by the authors to expand and strengthen our health care workforce, with special attention to rural health, culturally aware practices, and interprofessional teamwork. As current faculty members and proud graduates of the John A. Burns School of Medicine (JABSOM), we join forces with our health professions colleagues in our commitment to ensuring a robust workforce to care for all of Hawai'i's communities. The articles chosen for inclusion in this supplement are indicative of the type of work that needs to be done, the collaborations that need to happen, and the actions we need to take to grow and support our health care workforce here in Hawai'i.

In this supplement you will read about recent trends in the physician workforce, as summarized by the Hawai'i Physician Workforce Project. The 2020 assessment revealed that the State of Hawai'i is in the midst of a severe shortage of physicians, the worst since the project began in 2010. This shortage is mirrored in the Registered Dietitian Nutritionist 2019-2020 Workforce Assessment. With COVID-19 causing new stressors on providers, leading many to retire, move closer to family, or decrease their FTE to combat burnout, we are likely to see an even further exacerbation of this shortage in the Workforce Assessments in the coming years. It is essential that we find ways to better support those currently in practice while we nurture the next generation of physicians and other health care professionals who will eventually take their places.

We are fortunate that several of these programs already exist, a few of which we share within this special edition. Here we spotlight programs such as the *'Imi Ho 'ōla* Post-Baccalaureate Program, which focuses on supporting underrepresented students on their path to medicine, the *Mauli Ola Mālamalama*, a scholarship program designed to bolster a culturally aware Native Hawaiian health care workforce, and the JABSOM rural health program, which provides students the opportunity to experience clinical practice on the neighbor islands. It is clear that where and how one trains can have a significant impact on career and practice choice. For this reason, JABSOM has committed to increasing its class size in recent years and expanding opportunities for training on neighbor islands. Unfortunately, the 1990-2018 JABSOM specialty match and residency position data report shows a downward trend of students matching into primary care programs and a decrease in the number of JABSOM residency positions. We hope that this report will support better alignment of residency positions with the expanding JABSOM class size and that special attention can be given to retention and recruitment of JABSOM graduates to practice in Hawai'i, especially in primary care and other specialties with critical shortages.

As we better understand the role of social determinants and their impact on the health of individuals and communities, it has become clear that interprofessional collaboration is essential to achieve a healthier society. This edition also highlights the important curricular work being done at the University of Hawai'i at Hilo Daniel K. Inouye College of Pharmacy to increase the capacity for future pharmacists via interprofessional education and collaboration, telehealth communications, and competency in drug information skills to improve health care



quality measures. Additionally, the Pacific Islands Geriatrics Workforce Enhancement Program at the University of Hawai‘i provides a model for partnership across academia, primary care, and community-based organizations to transform care of the geriatric population in Hawai‘i and the Pacific. The final manuscript in this edition discusses access to contraception and provides a framework for collaboration across medical specialties to improve access to reproductive health services across the state. These manuscripts call us to collaborate across disciplines, practice settings, and geographic locations, in order to do the important work needed to address our health care workforce shortage and the patient care needs of our state.

We hope this special edition will inspire you to work with us in strengthening our pathway and training programs and in supporting our health care providers to offer the highest quality care to the people of Hawai‘i. Mahalo for taking time to read about the incredible work being done by our colleagues.

*With aloha,  
Teresa and Vanessa*

## **Mahalo**

The call for papers went out late 2020 with submissions in early 2021. It has been a long process for the authors and editorial staff. Throughout the last 2 years of the COVID-19 pandemic, we have all had to practice patience and flexibility. To that end, we appreciate the understanding and endurance of our authors as we journeyed together. Mahalo to the multiple reviewers who contributed their time and expertise to reviewing these manuscripts, as well as the copy editors and journal editorial staff for their flexibility and attention to detail as they helped us bring this publication to fruition. A special mahalo to Dr. Kelley Withy for her mentorship and guidance throughout this process and to Carolyn Imhoff for assisting us in keeping track of the myriad details needed to publish this supplement.

## **Conflict of Interest**

The authors do not identify a conflict of interest.



# Hawai'i Physician Workforce Assessment 2020

Kelley Withy MD, PhD; Kathleen Joo BS; Christian Potter BA, MS

## Abstract

*The Hawai'i Physician Workforce project, launched in 2010, investigates state physician workforce trends. Over the past decade, workforce demands have continued to climb as the state struggles to maintain the physician supply. This article describes the current state of the physician workforce, the physician age landscape, past trends, as well as initial changes to the physician supply with the COVID-19 pandemic. Data on practice location, full time equivalency of time spent providing patient care in Hawai'i, and specialty of non-military physicians were clarified and informed via survey, internet search, and direct calling methodologies. A proprietary microsimulation modeling methodology was used to assess physician demand. The current estimated physician shortage is between 710 and 1,008 full time equivalents, the largest shortage in a decade. The unmet demand for numbers of additional physicians is greatest on the largely urban island of O'ahu, however O'ahu's neighboring islands have the largest shortages by percentage of demand. In fact, Hawai'i island has over a 50% shortage of physicians for the first time since the supply has been calculated starting in 2010. Primary care has the greatest demand with a statewide shortage of 412 full time equivalents. The average age of physicians in Hawai'i is 54 compared to the national average of 52. The authors estimate that more than 52% of providers are utilizing telehealth and that 10% of providers have retired or closed their practices since the start of the COVID-19 pandemic. Hawai'i is now in an urgent state of need for recruitment and retention of physicians.*

## Keywords

*Physician supply, workforce, healthcare providers, shortage, demand*

## Abbreviations

*DCCA = Department of Commerce and Consumer Affairs*

*FTEs = full-time equivalents*

*VA = Veterans Administration*

## Introduction

Recent national estimates indicate a current shortage of between 40,000 and almost 60,000 practicing physicians, and is expected to potentially grow to 139,000 physicians by the year 2033.<sup>1</sup> Much of this projected shortage is attributed to an aging population who will require more medical care, and an aging physician workforce that is considering retirement.<sup>1</sup> A census by the Federation of State Medical Boards supports this finding with their 2018 estimate that 30% of licensed physicians were already over the age of 60.<sup>2</sup> Furthermore, COVID-19 is having a negative physical and psychological effect upon practicing physicians.<sup>3</sup> Burn out, moral distress, and compassion fatigue are prevalent in physicians working with COVID-19 patients.<sup>4</sup> To compound this, the pandemic is causing direct illness and death of physicians.<sup>5</sup>

In Hawai'i, local workforce shortage research indicated a lack of between 519 and 820 physician Full Time Equivalents (FTE) in 2019.<sup>6</sup> In addition to these shortages, 23% of active physicians in Hawai'i were at least 65 years of age, a traditional age for retirement in many careers. Furthermore, over half of the physicians were at least 55 years of age.<sup>6</sup> The high percentage of physicians nearing or of traditional retirement age in 2019 will likely contribute to a growth in the gap between supply and demand of physicians in 2020 data.

Rural populations were of concern for physician shortages. Though recent data on rural provider numbers is limited, it has often been cited that 20% of the US population lives in rural areas and only 11% of the physician workforce in the US practice in rural areas.<sup>7</sup> Rural shortages have been a significant challenge in Hawai'i, with neighboring islands having greater shortages of physicians than O'ahu.<sup>6</sup>

The current article uses data from the 2020 Physician Workforce Assessment to describe recent physician workforce trends in Hawai'i, such as physician age distribution and ethnicity. It also examines the impact of COVID-19 on physician practices in 2020.

## Methods

### Physician Supply Assessment

The supply of physicians in Hawai'i is estimated annually using surveys, internet searches, and direct calling of physician offices or other publicly available phone numbers. Physicians in Hawai'i must relicense every 2 years through the Hawai'i Department of Commerce and Consumer Affairs (DCCA). As a part of the relicensure process, physicians are asked to complete a voluntary survey that is approved by the University of Hawai'i Committee on Human Subjects (Protocol #15488). The survey includes 10 questions: whether the physician is actively treating Hawai'i patients, if they are primarily military or in training (both excluded from the research), their office address(es), specialt(ies), hours per week of patient care, telehealth hours, size of practice, and employment status (employed vs private practice). For the first time in the continued assessment of Hawai'i's workforce, the 2020 relicensure survey included questions on ethnicity and year of birth. Of the 8105 physicians who relicensed online, 7221 or 89% completed at least part of the Physician Workforce survey.

In order to confirm the accuracy of information, a list of licensed Hawai'i physicians was obtained from the DCCA website in June, 2020, and a web search performed on each physician to locate current office location (UH Committee on Human Subjects protocol #14645). This was followed up by a phone call to any Hawai'i based office to confirm that the physician was still at that location and current hours of active patient care (UH Committee on Human Subjects protocol #15107). In 2020, the research team included a telephone question about the impact of COVID-19 on practice by asking physicians and office staff whether the pandemic had impacted practice and if so, the way(s) in which practice had been affected were also noted.

### Physician Demand Assessment

The demand for physician services in any given area is difficult to assess. Therefore, the authors purchased a demand model from the IHS Markit (London, United Kingdom, <https://ihs-markit.com/>), a company that also supplies healthcare demand estimates to the American Association of Medical Colleges and the United States (US) Department of Health and Human Services. This model applies national healthcare utilization patterns from across the US to the makeup of the population of each county of Hawai'i to determine how many healthcare visits, on average, that county's population would make if they utilized services comparable to the average of all US counties. This model uses data from multiple national data sets to estimate the number of services utilized by a specific population of similar size, age, gender, ethnicity, health, and insurance status to the county population. The model allows for estimates of full-time equivalents (FTEs) of practicing physicians that each county would have based on national averages. The numbers utilized for this paper are the 2014 model estimates of demand projected to the year 2020.

### Analysis

The number of hours per week confirmed for each provider was divided by 40 hours to estimate full-time equivalency based on a 40-hour week. Although many physicians worked more than 40 hours a week, no FTEs over 1.0 were calculated for any individual to create a standard comparison for the data (maximum FTE is 1.0 regardless of hours worked per week). Primary care included the following specialties: Family Medicine, General Internal Medicine, General Practice, Geriatrics, and Pediatrics (General). The "Other Medical Specialties" category included the following specialties: Concierge, Complementary/Alternative Medicine, Hospitalist Medicine, Occupational Medicine, Palliative Care, Pain Medicine, Preventive Medicine, Sleep Medicine, Urgent Care, Medical Genetics, and Wound Care. Simple comparisons were tracked over years for number of FTEs by island and by specialty. All data is stored and calculations performed using Microsoft Access software, version 16.0 (Microsoft Corporation, Redmond, VA).

The supply of physician FTEs was compared to the calculated demand for physician FTEs. The comparison was made as a statewide number, as well as a separate number for each county. In addition, since Hawai'i is an island state and patients cannot easily travel off island, a third calculation was performed that eliminates any excess physician FTEs in each county who cannot perform the responsibilities of other physicians. For example, if there were more of a supply than demand for plastic surgeons on Kaua'i, the excess FTE was eliminated (made to equal zero in the calculation) as the extra plastic surgeons were unlikely to meet the primary care needs of the county. The number of county-wide demand FTEs minus supply FTEs without the specialty-specific surplus was called "Without Overage" in Table 2. This total number of FTEs needed for each county was subtracted from the demand estimate for that county to create the upper limit of the range of shortage for Hawai'i. This number has been tracked over the years and represented in Figure 1.

Age comparisons were made between the four counties of Hawai'i: Kaua'i County (Island of Kaua'i), Honolulu County (Island of O'ahu), Maui County (Islands of Moloka'i, Lāna'i and Maui) and Hawai'i County (Hawai'i Island). To compare physician ages between counties, a Kruskal Wallis non-parametric test and post-hoc pair wise Wilcoxon test were used. Physician age between counties for those who practice in primary care was also analyzed using the same methods. Additionally, for each county, proportion of physicians 65 and older, and proportion of physicians practicing in primary care were computed and compared to other counties using a pairwise chi-squared test. All analyses were performed using R software.<sup>8</sup>

Finally, the data collected in response to the telephone question regarding the impact of COVID-19 was tabulated and themes were identified and negotiated by the research team. Responses were categorized and tabulated for reporting.

## Results

### Supply Estimates

In September, 2020, a total of 10 227 physicians held active Hawai'i licenses through the Department of Commerce and Consumer Affairs. Of these, only 3290 were found actively practicing in a non-military setting in the state at that time based on survey and calling results. Of the physicians practicing, many were seeing patients only part-time, resulting in the physician FTEs caring for Hawai'i patients totaling 2812 FTEs. At least 110 physicians retired in 2019 (3%), 8 died, 139 moved out of state (4%) and 120 decreased their FTE (3%). Taking into account the new doctors working in Hawai'i, this resulted in a decrease of 162 FTEs since 2019 or a 5% decrease.

## Demand Estimates

Demand for physician FTE was estimated to be 3522 based on the IHS Markit demand model. A breakdown by specialty can be viewed in Table 1.

**Supply/Demand Comparison:** A simple statewide estimate of demand minus supply (3522-2812) totaled 710. However, when the overages of physicians by specialty were discounted (column “Without Overage” in Table 2), the shortage estimate increased to 1008.

## Age Comparisons

Physician age was analyzed for the 3223 practicing physicians in which reliable age data was available. The average age of physicians in Hawai‘i was 54. The oldest practicing physician was 90, and the youngest was 30. The age breakdown is shown in Table 3.

Currently, in Honolulu, Hawai‘i, Maui and Kaua‘i Counties, physicians 65 or older comprise 21%, 29%, 27%, and 25% of the county physician population, respectively. Compared to Honolulu County, both Hawai‘i ( $P \leq .001$ ) and Maui ( $P \leq .01$ ) counties have significantly larger proportions of physicians who are of age 65 or older.

In 2020, primary care physicians constituted 29% of the state’s physician population. In Honolulu, Hawai‘i, Maui and Kaua‘i Counties, primary care physicians made up 27%, 37%, 33%, and 36% of the county physician population, respectively. Compared to Honolulu County, only Hawai‘i County ( $P \leq .001$ ) has a significantly larger proportion of primary care physicians. There were no significant differences in the age of primary care physicians by county.

## Ethnicity, Sex and Other Practice Factors

Of the total physicians who relicensed and submitted a survey in 2020, the research team received a 65% response rate to the question of ethnicity. Asian physicians are the largest ethnic group, making up approximately one-third of the workforce, as seen in Table 2. Of the physicians who responded to the licensure survey, 58% reported being employed as compared to private practice or independent contractors. In addition, 47% reported working in groups of 5 or less, compared to 53% in groups of 6 or more. Women composed 37% of the physician workforce in Hawai‘i in 2020.

## COVID-19 Impact

A total of 989 offices responded to the telephone question asked about COVID-19, with 415 physician offices, or 42%, reporting that the pandemic caused practice disruptions. The primary themes that were identified were: temporary and permanent clinic closures, early retirement, full or partial dependence on telehealth services, and reduced office hours and patient volume. Reasons given were safety and decreased patient volume. Other disruptions mentioned less often included changes in protocol and increased staff training, as well as travel restrictions between offices.

## Comparison to Previous Years

Compared to prior workforce reports, the estimated shortage of physicians was greater than any year since 2010, as was the number of physicians who retired, moved out of state, or decreased practice time. It appears that much of the increase is due to retirements and either partial or full departure from practice for physicians in Hawai‘i concurrent with the COVID pandemic. Figure 1 illustrates Hawai‘i’s physician workforce shortage trends over the last decade. The latest statistics for each specialty statewide are outlined in Table 1.

Ethnicity	Total Physicians	Percent of Physician Population	Percent of Hawai‘i Population*
Asian	954	29%	37.6%
American Indian or Alaska Native	1	<1%	0.4%
Black/African American	19	<1%	2.2%
Hispanic/Latinx	30	1%	10.7%
Caucasian/White	756	23%	25.5%
Native Hawaiian/Pacific Islanders	65 + 20	3%	10.1%
Two or more races	225	7%	24.2%
Other	78	2%	
Unknown	1142	35%	

\* Ethnicities breakdown of Hawai‘i population obtained at <https://www.census.gov/quickfacts/HI>, accessed August 13, 2021.<sup>12</sup>

Table 2. Hawai'i Physician Supply and Demand by Specialty, 2020					
	State of Hawai'i				
	Physician Demand (FTE) <sup>a</sup>	Physician Supply (FTE)	Shortage <sup>b</sup>	Shortage Without Overage <sup>c</sup>	Percent Shortage <sup>d</sup>
Family Medicine & General Practice	536.0	342.2	193.8	193.8	36%
General Internal Medicine	499.0	319.9	179.1	179.1	36%
Pediatrics	252.5	216.1	36.4	36.4	14%
Geriatric Medicine	18.9	42.2	-23.3	2.7	14%
Allergy and Immunology	21.4	9.7	11.7	11.7	55%
Anesthesiology	172.3	139.8	32.5	33.4	19%
Cardiology	118.3	78.3	40.0	40.0	34%
Colorectal Surgery	7.2	2.5	4.7	4.7	65%
Critical Care	27.9	38.5	-10.6	5.4	19%
Dermatology	48.2	51.2	-3.0	4.8	10%
Emergency Medicine	181.7	185.6	-3.9	31.6	17%
Endocrinology	30.7	18.2	12.5	12.5	41%
Gastroenterology	64.8	48.8	16.0	16.0	25%
General Surgery	121.8	93.6	28.2	28.2	23%
Hematology and Oncology	63.8	35.9	27.9	27.9	44%
Infectious Disease	41.1	17.1	24.0	24.0	58%
Neonatal-perinatal	23.0	22.5	0.5	7.6	33%
Nephrology	36.0	31.8	4.2	6.5	18%
Neurological Surgery	22.1	16.5	5.6	5.6	26%
Neurology	78.4	47.0	31.4	31.4	40%
Obstetrics and Gynecology	189.1	166.9	22.2	22.2	12%
Ophthalmology	86.4	98.5	-12.1	8.1	9%
Orthopedic Surgery	110.9	75.6	35.3	35.3	32%
Otolaryngology	44.2	28.7	15.5	15.5	35%
Pathology	90.3	32.9	57.4	57.4	64%
Physical Medicine and Rehabilitation	35.6	24.7	10.9	10.9	31%
Plastic Surgery	33.2	25.4	7.8	7.8	24%
Psychiatry	196.7	153.4	43.3	43.3	22%
Pulmonology	57.3	21.0	36.3	36.3	63%
Radiology	142.8	109.2	33.6	33.6	24%
Rheumatology	20.2	13.1	7.1	7.1	35%
Thoracic Surgery	20.5	12.5	8.0	8.0	39%
Urology	47.0	30.2	16.8	16.8	36%
Vascular Surgery	13.9	13.0	1.0	2.3	16%
Other Medical Specialties	69.0	250.0	-181.0	0	0%
<b>Total</b>	<b>3522.2</b>	<b>2812.3</b>	<b>709.9</b>	<b>1008.0</b>	<b>29%</b>

<sup>a</sup> FTE is full-time equivalent

<sup>b</sup> Shortage is calculated as Physician Demand FTE less Physician Supply FTE. If Physician Supply is more than Physician Demand, Shortage is a negative number.

<sup>c</sup> Shortage without overage assigns a value of 0 to any negative supply value in county level data, to represent the fact that physicians from different specialties cannot cover for each other.

<sup>d</sup> Percent shortage is shortage without overage divided by physician demand FTE.

County	N	Mean	Median	Max	Min	SD
Honolulu	2394	53.9	53	90	30	12.0
Hawai'i	349	56.3	58	90	31	12.2
Maui	317	55.3	54	83	33	11.6
Kaua'i	163	53.9	52	84	31	12.1
State of Hawai'i	3223	54.3	54	90	30	12.0

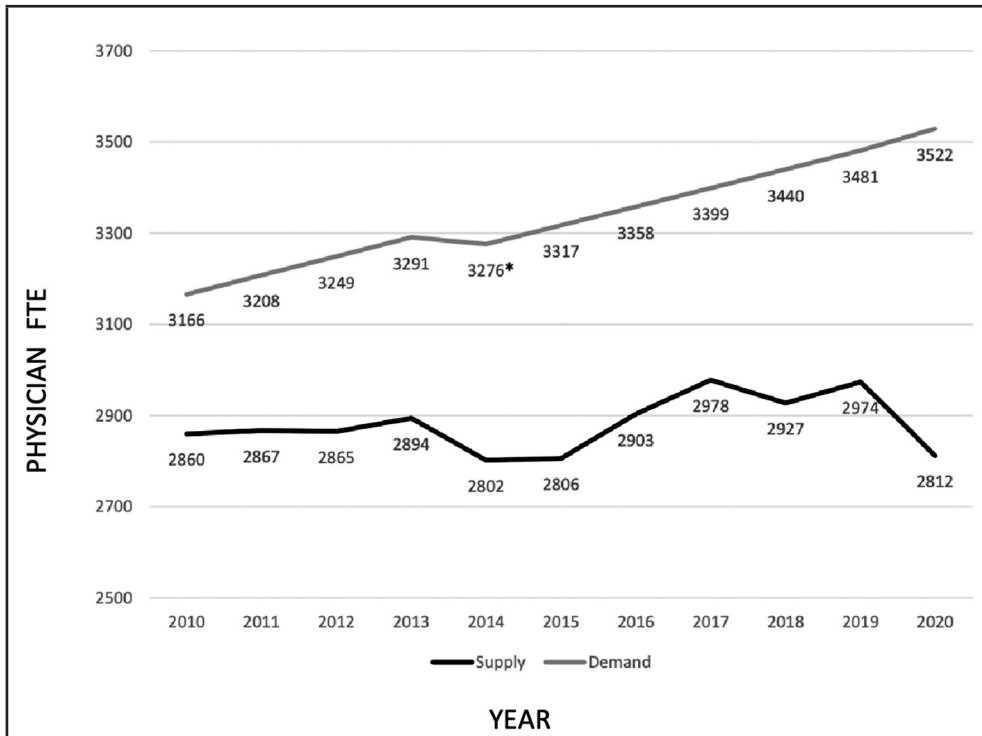


Figure 1. Hawai'i Physician Supply and Demand Trends 2010-2020

## Discussion

In 2020, Hawai'i saw the largest loss of physicians since documentation began in 2010. In fact, the number of practicing physicians is lower than the 2010 numbers. The researchers believe that the low physician numbers are directly related to the COVID pandemic. Many physicians decreased office hours or closed offices due to safety concerns and loss of patient volume. While telehealth has increased, it is unclear if this can meet patient needs or reach all the patients who need care. It is hoped that offices will reopen during 2021 and 2022 to restore the physician workforce in Hawai'i to prior levels. However, even with physicians re-opening their practices, the shortage is severe.

In addition, this research shows that the geographic areas of Hawai'i with the greatest shortages also have the oldest physi-

cian populations, in particular Hawai'i Island and Maui County. The shortages of physicians can be further exacerbated if these experienced physicians retire. Communities with limited numbers of physicians suffer diminished access to care and often suffer later diagnosis and worse health outcomes.<sup>9</sup> Further complicating the rural health picture is the fact that there are fewer large practices and employment opportunities in rural areas based on the physician jobs posted from across the state on a central website.<sup>10</sup>

Another important finding is the ethnic mix of the Hawai'i physician population. Compared to the continental US, where Caucasian physicians are in the majority at 56%,<sup>11</sup> Hawai'i has a much more diverse physician population. However, Hawai'i is far from representing the ethnic mix of the local population. The 2020 US Census estimated that 10.1% of Hawai'i's population is of Native Hawaiian or other Pacific Islander



ethnicity alone,<sup>12</sup> which is similar to the Hawai‘i Department of Business, Economic Development and Tourism’s numbers of 147,408 Hawai‘i residents out of the population of 1 407 006 or 10.5%.<sup>13</sup> This source also indicates that 388,110 individuals are of Native Hawaiian or other Pacific Islander ethnicity alone or in combination with other ethnicities, for 27.6% of Hawai‘i’s population.<sup>13</sup> The current study found only 85 providers from these ethnic groups alone (3% of the physician population). Individuals of Hispanic/Latino background alone make up 10.7% of the population,<sup>12</sup> but less than 1% of physicians (Table 1). Since patients generally express greater satisfaction with a physician from their same ethnic background, and because underrepresented, minority physicians are more likely to practice primary care and treat socially or economically disadvantaged patients,<sup>14</sup> it behooves the state to work toward equity in training of future physicians such that our physician workforce mirrors our ethnic composition.

The authors believe that many of the challenges faced in recruiting and retaining physicians in Hawai‘i can be overcome with coordinated training, recruitment, and retention programs for physicians in Hawai‘i. Programs that emphasize rural recruitment and training of medical students have demonstrated significant impact on placement of physicians.<sup>15</sup> Thus, expansion of medical school and residency training with emphasis on rural training, as well as the recruitment of students to medical school from rural areas and ethnic backgrounds that represent the makeup of Hawai‘i is highly likely to benefit the workforce. Expanded recruitment from and training on ALL islands in Hawai‘i will increase familiarity with rural areas and increase the chance of physicians returning to those areas to practice after training.<sup>16,17</sup>

An equally important effort to recruit and retain physicians should focus on financial incentives<sup>18-10</sup> and work/life balance.<sup>19,20</sup> This can be done through incentives for practice in areas of need, such as loan repayment<sup>21</sup> and by improving insurance reimbursement rates and decreasing the time spent on administrative burdens. Both actions would improve the sustainability of medical practices in Hawai‘i and increase patient care by increasing time spent with patients. Finally, the use of telehealth can assist all islands with meeting the workforce needs for primary care, psychiatry, and medical specialty physicians.<sup>22</sup>

## Limitations

Limitations of this study include the challenges to locating and quantifying the FTE of all the physicians working in Hawai‘i. Although the research team exhausted all available resources, it is not always possible to locate every practicing physician. The fact that all physicians who practice medicine in Hawai‘i, other than military and Veterans Administration (VA) physicians, must

have a Hawai‘i medical license, but two-thirds of physicians licensed in Hawai‘i do not actually practice in Hawai‘i make quantifying physicians challenging. Furthermore, the physicians who work at the VA must be individually identified, since they are not necessarily licensed in Hawai‘i.

Telehealth utilization, while beneficial to patients, complicates the workforce picture, as it adds to the difficulty in estimating service locations of Hawai‘i’s physician workforce. Physicians living out of state, particularly radiologists, report providing patient care via telehealth across the US, including Hawai‘i. It is difficult to quantify their time caring for Hawai‘i patients. In addition, physicians living in Hawai‘i sometimes provide telehealth to patients on the continental US. Every effort is made to accurately allocate physician time to the zip code where they care for patients. Ethnic comparisons are limited as ethnicity was only identified for two-thirds of the physicians. In addition, the US Census combines the ethnic categories of Native Hawaiian and Pacific Islander, as well as combines many Asian ethnicities, thereby limiting the comparison of each ethnicity independently to our findings. Finally, the current demand model counts hospitalist physicians in the “Other” category, which creates a falsely low supply number when county over-ages are discounted. The research team plans to purchase an updated demand model to address this issue in future studies.

## Conclusion

The physician shortage in Hawai‘i has worsened significantly with the COVID pandemic. The authors believe that in order to increase the physician population of Hawai‘i, several actions must be taken. Increasing recruitment of local students to medical school and expansion of training, especially to rural communities, is essential. Supporting medical practice by increasing reimbursement is also of critical importance, as private practice physicians report difficulty in sustaining a local practice. Since there is a paucity of large groups in rural areas of Hawai‘i, patients in such areas are dependent on small groups of private practice physicians. Thus, practice assistance, loan repayment, low interest loans, rural payment differentials, increased Medicare rates are all important. Furthermore, for-profit medical practices are required to pay the general excise tax on Medicaid and Medicare patient visits, as the subsidized health insurance does not allow charging this to patients. For small practices, this means paying out of pocket using office resources and has a negative impact on practice finances. Additionally, practice assistance for small practices to share costs for care coordination, billing, and office management would assist these practices in meeting patient needs. These considerations could go far in preventing the exit of physicians from Hawai‘i, but should be supplemented with additional methods to increase job satisfaction and physician retention on all islands.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# Laying the *Kahua* (Foundation): Incorporating Elements of Attitude and Purpose for Underrepresented Student Success at the University of Hawai'i John A. Burns School of Medicine 'Imi Ho'ōla Post-Baccalaureate Program

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## Abstract

The 'Imi Ho'ōla Post-Baccalaureate Program is a proven pathway to medicine that has significantly increased the number of underrepresented and disadvantaged students that complete medical school in Hawai'i. A recent program evaluation indicated a relationship between student success and the significance of attitude and purpose from the Learning and Study Strategies Inventory. Curricular innovations in a 5-week introductory course during Phase 1, lay the foundation to promote a healthy attitude with purpose-led activities, such as personalized journal vision covers, weekly journal reflections, a multimedia autobiography, and projects focusing on medical specialties, well-being, and resiliency. Such purposeful innovations are vital for the success of underrepresented students, with the ultimate intent to diversify the physician workforce and to increase the number of physicians serving in underrepresented and underserved communities in Hawai'i and throughout the Pacific.

## Keywords

post-baccalaureate, pathway programs, premedical, underrepresented, disadvantaged students, student success, curriculum, LASSI, attitude, purpose

## Abbreviations and Acronyms

DNHH = Department of Native Hawaiian Health

'Imi Ho'ōla = 'Imi Ho'ōla Post-Baccalaureate Program JABSOM = John A. Burns School of Medicine

LASSI = Learning and Study Strategies Inventory

PBL = Problem Based Learning

## Introduction

As institutions strive to increase the number of underrepresented students in medical school, pathway programs such as the 'Imi Ho'ōla Post-Baccalaureate Program ('Imi Ho'ōla), are essential in diversifying Hawai'i's healthcare workforce and increasing the number of physicians who represent the communities they will serve. For over 46 years, 'Imi Ho'ōla has significantly increased the number of underrepresented and disadvantaged students that complete medical school in Hawai'i and that commit to work in medically underserved areas.<sup>1,2,3</sup> A recent program evaluation indicated a relationship between student success and the significance of attitude and purpose.<sup>3</sup> As a result, purpose-driven innovations were expanded throughout the 'Imi Ho'ōla curriculum and emphasized from the very beginning of Phase 1 of the program. Curriculum innovations such as, creating a personalized journal vision cover, weekly

journal reflections, a multimedia autobiography, and projects focusing on medical specialties, well-being, and resiliency, lay the *kahua* (foundation), by incorporating elements of attitude and purpose required to succeed in the rigorous program and beyond. These innovations are prospective ways that the program can promote student success, with the ultimate intent of increasing the representation of underrepresented and disadvantaged serving physicians in Hawai'i and the Pacific Basin.

## Overview of the 'Imi Ho'ōla Post-Baccalaureate Program

The 'Imi Ho'ōla Post-Baccalaureate Program, established in 1973, is a 12-month program within the Department of Native Hawaiian Health (DNHH) at the John A. Burns School of Medicine (JABSOM) that provides educational opportunities for students from educationally, socially and/or economically disadvantaged backgrounds who have demonstrated a commitment to service and are deemed capable of succeeding in medical school.<sup>1,2</sup> When examining program participants from 1996-2016, over 50% were made up of traditionally underrepresented populations in medicine (30% Native Hawaiian, 27% Filipino, and 10% Pacific Islander), 63% were first-generation college students, and 61% came from families with incomes below the state median.<sup>3</sup> 'Imi Ho'ōla accepts up to 12 students a year with ties to Hawai'i and the U.S.-Affiliated Pacific to participate in the program. Upon successful completion of the program, students matriculate to JABSOM as first-year medical students the following year. Successful matriculants enter medical school equipped with a stronger foundation in the basic sciences, are familiar with the problem-based learning (PBL) process, and are able to apply specific learning and test-taking strategies to support their academic success.

The 'Imi Ho'ōla program is comprised of 3 phases - Phase 1: Assessment and Orientation, (July through August), covering an introduction to the foundation (*kahua*) of personal, academic, and professional skills, Phase 2: Post-Baccalaureate Enrichment, which includes rigorous coursework in medical biochemistry, medical biology, and humanities in medicine (August through May), and Phase 3: Pre-Matriculation (May through June), focusing on transitioning students into medical school. This article will focus on Phase 1, the *kahua*.

## Background of Phase 1

Phase 1 incorporates a blend of individual, pair, group, and entire class work in the form of lectures, discussions, presentations, and reflections. Students develop their oral and written communication skills from various assignments and projects. The focus is on understanding themselves by reflecting on who they are, where they come from, and where they want to be, by looking at their self-concept, values, and learning preferences and approach. Phase 1 centers on laying the *kahua* by introducing and building each students' personal, academic, and professional skills. The development of these skills, with a healthy attitude and purpose, helps to promote success in 'Imi Ho'ōla, in medical school, as a future physician, and in life.

For some students it is their first time learning and trying out these skills and strategies, for others it is refining them. After learning about the 'Imi Ho'ōla PBL process, students apply this process to non-medical cases in Phase 1. Other skills covered include listening and notetaking, reading and study strategies, exam preparation and exam taking, time management, stress management, and managing test anxiety. Additionally, concepts and strategies covered also include critical thinking and reasoning, wellness, professionalism, and medical terminology. These specific tools and strategies covered in Phase 1 continue to be refined throughout Phase 2 and Phase 3.

In the beginning of Phase 1, students are administered learning, personality, and lifestyle assessments and inventories to establish their level of skill development in reading and in learning strategies, and to identify learning and personal preferences and tendencies. In addition, a biochemistry pre-test is administered to provide baseline data on their competency in biochemistry. Based on the assessment results, course evaluations, and observations, all 'Imi Ho'ōla faculty come together to create individualized learning plans for each student, providing information on the students' strengths and recommendations on areas for further development. The Program Director, Learning Specialist, and Program Assistant meet with the students 5 times throughout the year, to go over this plan and provide recommendations and strategies for success.

### Importance of Attitude and Purpose

One of the assessments administered in Phase 1 is the Learning and Study Strategies Inventory (LASSI).<sup>4</sup> It is designed to help students gather information about learning, study practices, attitudes towards learning, and methods of studying. The LASSI is divided into 10 scales assessing student's awareness about and use of learning and study strategies related to skill (information processing, selecting main ideas, and test strategies), will (attitude, motivation, and anxiety), and self-regulation (concentration, time management, self-testing, and using academic resources) components of strategic learning. The intent is that thoughts, behaviors, attitudes, and beliefs that relate to successful learning can be promoted through educational intervention.<sup>6</sup>

For medical students, self-assessment tools such as the LASSI, provide students with information about their strengths and weaknesses and where to implement targeted support in specific study strategies which may correlate with a positive academic performance outcome.<sup>7</sup> In another study, time management and self-testing were stronger predictors of first-year academic performance than aptitude.<sup>8</sup> Other literature suggests that, for at-risk medical students, a combination of study skills, test-taking strategies, and time management learning tools should be provided to increase their chances of success. Further discussion suggests that the "will" components, such as motivation and attitude, are needed to promote the skill and self-regulation learning strategies for success.<sup>4,5</sup> A recent 'Imi Ho'ōla program evaluation identified the significance of the Attitude Scale of the LASSI. Having a healthy attitude and sense of purpose is a significant factor that can predict student success and the potential completion of the 'Imi Ho'ōla program.<sup>3</sup>

### Laying the *Kahua* in Phase 1 by Incorporating Attitude and Purpose

New additions and revisions are now implemented in the Phase 1 curricula, strengthening the laying of the *kahua*, through sessions designed to explore and clarify students' attitude and purpose (Table 1). Starting in Phase 1, the program stresses to the students the importance of giving meaning, relevancy, and a sense of purpose to why they want to become a physician. The goal is to have students be equipped with a toolbox of strategies to strengthen and maintain a healthy attitude and a sense of purpose throughout their academic medical journey and in their life-long professional and personal journey as a physician.

Examples of these curricula innovations include having students create a journal "vision" cover, by creatively using words, phrases, pictures (ie, from magazines, websites, and clipart) to represent positive and inspiring messages, often expressing where they see themselves in the future. In these journals, students are encouraged to self-reflect weekly on topics such as what they enjoyed, the challenges of what they learned, and what they will plan to implement in the future. At the end of Phase 1, they cumulatively reflect about what they learned through a summative journal entry. They also teach each other a learning success strategy and affirm to each other what tools they will attempt to utilize in Phase 2.

Other projects include an autobiography multimedia project, which further expands on the lifelines students share on the first day of Phase 1. Students are introduced to the importance of honoring where they come from by sharing who they are, including their family history, where they were born/grew-up, interests, and the significant events in their lives leading up to being enrolled in the program. Prior to starting 'Imi Ho'ōla, many students are not accustomed to seeing others from similar backgrounds pursuing medicine. Early in Phase 1 students are reminded about the significance of who they are and their



Table 1. 'Imi Ho'ōla Phase 1 Curricular Innovations	
Curricular Innovation	Ways to Incorporate Healthy Attitude and Purpose
Journal "Vision" Cover	To individually place words, phrases, pictures from magazines, clip art, etc. to represent positive and inspiring messages, giving purpose for their current and future goals.
Weekly Reflective Journal Entries	To self-reflect every week in writing on what they enjoyed, the challenges, what they learned, and what will use in the future
Autobiography Multimedia Project	To create an autobiography multi-media project, sharing who they are, where they come from, how they got to 'Imi Ho'ōla, and why they are pursuing medicine
Physician Specialty Project	To gain knowledge of different career paths and the awareness of their career interests and why they want to become a physician
Clinical Skills / SimTiki Session	To gain exposure in simulated clinical experiences in medicine and what it means to be a physician
Sense of Place	To purposefully understand their sense of place within the 'Imi Ho'ōla program, the historical and cultural significance of the program and JABSOM's physical location, and the meaningful connection of the program being part of the Department of Native Hawaiian Health
Wellness and Resiliency	To discuss and develop foundational skills to promote well-being and self-care as future health care providers
Book Projects	To read about non-technical science books, engage in meaningful discussions on ethical issues in medicine and health care, while promoting personal and professional relevancy

JABSOM = John A Burns School of Medicine

backgrounds, and also realize others in the program now and those who have completed the program share similar journeys. In addition, they share where they see themselves in the future. This reinforces having a purposeful attitude by thinking about the reasons they have enrolled in the program and exploring why they want to be a physician. This ties into a project where students select a physician specialty to research. They share the specialty pathway and requirements needed, job duties and work environment, patient population characteristics, and lifestyle considerations of these specialties. This project reminds students to keep an open mind as they learn from each other's presentations and create informational brochures during the exploration of different pathways in medicine. In Phase 1 there is also a session on clinical experiences in medicine. Students have the opportunity to visit JABSOM's Simulation Lab with a simulated mannequin (SimTiki) and practice introducing themselves to a patient, taking vitals, and experiencing what it may be like if a patient is in distress and undergoes a medical emergency and "codes." These practical experiences are helpful as students reflect on what it means to be a physician. These projects reaffirm their interests as they reflect on the overall purpose of why they are pursuing a career as a physician.

While in Phase 1, students are reminded about their purposeful place in 'Imi Ho'ōla. They learn about the history and cultural significance of the medical school's location, specifically the Kaka'ako area of Honolulu, in ancient and present-day Hawai'i, and the meaningful connection of 'Imi Ho'ōla being part of the Department of Native Hawaiian Health. This emphasizes the meaning and purpose of where they are and understanding their sense of place. Phase 1 also incorporates projects and activities that focus on wellness and resiliency, providing the foundational skills to promote well-being and self-care as future health care providers. Topics include dealing with adversity, burn out, mental health, and making healthy choices. There are also book projects, which include written and oral components, that incorporate non-technical science books about medicine

and health care. Students engage in reflections and meaningful discussions on ethical issues, while critiquing and sharing practical takeaways from their reading. This promotes personal and professional relevancy in their path toward medicine. The activities, projects, and assignments in Phase 1 encourage peer instruction and collaborative learning. Additionally, Phase 1 introduces students to the foundations of the PBL curriculum of JABSOM and 'Imi Ho'ōla, stressing the importance of teaching and learning from each other.

Preliminary observations and feedback of these curricular innovations indicate that these students are active learners who develop self-awareness, as well as increase their confidence as learners and leaders within the program and throughout medical school. A large number of 'Imi Ho'ōla alumni have taken on leadership roles while in medical school and in their careers, and are often active in social justice issues and community engagement activities.

'Imi Ho'ōla plans to further refine these innovative, healthy attitudes and purpose-led activities that start in Phase 1, and work on expanding and aligning them throughout the program. The program will continue to broaden initiatives and track the outcomes of 'Imi Ho'ōla alumni in medical school and in their careers. Implications of such initiatives and studies will continue to assist the program in facilitating the success of 'Imi Ho'ōla students while in the program and beyond.

## Summary

The curricular innovations implemented in Phase 1 address attitude and purpose, which are instrumental in promoting the success of underrepresented and disadvantaged students enrolled in a post-baccalaureate program. The *kahua* of personal, academic, and professional skills introduced early on in Phase 1 promote a healthy attitude and give purpose and meaning, vital to the success and well-being of future physicians. A

large number of 'Imi Ho'ōla alumni go on to lead and provide meaningful service to the medical school and continue to serve in leadership roles within their practices, as advocates for their patients, families, and communities.

The 'Imi Ho'ōla Post-Baccalaureate Program has significantly increased the number of underrepresented and disadvantaged students that complete medical school in Hawai'i. Such a valuable medical pathway program is needed to diversify Hawai'i's healthcare workforce, by increasing the number of future underrepresented physicians and physicians serving in underrepresented communities in Hawai'i and the Pacific.

### **Conflict of Interest**

None of the authors identify a conflict of interest.

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# Building a Culturally Aware Native Hawaiian Health Professions Workforce

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## Abstract

*The Native Hawaiian Health Scholarship Program (NHHSP) strives to build a culturally aware Native Hawaiian health professional workforce through coaching, mentoring, and networking, who are committed to serving the unique health needs of Native Hawaiians throughout the State of Hawai'i. As of October 2020, 302 scholarships have been awarded to 277 recipients across 12 health disciplines with 90% remaining in Hawai'i. In 2019, NHHSP began re-imagining how to build a vibrant, culturally aware workforce, committed to service, leadership, and improvement of Native Hawaiian health through program expansion. This article describes the transformation of NHHSP to Maui Ola Mālamalama (MOM), a success-oriented strategy-based Native Hawaiian Health Workforce Development Center of Papa Ola Lōkahi. Researchers conducted a qualitative assessment using surveys and interviews among alumni of the program to understand their experience of being a recipient and its meaning to them. Questions included work experience, challenges, solutions, impact of working in rural communities, mentorship, and legacy. The 5 themes identified by alumni were awareness, passion, inherent culture, reciprocity, and legacy. The overarching theme of the assessment, aloha, is embedded in the passion and desire to serve Native Hawaiian communities. Re-imagining the program from NHHSP to MOM began with examining the core values of suitability, commitment, and leadership. These values were then embedded in all aspects of the program and supports provided to recipients. MOM strives to ensure that recipients are culturally aware as they enter the workforce. This broader vision will help increase the number of Native Hawaiians in health care roles.*

## Keywords

*Native Hawaiian, workforce development, health professionals*

## Abbreviations

*MOM = Maui Ola Mālamalama*

*NHHSP = Native Hawaiian Health Scholarship Program*

*NHHWDC = Native Hawaiian Health Workforce Development Center*

## Introduction

Hawai'i has a shortage of healthcare providers across the state. However, the shortage is greatest for Native Hawaiian and other Indigenous providers. In an earlier article in this edition, it is demonstrated that while 21% of the population of Hawai'i are of Native Hawaiian ancestry, only 4.5% of the physicians are Native Hawaiian.<sup>1</sup> This must change to maximize the benefit of the healthcare system for all populations of the state.

For Native Hawaiian and other Indigenous students, the various barriers of post-secondary degree attainment and life outcomes

are attributed to the adverse effects of American colonialism and historical trauma.<sup>2</sup> Barriers for Indigenous students' post-secondary degree attainment include but are not limited to the following: difficulties of relationship building with non-Indigenous members; the need to adhere to the social protocols of the dominant culture; lack of financial support; underrepresentation of Indigenous peoples in academia; separation from country and/or land; and the external obligations Indigenous students may have to their families and communities.<sup>3,4</sup>

The Native Hawaiian Health Scholarship Program (NHHSP) strives to build a culturally aware Native Hawaiian health professional workforce through coaching, mentoring, and networking. Established in 1991 under the Native Hawaiian Health Care Act of 1988, the NHHSP is a merit-based scholarship administered by Papa Ola Lōkahi, the Native Hawaiian Health Board responsible for the oversight of the Native Hawaiian Health Care Improvement Act.<sup>5</sup> As a merit-based scholarship, NHHSP provides a comprehensive award to Native Hawaiian students seeking a degree in 1 of 12 primary care health professions including medicine, nursing, physician assistant, dentistry, dental hygiene, nutrition, social work, clinical psychology, optometry, marriage and family therapy, pharmacy, and public health.

Modeled after the National Health Service Corps, the NHHSP addresses the underrepresentation of Native Hawaiians in the primary health care professions.<sup>6</sup> The goal of the NHHSP is to develop a skilled and culturally aware Native Hawaiian health professional workforce that is committed to serving the unique health needs of the Hawaiian communities and improving health access and outcomes throughout the State of Hawai'i.

As of October 2020, 302 scholarships have been awarded to 277 recipients across 12 health disciplines with an estimated 90% of recipients remaining in Hawai'i. The NHHSP receives an average of 60 applications each year and makes about 10 awards a year to Native Hawaiian students who demonstrate suitability, commitment, and leadership to serve the Native Hawaiian and non-Indigenous underserved communities within the State of Hawai'i. Recipients' awards include tuition, other reasonable costs, and a monthly stipend. The award amount ranges from \$35,000 to \$379,000 and is dependent on the number of years remaining in education. All recipients are required to serve a minimum of 2 years and maximum of 4 years in return. The service requirement is dependent on the number of years of support.

The purpose of this paper is to describe the process of making the transformation from NHHSP to Maui Ola Mālamalama (MOM) a success-oriented strategy based Native Hawaiian Health Workforce Development Center (NHHWDC) of Papa Ola Lōkahi. The intent of this re-imagining was to increase the number of awards and support to be even more effective at building a culturally aware Native Hawaiian health professional and paraprofessional workforce. In this way, the chance of meeting the healthcare needs of Hawai‘i will be maximized.

## Methods

The NHHSP has contributed to improving the health of Native Hawaiians by providing care in rural settings, establishing health care services in places they were nonexistent, and grooming today’s leaders. In 2019, NHHSP began re-imagining how to build a vibrant, culturally aware workforce of health professionals committed to service and leadership to improve the health of Native Hawaiians.

To understand its successes and challenges, NHHSP conducted a qualitative project with NHHSP alumni during the Summer of 2018. A series of open-ended questions were developed to understand the alumnus experience of being a recipient of NHHSP and included work experience, challenges, solutions, impact of working in rural communities, mentorship, and legacy. The open-ended questions were used both as the interview guide and provided through a link to an on-line questionnaire using SurveyMonkey software (Momentive, San Mateo, CA). In-person interviews were audio recorded and transcribed verbatim. On-line questionnaires were compiled by questions.

NHHSP has 235 alumni across 12 health disciplines spanning nearly 30 years. The research team decided to sample 15% (n=37) of alumni across discipline, cohort year, and available contact information (email and phone). Of the 37 contacted, 18 participated with 4 completing an in-person interview and 14 completing the online questionnaire.

A thematic analysis was completed by the primary author and 2 NHHSP undergraduate nursing students. Each member independently reviewed and identified codes from the interview transcripts and open-text responses from the on-line questionnaire. Codes were presented, discussed, and themes emerged. The themes were then utilized in the reimagining of the NHHSP to MOM NHHWDC.

## Results

Five main themes emerged from the analysis. Themes included awareness, passion, inherent culture, reciprocity, and legacy. The overarching theme was *aloha* and how *aloha* is embedded in the passion and desire to serve Native Hawaiian communities. *Aloha* was the legacy that the NHHSP alumni described.

Awareness: Participants felt that NHHSP raised awareness of health issues Native Hawaiians face by exposing recipients to clinic and rural settings. This exposure encourages recipients to improve their work as well as develop a passion for improving the health of Native Hawaiians. One participant had this to say, “the scholarship really took us around the islands to meet all of the agencies that service Hawaiians. That’s how I built my connections. The scholarship broadened our horizons and gave us experiences.”

Passion was essential as participants began their service in rural communities. Participants described passion as the ability to provide health care to rural communities. One participant shared, “so what motivates me is that I know and accept fully my role and responsibility as a caregiver. And in doing so my heart lies with my people. So my heart lies with my family, my heart lives with the community-at-large, with any person that I come into contact, regardless if they’re Hawaiian or not, they’re still a part of me as I am a part of them. So that’s what motivates me, that’s what drives me. That’s what keeps me wanting to keep going every day.”

For participants, inherent culture was the ability to provide meaningful care from one Native Hawaiian to another Native Hawaiian. The participants agreed that inherent culture came down to how passionate the provider was in serving the community. One participant shared, “Our awareness allows us to connect to Native Hawaiians because we can relate to them. Non-natives don’t always understand the lifestyle and feel it’s easy to make simple changes such as not eating rice, although many natives have grown up with that as a staple. Unless you can connect and relate, it’s hard to make a change.”

Reciprocity is the ability to give back. This was commonly discussed among the participants. Reciprocity was encouraged by NHHSP to give back to the Native Hawaiian community. One participant shared, “Words cannot ever describe the blessing or encouragement of the NHHSP; they encouraged me through their transparency, truthfulness, contacts, and unwavering *aloha* for the scholars and recognizing their talents.”

Legacy lasts beyond any participant’s time as a provider. Legacy is seen as a lasting impact on an individual, family, and community. As one participant shared, “Being a healthcare provider requires passion to help, to serve, to make a difference. Sometimes making a difference is on a small scale, such as getting one person off diabetic medications. Other times the difference is huge such as establishing a non-profit organization in a rural area. Either way you’ve made a difference as long as you are passionate and genuine in your desire to serve, your legacy will live on.”

The findings informed the re-imagining of NHHSP to MOM NHHWDC. The renaming broadened the scope of awards and support to build a culturally aware Native Hawaiian health



professional and paraprofessional workforce. Guided by the overarching theme of “*aloha* is embedded in the passion and desire to serve Native Hawaiian communities,” MOM works on awareness through alignment of scholar recruitment and selection; embedded passion, inherent culture, reciprocity and legacy through the development of programs focused on leadership, knowledge, and support through learning opportunities (Ola Nā ‘Ōiwi program) and mentoring (‘Ua‘u Lele); and innovative ways to reach and provide resources to more individuals pursuing health careers through a new initiative of Kāko‘o Ulu ‘Oihana program.

### **Alignment: Suitability and Commitment**

Developing a culturally aware workforce begins with a holistic application process. Applicants are evaluated based on 3 areas: suitability, commitment, and leadership. These 3 areas correspond to the following Native Hawaiian values: suitability – *‘olu‘olu* (pleasant), *kuleana* (responsibility), *hoihoi* (cheerful), *pono* (right/correct), *a‘o* (to learn), *ha‘aha‘a* (humble), *hana ka lima* (hard working), *ka‘i* (to lead); commitment – *pono* (right/correct), *kuleana* (responsibility), *hoihoi* (cheerful), *a‘o* (to learn); and leadership – *ha‘aha‘a* (humble), *hana ka lima* (hard working), *ka‘i* (to lead), *a‘o* (to learn).

Applicants complete a comprehensive on-line application which includes letters of recommendation, a personal statement, a CV or resume along with other supporting documents. Eligible applicants are then interviewed by a panel comprised of NHHSP staff, Papa Ola Lōkahi staff, community, and employers. Applicants are then invited to submit a value-based video which demonstrates suitability, commitment, and leadership.

The emphasis on Native Hawaiian values as part of the evaluation process, ensures that applicants are prepared for the rigors of the award, from education to completion of service. As a recipient, individuals receive financial support including a monthly stipend while in school. Recipients are required to maintain a 3.0 GPA or better, complete monthly reports, and participate in face-to-face check-ins with their Coordinator. This generous award then requires the recipient to work at a Native Hawaiian Health Care System or a medically underserved area within the State of Hawai‘i for each year of award with a minimum of 2 years and maximum 4 years. While in service, recipients continue to do monthly face-to-face check-ins and complete quarterly written reports. Once complete with their service, recipients transition to an alumnus status and continue to engage as a mentor, practicum site, or presenter for NHHSP/MOM.

### **Leadership, Knowledge, and Support**

Developing a culturally aware Native Hawaiian health professional workforce requires mutual commitment between recipients and the NHHSP. Recipients are provided resources and support to facilitate growth in leadership and knowledge throughout their award period and thereafter. The period can

be between 2 to 12 years and is dependent on the health profession and number of years awarded. The goal is to ensure that recipients are successful in education, service, and as alumni by providing them with knowledge and skills to provide culturally aware care in our Native Hawaiian communities. Recipients are assigned a specialist to support them, attend learning series, and are matched with a mentor to guide them through their education and professional career.

Recipients are assigned a specialist with whom they work with from contract signing to contract completion. The specialist works closely with each recipient to ensure that appropriate support and resources are provided to ensure successful contract completion. Support is provided through monthly meetings throughout the contract period. This allows the specialist to identify areas needing additional support in academia, post-graduate training, as well as during service employment.

Enhancing the growth and development of future Native Hawaiian health care professional leaders in the Hawaiian community is essential. ‘Ua‘u Lele, a formal mentoring program was established in 2019. The intent of ‘Ua‘u Lele was two-fold: first, provide an opportunity for NHHSP Alumni and Native Hawaiian health professionals to continue their legacy by nurturing upcoming Native Hawaiian health professionals and second, providing current scholars with the guidance, support, and connections needed to nurture best practices as new health professionals.

Ola Nā ‘Ōiwi focuses on professional development and seeks to increase awareness and understanding of Native Hawaiian health disparities. The series features Native Hawaiian health professionals from across all disciplines throughout the State of Hawai‘i, the continental US, and across the lifespan. Since launching Ola Nā ‘Ōiwi in 2019, NHHSP has hosted 24, 90-minute webinars with 1,688 registrants. Ola Nā ‘Ōiwi has reached individuals locally, nationally, and internationally. Attendee comments have guided the selection of topics and speakers who address Native Hawaiian social-cultural determinants of health within the context of Native Hawaiian values. The series continues to grow and will launch a podcast series called Social Hour. The podcasts will focus on interdisciplinary health care approaches, resources, and networking.

Leadership Series with I Ola Lāhui is targeted towards training tomorrow’s leaders. I Ola Lāhui provides a culturally minded, evidence-based program focused on preparing scholars for career placement and beyond. Topics include stress management, self-care, career planning, and leadership. NHHSP has hosted nine, 2-hour sessions with 61 participants. The series is limited to only those in their first year of award. As the program continues to grow, a new program, “Growing leaders from within” will launch in 2022. This program will identify and provide leadership training to those working in Native Hawaiian Health interested in developing leadership skills.

Through Ola Nā ‘Ōiwi and the leadership Series with I Ola Lāhui, recipients are provided with support and programming to ensure success in both education and career. The emphasis is placed on being culturally aware as they prepare and enter the workforce. Through the support and programs, recipients are provided real life examples of the health status of Native Hawaiians and can use that as a trajectory to be leaders in the way they practice in their profession. More cultural topics and activities will be folded in as NHHSP grows in reach and subject area expertise.

The establishment of ‘Ua‘u Lele, mentorship program, is backed by literature that indicates support and programs ameliorate barriers to post-secondary degree attainment for Indigenous students.<sup>3-4,7-9</sup> Foremost, recipients are provided financial assistance through NHHSP. ‘Ua‘u Lele expounds on the needs of the recipients by promoting *pilina* (relationship building). Recipients are paired with *kua‘ana* (older sibling, mentor) from similar career and cultural backgrounds. Research indicates that Indigenous students find negotiating mainstream culture to be isolating.<sup>3</sup> Indigenous mentors who share similar backgrounds with their mentees can relate to pressures specific to Indigenous students, including the challenges that arise from conflicting worldviews and ways of learning and building relationships.<sup>7</sup> ‘Ua‘u Lele *kua‘ana* are tasked with guiding *haumāna* (students, mentee) as they develop goals for the school year and provide constructive and supportive feedback regarding recipients’ progress toward achieving those goals. *Kua‘ana* are also responsible for fostering networking opportunities by identifying various resources for recipients’ benefit, introducing recipients to faculty and other health professionals, and connecting recipients with experts in the community who can provide career perspectives. Additionally, *kua‘ana* can share personal experiences with recipients that are specific to recipients’ needs and challenges.

These mentors act as culturally appropriate professional role models who can advocate for students with other academics or professionals.<sup>8</sup> Thus, the purpose of ‘Ua‘u Lele is to foster dedicated leadership through relationship building that will ultimately improve the quality of health care and accessibility of health services within Native Hawaiian communities by Native Hawaiian health care professionals that are grounded in Native Hawaiian practices.

## **Discussion: Reimagining Tomorrow’s Workforce**

In 2020, the NHHSP was re-imagined to Maui Ola Mālamalama: Native Hawaiian Health Workforce Development. This re-imagining allows for a greater reach to increase the number of Native Hawaiians in healthcare roles serving and supporting one another, primarily through removing financial barriers that may otherwise prevent Native Hawaiians from entering the workforce. In addition to offering financial assistance to applicants committed to improving the health of Native Hawaiian communities, we seek to identify and address gaps in educational attainment that exist for Native Hawaiian students by establishing additional health scholarship pathways and providing support and resources.

These pathways may include providing financial support for applications to programs or conferences, certificate programs, program materials, certifications, licensures, and/or examinations, living expenses, travel, housing, and childcare. Furthermore, we aim to provide a more holistic approach to student and professional well-being that focuses on emotional and mental health in addition to academic and professional pursuits. These initiatives will be carried out through our series, Ola Nā ‘Ōiwi and with I Ola Lāhui, as well as through ‘Ua‘u Lele and our upcoming Kōhi ‘Ulu, a podcast, where recipients, health professionals, and community members alike can connect to better understand how we can improve the health of Native Hawaiian communities.

The goal is to diversify the workforce, increase investment in the community as community members, expand reach into rural and underserved communities, and foster a sense of belonging and in-school community that ultimately serves to benefit the broader community. By extending impact beyond the NHHSP, the program can support and facilitate the continued development of Native Hawaiian health professionals to increase the economic prosperity, and thus improve the overall wellbeing of the Native Hawaiian community.

## **Conflict of interest**

None of the authors identify a conflict of interest.

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# Hawai'i Rural Health Program: Shaping the Next Generation of Rural Doctors

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## Abstract

*Like many areas of the United States, Hawai'i and its rural communities are suffering from a significant physician shortage. The University of Hawai'i (UH) John A. Burns School of Medicine (JABSOM) developed the Hawai'i Rural Health Program (HRHP) in 2011 to help provide early and substantial rural training experiences for its medical students in hopes of generating more rural health care providers. Thus far, 20.6% of the students who participated in this program and have since graduated from residency are now practicing in rural communities. Final exam grades of students who participated in the program were not statistically different from those who did not participate, suggesting a similar quality of training between both the rural and traditional cohorts of students. Reflections from students who completed the program demonstrate the large and lasting impact that this immersive experience has on their medical education and desire to help rural communities.*

## Keywords

*Rural health, medical education, Hawai'i Rural Health Program (HRHP), University of Hawai'i (UH) John A. Burns School of Medicine (JABSOM), physician shortage*

## Abbreviations and Acronyms

HRHP = Hawai'i Rural Health Program  
JABSOM = John A. Burns School of Medicine  
PBL = problem-based learning  
UH = University of Hawai'i

## Introduction

The health profession shortage in Hawai'i is pervasive throughout the islands, with an estimated physician shortage of 29% statewide according to the 2020 Hawai'i Physician Workforce Assessment Project.<sup>1</sup> This deficit is particularly glaring within Hawai'i's rural communities. Hawai'i Island (colloquially referred to as the Big Island), Maui County (encompassing the islands of Maui, Kaho'olawe, Lana'i, and Moloka'i), and Kaua'i have physician shortages of 53%, 42%, and 33%, respectively.<sup>1</sup> Although the rural physician shortage is profound in Hawai'i, this problem is not unique to the islands. Rural physician shortages are observed nationally and internationally. It is estimated that 20% of the United States population lives in rural areas, while only 11% of physicians practice in these communities.<sup>1</sup>

Multiple studies have validated that health care providers who are from rural areas are more likely to practice in rural commu-

nities.<sup>2-4</sup> MacQueen et al's systemic review included 50 studies published between 2005 and 2017 and concluded growing up in a rural place as the strongest predictor of health care workers returning to rural communities.<sup>2</sup> A study of multiple Australian medical schools found that students from rural areas were 10 times more likely to favor working in rural communities compared to their peers who were from urban areas.<sup>5</sup> A 2010 survey of University of Hawai'i (UH) John A Burns School of Medicine (JABSOM) students supported these findings and showed that students from rural backgrounds were 11 times more likely to want to practice in rural communities in the future.<sup>6</sup> This correlation extended beyond intention. A survey of JABSOM alumni showed that 46% of physicians practicing in rural places across Hawai'i were from rural communities.<sup>6</sup>

The literature also suggests that rural medical training programs may improve rural physician recruitment.<sup>2,3</sup> MacQueen et al's systemic review concluded that approximately 44% of providers who were trained in rural communities were retained in such communities.<sup>2</sup> Rural residency programs have shown particular promise, with one study showing that physicians who attended rural residencies were three times as likely to practice in a rural area.<sup>7</sup> Positive associations towards rural practice have also been observed through rural clerkship programs and electives.<sup>8,9</sup>

Medical students at JABSOM can gain exposure in rural health care via enrollment in the Hawai'i Rural Health Program (HRHP). The HRHP was developed at JABSOM in 2011. Funding for this program has been made possible through multiple sources including the Rural Neighbor Island Medical Education Fund, Area Health Education Center (Grant #U77HP08404), Native Hawaiian Center of Excellence (Grant #D34HP16044), and the North Hawai'i Medical Education Fund. The program provides first-year medical students with opportunities to experience what medical practice is like in rural Hawai'i communities. The state of Hawai'i is comprised of eight main islands. The following seven islands are mostly rural communities and are collectively referred to as the Neighbor Islands: Ni'ihau, Kaua'i, Moloka'i Maui, Lana'i, Kaho'olawe, and Hawai'i Island (Big Island). JABSOM's campus is located in Honolulu, the urban capital of the state, on the island of O'ahu. The main goal of the program is to encourage students to return to these communities, especially the neighbor islands, as physicians in the future.



## Methods

Initially HRHP sent up to six students to Hilo during the Spring semester of their first year. In 2014, the program expanded and now sends up to 12 students to Hawai'i Island for a 12-week block in their first year. Six students live in Waimea and six students live in Hilo. The program covers the cost of housing, airfare, and car shipment expenses for the students.

The Hawai'i Island students participate in the same educational activities as their counterparts on O'ahu, such as problem-based learning (PBL), clinical shadowing, and community engagement, with the unique opportunity to do so in a rural setting. Each group on Hawai'i Island is paired with a local physician, their PBL tutor, to guide them through their bi-weekly PBL sessions that follow the same curriculum as the O'ahu students. Students also shadow various community physicians, allowing them to develop their clinical skills and gain experience in rural medicine. The O'ahu students primarily shadow physicians in urban settings. Additionally, students engage with the community on a regular basis by participating in local health events, mentoring elementary and high school students, and exploring the natural beauty of Hawai'i Island. Some of the community events that the Hawai'i Island students lead are also offered on O'ahu, such as Tar Wars and Teen Health Camps, however some events are specific to Hawai'i Island, such as attending Rat Lungworm Support Group meetings.

The Hawai'i Island students have access to the same lectures as their O'ahu classmates, with the option to live-stream them via a video-conference app or to view the archived lecture recordings. When live-streaming the lectures, students can engage with and ask questions to the lecturers, emulating an in-person lecture. The rural health students return to O'ahu three times during the unit to participate in anatomy dissections and review sessions. The students take their mid-unit exam on Hawai'i Island, proctored by their PBL tutor. One week prior to final examinations, the students return to O'ahu so they can participate in end of unit review sessions and take their final examinations with their peers at JABSOM's main campus.

In 2019, surveys were sent to the 12 students once they completed their time on Hawai'i Island. Ten students responded and their subjective responses are included in the reflections section of this paper. Responses were edited for clarity and length.

## Results

To date, 97 students have participated in the HRHP on Hawai'i Island, with 56 students rotating in Hilo and 41 students rotating in Waimea. Of the past HRHP students, 29 have finished their residency training and are currently in practice. Of those who have completed their residency training, 21% (6 out of 29) are working in rural communities. Five of the six of these rural physicians are working on a neighbor island in Hawai'i and one is working in a rural community in California.

To ensure that the HRHP students were not compromising their education while training on Hawai'i Island, final exam grades were compared to non-HRHP students. From 2015 to 2019, there were no statistical differences between the end-course exam scores for HRHP students vs. non-HRHP students in any exam (Table 1).

	HRHP Students n=58	Non HRHP Students n=284	P-value
Anatomy Exam	85.1%	83.7%	.45
Pathology Exam	86.4%	85.6%	.73
PBL/Lecture Exam	79.5%	79.1%	.75

## Reflections

Some aspects of the HRHP's impact are difficult to distill into numbers and charts. The following are reflections from the 2019 HRHP cohort that highlight the diverse experiences they had while on Hawai'i Island, from providing medical outreach to high school and college students, to shadowing in rural clinics, attending Rat Lungworm support groups, traveling to Lana'i to host health fairs, and even creating similar programs to expand the mission of HRHP. Each subtitle below marks an excerpt written by a different member of the 2019 HRHP cohort, reflecting on a distinct aspect of the program. These experiences emphasize the positive impact that immersive programs like this can have on shaping the next generation of rural doctors.

### *Promoting Careers in Healthcare for High School and College Students*

*As a graduate of a public high school on Hawai'i Island myself, I never thought that becoming a physician was an option for me due to lack of exposure to the field of medicine growing up. However, programs like HRHP help to inspire young learners to pursue higher-level education and one day return to work in their communities. I attended an HRHP event back in 2017 when I was a student at UH Hilo, and here I am now helping to conduct the same workshop in 2019 as a medical student! The opportunity to return home and help lead community outreach programs for local students was the highlight of my HRHP experience. It was extremely meaningful to work alongside high school and undergraduate students in hopes of inspiring the next generation of doctors and health care workers.*

### *Insight into the Rural Community*

*The HRHP experience provides a remarkable opportunity for students to explore and learn from the rural communities they visit. Working closely with the local physicians, we were able to see how intertwined they can be with the lives of their pa-*

tients. The family medicine physician I shadowed would speak of her frequent interactions with patients she saw at the coffee shop and about the texts she would receive from concerned parents about their children. One evening, my classmate and I were invited to her hula practice and saw that it served as an opportunity for her fellow dancers to share health updates and concerns. It was apparent how deeply ingrained into the community she was and how much joy it gave her to help her patients in and out of the clinic.

Hawai'i Island left us overflowing with memories of its natural beauty, its devoted physicians, and treasured time shared together as classmates. The experience showed us how vital local physicians are to a rural community. While the physicians we worked with showed great sacrifice, it was clear that they found their work to be very rewarding. The HRHP experience opened our eyes to the joys that a future career in rural health could offer.

### **The Parasite Plaguing Rural Hawai'i**

We attended Rat Lungworm support group meetings in both Puna and North Kohala on Hawai'i Island. These meetings brought together patients who have been affected by Rat Lungworm, their loved ones, local hospital staff, and concerned community members. JABSOM teaches more about Rat Lungworm than most medical schools in the U.S., so we attended that meeting with what we thought was a sufficient understanding of this parasite and its effect on the human body. It quickly became evident that there was a disconnect between our medical textbooks and reality. Our textbooks also failed to highlight how a devastating parasite can uniquely affect rural communities like these.

One community member expressed frustration that if this had affected Honolulu, then doctors would be better educated on how to diagnose this disease, travelers would be warned of the serious consequences of not washing local vegetables properly, and more resources would be dedicated to finding a cure for this parasite. We interviewed community members living with Rat Lungworm and created a video for JABSOM's PBL curriculum to provide a humanistic understanding of this condition. This video is now shown to all first year JABSOM students.

### **The Unique Healthcare System of Lana'i**

Our HRHP cohort was fortunate to travel beyond Hawai'i Island as well; we flew to Lana'i. The agenda for our trip included hosting a health fair where we taught students how to cast and suture, perform an array of clinical skills, and treat select infectious diseases. There has not been a student from Lana'i enrolled at JABSOM in the past few decades, but hopefully, this bright group will change this, and potentially alleviate the healthcare shortage on the island.

Our first visit to the island opened our eyes to the significant challenge Lana'i faces with their shortage of physicians. A small population of roughly 3,000 people is not enough to support certain specialties such as OB/GYN, pediatrics, emergency medicine, and cardiology. However, the need for these services is indisputable. Most people on Lana'i have to purchase air ambulance insurance to cover the cost of flying to neighboring islands for medical treatment. A pregnant woman in Lana'i must move to Honolulu weeks before delivery because babies cannot be delivered locally. For the more urgent care, the time it takes to be driven to the airport and subsequently airlifted to a Honolulu hospital may affect the patient's prognosis.

### **Student Advocacy Projects**

As part of the HRHP curriculum, medical students complete an advocacy project that requires them to identify and research medically related issues in a rural area and provide a sensible solution and detailed plan on how to combat the problem. In doing so, medical students learn more about the unique healthcare challenges that rural communities face while envisioning practical ways they could help support them now and in the future.

With the help of two classmates, my project focused on piquing the interest of high school students to pursue a career in medicine and return to practice in rural Hawai'i. We focused our efforts on the district of Honoka'a: an old plantation community located on the northern tip of Hawai'i Island; a town rich in culture and neighborly comradery, but in need of more healthcare professionals to serve its residents. We outlined a program that provides Honoka'a High School students the opportunity to participate in several healthcare-related service projects and provide invaluable mentorship to help guide them into the medical field. As COVID-19 hindered the start of this program, plans are being made for future, modified efforts to carry out this program.

### **Discussion**

Programs like the HRHP are vital to the continued effort to educate future physicians who will be ready and willing to commit to a life of medical practice in rural communities. The preliminary outcome of 21% of former HRHP students currently practicing in rural communities is promising. Future studies could compare this to the percentage of students who do not participate in HRHP to evaluate the impact that the HRHP has on rural practice selection independent of other factors known to help predict future practice in rural communities, such as growing up in a rural community.

The average final exam scores of the HRHP students were not statistically different from the rest of the class for the anatomy, pathology, and PBL/lecture exams, suggesting that participating in the program does not hinder students' academic performance.

The students on Hawai‘i Island have the same curriculum as those on O‘ahu, however they attend lectures virtually. In response to the COVID-19 pandemic, a significant portion of JABSOM’s curriculum has been transitioned to remote learning. This has normalized the remote learning experiences of the HRHP students. The PBL curriculum lends well to students studying remotely from campus since only one faculty or volunteer physician is required to oversee the small group of students during their PBL sessions. Some students choosing to enroll in HRHP have previously expressed concerns about learning anatomy virtually throughout the unit; however, the data shows that the mean anatomy scores of the HRHP students are not statistically different from their peers, suggesting the adapted curriculum is adequate and effective.

The student reflections highlight the meaningful experiences offered through HRHP, particularly the unique ways in which the students were able to connect with the Hawai‘i Island communities. Common themes found in the reflections are community involvement, mentorship, empathy, and advocacy, all of which emphasize the positive impact this program has on its participants.

This data is preliminary as only 30% of all students who have enrolled in HRHP have graduated from residency while the remaining 70% are still in training. As more students participate in HRHP and complete residency, future directions for research may include data on how many students in the program originally come from rural backgrounds and how this correlates with eventual rural practice. Additional data could include the overall rate of rural practice by JABSOM graduates before versus after implementation of HRHP. Another consideration would be to determine the number of physicians working with the students on Hawai‘i Island who are originally from rural areas themselves and whether this influenced their decision to practice there.

An obvious strength of the program is the promotion of rural health opportunities to students who are just beginning their formal medical education who may have otherwise not had exposure to rural medicine. This is done through the neighbor island outreach visits and time spent living on Hawai‘i Island. These aspects also provide students who are originally from rural areas to revisit those environments during medical school and re-solidify their sense of place and desire to return as licensed physicians. Since these individuals are more likely to return to practice in their community, the HRHP is an important tool in helping to inspire and recruit youth from these communities to pursue careers in medicine. Possible directions for growth of the HRHP include increasing the number of rural training sites across the Hawaiian Islands and/or creating a fully rural

pre-clinical track for a set number of MD candidates. Expansion of the HRHP in these ways could provide medical students and local youth alike with greater exposure to careers in rural health care, potentially addressing the physician shortage by generating more rural providers in the future.

## Conclusion

In a location such as Hawai‘i, where the barrier between rural populations and access to primary and specialty medical care is limited not only by the insufficient proportion of doctors to patients but also by the geographic separation between islands, active efforts to make these locations more attractive to future physicians need to come from within the curriculum of the state’s local medical school. The challenge of recruiting physicians for rural practice discussed in this article is not unique to the islands of Hawai‘i, thus the HRHP’s success can be adapted to the other areas of the United States struggling with similar doctor shortage issues.

## Conflict of Interest

None of the authors identify a conflict of interest.

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

Nash A.K. Witten MD; Lovedhi Aggarwal MD; Allen L. Hixon MD

## 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.

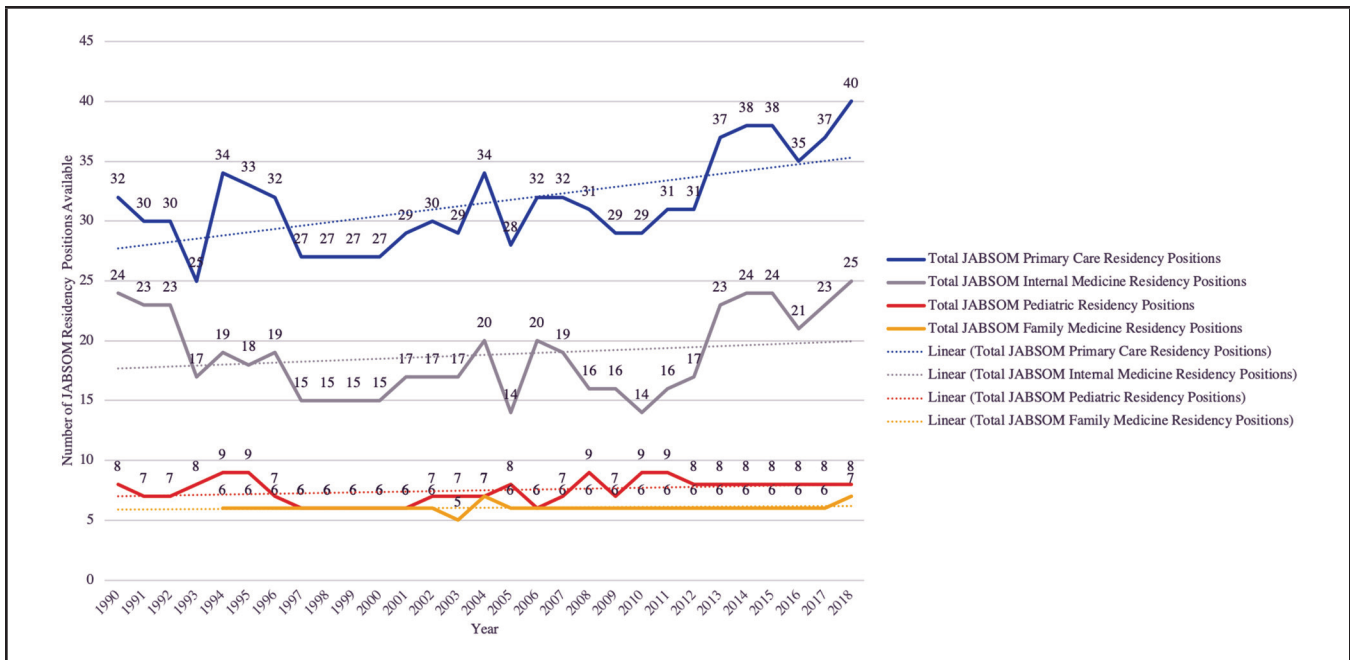


Figure 1. The Number of Available JABSOM Primary Care Residency Program Positions in Hawai‘i, Per Year. Data is based on NRMP Main Residency Match Data from 1990 to 2018.<sup>9</sup> All JABSOM Family Medicine, Internal Medicine, and Pediatric Residency available NRMP positions are included in the above 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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# Training Future Pharmacists to Optimize the Healthcare Workforce

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## Abstract

*Many efforts are taking place to improve the quality of healthcare and reduce healthcare cost. Pharmacists play a key role in optimizing the healthcare workforce, and colleges of pharmacy are adapting to this need by emphasizing skills needed to improve quality health measures, interprofessional collaboration and communication, and supplying quality drug information. The University of Hawai'i at Hilo Daniel K. Inouye College of Pharmacy has incorporated additional pharmacy practice experience electives to teach pharmacy students to analyze and optimize workflow, identify high-risk patients in need of intervention, and work collaboratively with providers to decrease patient burden. The pharmacy curriculum has also increased the number of interprofessional educational events for enhancing interprofessional collaboration and communication, including in a telehealth setting.*

*Furthermore, the college of pharmacy has increased the number of drug information assignments and practical exams to increase competency and the speed of providing quality, evidence-based drug information to providers. This article presents an overview of the health care workforce needs and examples of the increased efforts to train future pharmacists in Hawai'i to improve healthcare access and quality of patient care, as well as decrease healthcare costs.*

## Keywords

*healthcare payment reform; quality improvement; pharmacy education; interprofessional education; interprofessional collaboration; drug information*

## Introduction

When comparing the expenditure on healthcare and the present healthcare burden, the United States (US) has a wide gap. According to the 2015 Commonwealth Fund brief, the US spent nearly twice as much on healthcare as the average developed country and yet maintained the lowest life expectancy and the highest rates of disease burden, obesity and suicide.<sup>1</sup> In 2018, the US spent 17.7% of its gross domestic product on healthcare which is a 4.6% increase from the previous year.<sup>2</sup> Proposed reasons for this discrepancy in cost and care include a shortage of primary care providers leading to fewer physician visits compared to other countries, an increased rate of hospitalizations and preventable deaths, as well as increasing drug costs.<sup>3</sup>

The current fee-for-service payment model may be a barrier to healthcare access. Fee-for-service is the traditional healthcare payment model utilized in the US in which individual services are paid for. This payment model inherently discourages the maintenance of a healthy patient population. Furthermore, the fee-for-service model may be contributing to the estimates

that 30% of healthcare expenditures may not impact health outcomes.<sup>4</sup> In an effort to control healthcare costs while increasing quality of care, payment reform towards a value-based healthcare system has been implemented as a way to increase coordination amongst healthcare providers, to incentivize providers to proactively maintain patients' health, and to improve health outcomes by utilizing cost-effective, evidence based treatment modalities.<sup>4</sup>

For payment reform to be successful, however, it is vital that institutions responsible for the training of healthcare providers, such as colleges of pharmacy, adapt their curriculum to ensure that their graduates possess the necessary skills and competencies to ensure a value-based healthcare system. There is only 1 college of pharmacy in the State of Hawai'i, of which more than 50% of the students are Hawai'i residents. The University of Hawai'i at Hilo, Daniel K. Inouye College of Pharmacy plays a large role in supplying future pharmacists for the local community. Thus, its curriculum remains fluid to the changing needs of both the local and national healthcare workforce. The curriculum works towards the improvement of healthcare quality measures by building a strong foundation in pharmacotherapy and drug information to optimize medication regimens and working effectively in interdisciplinary healthcare teams, while incorporating modern technology. In providing future pharmacists with these skills, not only will the capacity of primary care providers to provide access to care increase, but the quality of evidence-based practice provided to patients will also increase, ultimately leading to improved patient care.

## Improvement in Quality Measures

Key features of a value-based payment model include incentivizing health maintenance by instituting a capped reimbursement rate that is linked to the obtainment of key quality measures such as cardiovascular risk reduction, blood pressure and blood glucose control, as well as vaccination against diseases linked to hospitalization and mortality such as pneumonia. Pharmacists are uniquely trained to manage many chronic disease states, such as diabetes, hypertension, and hyperlipidemia, ensuring patients receive effective medications while mitigating potential adverse events and taking into consideration economic factors such as medication coverage and cost. The importance of these performance measures and the impact they have on reimbursement to primary care providers is evident in various payment transformation initiatives. One of the 2020 quality measure benchmarks in the Centers for Medicare and Medicaid Services



(CMS) Medicare Shared Savings Program measures the use of statin therapy for the prevention and treatment of cardiovascular disease. This metric tracks the percentage of males aged 21-75 years and females aged 40-75 years with cardiovascular disease who were dispensed at least 1 statin medication during the measured year. Other key measures of the program that fall within the scope of pharmacists' training include blood pressure control, diabetes control based on hemoglobin A1c (HbA1c) laboratory test, and appropriate effective medication therapy to prevent complications from medical conditions. Examples include angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers for nephropathy, influenza immunization, and tobacco cessation intervention.<sup>5</sup>

To better prepare pharmacy students to improve performance in quality measures in an efficient and effective manner, novel Advanced Pharmacy Practice Experience (APPE) electives were initiated with a focus on population health management and development of standardized workflows and clinical algorithms for identifying patients with the highest potential for intervention. Students enrolled in these electives review physician scorecards to identify potential high yield areas for improvement. Students then work to design workflows, treatment algorithms, and collaborative practice agreements to allow pharmacists to make the necessary changes while minimizing any additional burden on prescribers. Lastly, students prepare presentations to illustrate the models to community pharmacy and physician office staff. The aim of these projects is to develop and present a model where a single pharmacist or pharmacist team can provide services for multiple physician groups across different geographic locations. The recent COVID-19 pandemic necessitated that these activities be done virtually, which provided students with the additional opportunity to work with informatics and remote patient monitoring platforms (eg, self-monitored blood pressure and blood glucose) to maximize patient care while allowing those at risk to maintain social distancing.

## **Interprofessional Education**

Healthcare has moved away from a group of individual experts to an interprofessional collaborative practice model. Interest in interprofessional team collaboration has increased to improve patient safety, provide cost effective quality health care, and decrease medical errors. Interprofessional teams have been shown to improve patient care and are now expected by many as a standard of care in ambulatory and acute care practice settings.<sup>6-8</sup>

Interprofessional education prepares future pharmacists for team-based care. The University of Hawai'i at Hilo, Daniel K. Inouye College of Pharmacy curriculum has incorporated student interactions and learning experiences that optimize collaboration with other healthcare professionals starting in the first year of pharmacy school. Each interprofessional education event places students in more complex situations with a larger

variety of disciplines where communication and collaboration are practiced. After each scenario, co-debriefing with faculty from the different disciplines is essential for emphasizing the take-away points and lessons learned from the event.<sup>9</sup> The students' understanding of their own role and those of other healthcare professionals, communication skills, and collaboration abilities grow with each interprofessional education event making the expected transition to an interprofessional collaborative practice as a new practitioner more seamless.<sup>10,11</sup>

Another area that is changing the way the workforce trained is the growth of telehealth services which provide clinical and non-clinical services. Innovative pharmacy services using technology continue to grow in demand. The use of telehealth services expanded during the COVID-19 pandemic and these innovative pharmacy services can also be used to increase access to healthcare.<sup>12,13</sup> Clinical pharmacist services delivered via telehealth showed positive patient outcomes, such as adherence to medications.<sup>14</sup> The communication skills required for interprofessional collaborative care over distance technology can be taught and practiced during interprofessional education events. One interprofessional telehealth event allowed the pharmacy students in Hilo, Hawai'i to utilize a telepresence robot to interact with nursing students and a manikin patient at the nursing school simulation center on O'ahu. The pharmacy students and nursing students were able to collaborate and solve a medication related problem.<sup>11</sup>

Interprofessional education is a key addition to pharmacy curriculum to meet workforce needs. These education events provide students with the knowledge, skills, and attitudes needed for an interprofessional collaborative practice. The culture of collaboration can improve patient care, reduce errors, reduce costs, and improve communication.<sup>8</sup> Training students together with other health care disciplines will prepare them for the interprofessional team collaboration expected in patient care.

## **Competency in Drug Information Skills**

Applying evidence-based medicine in practice is considered a core component in health profession programs for providing quality patient care.<sup>15-17</sup> Nevertheless, there are many barriers for providers to evidence-based practice. Some barriers of health care providers include the large volume of new evidence and the lack of time to review them, inadequate access to resources, inadequate research skills, and lack of motivation to update ones' knowledge.<sup>18</sup> In Hawai'i, especially, with a physician workforce that is far below the demands of the aging population,<sup>19</sup> practicing with the most up-to-date information remains challenging.

The role of the pharmacist in providing drug information to healthcare providers and patients is essential for improved patient care. Thus, accredited colleges of pharmacy are required to include health information retrieval and evaluation in the curriculum.<sup>20</sup> Colleges of pharmacy incorporate the use of

drug information skills, such as the ability to research, find, summarize, and communicate evidence-based information in both their didactic and experiential courses.<sup>20,21</sup> In addition to the stand alone courses of drug information, evidence based medicine, and biostatistics, the pharmacy curriculum at the Daniel K. Inouye College of Pharmacy has, in recent years, integrated and increased the number of drug information assignments and practical examinations throughout the curriculum, requiring competency and speed of drug information skills in addition to knowledge in pharmacotherapy. Students are required to utilize multiple types of drug information sources, evaluate literature and research, answer formal drug information requests, and apply the latest evidence-based practice to specific patient situations.

## Conclusion

While the healthcare providers in Hawai'i are diligently working towards providing care for the state's population, colleges of pharmacy are adapting to the challenges and needs of the healthcare workforce to help deliver quality patient care. Incorporating layered learning and experiences in pharmacy schools' curricula focusing on interprofessional collaboration skills, telehealth communication and collaboration, and drug information skills will ensure that future pharmacists will aid in the provision of improved results for healthcare quality measures both in Hawai'i and in the rest of the nation.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# Hawai'i Registered Dietitian Nutritionist 2019-2020 Workforce Assessment

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## Abstract

*There is scant literature available on the Registered Dietitian Nutritionist (RDN) workforce in the United States, but a review of healthcare systems suggests that implementation of RDNs in primary care settings may improve access to care, patient satisfaction, and quality of care. The Area Health Education Center (AHEC), in partnership with the Hawai'i Academy of Nutrition and Dietetics (HAND), investigated 395 providers to evaluate the status of Hawai'i's RDN workforce. The research team utilized all available provider information and direct calling methodology to collect data from August 2019 to February 2020. Microsoft Excel software allowed for data analysis and ArcGIS mapping software was used to visualize provider totals and Full-Time Equivalencies (FTEs) across the state. This study identifies trends in workforce demographics and provider supply. Researchers found 100 RDNs providing direct patient care for a total of 82.4 FTEs. Women account for 94% of survey respondents, and the average age of providers was 48. RDNs who self-identify as being Asian American (41%) or White (47%) were the largest ethnic groups providing direct patient care. Seventy percent of the RDN workforce was located on O'ahu, while RDN FTEs are concentrated in mainly 5 zip codes, 1 on each of O'ahu, Kaua'i, and Maui and 2 on Hawai'i Island. Provider demand trends, increased training and retention efforts, and integration of nutritional services in healthcare teams should be further investigated.*

## Keywords

RDN, nutrition, primary care, healthcare, Hawai'i, supply, shortage

## Abbreviations

AHEC = Area Health Education Center  
CDR = Commission on Dietetic Registration  
FTE = Full-Time Equivalency  
HAND = Hawai'i Academy of Nutrition and Dietetics  
LD = Licensed Dietitian  
OHCA = Office of Health Care Assurance  
RDN = Registered Dietitian Nutritionist  
UHM = University of Hawai'i at Mānoa

## Introduction

Registered Dietitian Nutritionists (RDN) are food and nutrition experts who provide nutritional support throughout the community in hospitals and clinics, nursing homes, private practice, dialysis centers, food industries, universities, and research.<sup>1</sup> The Academy of Nutrition and Dietetics (AND) outlines the path to becoming an RDN, which currently involves (i) completing a bachelor's degree with appropriate coursework, (ii) completing an accredited dietetic internship program or supervised practice pathway, (iii) passing the Commission on Dietetic Registration's

(CDR) national exam, (iv) gaining licensure, if applicable, and (v) maintaining professional education requirements, beginning in January 2024, a graduate degree will be required for CDR exam eligibility.<sup>2,3</sup> A study conducted in North Carolina, Integrated Nutrition for Kids, found that integration of RDNs in primary care settings or health care teams was feasible and benefits included added focus on weight and nutrition, nutritional support for staff and other health care providers, and increased capacity for patient care.<sup>4</sup> In a recent survey of cardiologists, cardiology fellows, and cardiovascular teams, providers reported feeling inadequately trained to provide nutritional support for their patients and saw a benefit to adding an RDN to their health care team.<sup>5</sup> However, few RDNs are integrated in primary care models, despite researchers in the field advocating for an interdisciplinary approach to patient care.<sup>4,6,7</sup> These findings demonstrate the potential for integrated nutritional support in health care, not only for the benefit of the community, but for fellow health professionals as well.

While research supports the utility of RDNs in the healthcare workforce, literature is scant on the status of the United States (US) RDN workforce. An evaluation of supply and demand trends conducted by the Health Resources and Services Administration demonstrated RDN demand in 2 scenarios, 1 of which considered an evolving healthcare system that resulted in an estimated national shortage of 1600 RDNs by 2030.<sup>8</sup> Hawai'i has a licensure statute for dietitians, wherein RDNs may or may not carry a Licensed Dietitian (LD) designation.<sup>9</sup> Briefly, registered dietitians and RDNs are interchangeable credentials that confer government regulations and protection, while nutritionist credential standards vary by state. No such licensing requirement exists in Hawai'i for nutritionist.<sup>10</sup> The US Bureau of Labor Statistics reported 260 employed dietitians and nutritionists in Hawai'i as of May 2020 -- which is inclusive of both registered RDNs and non-registered, non-licensed nutritionists -- while recent reports from the Commission on Dietetic Registration include 429 local RDNs as of November 2021.<sup>11,12</sup> It is unclear why this discrepancy exists, but could be explained by the year in which these reports were published or by available employment opportunities that exist in the state. RDN demand in the state of Hawai'i has not yet been evaluated.

As 1 of the most geographically isolated places in the world,<sup>13</sup> Hawai'i faces unique challenges in healthcare. Geographical isolation for rural communities means limited access to clinics and hospitals, which may result in a lack of coordinated care.<sup>14</sup>

Barriers in transportation and cost of services are also of issue for geographically isolated communities.<sup>14</sup> In rural areas and neighboring islands, public transportation is inadequate and road networks are underdeveloped due to the islands' natural terrain, furthering limiting access to care.<sup>13</sup>

In 2019, the Hawai'i Academy of Nutrition and Dietetics (HAND) partnered with the Area Health Education Center (AHEC) to investigate RDN workforce trends as part of a continued assessment of Hawai'i's healthcare workforce. The main objective of the study was to estimate the number of active RDN's providing direct patient care for residents of Hawai'i.

## Methods

### Survey and Project Development

The 2019-2020 RDN survey was modeled after AHEC's existing provider workforce surveys. The research coordinators finalized an 11-item questionnaire prior to recruitment of a research team. Survey questions were intended to gather information on employment status, location, specialty, and practice setting. Demographic information was also collected and included ethnicity, age, and education. A spreadsheet using Microsoft Excel software, v16.0 (Microsoft Corporation, Redmond, WA) was prepared for data collection and de-identified for analysis. This study is considered IRB exempt under CHS#15107.

### Data Collection

An initial list of Hawai'i RDNs was compiled using data from the Hawai'i Office of Health Care Assurance (OHCA), as well as HAND. OHCA provided names of 184 LDs and their license numbers. HAND provided the names of 403 nationally registered RDNs residing in Hawai'i. Provider data was collected through community contacts and internet searches, while direct calling of medical offices and departments confirmed practice location, hours of direct patient care, and specialty of all active RDNs providing direct patient care in Hawai'i. Volunteer researchers used Google Sheets software, 2019-2020 (Google LLC, Mountain View, CA) to record data collection findings. The bulk of data collection was performed from August 2019 to February 2020 by a team of 5 undergraduate volunteers led by the AHEC research specialist. Researchers made a second attempt to reach out to known providers in November 2020, and 3 responses were returned. The 2019-2020 survey questions are included in Table 1.

The focus of the study was to investigate and confirm active RDNs providing direct patient care across clinical and non-clinical settings. RDNs working in education and administrative positions were not included in workforce estimates unless they reported spending time in patient care. Military and out-of-state RDNs, retired providers, temporary or traveling RDNs, and dietetic interns were also not included in workforce estimates. RDNs in state facilities or departments, such as the Department

of Education and Department of Health, were included only if they self-reported direct client care. RDNs whom researchers found local contact information for but were unable to confirm were categorized as 'Unconfirmed,' and those who had no available contact information were considered 'Unknown.'

## Analysis

Providers with Full-Time Equivalency (FTE) greater than 0 and providing direct patient care in Hawai'i were analyzed for trends in age, specialty, FTE, race and ethnicity, education, and practice setting. FTE accounts for RDN workload by dividing providers' total work hours by 40 hours per week, a full-time workweek. Calculations for patient care over 40 hours distributed across multiple locations and/or specialties were standardized by dividing providers' total work hours at 1 location or in 1 specialty by the individual provider's total work hours. Percentages were calculated out of total responses to survey questions. For example, percentages for race and ethnicity were calculated using the total number of responses to the question, not total practicing providers, as the denominator. All analyses were conducted using Microsoft Excel. Total providers were not mutually exclusive. Providers with multiple specialties, or working in multiple healthcare settings, are counted for each specialty or setting.

Workforce distribution across the state was visualized using ArcGIS mapping software version 10.8.1 (Esri, Redlands, CA). Since a demand model for the RDN workforce was not available at the time of writing, provider supply was calculated per 100 000 population to estimate workforce density and allow for future supply comparisons.

## Results

The authors pooled available resources to compile a list of 587 RDNs, from which duplicates were removed and a total of 395 RDNs were assessed. Table 2 summarizes status findings (Active, Administrative, Military, etc.) of RDNs in Hawai'i. Researchers were unable to confirm local information for 84 providers and determined that another 88 were unknown. RDNs working in education and administrative positions were not included in workforce estimates unless they self-reported time in direct patient care. Military and out of state RDNs, retired providers, temporary or traveling RDNs, and dietetic interns were also not included in workforce estimates. As a result, a total of 123 providers did not meet the inclusion criteria for workforce estimates. This survey found 100 RDNs, approximately 25% of researched providers, who are considered active and providing direct patient care in Hawai'i for a total of 84.2 FTEs. The majority (70%) of the state's clinical RDN workforce practices on O'ahu. The workforce is predominantly female (94%) and middle-aged (age range: 26-73 years old; average age: 48). Figure 1 illustrates the age distribution of Hawai'i's active RDN workforce.



Table 1. 2019-2020 Hawai'i Registered Dietitian Nutritionist (RDN) Workforce Project Survey <sup>a</sup>			
1. Do you provide direct healthcare services to individual patients in Hawai'i? (if you are completely administrative or non-clinical please answer "No") Yes ___ No ___			
2. Do you primarily serve an active duty military or military dependent population (VA registered dietitians please answer "No")? Yes ___ No ___			
3. What specialty/specialties do you practice and how many hours a week on average for each?			
Specialty 1	Specialty 2	Average Hours p/Week	
Clinical Nutritional Support	Clinical Nutritional Support	1. _____	
Diabetes Education	Diabetes Education	2. _____	
Renal	Renal		
Weight Management-Adult	Weight Management-Adult		
Weight Management-Pediatric	Weight Management-Pediatric		
Sports Dietetics	Sports Dietetics		
Other (please fill in)	Other (please fill in):		
4. Please tell us about your primary work environment:			
Community Health Center Dialysis Food Service Management Inpatient-Clinical Long Term Care Outpatient-Clinical Private Practice Other (please fill in):			
Primary Address (Office or Hospital):			
City:	State:	Zip Code:	Phone:                      Email(s):
How many hours per week do you see patients at this address?			
5. Is a majority of your income a result of being employed by a medical group, hospital, school (faculty) or other entity? Yes ___ No ___                      Name of entity:			
6. If you have more than one position, please provide information for your second address:			
Second Address (Office or Hospital):			
City:	State:	Zip Code:	Phone:
How many hours per week do you see patients at this address?			
7. What ethnicity/ethnicities do you identify with?			
8. Do you provide telehealth care to Hawai'i patients? If so, how many hours a week?			
9. What year were you born?			
10. Where did you complete your Dietetic Internship (also known as Supervised Practice) (share program name and location)?			
11. What is your highest degree earned from an accredited college or university?			
a. Bachelor's Degree b. Master's Degree c. Doctoral Degree d. Other (please fill in):			

<sup>a</sup> The survey was conducted via direct calling or emailing of medical offices and departments. Researchers followed the questionnaire to confirm practice location, hours of direct patient care, and specialty of all active registered dietitian nutritionists providing direct patient care in Hawai'i.

**Table 2. Registered Dietitian Nutritionist Workforce Status Findings from the Hawai'i Registered Dietitian Nutritionist 2019-2020 Workforce Assessment**

Status	Number (%)
Active <sup>a</sup>	100 (25)
Administrative	9 (2)
Inactive	41 (10)
Intern	1 (< 1)
Military	14 (4)
Non-Clinical	16 (4)
Out of State	33 (8)
Retired	8 (2)
Temporary Hire	1 (<1)
Unconfirmed <sup>b</sup>	84 (21)
Unknown <sup>c</sup>	88 (22)
Total Researched	395

<sup>a</sup> Registered dietitian nutritionists (RDNs) were considered active if they self-reported hours spent providing direct patient care.  
<sup>b</sup> RDNs for whom researchers found local contact information for but were unable to confirm were categorized as 'unconfirmed'.  
<sup>c</sup> Those who had no available contact information were considered unknown.

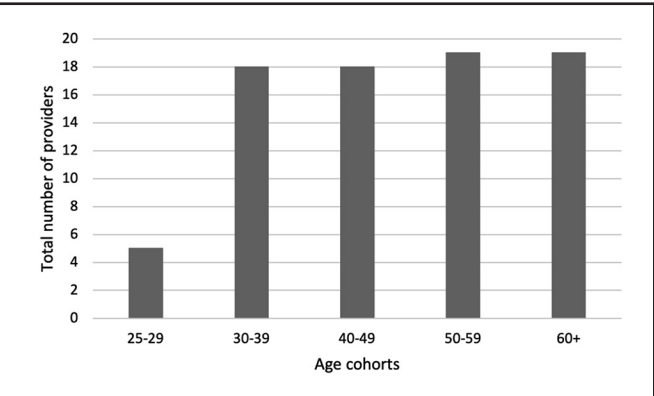
**Table 4. Total Active Registered Dietitian Nutritionists in Hawai'i from 2019-2020 by Practice Setting**

Practice Setting	Number of Active RDNs (%) <sup>a</sup>
Community Health Center	18 (22)
Dialysis	12 (15)
Inpatient Clinical	17 (21)
Long Term Care	9 (11)
Outpatient Clinical	7 (9)
Private Practice	10 (12)
Other <sup>b</sup>	9 (11)
Total	81 <sup>c</sup>

**Table 3. Race/Ethnicity Composition of the Active Registered Dietitian Nutritionist (RDN) Workforce from the Hawai'i Registered Dietitian Nutritionist 2019-2020 Workforce Assessment**

Race/Ethnicity	Number of Active RDNs (%) <sup>a</sup>
African American	2 (3)
American Indian/Alaska Native	1 (1)
Asian	31 (41)
- Chinese	3 (4)
- Filipino	1 (1)
- Japanese	10 (13)
- Okinawan	1 (1)
- Vietnamese	1 (1)
White/European American	35 (47)
Hispanic/Latinx	4 (5)
Native Hawaiian/Pacific Islander	6 (8)
More than one race	3 (4)
Total Responses	75 <sup>b</sup>

<sup>a</sup> Percent is of total confirmed.  
<sup>b</sup> Researchers were unable to confirm race and/or ethnicity for 25 of 100 active registered dietitian nutritionists.



**Figure 1. Age Distribution of Active Providers from the Hawai'i Registered Dietitian Nutritionist 2019-2020 Workforce Assessment**

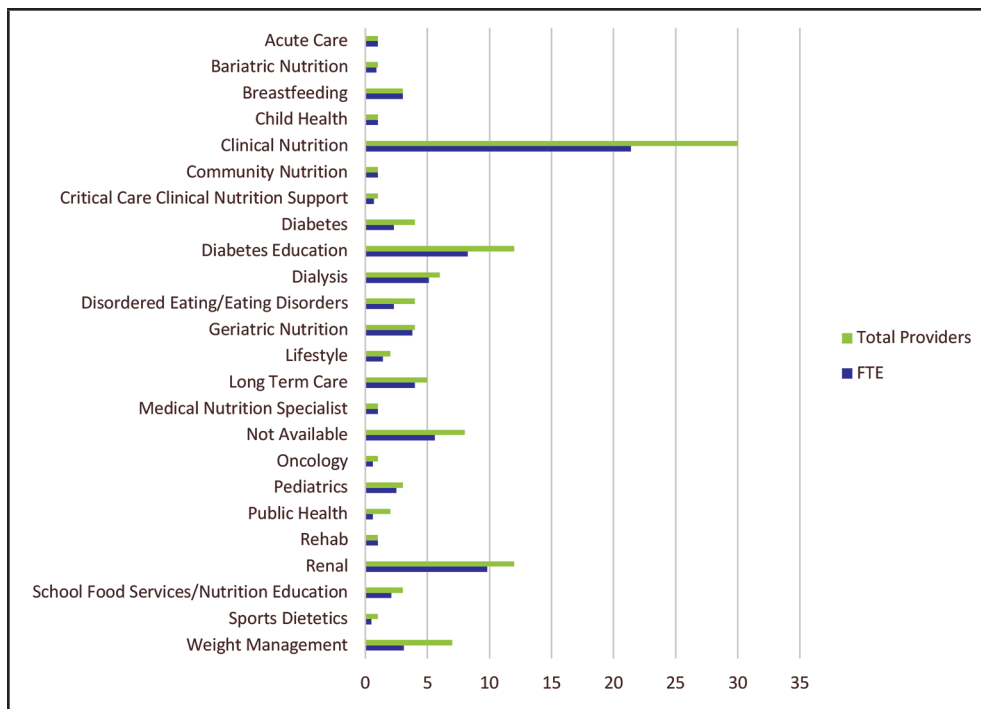


Figure 2. Total Active Registered Dietitian Nutritionists and Full-Time Equivalency by Specialty from the Hawai'i Registered Dietitian Nutritionist 2019-2020 Workforce Assessment

RDNs working in education and administrative positions were not included in workforce estimates unless they reported spending time in patient care. Military and out-of-state RDNs, retired providers, temporary or traveling RDNs, and dietetic interns were also not included in workforce estimates. RDNs in state facilities or departments, such as the Department of Education and Department of Health, were included only if they self-reported direct client care.

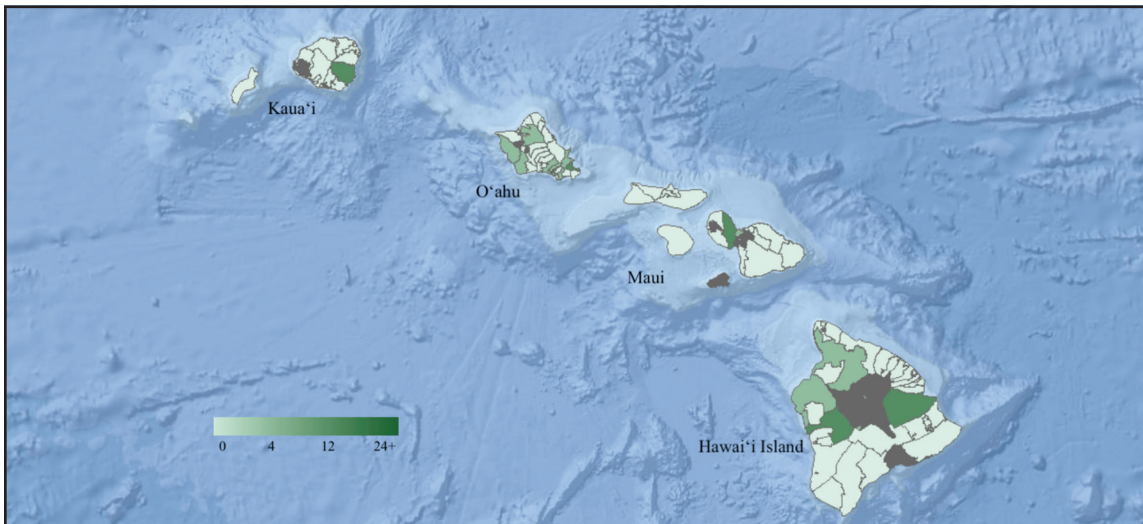


Figure 3. Density Map of Total Active Registered Dietitian Nutritionists in Hawai'i per 100 000 Population from the Hawai'i Registered Dietitian Nutritionist 2019-2020 Workforce Assessment

Grey areas are unpopulated regions or military bases. Registered dietitian nutritionists were considered active and included in estimates only if providers self-reported spending time in direct patient care. Military and out-of-state, retired, temporary or traveling registered dietitian nutritionists and dietetic interns were not considered active.

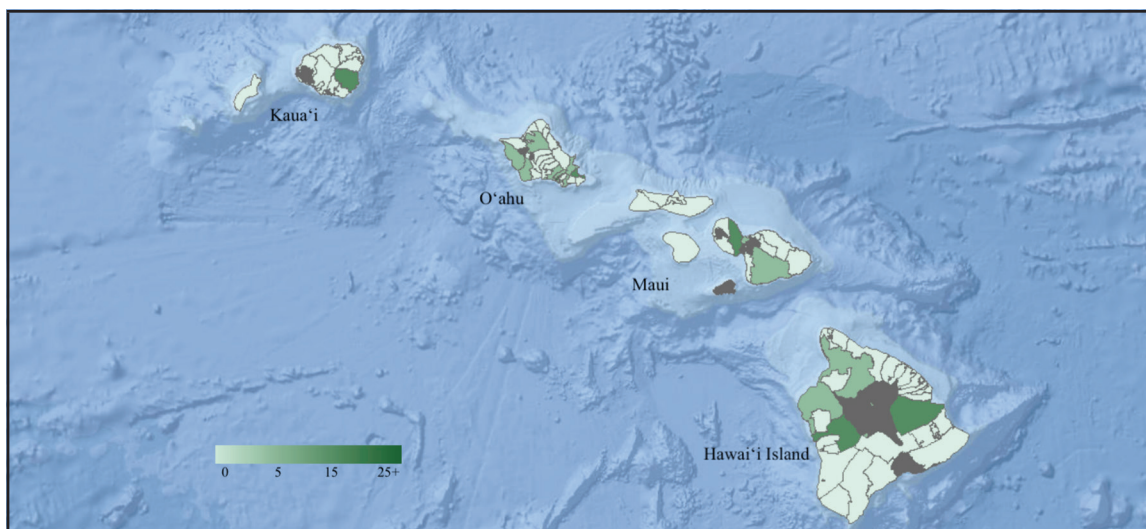


Figure 4. Density Map of Active Registered Dietitian Nutritionist Full-Time Equivalencies in Hawai'i per 100 000 Population from the Hawai'i Registered Dietitian Nutritionist 2019-2020 Workforce Assessment

Grey areas are unpopulated regions or military bases. Registered dietitian nutritionists were considered active and included in estimates only if providers self-reported spending time in direct patient care. Military and out-of-state, retired, temporary or traveling registered dietitian nutritionists and dietetic interns were not included in full-time equivalency estimates.

RDNs who self-reported being of White and Asian American race and ethnicity accounted for 47% and 41% of respondents respectively, and only 8% of respondents self-reported as being of Native Hawaiian or Pacific Islander race and ethnicity. Table 3 summarizes research findings on the race and ethnic diversity of the RDN workforce.

Data on education was also collected. Forty-two percent of respondents hold Master's degrees in science, business, or public health. Nearly 80% of respondents report completing their dietetic internship or supervised practice outside of Hawai'i, with just 17, or less than 22% doing so locally.

Nearly half (44%) of the workforce practices in clinical nutrition settings (community health centers or inpatient facilities). Figure 2 provides a comparison of the total number of active providers versus the total full-time equivalents of patient care by specialty, while Table 4 shows the distribution of practice settings. The "Other" category of practice settings includes Clinical Nutrition Support, State Department of Education, State Department of Health, Home Infusion, Rehabilitation, Residential, Telehealth, and the Hawai'i Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), where RDNs reported providing direct patient care, but outside of clinical settings.

An accurate demand model for the State of Hawai'i's RDN workforce has yet to be constructed. However, Figures 3 and 4 provide visual representation of workforce densities by zip code. Grey areas are unpopulated regions or military bases. Figure 3 depicts the ArcGIS results of RDN provider totals

per 100 000 population. RDN provider density is highest in five distinct geographic regions, 1 region on each of O'ahu, Maui, and Kaua'i, and 2 on Hawai'i Island. Figure 4 depicts similar data but for RDN FTE per 100 000 population and where a similar trend exists. The RDN workforce is heavily concentrated in mainly 5 distinct regions: Honolulu (96813) on O'ahu, Wailuku (96793) on Maui, Lihue (96766) on Kaua'i, and both Kealahou (96750) and Hilo (96720) on Hawai'i Island.

## Discussion

Preliminary findings suggest that the clustering of Hawai'i's RDNs is highest in areas where large medical facilities are situated. Nearly 20% of the state's population live outside of urban areas, with proportionally more Native Hawaiians living rurally than non-Native Hawaiians.<sup>15,16</sup> The majority of populated zip codes across the state of Hawai'i have extremely low RDN density, which may result in gaps in services for individuals living in those regions.

Sex representation in Hawai'i's RDN workforce mirrors that of national statistics; however, when compared to the national average age of 41,<sup>9</sup> local RDNs are generally older with a mean age of 48. The Academy of Nutrition and Dietetics 2008 Needs Assessment reported that among those in the field of dietetics, the RDN profession was the least diverse in regard to race and ethnicity.<sup>17</sup> Though the racial and ethnic diversity in Hawai'i differs considerably from national statistics, the state experiences a similar lack of minority representation in the RDN workforce. Of respondents, only 8%, or 6 providers in direct patient care self-identified as Native Hawaiian or



Pacific Islander, whereas 41% and 47% identified as being of Asian American and White race and ethnicity, respectively. Race and ethnic representation in the healthcare workforce is vital to understanding health disparities in Hawai‘i, where indigenous groups are disproportionately burdened by illness, as well as broadening provider perspectives and enabling them to better serve a diverse patient population.<sup>18</sup> One approach to increasing diversity and representation in the RDN workforce is early outreach and the establishment of specialized academic pipelines throughout high schools and community colleges to educate students on the RDN profession. Currently, the Children’s Healthy Living Program is developing, implementing, and evaluating a Native Hawaiian scholar’s program that provides enhanced service learning and leadership activities grounded in Native Hawaiian culture.<sup>19</sup>

The University of Hawai‘i at Mānoa (UHM) hosts the state’s only accredited degree-granting dietetic program, training 14 post-baccalaureate students from 2019-2020. However, there are limited opportunities for graduates to complete their supervised training in Hawai‘i. The state has no accredited dietetic internship programs, meaning graduates must either enroll in a distance learning program and find a local preceptor, which requires an RDN to voluntarily dedicate time to mentor and teach them, or relocate to the US mainland to complete their training. This increases the likelihood of Hawai‘i losing RDNs to the continental US and could negatively impact the workforce. This study finds that less than 22% of Hawai‘i’s active RDN workforce completed their supervised practice locally. Dietetic internship opportunities in Hawai‘i are limited by the pool of qualified and willing RDNs to serve as voluntary preceptors to supervise each dietetic intern’s 1000-hour experience. The UHM Nutritional Sciences Masters of Science RDN concentration is currently seeking to increase these opportunities by working with preceptors and developing simulation activities that can replace some of the required supervised practice hours, thus easing the burden on preceptors. Another way to incentivize preceptors is the inclusion of RDNs on the Hawai‘i Preceptor Tax credit, a tax credit for eligible providers offering professional instruction to healthcare students which is part of a larger effort to build in-state academic programs and improve clinical education.<sup>20</sup>

Study limitations include incomplete reporting. Though the research team exhausted all resources, it is not always possible to locate and contact every provider. Another limitation was the lack of state-specific supply and demand models, so shortage areas are difficult to determine. To overcome this, FTE and total provider estimates were calculated per 100 000 population for visualization with ArcMap software. Standardizing provider totals allows researchers to compare areas of varying population sizes and identify low- and high-density regions.

Future research on RDN demand models, state workforce trends, and the contribution allied health partners make in offsetting other professional shortages is suggested. Further understanding of the nature in which RDNs provide services to patients (ie, telehealth, in-person) may also further elucidate true gaps in service. Efforts must also be made to train and retain Hawai‘i RDNs locally to avoid worsening healthcare shortages. At the time of writing, local RDNs are not eligible for state loan repayment programs like those offered to other healthcare providers working in rural areas of Hawai‘i. Student debt relief may help restore the state’s RDN workforce by offsetting the financial burden of local providers and incentivizing long-term practice in Hawai‘i. There is a need for accessible educational programs, especially in rural areas and for those who are socio-economically disadvantaged, for the recruitment and training of underrepresented professionals.<sup>21</sup> A diverse workforce is linked to community health outcomes through (1) increased access to care for racial/ethnic minorities, particularly in rural areas and (2) improved patient-provider communication, trust, and decision-making.<sup>22</sup>

In the face of growing healthcare shortages, a shift in focus on supporting allied health partners may provide a strong foundation for restoring the workforce and improving community health. RDNs create a bridge between primary care visits and disease management through preventative lifestyle changes. Dietetic intervention statistically and clinically improves outcomes of leading causes of death including obesity and cardiovascular disease, while also cutting primary healthcare costs.<sup>23</sup> Increased utilization of resources like nutritional support may improve the primary care shortages seen in Hawai‘i, particularly in rural areas and for populations that are disproportionately affected by health disparities.<sup>24</sup>

## Conflict of Interest

None of the authors identify a conflict of interest.

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# Increasing Geriatric Care Capability in Hawai'i's Healthcare Systems through the Pacific Islands Geriatrics Workforce Enhancement Program (GWEP) at the University of Hawai'i

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## Abstract

There is an increasing shortage of skilled healthcare workers to provide care to the aging US population. In response, the Geriatrics Workforce Enhancement Program (GWEP) was developed in 2015 by the Health Resources and Services Administration (HRSA). This article describes the objectives, accomplishments, and lessons learned by the Pacific Islands GWEP at the University of Hawai'i (UH) over the past 5 years. The program's multi-pronged approach includes: (1) Developing partnerships between academia, primary care delivery sites/systems, and community-based organizations to educate a geriatrics workforce; (2) Training providers and students in medicine and allied health professions to address the primary care needs of older adults; (3) Transforming clinical training environments to become age-friendly health systems that incorporate the principles of value-based care and alternative-payment models; (4) Delivering community-based programs for patients, families, caregivers, and direct care workers to provide knowledge and skills to improve health outcomes for older adults; and (5) Providing training in Alzheimer's Disease and related dementias (ADRD), including the value of dementia-friendly communities. The GWEP provided education to over 3000 providers, 700 healthcare trainees, and 1000 patients and caregivers each year in a wide variety of care settings (eg, outpatient, home care, nursing facilities, care home, and hospice). Caregivers feel better able to care for themselves and/or others, find resources, and improve their practice of caregiving. The program is also transforming primary care delivery in underserved areas (eg, Community Health Centers, Family Medicine clinic, and the GRACE Team Care™ model). Outreach included rural areas, neighbor islands, and Pacific Islands.

## Keywords

Geriatrics, workforce shortage, primary care

## Abbreviations and Acronyms

AFHS = Age-Friendly Health Systems  
AHEC = Area Health Education Center  
AHRQ = Agency for Healthcare Research and Quality  
ADRD = Alzheimer's Disease and related dementias  
AWV = Annual Wellness Visit  
CHW = Community Health Worker  
COVID-19 = Coronavirus disease 2019  
EOA = Executive Office on Aging  
FQHCs = Federally Qualified Health Centers  
GRACE = Geriatric Resources for Assessment and Care of Elders  
HDOH = Hawai'i Department of Health  
HPCA = Hawai'i Primary Care Association  
HAH = Healthcare Association of Hawai'i  
HRSA = Health Resources and Services Administration

IHI = Institute for Healthcare Improvement  
IPE = Interprofessional Education  
JABSOM = John A. Burns School of Medicine  
KCC = Kapi'olani Community College  
KKV = Kokua Kalihi Valley Comprehensive Family Services  
Kula = Kula No Na Po'e Hawai'i at Papakōlea  
LTSS = Long-Term Services and Support  
LTC = Long-Term Care  
MPQH = Mountain Pacific Quality Health  
PCC = Palau Community College  
PI-GWEP = Pacific Islands Geriatric Workforce Enhancement Program  
PCP = primary care providers  
Project ECHO® = Extension for Community Healthcare Outcomes  
QMC = Queens Medical Center  
UH = University of Hawai'i  
USAPI = US Affiliated Pacific Islands  
4Ms = What Matters, Medications, Mentation, Mobility

## Introduction

There is an increasing shortage of a skilled healthcare workforce to provide effective care for the aging US population.<sup>1</sup> Thus, the Geriatrics Workforce Enhancement Program (GWEP) was developed in 2015 by the Health Resources and Services Administration (HRSA) to address current and future geriatric workforce challenges, redefine the delivery of care to older adults, and transform geriatric care in the primary care setting.<sup>2</sup> HRSA tasked the national network of 44 GWEPs to increase adoption of the Age-Friendly Health Systems (AFHS) paradigm, and to help clinical sites achieve AFHS recognition by the Institute for Healthcare Improvement (IHI). The AFHS is based on the 4Ms framework - what Matters, Medication, Mentation, and Mobility.<sup>3</sup> The University of Hawai'i (UH) is home to the Pacific Islands GWEP (PI-GWEP), which provides geriatrics workforce training in Hawai'i and US Affiliated Pacific Islands (USAPI). This paper describes the objectives, accomplishments, and lessons learned by the PI-GWEP over the past 5 years.

## Methods

In order to transform Hawai'i's capacity to provide Age-Friendly Health Care, a 5-pronged approach was implemented: (1) develop partnerships with academic, clinical, and community-based entities; (2) train providers and students to assess and address primary care needs of older adults; (3) transform clinical training

environments to become AFHS; (4) deliver community-based education for patients, families, caregivers, and direct care workers; and (5) provide training in Alzheimer’s Disease and related dementias (ADRD), including supporting dementia-friendly communities. Accomplishments of each objective are tracked, including number and types of partnerships, number of educational events, number and types of trainees, and number of clinical environments to become AFHS.

## Results

### Partnerships Established

The PI-GWEP works in partnership with 12 academic, 5 clinical, and 12 community-based entities (Table 1 and Figure 1). Based within the Department of Geriatric Medicine in the John A. Burns School of Medicine (JABSOM), the PI-GWEP partners internally with other JABSOM departments and collaborates with other UH Schools for allied health training and interprofessional education (IPE) activities. Palau Community College (PCC) and Yap Area Health Education Center (AHEC) are important US Affiliated Pacific Island partners.

Clinical partners have been engaged to facilitate the spread of AFHS in Hawai‘i. Important community clinical partners are AlohaCare, The Queen’s Health System, Hawai‘i Primary Care Association (HPCA), and Mountain Pacific Quality Health (MPQH). These organizations support training and implementation of AFHS amongst their providers and members. These partners work closely with selected Federally Qualified Health Centers (FQHCs) and other primary care providers in Hawai‘i (eg, Kookia Kalihi Valley Comprehensive Family Services (KKV) and Pali Momi Family Medicine Clinic). The Healthcare Association of Hawai‘i (HAH) and MPQH assist in providing AFHS training to the network of Long-Term Services and Support (LTSS) providers in the state (eg, nursing homes and family/foster care homes). The goal is to help clinical sites achieve AFHS recognition from IHI.

The PI-GWEP works with community partners on the mutual goal of improving care provided by family caregivers of older adults. The partners providing direct outreach include Catholic Charities Hawai‘i, the Alzheimer’s Association Hawai‘i Chapter, AARP, and Kula No Na Po’e Hawai‘i at Papakōlea (Kula). PI-GWEP also works with the Hawai‘i Department of Health (HDOH) and Executive Office on Aging (EOA) to extend resources for family caregivers.

### Training for Providers and Health Students

The PI-GWEP has provided a wide array of educational offerings (Table 2), including monthly Department of Geriatric Medicine Grand Rounds attended by an interdisciplinary audience. This transitioned to tele-education in 2020 due to the coronavirus disease 2019 (COVID-19) pandemic. In partnership with the

Hawai‘i AHEC, an all-day Geriatrics Track at the Hawai‘i Healthcare Workforce Summit Conference is sponsored each year, and attended by over 600 primary care professionals, geriatrics specialists, students, residents, fellows and faculty.

In 2016, PI-GWEP began providing tele-education using the University of New Mexico’s Project ECHO (Extension for Community Healthcare Outcomes) Model.<sup>4</sup> They established

Table 1. List of Academic and Community Partnerships of the Pacific Islands Geriatrics Workforce Enhancement Program at the University of Hawai‘i with Acronyms

UNIVERSITY OF HAWAII'S GWEP PARTNERS
<b>John A. Burns School of Medicine (JABSOM)</b>
Department of Geriatric Medicine
Family Medicine and Community Health
Native Hawaiian Health
Area Health Education Center (AHEC)
<b>University of Hawai‘i System</b>
School of Nursing and Dental Hygiene
Daniel K. Inouye College of Pharmacy
Thompson School of Social Work and Public Health
Center on Aging
Kapi‘olani Community College Health Sciences
<b>Community Clinical Sites</b>
Pali Momi Family Medicine Clinic
Kookia Kalihi Valley Comprehensive Family Services
Other Primary Care Providers
AlohaCare
The Queen’s Health System
Veteran Affairs
<b>Community Organizations</b>
AARP
Alzheimer’s Association – Hawai‘i Chapter
DOH – Public Health Nursing Branch
Hawai‘i Primary Care Association (HPCA)
Mountain Pacific Quality Health (MPQH)
Kula No Na Po’e Hawai‘i
Catholic Charities
Executive Office on Aging
Healthcare Association of Hawai‘i
Adult Foster Homecare Association of Hawai‘i (AFHA)
Adult Residential Care Homes (ARCH)
<b>US Affiliated Pacific Islands</b>
Guam School of Nursing and Health Sciences
Palau Community College (PCC)
Yap Area Health Education Center (AHEC)



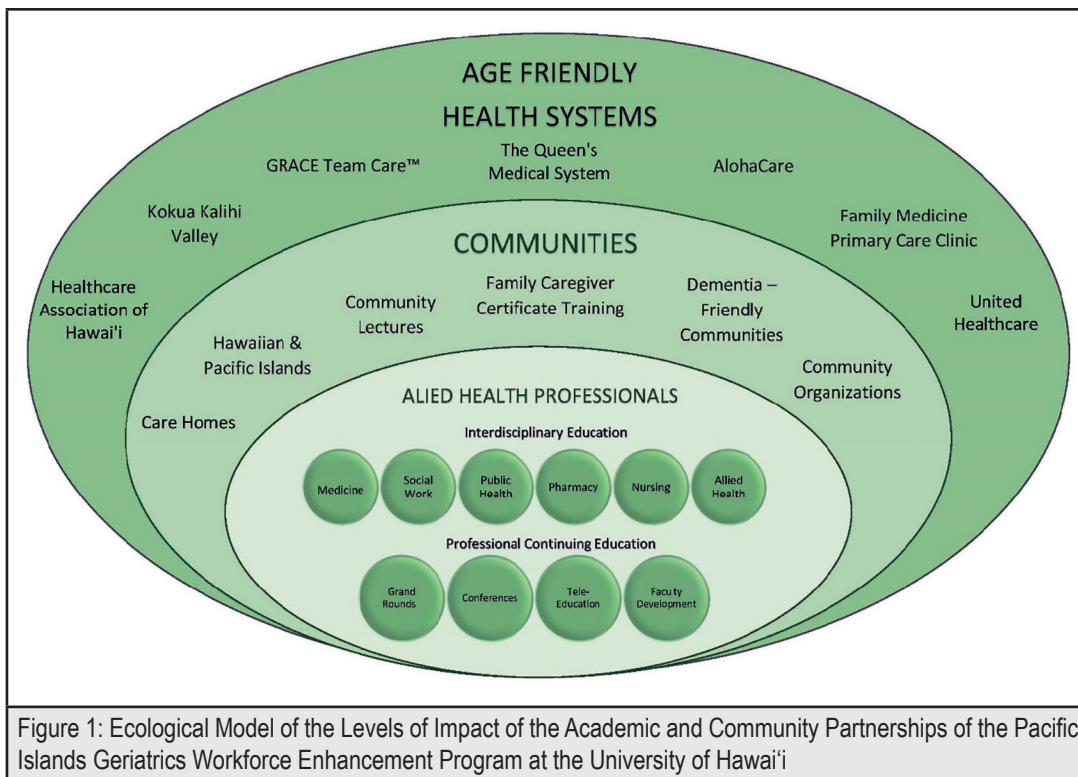


Table 2. Types of Geriatric Training and Number of Learners in the Past 2 Years		
Type of Training (2015-2021)	July 2019 – June 2020	July 2020 – June 2021
Department of Geriatric Medicine Grand Rounds (monthly)	475	603
AHEC Hawai'i Healthcare Workforce Summit Conference (annual)	631	766
Geriatric ECHO series (monthly)	244	270
Long Term Services and Support (LTSS) ECHO: COVID Preparation Series (initially weekly, then twice a month, then monthly)	1,678	346
Long Term Care ECHO: Learning Action Network (LTC ECHO: LAN) (monthly)	N/A	217
AHRQ ECHO COVID Action Network (Phase 1 - 16 sessions: December 2020 to March 2021; Phase 2 – 16 sessions: May to August 2021)	N/A	1,407
Care Homes ECHO (monthly)	N/A	542
<b>Provider Training Total Numbers</b>	<b>3,028</b>	<b>4,151</b>
Geriatric Medicine Fellows	7	7
Residents	30	29
4th Year Medical Student Rotation	78	78
<b>Medical Trainees Total Numbers</b>	<b>115</b>	<b>114</b>
Geriatrics Inter-Professional Panel (GIPP)	223	236
Hawai'i Interprofessional Team Care Simulation (HIPTCS)	234	251
Family Medicine Annual Wellness Visit Clinic at Pali Momi and AlohaCare interdisciplinary team meetings for GRACE Team Care™ patients	13	14
Kapi'olani Community College - Community Health Workers (CHW) Program	34	133
Other Allied Health Lectures	105	47
<b>Allied Health Trainees Total Numbers</b>	<b>609</b>	<b>681</b>
<b>Family &amp; Caregivers Trained</b>	<b>1,028</b>	<b>1,263</b>
<b>Dysphagia Videos</b>	<b>430</b>	<b>110</b>
<b>Grand Total of Learners</b>	<b>5,210</b>	<b>6,292</b>

an ongoing monthly Geriatrics ECHO Clinic that addresses the needs of outpatient community providers and allied health professionals. They launched the LTSS ECHO: COVID Preparation Series (April-October 2020) to address the COVID-19 crisis for nursing homes, assisted living, care/foster homes, and hospices. This series was conducted in collaboration with multiple partners: HAH, MPQH, HDOH, and Hawai'i Emergency Management Agency. As a result, GWEP received the Hawai'i Public Health Heroes Award in November 2020 for our work to prevent the spread of COVID-19 in LTSS settings. The monthly Long-Term Care (LTC) ECHO: Learning Action Network series launched in October 2020 to assist nursing facilities successfully implement Quality Improvement projects that enhance geriatric care. To augment this effort, they participated in the National Agency for Healthcare Research and Quality (AHRQ) ECHO COVID Action Network in collaboration with University of Massachusetts from December 2020-March 2021 (Phase 1: 16 sessions), and May-August 2021 (Phase 2: 16 sessions). PI-GWEP also launched a new monthly Care Homes ECHO series in April 2021 to enable them to provide better AFHS care.

The PI-GWEP also provided geriatric curriculum and teaching for medical students in all years of medical school. First year students receive feedback on the interview of a standardized older patient. Second year students practice geriatric assessment skills (cognitive, depression, functional screening) in during a "Geri-Lab" session. Third year students engage with interprofessional students in a discharge planning simulation activity. Finally, fourth year students have a required 4-week Geriatrics and Palliative Care Clerkship. Additionally, training is provided for residents in Internal Medicine, Family Medicine, and other specialties through didactics and clinical teaching.

The PI-GWEP collaborated with UH Allied Health Schools to provide several AFHS and innovative interprofessional curricula, including the Geriatrics Inter-Professional Panel focusing on interprofessional roles, and Hawai'i Interprofessional Team Care Simulation focusing on teamwork. These interprofessional exercises host over 200 students each year from multiple schools. The UH Family Medicine Clinic provides clinical geriatrics experiences for interdisciplinary students from medicine, nursing, social work and pharmacy through their Annual Wellness Visit Clinic. Student learning is augmented through participation at AlohaCare interdisciplinary team meetings. All experiences were converted to a telehealth format in 2020.

At Kapi'olani Community College (KCC), PI-GWEP faculty have provided lectures for the 2-year Community Health Worker (CHW) curriculum since 2016; this program has grown significantly from an average of 27 per year to 133 in 2020-21. In collaboration with Alzheimer's Association and Catholic Charities, we developed a geriatrics module curriculum for KCC's Health Sciences Department faculty with recorded lectures, resources, and assessments. There are currently 7 topics, examples include: healthy brain aging and dementia overview,

advanced care planning, caregiver support, and community resources for *kupuna* (the elderly). The ultimate goal for this training is to lead to a geriatrics specialty certificate. PI-GWEP faculty also provided lectures on geriatrics and AFHS to undergraduate health professions students at UH West Oahu, an underserved area.

Overall, GWEP geriatrics training reached 8698 providers and students from 2019-2021, including participants from across Hawai'i and the Pacific (Table 2). GWEP education receives positive evaluations. The overall quality of ECHO sessions are rated an average of 4.6 on a 5-point Likert Scale (1=poor, 5=excellent). Pivoting to virtual and asynchronous education formats has enabled much needed training for students and practicing providers in the midst of COVID-19 restrictions. It enhanced outreach, contact with more disciplines, and enabled greater participation from rural, neighbor island, and Pacific Island providers and caregivers.

### **Building Age-Friendly Health Systems**

According to the IHI AFHS framework, health systems must implement evidence-based practices that address what Matters, Medications, Mentation, Mobility (4Ms), for all older adults. IHI created a mechanism for healthcare organizations to achieve AFHS recognition, level 1 (develop a plan to implement 4Ms) and level 2 (provide 3 months of data to demonstrate early impact of using 4Ms). IHI AFHS recognition demonstrates commitment to excellence in the quality of care for older adults. During the past 2 years, the PI-GWEP has been working to build AFHS through: (1) GRACE Team Care™, (2) KKV, (3) The Queen's Medical Center (QMC), and (4) Pali Momi Family Medicine Clinic.

GRACE Team Care™ is a geriatric healthcare model created by Indiana University as a strategy to implement AFHS in coordinating care for high-risk patients, where GRACE stands for "Geriatric Resources for Assessment and Care of Elders".<sup>5</sup> After 2 years of collaboration between GWEP, HPCA, AlohaCare, and Indiana University to determine sustainability, the model successfully launched in May 2019 at KKV. The GRACE model is a "high touch" model utilizing a nurse practitioner and social work dyad to provide geriatric assessment, resources, and frequent follow-up for vulnerable older adults in their homes, in collaboration with primary care providers (PCP). Since March 2020, with COVID restrictions and staff turnover, the program encountered many challenges and was unable to expand. Despite these challenges, the program maintained its census of about 40 patients, and continued to provide much needed support during the pandemic. The program has received positive feedback, with patients enjoying home visits, increased attention to "What Matters," and faster resolution of their needs. PCP satisfaction has also increased. The program addressed dementia education, falls screening, medication reconciliation, and resulted in greater completion of advanced healthcare directives, while

demonstrating reduction in healthcare utilization costs. The GRACE program and outcomes were presented at the 2020 Hawai'i AHEC Conference. AlohaCare's GRACE Team Care™ program was recognized as one of the 2020 Medicaid Managed Care Organization Best Practices and Innovative Initiatives in the category of High-Risk Care Coordination by the Institute for Medicaid Innovation. The goal is to expand and support this AFHS model at other FQHCs.

KKV is an FQHC primary care delivery site that provides care to many Pacific Island peoples and serves as a clinical training site for health sciences students. A workflow was developed to identify and address geriatric concerns using the culturally-adapted Elder Risk Screen tool. Screening began in 2019 at a mass event that coincided with their regular senior exercise program. Positive screens were referred to PCPs. This screening is now administered on a small number of patients monthly, instead of annual screening events. KKV has remained committed to building an AFHS and is working towards achieving IHI AFHS recognition in 2021-2022, with support from HPCA. After establishing an AFHS model at KKV, HPCA will identify other FQHCs interested in applying for IHI AFHS recognition.

The QMC is a major teaching hospital for UH JABSOM and includes residency/fellowship programs for many specialties (internal medicine, cardiology, geriatrics, pathology, psychiatry, surgery, orthopedics), and allied health trainees (nursing, pharmacy). Through partnership with MPQH, GWEP assisted QMC in achieving IHI Level 1 and Level 2 certification as an AFHS Committed to Care Excellence in 2020, for both outpatient and inpatient settings. Eventually, QMC hopes to extend AFHS practices to the entire Queen's Health Systems.

The Pali Momi Family Medicine Clinic established an interdisciplinary Annual Wellness Visit (AWV) teaching clinic to improve rates of screening for geriatric syndromes such as dementia, improve patient care and patient/family satisfaction, and provide IPE. At this clinical training site, students from schools of medicine, nursing, social work, and pharmacy come together to learn how to provide preventive and supportive care for older patients and their caregivers. They also have the opportunity to apply their learning through interprofessional collaborative practice in an outpatient setting. The Pali Momi Family Medicine Clinic achieved IHI AFHS Level 1 Recognition in March 2021, and Level 2 Recognition in August 2021.

### **Family/Caregiver Training**

Catholic Charities and Alzheimer's Association are major partners who have facilitated educational opportunities for families and caregivers (Table 2). During the pandemic, they helped caregivers learn to use video-conferencing tools for webinars. GWEP faculty also served as guest lecturers for caregivers with St. Francis Healthcare Systems. We continued to offer a 5-week lecture series attended by over 300 community members each

year at JABSOM's Mini-Medical School for Healthy Aging. In 2017, we developed a dysphagia video to help caregivers better understand dysphagia, strategies for safer feeding, and issues surrounding tube feeding. This video emphasizes Filipino, Hawaiian and Pacific Island communities, and was translated to Samoan, Ilocano, and Chuukese, and continues to receive views.<sup>6</sup> Culturally sensitive screening tools for Native Hawaiian elders were developed with Kula.

### **US Affiliated Pacific Islands (USAPI)**

Our USAPI initiatives include partnerships with PCC, Yap AHEC, and Guam School of Nursing. The majority of care for seniors in USAPI is provided by family caregivers. Thus, there is a great need to train caregivers in basic geriatric care. In the first GWEP cycle, faculty went to Palau to deliver training in-person in partnership with the Ministry of Health and PCC. GWEP faculty provided the curriculum, training, and technical assistance, empowering PCC to offer the caregiver certificate as part of continuing education in their own language. After Palau's borders were completely closed to travel and large gatherings were impossible due to COVID-19, the strategy changed to have a videographer film small group trainings. Recorded short video clips on caregiver training allow for more widespread and efficient dissemination. Beginning in 2021-22, the PI-GWEP will partner with Yap AHEC to provide a similar program.

PI-GWEP continues to collaborate with University of Guam's School of Nursing and Health Science GWEP to share dementia caregiver curriculum and resources. The Guam GWEP contracted with faculty to bring Dementia Friends training to Guam. Dementia Friends is part of a global movement, with the purpose of helping everyone in the community understand dementia.<sup>7</sup> When post-pandemic travel is possible, Dementia Friends Master Training will be conducted as a train-the-trainer model so GWEP staff in Guam can spread the program independently.

Since 2019, community-based trainings have reached 2831 patients and caregivers. Evaluation data show caregivers feel better able to care for themselves and/or others, find resources, and improve their practice of caregiving (average score 4.5 on 5-point Likert-Scale; 1=poor, 5=excellent).

### **Dementia Training**

PI-GWEP has incorporated dementia screening, resources, and training into clinical training sites and simulation curricula for allied health schools. Dementia-related topics were included in all training events for healthcare professionals and families, caregivers and direct care workers. This year, in collaboration with Alzheimer's Association and Catholic Charities, geriatrics modules, resources, and assessment tools for KCC's Health Science faculty were developed to incorporate into their curricula in Fall 2021, with a strong emphasis on promoting dementia

capability. Last year, in partnership with the HDOH's EOA, their "Worried About My Memory" brochure was translated into 7 languages common in Hawai'i (Ilocano, Tagalog, Simplified and Traditional Chinese, Japanese, Korean, Marshallese).<sup>8</sup> GWEP faculty have been a part of the HDOH's ADRD State Planning Committee and have provided input related to workforce development.

## Discussion

The HRSA funded GWEP project is a wide-ranging effort to build and transform the healthcare system to provide better care for our growing older population. In the process of implementing GWEP goals, there were important lessons learned about how to achieve these goals effectively:

First, the integration of academic, clinical and community experiences are vital in preparing trainees to provide interprofessional care. The geriatrics team approach amongst different disciplines and organizations is best taught within a clinical setting with integrated interprofessional practice, curriculum and role modeling,<sup>9</sup> as demonstrated in the success of the AWV clinic and GRACE Team Care™ as clinical teaching models. Second, strong partnerships and leveraging are critical for success. Long-term partnerships were nurtured across sectors over years -through clinical care, teaching, and community support. Relationships were strengthened by cooperation. Meeting regularly provided insights into the accomplishments and challenges faced by the partner organizations. Partner roles were leveraged to achieve common goals. For example, while engaging with health systems leadership to take advantage of payment transformation incentives, academic partners provided education and expertise about geriatric assessments and interventions. Other organizations provided technical assistance with regards to reviewing clinical workflows and applying quality improvement principles to embed 4Ms processes, and community partners provided direct support to caregivers through booklets, seminars, and support groups. With this collaborative approach, GWEP was able to build a supportive network that grew as an AFHS.

Third, caregiver engagement is a must. The ultimate stakeholders in the AFHS endeavor are patients and caregivers. Understanding patient priorities, cultural context, and providing caregiver support is vital to addressing the needs of older adults. These concepts can be integrated into organizational practices striving to achieve a patient-centered medical home.<sup>10</sup> By engaging caregivers and providing education and resources, caregivers are encouraged to seek more from healthcare and community support systems. Organizational pressure and customer demand can be a driver for health systems transformation.

Fourth, an essential ingredient for successful healthcare system transformation is the need for ongoing quality improvement and feedback.<sup>11</sup> In order to meet the IHI AFHS challenge, it was necessary to learn, teach, apply, and reinforce quality improvement principles and skills with all partners. QI principles are taught during some monthly ECHO sessions, including the opportunity to work with a QI coach from MPQH. Learner outcomes, quality measures, and patient outcomes are continuously assessed. Opportunities for updates and feedback during monthly meetings kept processes moving. Semi-annual advisory meetings provided the opportunity for all partners to learn from each other and share ideas.

Fifth, the virtual format of education was transformative. It was important to move beyond the traditional in-person lecture format to provide education with more flexibility to increase reach beyond time and space constraints and make training more relevant. Driven by COVID-19 pandemic restrictions, virtual education significantly increased during the past year. Providing greater access to education and clinical care via tele-education and telemedicine became critical as the vulnerabilities and needs of older adults were highlighted and workforce capacity was stretched. Using virtual strategies, extending outreach to a greater number of people and a wider variety of settings and populations was possible.

In conclusion, the HRSA funded GWEP program has become a powerful agent for change. Transforming geriatric care in Hawai'i and the Pacific Islands requires collaboration, cooperation, and leveraging among academic, clinical and community partners, and by keeping patients and caregivers as the focal point. These efforts have been further enhanced by embracing quality improvement and virtual education. Through these strategies, it is possible to build a coalition that can transform geriatric care in Hawai'i and the Pacific Islands.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# Expanding Access to Contraception: Identifying Accessibility Gaps Across Hawai'i Communities

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## Abstract

*In 2019, Hawai'i ended its Title X program resulting in a loss of federal family planning funds. Additionally, physician shortages have decreased family planning resources available to patients. The objective of this study was to assess contraception availability by determining the number and location of healthcare providers in Hawai'i that prescribed at least one form of contraception. A list of healthcare providers was compiled using Google searches, major health insurance, and hospital provider directories. Providers were organized by physical location (ie, address). Each location was contacted to inquire about each provider's ability to prescribe different forms of contraception (eg, intrauterine device, implant, injection, pill, patch, or ring). Of the 1,020 locations contacted, 274 prescribed at least one form of contraception. Of the 1,810 providers surveyed at these locations, 744 prescribed at least one form of contraception. In regard to insurance, 201 locations and 609 providers accepted at least one form of Medicaid. Most prescribing providers were located on the island of O'ahu. The majority of providers across the state prescribed the pill, patch, or ring. There are many additional barriers that were not addressed in this study, including factors that affect physician prescribing practices. Identifying these barriers is important to further address gaps in contraceptive accessibility. Consideration of improved support for training in specialties such as Family Medicine, Internal Medicine, and Pediatrics can expand access to contraception within primary care settings.*

## Keywords

Contraception, family planning, Title X, intrauterine device

## Abbreviations

AAFP – American Academy of Family Physicians

GIS = geographical information system

IUD = intrauterine device

LARC – Long-acting reversible contraception

OB/GYN = obstetrician-gynecologist

UHFMRP – University of Hawai'i Family Medicine Residency Program

## Introduction

There is no one-size-fits-all approach to pregnancy planning. While some individuals actively plan pregnancy, others may allow for the possibility of pregnancy at various points in their life without actively seeking or preventing pregnancy. An individual's desire for pregnancy exists on a continuum and changes over time. No one contraceptive method is right for everyone. A pregnancy planning framework that accommodates an individual's reproductive goals, values, and needs at each point on the pregnancy planning continuum is necessary.<sup>1</sup> A

patient-centered approach allows providers to more effectively address patient concerns and integrate patient perspectives into contraceptive decision-making.<sup>2</sup> Contraceptive counseling and access to contraception are also critical in reducing unwanted pregnancy, improving pregnancy outcomes, and allowing individuals to take control of their own fertility to achieve their reproductive life goals.<sup>3</sup>

For an individual to have access to contraception, they must have insurance coverage and access to providers that prescribe the full range of contraceptives including short-acting methods like combined hormonal contraceptives (eg, pill, patch, or ring), injections (eg, depot medroxyprogesterone acetate), and long-acting reversible methods like implants and intrauterine devices (IUDs).<sup>4</sup> The “best” form of contraception varies between patients depending on their preferences, medical comorbidities, attitudes toward contraception, and prior experiences with contraception.<sup>4</sup> Access to a variety of short- and long-term contraceptives allows individuals to select the method that works best for them.

Individuals in Hawai'i face unique challenges in obtaining healthcare due to the geographical distribution of providers across the state. In rural areas of Hawai'i, where the physician shortage is the most pronounced,<sup>5</sup> there may be limited access to providers who can prescribe the variety of contraceptives needed to support a patient-centered approach to reproductive planning. This deficit in care highlights gaps in accessibility that need to be filled. Additionally, in 2019, Hawai'i was 1 of 6 states to end Title X programming. Title X is a nationally administered federal program that provides comprehensive family planning services to individuals with financial barriers to healthcare. Prior to 2019, Title X funds in Hawai'i supported a total of 32 health centers across the state. According to the 2015 Title X Family Planning Annual Report, Title X served approximately 15,746 patients with incomes at or below 100% of the federal poverty level. There were 15 Title X funded clinics in Honolulu County, 9 in Hawai'i County, 6 in Maui County, and 2 in Kaua'i County.<sup>6</sup> The physician shortage combined with the loss of Title X funding may have exacerbated existing barriers and reduced many individuals' ability to access contraception and maintain reproductive autonomy.

Access to a wide range of contraceptive methods plays an integral part in allowing people to fully participate in their health

decisions. There are many barriers that exist in accessing contraceptive care in Hawai‘i. For example, providers are not equally distributed across the islands and do not always implement the same prescribing practices. Additionally, reduced funding for clinics can result in shorter hours of operation, decreased outreach and education, and decreased availability of more costly contraceptives, like IUDs.<sup>6</sup> Future endeavors aimed at increasing the number of contraceptive providers should be based on the current availability of services; therefore, it is critical to assess the availability of contraceptive providers across communities in Hawai‘i. Additionally, while many patients receive contraceptive care through their obstetrician-gynecologist (OB/GYN) provider, specialties such as Family Medicine, Internal Medicine, and Pediatrics may provide contraceptive care within their primary care setting. Not all primary care physicians are experienced in providing this service, so it may help to remove barriers to access by increasing training and support for physicians in these specialties both during and after residency.

## Methods

A cross-sectional phone survey of provider offices was conducted to determine the availability and location of contraceptive providers across Hawai‘i. This study was reviewed and determined to be not human studies research and therefore exempt by the University of Hawaii Office of Research Compliance Human Studies Program (2019-00716). A database of providers (Family Medicine, OB/GYN, Internal Medicine, Pediatrics, and Advanced Practice Providers) in Hawai‘i was compiled from August 2019 through December 2019 using Google and Google Maps searches and directories from major health systems and insurance plans. Google searches were conducted for a specific island or city/town using the search term “birth control” (eg,

“birth control Honolulu”). Insurance and hospital directory search terms included: “Women’s Health”, “Obstetrics”, “OB/GYN”, “Family Medicine”, “Internal Medicine”, and “Pediatrics”. Military providers, specialized internal medicine physicians, such as cardiologists, individuals who were no longer practicing in Hawai‘i, offices that were permanently closed, and providers who were retired or deceased were excluded from the study.

Once providers were identified, a cross-sectional phone survey of provider offices was conducted from January 2020 through August 2020. Each clinic location was surveyed to determine the number of providers, forms of contraception available, and whether or not the practice accepted at least one form of Medicaid. Providers who practiced at multiple locations on 1 island were counted as 1 individual prescribing provider. If a provider practiced at multiple locations, each office was included as a unique location. A maximum of 3 attempts were made to contact all offices on the compiled list of providers. If an office could not be reached after 3 attempts, they were removed from the list. A cut-off of 3 attempts was selected based on the assumption that it was unlikely a prospective patient would call the same phone number more than 3 times after receiving no response.

After completing data collection, heat maps were generated using Google My Maps (Google, Mountain View, CA) and Google Drawing (Google, Mountain View, CA) to illustrate the density of providers that prescribed contraception across each island. Population density maps from the 2010 U.S. Census data were used as the foundation for the maps. Approval for use of these maps was obtained from the Hawai‘i State Geographical Information System (GIS) Program. Inclusion and exclusion criteria for providers and locations are described in Figure 1.

Island	Providers surveyed	Providers prescribing at least one form of contraception <sup>a</sup>		Providers prescribing IUD <sup>b</sup>		Providers prescribing implant <sup>b</sup>		Providers prescribing Depo <sup>b</sup>		Providers prescribing pill, patch, ring <sup>b</sup>		Providers accepting Medicaid <sup>b</sup>	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Hawai‘i	319	90	28	71	79	63	70	65	72	90	100	72	80
O‘ahu	1,132	503	44	313	62	324	64	416	37	503	44	410	36
Maui	169	63	37	31	49	28	44	41	65	63	100	45	71
Kaua‘i	161	79	49	34	43	30	38	31	39	75	95	73	92
Lana‘i	6	6	100	0	0	4	67	6	100	6	100	6	100
Moloka‘i	23	3	13	3	100	3	100	3	100	3	100	3	100
<b>State Total</b>	<b>1,810</b>	<b>744</b>	<b>41</b>	<b>452</b>	<b>61</b>	<b>452</b>	<b>61</b>	<b>562</b>	<b>76</b>	<b>740</b>	<b>99</b>	<b>609</b>	<b>82</b>

<sup>a</sup> Based on all eligible providers. <sup>b</sup> Based on providers who prescribe contraception.

## Results

A total of 744 providers prescribed at least one form of contraception across all islands. Table 1 describes the location of these providers. A total of 274 clinics prescribed at least 1 form of contraception. Table 2 describes the location of these clinics. O‘ahu had the most providers and clinics prescribing at least 1 form of contraception, while Lana‘i and Moloka‘i had the least. The majority of locations serving O‘ahu were located in Honolulu (Figure 2). Of the providers prescribing at least 1 form of contraception, 100% (3/3) provided IUDs on Moloka‘i, while 0% (0/6) provided IUDs on Lana‘i.

Across the State of Hawai‘i and on each individual island, the most prescribed forms of contraception were the pill, patch, and ring. On Moloka‘i, all methods were prescribed by all 3 providers at a single location. Tables 1 and 2 describe the providers and clinics accepting at least one form of Medicaid. With regard to providers prescribing at least one form of contraception, 609 out of 744 accepted at least one form of Medicaid (82%). Of the 274 clinics prescribing at least one form of contraception, 201 clinics accepted at least one form of Medicaid (73%).

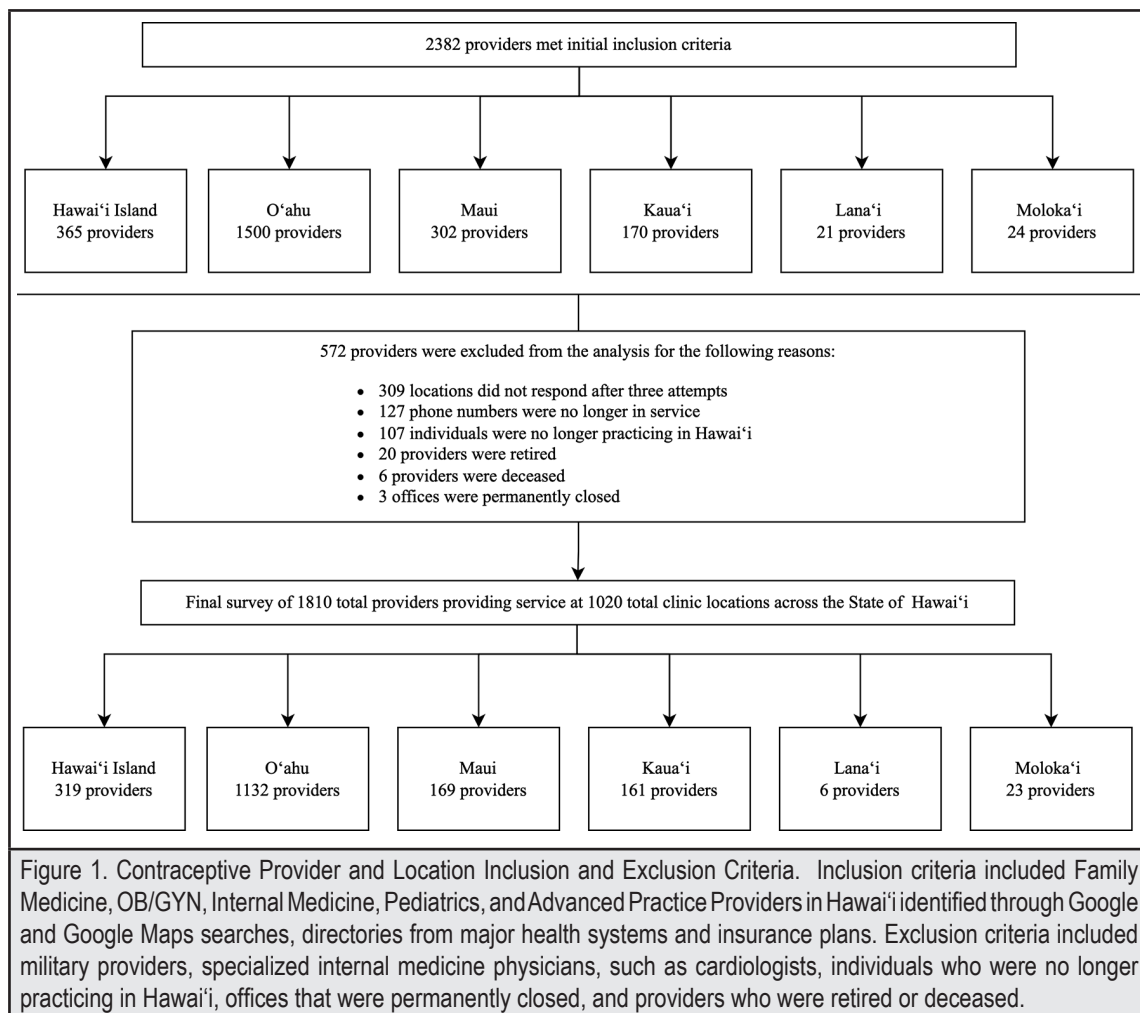




Table 2. Contraception Prescription Practices by Location in Hawai'i, 2020													
Island	Locations surveyed <sup>d</sup>	Locations prescribing at least one form of contraception <sup>a</sup>		Locations prescribing IUD <sup>b</sup>		Locations prescribing implant <sup>b</sup>		Locations prescribing Depo <sup>b</sup>		Locations prescribing pill, patch, ring <sup>b</sup>		Locations accepting Medicaid <sup>b</sup>	
		No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Hawai'i	201	50	25	35	70	34	68	35	68	48	96	37	74
O'ahu	651	174	27	95	55	93	53	117	67	172	99	121	70
Maui	99	25	25	10	40	8	32	12	48	25	100	18	72
Kaua'i	56	21	38	10	48	10	48	12	57	20	95	21	100
Lana'i	4	3	75	0	0	2	67	3	100	3	100	3	100
Moloka'i	9	1	11	1	100	1	100	1	100	1	100	1	100
<b>State Total</b>	<b>1,020</b>	<b>274</b>	<b>27</b>	<b>151</b>	<b>55</b>	<b>148</b>	<b>54</b>	<b>180</b>	<b>66</b>	<b>270</b>	<b>99</b>	<b>201</b>	<b>73</b>

<sup>a</sup> Based on all eligible locations with at least one provider who prescribes contraception. <sup>b</sup> Based on locations with providers who prescribe contraception.

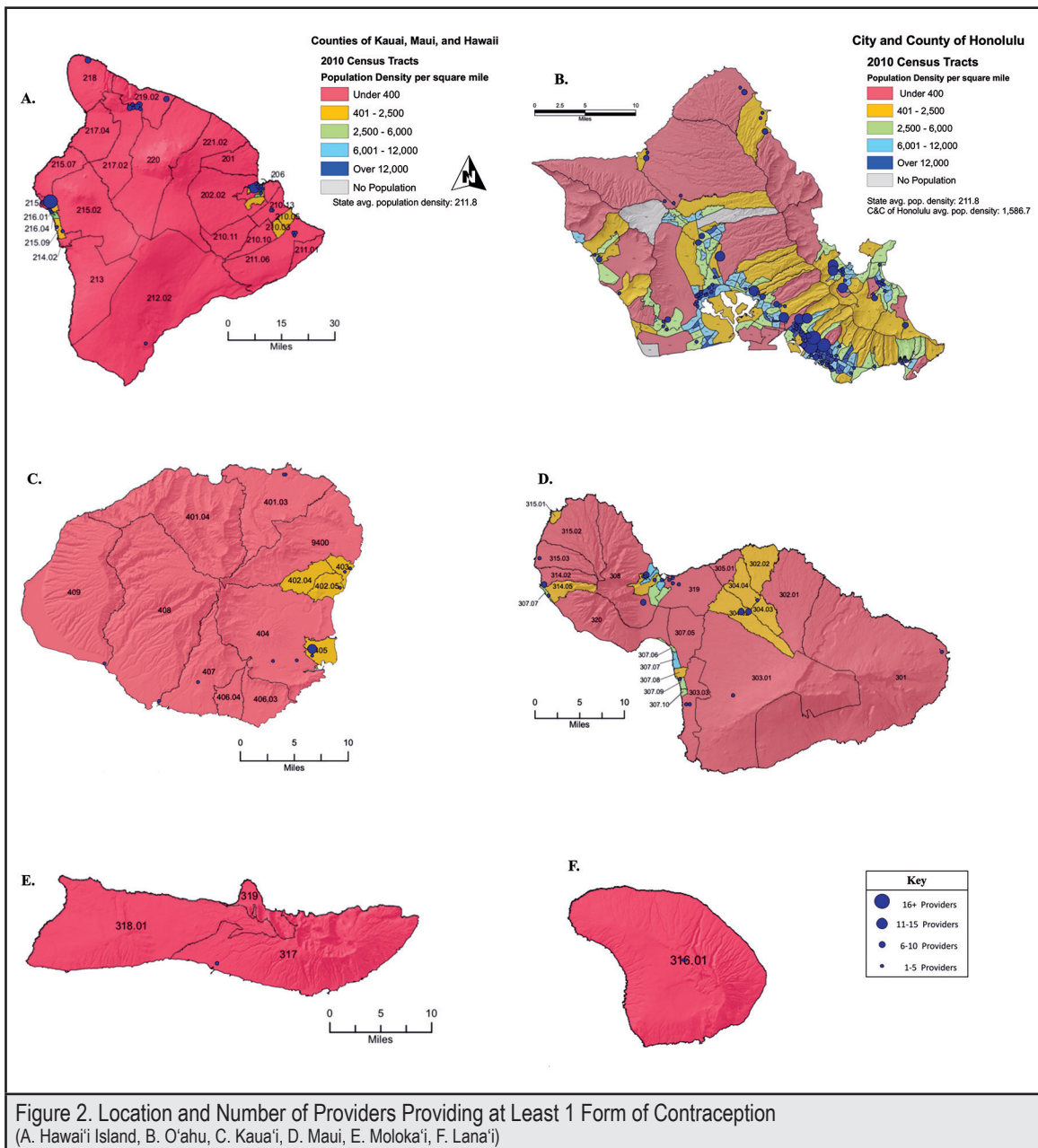


Figure 2. Location and Number of Providers Providing at Least 1 Form of Contraception (A. Hawai'i Island, B. O'ahu, C. Kaua'i, D. Maui, E. Moloka'i, F. Lana'i)

## Discussion

There are many factors that contribute to a patient's ability to access contraception. Availability and location of providers can greatly impact how easily a patient is able to see a provider. In addition, providers of different specialties may receive different training or have different comfort levels in prescribing certain types of contraceptives.<sup>7</sup> This poses a barrier for patients who desire a type of contraceptive that their provider may not be trained to provide. Insurance plays a role in accessibility since not all providers accept Medicaid and insurance does not reimburse all providers of reproductive health services equally. These barriers influence an individual's ability to take control of their reproductive health.

In Hawai'i, the location of contraceptive providers can pose a significant barrier to patients. This is a particular concern for people in rural communities. The lack of access to contraception in rural communities is in part due to the physician shortage, particularly in primary care, as demonstrated by the 2016 Hawai'i Physician Workforce Assessment<sup>5</sup> and again demonstrated in the 2020 workforce assessment in this supplement.<sup>10</sup> Islands with higher population density, such as O'ahu, have more contraceptive providers and greater variety in the types of contraceptives available. On the neighbor islands, where there are fewer providers, the accessibility gaps were pronounced. In general, long-term forms of contraception, such as IUDs and implants, are not as readily available in rural areas. For example, a patient on Lana'i is unable to get an IUD without traveling to another island. However, there were exceptions to this. On Moloka'i, contraceptive providers on the island provided all forms of contraception. Most of the providers across the state prescribe the pill, patch, or ring, making these the most accessible forms of contraception (Table 1). The authors anticipated that methods which require specialized training to insert (IUD and implant) may be less accessible in areas with fewer providers. Upcoming efforts to improve contraceptive access should focus on training providers in rural areas. Additionally, as providers often move, training programs must be regular, ongoing endeavors.

Though conversations with providers and their office staff were not captured in a systematic fashion, many Internal Medicine and Family Medicine physicians stated that they referred patients who desired contraception to an OB/GYN even though they were able to prescribe contraception in some circumstances. One primary care location surveyed stated that primary care physicians do not receive the same level of compensation for birth control services as their OB/GYN counterparts, prompting them to refer patients out for contraceptive care. These anecdotes suggest that while prescribing contraception may be within a provider's scope of practice, other factors may prevent them from providing this care. Internal Medicine and Family Medicine physicians located on more rural islands tended to primarily prescribe oral contraception. Further research should investigate

the barriers physicians face when prescribing different forms of contraceptives to elucidate this finding. The phone survey also revealed difficulties from the patient perspective of finding a provider to obtain contraceptives. This study implemented methods typically utilized by patients, such as Google searches or insurance and hospital directories. The information found through these search methods was often outdated, with many inconsistencies in address and phone number, and included providers who were no longer practicing.

Although this study provides much-needed insight into a patient's ability to access contraception, it is not without limitations. Respondents to this phone survey included front desk staff, medical assistants, or physicians who have different knowledge of what contraceptive methods are available to patients. This may have an impact on the accuracy of the data. With larger practice locations, the types of birth control methods offered were generalized to the entire clinic as opposed to individual providers. For example, in a large, multispecialty location with Internal Medicine physicians, Family Medicine physicians, OB/GYNs, and Nurse Practitioners, receptionists were unable to provide information on what each clinician provided but knew that all methods were available at their site. Thus, the number of clinicians who provided various forms of contraception may be an overestimate of the true number of contraceptive providers. The authors sought to overcome this limitation by also describing the number of locations where contraceptives were available as this may more accurately represent the availability of a contraceptive method. Another limitation to the study was the inability to reach all providers. Some of our phone calls took place after the COVID-19 pandemic began. Although most clinics resumed normal business hours and continued to answer phone calls, some may have had reduced hours for certain periods of time. This factor could have resulted in the underestimation of the number of contraceptive providers and clinic locations surveyed.

This study primarily focuses on identifying gaps in accessibility to contraception based on geographical access to providers. One solution to these gaps in access is to increase training and support for primary care physicians (such as Family Medicine, Pediatrics, and Internal Medicine) both during and after residency so they may offer full spectrum reproductive health care within the primary care setting. In particular, Family Medicine physicians are at the frontlines of providing primary care for people of all ages and backgrounds. This makes the specialty well situated to offer contraceptive counseling and services at any point along a person's family planning journey. Family Physicians tend to provide the majority of primary care in rural and urban underserved areas both in Hawai'i and nationally. While the ability to offer contraceptive services without need for referral does not account for all of the barriers previously mentioned, this could expand family planning care for patients within their medical homes and provide this service where access may otherwise be limited. Training on comprehensive

sexual and reproductive health is required during the 3 years of family medicine residency. Per the American Academy of Family Physicians, “At the completion of residency training, a family medicine resident should be able to: offer patient-centered, comprehensive contraceptive counseling and options, including long-acting reversible contraception...”<sup>8</sup>

The University of Hawai‘i Family Medicine Residency Program (UHFMRP) serves a population that is close to 50% Medicaid. One of the program’s aims is to train residents who will continue to practice in Hawai‘i upon graduation. Unpublished internal data collected by UHFMRP shows that over the past 10 years, 72% of residents chose to practice in Hawai‘i in their first job after graduation. Forty-three percent of these graduates chose positions in areas of physician shortage or at federally qualified health centers across the state. Given the large number of graduates who stay and practice in Hawai‘i, UHFMRP has a unique opportunity to train primary care physicians who can offer full spectrum reproductive health care and thus increase access across the state. The UHFMRP’s current training in women’s health is focused on teaching its physician residents a patient-centered, unbiased approach to comprehensive contraception counseling. They have implemented a Buy and Bill program to allow for same day long-acting reversible contraceptive (LARC) insertions. This teaches residents the importance of access and builds capacity to do this in their future practice. Hawai‘i Residency Programs in Family Medicine, Pediatrics, OB/GYN, and Internal Medicine can expand their current collaborations to emphasize training in contraception care given the potential to encounter patients with this need in all of these aforementioned specialties. This could significantly expand contraceptive services to patients across the state. Providing a network of support and ongoing training for physicians in the community may also empower them to continue to offer these services post-graduation. Additionally, recruiting students to JABSOM from rural communities will also likely address the workforce shortage in those areas for all specialties, not only those that provide reproductive health services.<sup>9</sup>

More research is needed to elucidate the most significant barriers to access to reproductive care in Hawai‘i so that concerted efforts can be made to overcome those specific barriers. Future studies should address the multitude of other factors that impact access to contraception and how they influence the behavior of patients seeking contraception. The impact of insurance coverage and cost is an important area to investigate further in order to address the socioeconomic factors that affect an individual’s choice for a provider as well as a provider’s choice about offering this service. The discontinuation of Title X in 2019 may have further exacerbated the barriers to contraceptive options, particularly for patients from low-income backgrounds. Identifying

these barriers is an essential step in improving overall access to contraception, increasing contraceptive options, encouraging shared patient-provider decision-making, and properly targeting future endeavors aimed at increasing the availability of contraceptive providers. Improved access to family planning services is vital for comprehensive care of all patients and for the health of Hawai‘i’s communities.

## Conflict of Interest

None of the authors identify a conflict of interest.

## Disclosure Statement

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Dr. Teresa Schiff-Elfalan and Dr. Komal Soin are employees of the University of Hawai‘i Family Medicine Residency Program.

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