

Hawai'i Physician Workforce Assessment 2020

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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 2033.¹ 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.¹ 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 60.² Furthermore, COVID-19 is having a negative physical and psychological effect upon practicing physicians.³ Burn out, moral distress, and compassion fatigue are prevalent in physicians working with COVID-19 patients.⁴ To compound this, the pandemic is causing direct illness and death of physicians.⁵

In Hawai'i, local workforce shortage research indicated a lack of between 519 and 820 physician Full Time Equivalents (FTE) in 2019.⁶ 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.⁶ 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.⁷ Rural shortages have been a significant challenge in Hawai'i, with neighboring islands having greater shortages of physicians than O'ahu.⁶

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.⁸

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, 2021.¹²

Table 2. Hawai'i Physician Supply and Demand by Specialty, 2020					
	State of Hawai'i				
	Physician Demand (FTE) ^a	Physician Supply (FTE)	Shortage ^b	Shortage Without Overage ^c	Percent Shortage ^d
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%
Total	3522.2	2812.3	709.9	1008.0	29%

^a FTE is full-time equivalent

^b Shortage is calculated as Physician Demand FTE less Physician Supply FTE. If Physician Supply is more than Physician Demand, Shortage is a negative number.

^c 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.

^d Percent shortage is shortage without overage divided by physician demand FTE.

Table 3. Summary Statistics of Physician Age by County in the State of Hawai'i, 2020						
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

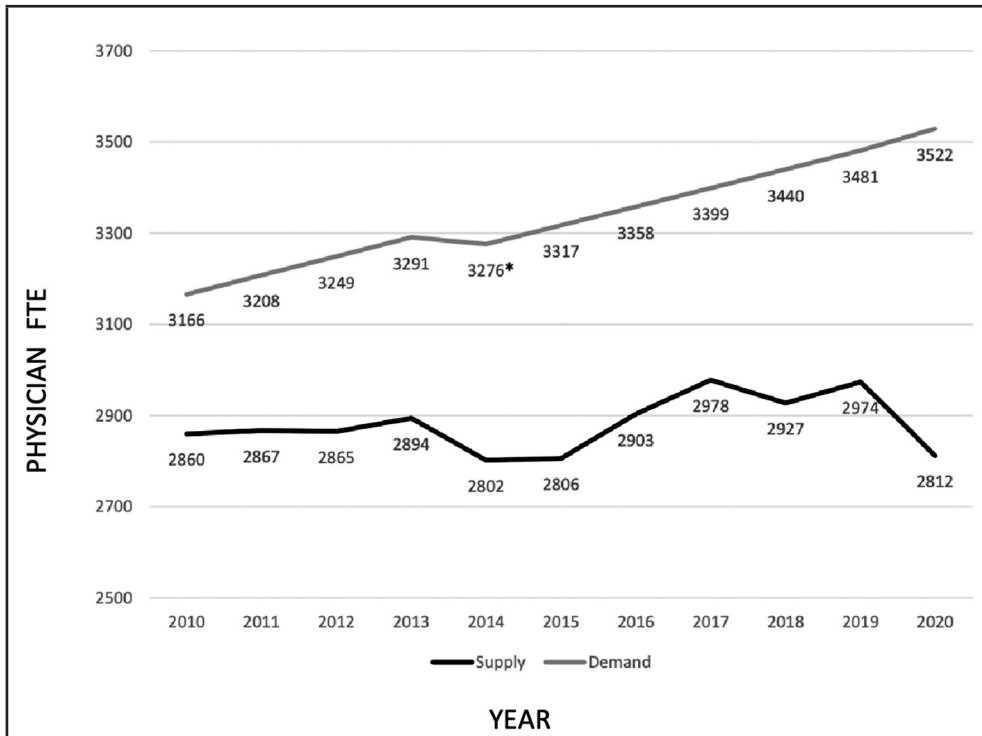


Figure 1. Hawai'i Physician Supply and Demand Trends 2010-2020

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.⁹ 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.¹⁰

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%,¹¹ 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,¹² 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%.¹³ 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.¹³ 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,¹² 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,¹⁴ 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.¹⁵ 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.^{16,17}

An equally important effort to recruit and retain physicians should focus on financial incentives¹⁸⁻¹⁰ and work/life balance.^{19,20} This can be done through incentives for practice in areas of need, such as loan repayment²¹ 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.²²

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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