

UNIVERSITY OF HAWAI‘I SYSTEM ANNUAL REPORT



REPORT TO THE 2022 LEGISLATURE

Annual Report on Findings from the
Hawai'i Physician Workforce Assessment Project

Act 18, SSLH (Section 5)
Act 186, SLH 2012
Act 40, SLH 2017

November 2021

Hawai'i Physician Workforce Report

Executive Summary

Of the 10,592 physicians licensed in Hawai'i, only 3,293 are currently providing patient care to Hawai'i's population. Since not all physicians are full time, we estimate 2,857 Full Time Equivalents (FTEs) of direct patient care. This number is 45 FTEs higher than in 2020. A new model of demand was purchased which is based on US average physician use as applied to Hawai'i's four counties. The model indicates the State of Hawai'i needs 3,395 FTEs of practicing physicians, indicating a statewide shortage of 537 FTE of physician services. However, when island geography and unmet specialty specific needs by county are examined, the estimated unmet need for physicians is **732 FTEs**.

Of the physicians previously found working in Hawai'i, at least 71 physicians retired, nine passed away, 154 moved out of state, and 46 decreased their work time (possibly indicating an intention to retire soon). Over 152 new doctors were discovered practicing in Hawai'i, including 28 who returned to Hawai'i after moving out of the state in the last five years. The average physician age in Hawai'i is 54.6 years, compared to the average age of physicians in the US of 51 years. Almost half (48%) of our physician workforce is aged 55 or over, and 22% of our physicians are already 65 or over. Five of our practicing physicians are 90 or over. Women make up 38% of the workforce (up slightly from 37% last year).

The greatest area of statewide shortage is primary care, with 163 FTEs needed total across all islands. Statewide, the greatest specialty shortages by percentage are: Pediatric Gastroenterology (70%), Colorectal Surgery (66%), Adult Pulmonology (65%), Pediatric Pulmonology (64%), Pediatric Endocrinology (61%), Infectious Disease (58%), Thoracic Surgery (53%), Allergy & Immunology (50%), Rheumatology (50%), and Adult Endocrinology (49%).

Activities pursued by the Physician Workforce team to increase the physician population include: Ongoing recruitment of physicians to Hawai'i through a dedicated recruiter and regularly updated job board at AHEC.hawaii.edu; maintaining the workforce database and providing de-identified data and presentations as requested throughout the state; providing continuing education including the Hawai'i Health Workforce Summit (400 online participants in 2021) and Project ECHO (4,000 people-hours of case-based education each year); providing Educational Loan Repayment to 60 individuals since 2012; coordinating neighbor island clinical teaching, travel, lodging, community activities and recruitment of health career-focused learners; assisting with administering the Hawai'i Preceptor Tax Credit; and assisting in the administration of JABSOM scholarships which require pay back of academic education through time practicing in

Hawai'i. New activities in 2021 include a free rural telecounseling program (hawaiiutelehealth.org), online support groups, and a new physician mentoring program.

Background

Recent national estimates indicate a current shortage of between 40,000 and almost 60,000 practicing physicians in the United States, and this shortage is expected to grow to 139,000 physicians by the year 2033.¹ Much of this projected shortage is attributed to an aging population which will require more medical care, and an aging physician workforce which is increasingly considering retirement.¹ The Federation of State Medical Boards in 2018 estimated that 30% of licensed physicians were already over the age of 60.² Furthermore, COVID is having a negative effect upon practicing physicians, both physically and psychologically.³ Burn out, morale distress, and compassion fatigue are prevalent in physicians working with COVID patients.⁴ To compound this, COVID is causing direct illness and death of physicians, especially the older generation.⁵ Hawai'i has not been spared from these phenomena. This report outlines the activities undertaken to measure and confront the physician shortage in the state.

Project Methodology

Supply

The **supply** of physicians in Hawai'i is estimated based on queries of local community contacts, internet searches and direct calling of physician offices to confirm hours of active patient care. The phone calls were performed by staff from the Area Health Education Center (AHEC) office at the University of Hawai'i John A. Burns School of Medicine and pre-health interns working with the AHEC. The script used is included in Appendix 1. It includes confirming whether the physician works at the office, his/her specialty, how many hours s/he works each week on average, if s/he has other office locations or has partners working in the office. These numbers are converted to Full Time Equivalent (FTE) based on a 40-hour week representing 1.0 FTE. Although many physicians work more than 40 hours a week, this is used as a baseline for full time effort and 1.0 is the maximum allocation given to a physician.

Demand

There is no estimate of the ideal number of physicians per population or physician mix for an island population such as ours in Hawai'i. Therefore, a demand model was purchased from a well-known healthcare workforce modeling organization¹ which does demand estimates for the federal government and other large organizations. The **demand** for physician services is estimated using a model purchased from IHS Global in 2021. The major components of the demand model include:

¹ IHS Markit, <https://ihsmarkit.com/index.html>

1. a population database that contains characteristics and health risk factors for a representative sample of the population in each Hawai'i county,
2. predictive equations are based on national data that associate a person's demographic, socioeconomic and health risk factor characteristics to his or her demand for healthcare services by care delivery setting, and
3. national healthcare delivery patterns that convert demand for healthcare services to demand for FTE of physicians.

For purposes of physician workforce modeling, the relevant settings are physician offices, outpatient clinics, hospital emergency departments, and hospital inpatient settings. While the forecasting equations and staffing patterns are based on national data, a population database was constructed for Hawai'i that was representative of the population in each county of Hawai'i. This was done using county-level population information (e.g., age-gender-race/ethnicity), whether a county was considered metropolitan or non-metropolitan, and information from the Behavioral Risk Factor Surveillance System (BRFSS) for the population, including summary statistics by county for factors such as prevalence of obesity, diabetes, current smoking status, and other risk factors used in the model.

All data used in this model originate from sources before the COVID pandemic, so the data do not reflect the changes in physician use patterns as a result of the global pandemic. The numbers included in this report are based on average demand for services under normal healthcare circumstances, not a situation of unusual demand patterns such as we have seen since March 2020.

The new model, while made by the same company as the prior model, has a lower estimate of demand than the previous model for two primary reasons:

1. The population of Hawai'i grew 4% less than was projected in the prior demand model. This accounts for an estimate of demand approximately 140 physicians less than predicted in the prior physician workforce model.
2. Lower use of services across the US between 2015 and 2019, resulting in a lower demand than estimated previously.

The new model also has pediatric subspecialty estimates for most subspecialties which were not available previously.

Applying the IHS Markit model to Hawai'i produced estimates of physician demand by specialty representing the demand for service if the people in each county were to receive a level of care consistent with the national average, while adjusting for differences across counties in demographics, health and economic factors that affect demand for health care services. To adapt for the island geography, three changes were made to the model in collaboration with the model's creators:

1. Tourist use of emergency care: Emergency physician demand was increased to cover the percent of Emergency Department (ED) visits which were made by non-residents in each county. The hospital ED visit numbers were obtained for 2016-2019² and ED and inpatient demand was increased by the percentage of non-residents receiving emergency care in that county.
2. Psychiatry demand: The need for Psychiatry care has long been reportedly underestimated, therefore discussion was undertaken with the UH Department of Psychiatry to accurately represent the need. Despite there being a plethora of estimates of population-based demand, the ratio used was the number of patients to support a full-time psychiatrist (one for every 8,400 patients).³ This ratio is an average of 11.9 psychiatrists per 100,000 population and is well within the range of estimates of necessary psychiatrist to population ratio of 3.9⁴ to 25.9⁵ from published articles. Use of this ratio did not make a large difference in psychiatrist demand estimations, but more accurately reflects need in Hawai'i.
3. Emergent surgical and intensive care services: Based on current research of best practices^{6,7}, the research team believes that every patient should be within an hour of a hospital with available intensive care and emergency surgical capabilities to provide orthopedic, urologic, cardiothoracic, and vascular care. To make this possible, each island with a Level III or higher trauma center (Kaua'i, O'ahu, Maui and Big Island) was estimated to need at least 2.0 intensivists and surgeons from the specialties described. Due to size, Hawaii Island was estimated to have double the need for these specialties to facilitate access to services within one hour. That being said, a group of only two providers in a community for a discipline is challenging to maintain due to on-call responsibilities. Unfortunately, it would be difficult to support much larger practices in rural areas, and in fact, the market may not be able to support what is recommended here.

These changes are incorporated into the tables in Appendices 2 and 3.

² Hospital billing data archive of the Laulima Data Alliance. Analyzed by Hawai'i Department of Health and provided to research team.

³ Sargeant, J. K., Adey, T., McGregor, F., Pearce, P., Quinn, D., Milev, R., Renaud, S., Skakum, K., & Dada, N. (2010). Psychiatric human resources planning in Canada. Position paper. Canadian Psychiatric Association. *Canadian journal of psychiatry. Revue canadienne de psychiatrie*, 55(9), 1–20.

⁴ <https://openminds.com/store/the-2018-open-minds-state-by-state-guide-to-estimating-the-number-of-psychiatrists-an-open-minds-market-intelligence-report/>

⁵ Satiani, A., Niedermier, J., Satiani, B., & Svendsen, D. P. (2018). Projected Workforce of Psychiatrists in the United States: A Population Analysis. *Psychiatric services (Washington, D.C.)*, 69(6), 710–713. <https://doi.org/10.1176/appi.ps.201700344>

⁶ McCrum, M. L., Wan, N., Lizotte, S. L., Han, J., Varghese, T., & Nirula, R. (2021). Use of the spatial access ratio to measure geospatial access to emergency general surgery services in California. *The journal of trauma and acute care surgery*, 90(5), 853–860. <https://doi.org/10.1097/TA.0000000000003087>

⁷ <https://www.facs.org/-/media/files/quality-programs/trauma/vrc-resources/resources-for-optimal-care.ashx>

Shortage is calculated in two ways. The first is by simply subtracting supply from demand. Percent of shortage is then calculated as (Demand-Supply)/Demand. This number is included on the Supply and Demand tables starting in Appendix 3 as “Shortage”. An estimate which considers geographic differences is included in the Supply and Demand tables in Appendix 3 as “Without overage”. The percentage of shortage is calculated by dividing this “Without overage” number by the demand. The actual shortage is most likely somewhere between the two figures.

Other data collection:

Physician age and gender are obtained as available from internet searches and the licensure survey. Retirement, death, decreased time practicing and moved out of state status was obtained from community contacts, internet search or the physician office upon phone call.

Project Results

Workforce statistics obtained from internet searches, public records, community contacts and calling of physician offices indicate that:

- There are currently 10,592 physicians licensed to practice in Hawai‘i
- Only 3,290 physicians (non-active duty) are actively providing patient care. Given that the military has a separate health system, active-duty personnel were excluded from our analysis).
- These actively practicing physicians provide 2,857 Full Time Equivalents of direct patient care
- There are 45 more full time equivalents of physician services available to Hawai‘i’s patients in 2021, than in 2020 as outlined below in Table 1.

Table 1: Hawai‘i Physician Supply Trend (in Full Time Equivalents)

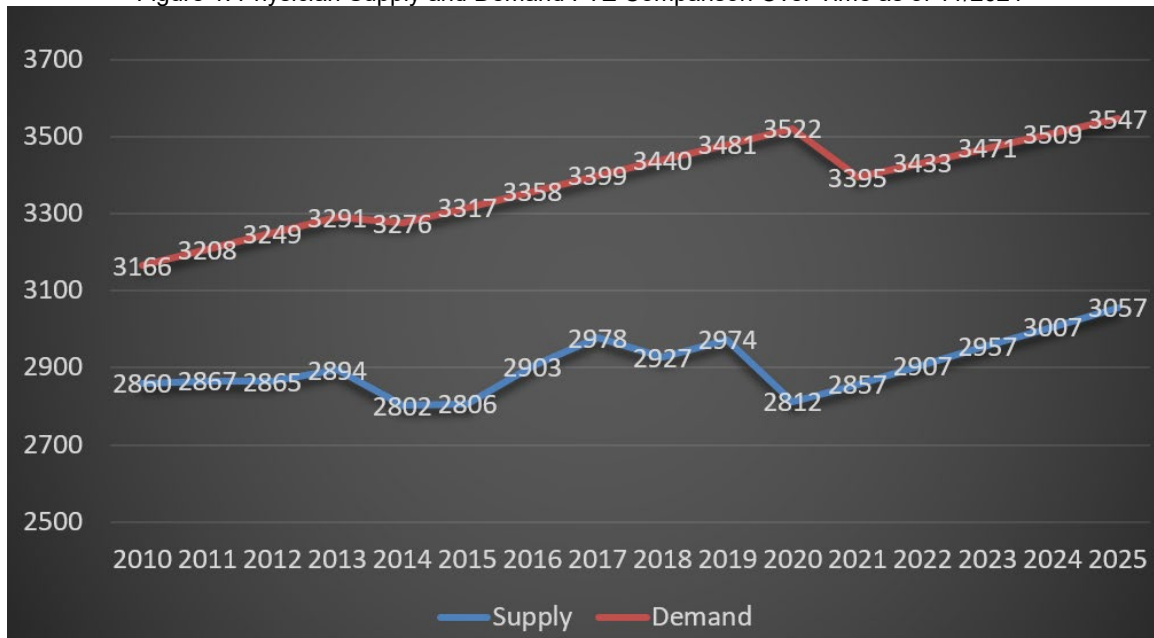
Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
FTE	2894	2802	2806	2903	2978	2927	2974	2812	2857

The demand model based on US average physician use when applied to Hawai‘i’s four counties indicates the State of Hawai‘i needs 3,395 FTEs of practicing physicians. This indicates a shortage of 537 FTE of physician services. However, when island geography and unmet specialty specific needs by county are examined, the estimated unmet need for physicians (accounting for geographic distance and air travel) increases to 732 FTEs.

Future Trends

The demand model predicts our demand will increase by 38 FTE a year. If we only increase our workforce by 50 a year, we will not meet our demand in the foreseeable future.

Figure 1: Physician Supply and Demand FTE Comparison Over Time as of 11/2021



Additional facts about the active physician workforce in Hawai‘i

Of the physicians previously found working in Hawai‘i during the last year, at least 71 physicians retired, nine passed away, 154 moved out of state, and 46 decreased their work time (possibly indicating an intention to retire in the near future). Over 152 new doctors were discovered practicing in Hawai‘i, including 28 who returned to Hawai‘i after moving out of the state in the last five years. The average physician age in Hawai‘i is 54.6, compared to the average age of physicians in the US of 51. A total of 48% of our physicians are 55 or over, and 22% of our doctors are already 65 or over. Five of our practicing physicians are 90 or over and practicing part time. When analyzed by county, in Honolulu, Hawai‘i, Maui and Kaula‘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 ($p \leq 0.001$) and Maui ($p \leq 0.01$) counties have significantly higher proportions of physicians who are of age 65 or older. This year women make up 38% of the physician workforce (up from 37% last year).

Statewide supply and demand by county and primary care by county tables are included below.

Table 2: Physician Shortage by County 2021

	Honolulu County	Maui County	Hawai'i County	Kauai County	Statewide
Shortage	344	158	187	43	732
Percent	15%	40%	40%	26%	22%

Table 3: Primary Care Physician Shortage by County 2021

	Honolulu County	Maui County	Hawai'i County	Kauai County	Statewide
Shortage	115	32	16	1	163
Percent	15%	27%	11%	1%	15%

Specialty Specific Shortages by State and County

Shortages of specialty physicians have changed slightly from past years, but remain similar as outlined in Appendix 2.

The greatest area of statewide shortage is primary care, with 163 FTEs needed total across all islands. Statewide, the greatest subspecialty shortages by percentage are: Pediatric Gastroenterology (70%), Colorectal Surgery (66%), Adult Pulmonology (65%), Pediatric Pulmonology (64%), Pediatric Endocrinology (61%), Infectious Disease (58%), Thoracic Surgery (53%), Allergy & Immunology (50%), Rheumatology (50%), and Adult Endocrinology (49%).

Table 4: Greatest Statewide Subspecialty Shortages by Percent

Specialty	Percent Shortage
Child Gastroenterology	70%
Colorectal Surgery	66%
Adult Pulmonology	65%
Child Pulmonology	64%
Child Endocrinology	61%
Infectious Diseases	58%
Thoracic Surgery	53%
Allergy & Immunology	50%
Adult Rheumatology	50%
Adult Endocrinology	49%

2021 Individual Specialty Shortages by County in Rank Order of Percent Shortage Estimates tables are included in Appendix 2.

Solutions Being Implemented

Ongoing Physician Workforce activities designed to grow, keep and support the physician workforce.

- ❖ **Recruit the future physician workforce:** The AHEC team has contacted over 4,000 health professions students in the intervening year. Health career activities have been expanded to reach students on all neighboring islands. Through federal grant funding, AHEC provides mentoring, counseling support and activities so that students from throughout Hawaii can successfully pursue careers in the health professions. Participating AHEC students receive certification and training in Cardio Pulmonary Resuscitation (CPR), First Aid, Youth Mental Health First Aid and Occupational Safety Administration procedures, Health Information Portability and Accountability Act (HIPPA) procedures, as well as training in science, technology, engineering, and mathematics through real life data acquisition, public speaking, leadership, research literacy, teamwork abilities, interview skills, professionalism, time management, and financial planning methods. The PreHealth Career Corps program for students pursuing health careers now has 2,975 students. AHEC is also working with the Healthcare Association of Hawai'i to bolster non-physician health professions in order to lighten the load on the physicians by maximizing teamwork and collaboration and assisting with O'ahu and Maui Health Sector Partnership activities which increase students pursuing health careers.
- ❖ **Expand rural training opportunities:** AHEC hired a Rural Coordinator to work with neighbor island communities to recruit additional preceptors to teach health professions students, recruit and support students interested in health careers, work with community members to host students, and document the impact of rural activities on rural health professions training.
- ❖ **Physician Recruitment:** AHEC has hired a statewide physician recruiter to help recruit physicians to Hawai'i. In addition, AHEC posts all physician job openings online through collaboration with the Hawai'i Physician Recruiters Group: The AHEC.hawaii.edu website advertises job opportunities in Hawai'i to providers interested in practice and disseminates information. This endeavor includes personnel searching the web for all available postings and working with recruiters to post their jobs. Physician practices wishing to hire or transition their practice are offered assistance to create an advertisement for a new provider. Direct assistance has been provided for 12 practices during the current year to connect to a new provider. Outreach is planned to all JABSOM medical school and residency graduates as potential recruits.
- ❖ **New Physician mentoring program:** Thomas Hao, the Hawai'i physician recruiter, has created the Alaka'i program for mentoring and providing cultural awareness to new physicians moving to Hawai'i to practice. This program matches new physicians to established providers for mutual information sharing and support. More information is available at ahec.hawaii.edu.

- ❖ Educational Loan Repayment: The Hawai'i State Loan Repayment Program has supported 60 loan repayment recipients since the program began in 2012. There are 26 active providers currently receiving support and an additional 13 being reviewed for future support. Of the 32 program completers to date, 20 are still at the sites where they served their commitments (63%) and 26 continue to practice in Hawai'i (83%). A total of 18 recipients' educational loan debt has been paid-in-full by HSLRP. The loan repayers who left their original service positions still work in areas of need, including Maui, Haleiwa, for the Queens Health System, Castle Medical Center and Hawai'i Pacific Health in Honolulu. One loan repayer is on deferment while helping with the regional COVID efforts.
- ❖ Scholarships: In addition, the AHEC Office has agreed to oversee the repayment responsibilities for new JABSOM scholarships which require recipients to practice in Hawai'i after graduation. AHEC anticipates creating a medical school scholarship for a student who has excelled in the AHEC program through their pursuit of medical school and training.
- ❖ Continuing Education: The 2021 Hawai'i Health Workforce Summit offered seven hours of Continuing Education Credit to 460 participants in a virtual format. The Summit addressed resiliency and avoiding practice burnout, geriatric expertise, treatment for opioid use disorder, rural health practice and telehealth. The participant evaluation demonstrated a high level of satisfaction with the event and improvement in knowledge.

In addition, the ECHO Hawai'i project provided over 4,000 person-hours of continuing education between January 1 and November 21, 2021, covering the topics of Behavioral Health, Geriatrics and Pediatrics. The three options for case-based distance education through the supported Project ECHO in Hawai'i with information summarized at www.hawaiiecho.info

- Behavioral Health ECHO Every Tuesday noon to 1PM
 - Geriatrics ECHO Every second Wednesday noon to 1PM
 - Pediatrics ECHO Every first and third Wednesday noon to 1PM
 - NEW ECHO: Medication for Opioid Use Disorder Mondays at noon
- ❖ Malpractice improvement: Assistance with the Medical Inquiry and Conciliation Panel (MICP) is offered for finding medical specialists and other physicians to serve on this required element of the State malpractice system. The MICP provides a kinder, gentler system of malpractice for physicians working in Hawai'i, than was previously available.
- ❖ Preceptor Tax Credit: AHEC is instrumental in implementing the Hawai'i Health Preceptor Tax Credit for preceptors offering professional instruction, training, and supervision to students and residents in medicine, nursing and pharmacy. In 2019,

the first year of implementation, \$371,000 of tax credit was provided to 181 providers, and in 2020, 185 providers received \$368,000 in tax credit. Of the recipients, 79% were physicians volunteering clinical supervision, many in rural and neighbor island locations.

- ❖ Incentives: The Physician Workforce Assessment team is working with the Hawai'i State Rural Health Association and the Hawai'i Physician Recruiter's Group to expand rural incentives, community welcoming of providers and increase ability for spouses to find jobs.
- ❖ Low interest, low down payment loans for physicians: AHEC is working with multiple banks to bring physicians access to banking services, especially low interest/low down payment loan packages for purchasing homes or practice resources.
- ❖ Physician resiliency: Dr. Withy holds a Balint group monthly for providers interested in sharing about work stress in a safe environment.
- ❖ Free telepsych for rural areas: In collaboration with Hawai'i State Rural Health Association, AHEC is supporting a network of behavioral health and primary care/addiction providers who provide telecounseling and support to all rural individuals as requested, to include free training, computer and internet if needed.
- ❖ In addition to these activities, Dr. Withy serves on the Hawai'i Health Workforce Advisory Board. She also is assisting with Health Professional Shortage Area designations for additional areas of Hawai'i and has provided informational sessions on workforce shortage, as well as provided de-identified data to four organizations during 2021.

Next Steps

The Physician Workforce Research Team will continue to conduct the research and implement the solutions described above. In addition, further annual Health Workforce Summits are planned, emphasizing systems of care delivery, payment reforms and other factors that will improve provider recruitment and career satisfaction. These are anticipated to be held on the first Saturday after Labor Day every year. In 2022, it will be September 17, at the Hilton Hawaiian Village.

Dr. Withy is working closely with the Hawai'i Physician Shortage Crisis Task Force, a group of 30 physicians and community members who along with local and federal lawmakers seek to improve conditions for physicians. Efforts include working toward an improved Medicare fee schedule and lifting of state general excise tax requirements associated with Medicare and Medicaid patient visits, which physicians must pay out of the insurance payments received. For Medicare and Medicaid, physicians are not

allowed to pass these required charges (taxes) on to patients as they are for other insurances.

AHEC has struggled to create a mentoring pipeline to provide knowledge of and connection to practice opportunities across the State. The Bridge to Practice initiative encourages residents in primary care graduate medical education programs to be mentored by and explore work opportunities in independent practices across Hawai'i. It is hoped that this program will encourage physician residents and fellows to practice in health care need areas upon graduation. A new program is planned as well, a "Young Doctor's Hui" with regular social and professional activities to start on a quarterly basis, for collegial contact and potential educational opportunities associated with career networking for young physicians when the pandemic is controlled.

A new possibility is an online anonymous counseling program for providers to engage in wellness activities, relaxation, support groups or direct counseling when needed. It is likely that physicians will be able to try this program before the end of 2021.

More information on ongoing and upcoming activities is available at the AHEC website: www.ahec.hawaii.edu. The AHEC office number is 808-692-1060 and Dr. Withy's direct office line at JABSOM is 808-692-1070 and email is withy@hawaii.edu.

Appendix 1: Physician Research Telephone Script

Please review each entry before calling. Physician offices may be busy, especially under current circumstances. You want to be prepared for any changes to data or sudden disruptions during the call. Among the various details we're confirming and updating, the most important are FTE, physician specialty, contact information, and address.

"Hi, I'm _____ with the UH Medical School Area Health Education Center doing physician workforce research."

(If they ask about our research: The purpose of this research is to identify where the largest shortages are so we can develop programs to recruit providers such as loan repayment programs).

"I'm calling to see if _____ works here."

(If YES) "I have a few questions regarding this physician to update our database, would you or Dr. _____ be able to assist us in our research?"

(If the receptionist doesn't feel comfortable, ask for an office manager. Otherwise, ask if you can leave a message or if there is a better time to call back)

"Does Dr. _____ work full time?" (If they ask, full time is 40+ hours per week) (If NO) "How many hours at this office?"

"I wanted to confirm Dr. _____'s specialty. Is it **[insert found specialty]**?"

"Is this the best **contact phone number** for the office/Dr. _____?"

"I have the office/hospital **address** as _____. Is this correct?"

"Does s/he work at any **other clinic locations**?" (If YES) "Would you happen to have the location and/or phone number?" You'll call this second location to confirm FTE and other practice details. Some physicians may have more than two locations. Add any additional information to the 'Notes' column. Be sure to confirm FTE at every location you find.

"How many **other physicians** work at this location?" This is group size.

"Thank you very much for your time and for supporting our work!"

ALWAYS BE POLITE AND THANK THEM FOR THEIR TIME. If they have any further questions that you don't know the answers to, you can direct them to me. My email is withy@hawaii.edu, or they may call at 808-692-1070.

"I'm not sure, but I can give you the contact of my supervisor! The Area Health Education Center's Director is Kelley Withy, and you can reach her at **[insert email or**

If busy:

1. Would I be able to send an email or fax our survey?
2. Is there a better time to call back, or someone else available I can talk to?
3. Leave voicemail with name, reason for your call, best time to reach you, and contact number. Repeat this a second time in case they didn't hear the first time. You may want to create your own voicemail script to help with leaving messages.

If the health professional doesn't work there anymore:

Would you happen to know if they moved practice locations, moved out of state, or retired? (obtain new address if moved)

Appendix 2: Greatest Shortages by Percentage

Table 5: Statewide Greatest Specialty Shortages by Percentage

Specialty	Statewide Demand	Statewide Supply	Unmet demand	Unmet demand without overage	% shortage statewide
Child Gastroenterology	8.2	2.5	5.7	5.7	70%
Colorectal Surgery	10.5	3.6	6.9	6.9	66%
Adult Pulmonology	56.3	19.9	36.4	36.4	65%
Child Pulmonology	5.5	2	3.5	3.5	64%
Child Endocrinology	7.7	3	4.7	4.7	61%
Infectious Diseases	37.8	15.7	22.1	22.1	58%
Thoracic Surgery	20.2	9.5	10.7	10.7	53%
Allergy & Immunology	20.4	10.3	10.1	10.1	50%
Adult Rheumatology	22.3	11.1	11.2	11.2	50%
Adult Endocrinology	27.7	14.2	13.5	13.5	49%

2021 Individual Specialty Shortages by County in Rank Order of Percent Shortage Estimates

Table 6: Honolulu County Greatest Specialty Shortages by Percentage

Specialty	Honolulu County Demand	Honolulu Co Supply	Unmet demand	Unmet demand without overage	Honolulu Co % shortage
Child Gastroenterology	6.7	2.5	4.2	4.2	63%
Adult Pulmonology	40.8	17.7	23.1	23.1	57%
Colorectal Surgery	7	3.2	3.8	3.8	54%
Child Pulmonology	4.3	2	2.3	2.3	53%
Infectious Diseases	26.4	13.3	13.1	13.1	50%
Other Specialties	101.6	55.4	46.2	46.2	45%
Child Endocrinology	5.2	3	2.2	2.2	42%
Allergy & Immunology	14.8	9.2	5.6	5.6	38%
Adult Endocrinology	20.5	13	7.5	7.5	37%
Adult Rheumatology	15.8	9.9	5.9	5.9	37%
Pathology	43.5	31.4	12.1	12.1	28%
Emergency Medicine	194	141.4	52.6	52.6	27%
Family Medicine	286.1	211.5	74.6	74.6	26%
Neurological Surgery	17.4	13.1	4.3	4.3	25%

Table 7: Maui County Greatest Specialty Shortages by Percentage

Specialty	Maui County Demand	Maui County Supply	Unmet demand	Unmet demand without overage	Maui Co % shortage
Geriatric Medicine	5	0	5	5	100%
Allergy & Immunology	2.7	0	2.7	2.7	100%
Neonatology	2.7	0	2.7	2.7	100%
Child Critical Care	0.3	0	0.3	0.3	100%
Child Endocrinology	1	0	1	1	100%
Child Gastroenterology	0.8	0	0.8	0.8	100%
Child Hematology & Oncology	0.6	0	0.6	0.6	100%
Child Pulmonology	0.6	0	0.6	0.6	100%
Child Rheumatology	0.1	0	0.1	0.1	100%
Thoracic Surgery	2.2	0	2.2	2.2	100%
Adult Rheumatology	2.6	0.2	2.4	2.4	92%
Adult Pulmonology	7	1	6	6	86%
Adult Hematology & Oncology	7.2	1.5	5.7	5.7	79%
Pathology	7.3	1.5	5.8	5.8	79%
Infectious Diseases	4.4	1	3.4	3.4	77%
Colorectal Surgery	1.3	0.3	1	1	77%
Adult Gastroenterology	7.6	1.9	5.7	5.7	75%
Child Neurology	1.1	0.3	0.8	0.8	73%
Urology	4.5	1.5	3	3	67%
Adult Endocrinology	3.2	1.2	2	2	63%
Anesthesiology	21.6	8.7	12.9	12.9	60%
Child Psychiatry	6.2	2.5	3.7	3.7	60%
Nephrology	4.8	2.1	2.7	2.7	56%
Adult Cardiology	12	5.5	6.5	6.5	54%
Emergency Medicine	28.8	13.8	15	15	52%

Table 8: Hawaii County Greatest Specialty Shortages by Percentage

Specialty	Hawaii County Demand	Hawaii Co Supply	Unmet demand	Unmet demand without overage	Hawaii Co % shortage
Neonatology	3.8	0	3.8	3.8	100%
Child Critical Care	0.4	0	0.4	0.4	100%
Adult Endocrinology	3	0	3	3	100%
Child Endocrinology	1.1	0	1.1	1.1	100%
Child Gastroenterology	0.5	0	0.5	0.5	100%

Specialty	Hawaii County Demand	Hawaii Co Supply	Unmet demand	Unmet demand without overage	Hawaii Co % shortage
Child Hematology & Oncology	0.9	0	0.9	0.9	100%
Child Pulmonology	0.4	0	0.4	0.4	100%
Child Rheumatology	0.2	0	0.2	0.2	100%
Colorectal Surgery	1.6	0	1.6	1.6	100%
Thoracic Surgery	4	0	4	4	100%
Vascular Surgery	4	0	4	4	100%
Child Neurology	0.9	0	0.9	0.9	100%
Adult Pulmonology	6.4	0.2	6.2	6.2	97%
Physical Medicine & Rehabilitation	7.2	0.4	6.8	6.8	94%
Infectious Diseases	5.2	0.4	4.8	4.8	92%
Adult Critical Care	4	0.4	3.6	3.6	90%
Plastic Surgery	3.9	0.5	3.4	3.4	87%
Otolaryngology	5	1	4	4	80%
Neurological Surgery	4	0.9	3.1	3.1	78%
Adult Neurology	6.1	1.4	4.7	4.7	77%
Anesthesiology	25.2	6.6	18.6	18.6	74%
Nephrology	6.6	2.1	4.5	4.5	68%
Pathology	9	3	6	6	67%
Adult Hematology & Oncology	5.8	2	3.8	3.8	66%
Adult Rheumatology	2.9	1	1.9	1.9	66%
Emergency Medicine	36.7	17.6	19.1	19.1	52%
Allergy & Immunology	2.2	1.1	1.1	1.1	50%
Urology	5	2.5	2.5	2.5	50%
Radiology	17.3	8.6	8.7	8.7	50%

Table 9: Kauai County Greatest Specialty Shortages by Percentage

Specialty	Kauai County Demand	Kauai County Supply	Unmet demand	Unmet demand without overage	Kauai Co % shortage
Allergy & Immunology	0.7	0	0.7	0.7	100%
Neonatology	1.3	0	1.3	1.3	100%
Nephrology	2.3	0	2.3	2.3	100%
Child Cardiology	0.2	0	0.2	0.2	100%
Adult Critical Care+	2	0	2	2	100%
Child Critical Care	0.1	0	0.1	0.1	100%

Specialty	Kauai County Demand	Kauai County Supply	Unmet demand	Unmet demand without overage	Kauai Co % shortage
Adult Endocrinology	1	0	1	1	100%
Child Endocrinology	0.4	0	0.4	0.4	100%
Child Gastroenterology	0.2	0	0.2	0.2	100%
Child Hematology & Oncology	0.3	0	0.3	0.3	100%
Child Pulmonology	0.2	0	0.2	0.2	100%
Adult Rheumatology	1	0	1	1	100%
Child Rheumatology	0.1	0	0.1	0.1	100%
Neurological Surgery+	2	0	2	2	100%
Plastic Surgery	1.3	0	1.3	1.3	100%
Thoracic Surgery+	2	0	2	2	100%
Physical Medicine & Rehabilitation	2.5	0	2.5	2.5	100%
Child Neurology	0.3	0	0.3	0.3	100%
Vascular Surgery+	2	0.1	1.9	1.9	95%
Colorectal Surgery	0.6	0.1	0.5	0.5	83%
Pathology	3.1	1	2.1	2.1	68%
Radiology	5.7	2	3.7	3.7	65%
Adult Psychiatry**	7.4	2.8	4.6	4.6	62%
Adult Cardiology	4.5	2	2.5	2.5	56%
Adult Pulmonology	2.1	1	1.1	1.1	52%
Adult Neurology	2.1	1	1.1	1.1	52%

Appendix 3: Physician Supply and Demand Tables

The following five pages outline the county specific shortages by specialty and can be compared to prior year reports available at AHEC.hawaii.edu/workforce/.

Table 10: Statewide Supply and Demand Estimates

2021	Specialty	Statewide Demand	Statewide Supply	Unmet demand	Unmet demand without overage	% shortage statewide
Primary Care	Family Medicine	428.5	352.4	76.1	85.8	20%
	General Internal Medicine	397.9	335.7	62.2	62.2	16%
	Geriatric Medicine	27.7	39.6	-11.9	5.2	19%
	Pediatric Medicine	229.1	220.9	8.2	10	4%
Medical Specialties	Allergy & Immunology	20.4	10.3	10.1	10.1	50%
	Dermatology	34.2	55.4	-21.2	0.7	2%
	Infectious Diseases	37.8	15.7	22.1	22.1	58%
	Neonatology	25.2	22.3	2.9	7.8	31%
	Nephrology	46.7	30.6	16.1	16.1	34%
	Adult Cardiology	100.4	74.4	26	26	26%
	Child Cardiology	7.1	6.4	0.7	1.1	15%
	Adult Critical Care+	20	34.5	-14.5	5.6	28%
	Child Critical Care	2.7	4	-1.3	0.8	30%
	Adult Endocrinology	27.7	14.2	13.5	13.5	49%
	Child Endocrinology	7.7	3	4.7	4.7	61%
	Adult Gastroenterology	63.1	57.1	6	7.6	12%
	Child Gastroenterology	8.2	2.5	5.7	5.7	70%
	Adult Hematology & Oncology	43.5	29.1	14.4	14.4	33%
	Child Hematology & Oncology	7.3	5.3	2	2	27%
	Adult Pulmonology	56.3	19.9	36.4	36.4	65%
	Child Pulmonology	5.5	2	3.5	3.5	64%
	Adult Rheumatology	22.3	11.1	11.2	11.2	50%
	Child Rheumatology	1.3	2.1	-0.8	0.4	31%
	Surgery	Colorectal Surgery	10.5	3.6	6.9	6.9
General Surgery		93.1	95.9	-2.8	6.6	7%
Neurological Surgery+		25.4	16	9.4	9.4	37%
Obstetrics & Gynecology		165.4	170.7	-5.3	6.9	4%
Ophthalmology		81.1	97.1	-16	6.5	8%
Orthopedic Surgery		90	78.7	11.3	11.3	13%
Otolaryngology		37.2	27.9	9.3	9.6	26%

2021	Specialty	Statewide Demand	Statewide Supply	Unmet demand	Unmet demand without overage	% shortage statewide
	Plastic Surgery	29.6	24.6	5	6.7	23%
	Thoracic Surgery+	20.2	9.5	10.7	10.7	53%
	Urology+	35.8	32.5	3.3	5.5	15%
	Vascular Surgery+	21.1	11.4	9.7	9.7	46%
Other	Anesthesiology	173	131.6	41.4	41.4	24%
	Emergency Medicine*	273.1	190.5	82.6	86.7	32%
	Other Specialties	145.2	82.9	62.3	63	43%
	Pathology	62.9	36.9	26	26	41%
	Physical Medicine & Rehabilitation	36.9	26	10.9	10.9	30%
	Radiation Oncology	17.4	17.5	-0.1	1.3	7%
	Radiology	97.1	83.1	14	18.6	19%
	Adult Neurology	51.3	43.6	7.7	7.7	15%
	Child Neurology	6.5	6.5	0	2	31%
	Adult Psychiatry**	128.1	126	2.1	14.3	11%
	Child Psychiatry**	39.4	37.7	1.7	3.7	9%
	Hospital Medicine	134.3	159	-25.4	13.3	10%
Grand Total		3395.2	2857	536.8	731.6	22%

*Increase in demand to reflect non-resident increase in utilization on each island.

**Calculated at 8,400 individuals to one provider divided between adult & pediatric specialists as indicated by the population based IHS model.

+All residents should be within 60 minutes of care, so each island would have at least 2 providers, and Big Island have a minimum of 4 providers.

Table 11: Honolulu County Supply and Demand Estimates

2021	Specialty	Honolulu County Demand	Honolulu Co Supply	Unmet demand	Unmet demand without overage	Honolulu Co % shortage
Primary Care	Family Medicine	286.1	211.5	74.6	74.6	26%
	General Internal Medicine	302.9	262.7	40.2	40.2	13%
	Geriatric Medicine	20	35.4	-15.4	0	0%
	Pediatric Medicine	167	168.8	-1.8	0	0%
Medical Specialties	Allergy & Immunology	14.8	9.2	5.6	5.6	38%
	Dermatology	23.2	43.1	-19.9	0	0%
	Infectious Diseases	26.4	13.3	13.1	13.1	50%
	Neonatology	17.4	22.3	-4.9	0	0%
	Nephrology	33	26.4	6.6	6.6	20%
	Adult Cardiology	70.7	60.2	10.5	10.5	15%

2021	Specialty	Honolulu County Demand	Honolulu Co Supply	Unmet demand	Unmet demand without overage	Honolulu Co % shortage
	Child Cardiology	5.5	4.9	0.6	0.6	11%
	Adult Critical Care+	12	31.8	-19.8	0	0%
	Child Critical Care	1.9	4	-2.1	0	0%
	Adult Endocrinology	20.5	13	7.5	7.5	37%
	Child Endocrinology	5.2	3	2.2	2.2	42%
	Adult Gastroenterology	46.2	47.2	-1	0	0%
	Child Gastroenterology	6.7	2.5	4.2	4.2	63%
	Adult Hematology & Oncology	28.6	24.5	4.1	4.1	14%
	Child Hematology & Oncology	5.5	5.3	0.2	0.2	4%
	Adult Pulmonology	40.8	17.7	23.1	23.1	57%
	Child Pulmonology	4.3	2	2.3	2.3	53%
	Adult Rheumatology	15.8	9.9	5.9	5.9	37%
	Child Rheumatology	0.9	2.1	-1.2	0	0%
Surgery	Colorectal Surgery	7	3.2	3.8	3.8	54%
	General Surgery	59	67.2	-8.2	0	0%
	Neurological Surgery+	17.4	13.1	4.3	4.3	25%
	Obstetrics & Gynecology	118.5	130.7	-12.2	0	0%
	Ophthalmology	55.9	77.8	-21.9	0	0%
	Orthopedic Surgery	58.9	55.4	3.5	3.5	6%
	Otolaryngology	24.6	20.4	4.2	4.2	17%
	Plastic Surgery	19	20.7	-1.7	0	0%
	Thoracic Surgery+	12	9.5	2.5	2.5	21%
	Urology+	24.3	25.5	-1.2	0	0%
	Vascular Surgery+	13	10.2	2.8	2.8	22%
Other	Anesthesiology	117.5	108.3	9.2	9.2	8%
	Emergency Medicine*	194	141.4	52.6	52.6	27%
	Other Specialties	101.6	55.4	46.2	46.2	45%
	Pathology	43.5	31.4	12.1	12.1	28%
	Physical Medicine & Rehabilitation	24.2	23.1	1.1	1.1	5%
	Radiation Oncology	11.7	11.1	0.6	0.6	5%
	Radiology	61.2	65.8	-4.6	0	0%
	Adult Neurology	37.4	36.9	0.5	0.5	1%
	Child Neurology	4.2	6.2	-2	0	0%

2021	Specialty	Honolulu County Demand	Honolulu Co Supply	Unmet demand	Unmet demand without overage	Honolulu Co % shortage
	Adult Psychiatry**	86	98.2	-12.2	0	0%
	Child Psychiatry**	28.8	29.4	-0.6	0	0%
	Hospital Medicine	92.9	131.6	-38.7	0	0%
Grand Total		2368	2193.3	174.7	344.1	15%

*Increase in demand to reflect non-resident increase in utilization on each island.

**Calculated at 8,400 individuals to one provider divided between adult & pediatric specialists as indicated by the population based IHS model.

+All residents should be within 60 minutes of care, so each island has at least 2 providers, and Big Island have a minimum of 4 providers.

Table 12: Maui County Supply and Demand Estimates

2021	Specialty	Maui County Demand	Maui County Supply	Unmet demand	Unmet demand without overage	Maui Co % shortage
Primary Care	Family Medicine	51.5	40.3	11.2	11.2	22%
	General Internal Medicine	38.2	29.2	9	9	24%
	Geriatric Medicine	5	0	5	5	100%
	Pediatric Medicine	25.4	18.5	6.9	6.9	27%
Medical Specialties	Allergy & Immunology	2.7	0	2.7	2.7	100%
	Dermatology	5	6.4	-1.4	0	0%
	Infectious Diseases	4.4	1	3.4	3.4	77%
	Neonatology	2.7	0	2.7	2.7	100%
	Nephrology	4.8	2.1	2.7	2.7	56%
	Adult Cardiology	12	5.5	6.5	6.5	54%
	Child Cardiology	0.8	0.5	0.3	0.3	38%
	Adult Critical Care+	2	2.3	-0.3	0	0%
	Child Critical Care	0.3	0	0.3	0.3	100%
	Adult Endocrinology	3.2	1.2	2	2	63%
	Child Endocrinology	1	0	1	1	100%
	Adult Gastroenterology	7.6	1.9	5.7	5.7	75%
	Child Gastroenterology	0.8	0	0.8	0.8	100%
	Adult Hematology & Oncology	7.2	1.5	5.7	5.7	79%
	Child Hematology & Oncology	0.6	0	0.6	0.6	100%
	Adult Pulmonology	7	1	6	6	86%

2021	Specialty	Maui County Demand	Maui County Supply	Unmet demand	Unmet demand without overage	Maui Co % shortage
	Child Pulmonology	0.6	0	0.6	0.6	100%
	Adult Rheumatology	2.6	0.2	2.4	2.4	92%
	Child Rheumatology	0.1	0	0.1	0.1	100%
Surgery	Colorectal Surgery	1.3	0.3	1	1	77%
	General Surgery	11.4	7.5	3.9	3.9	34%
	Neurological Surgery+	2	2	0	0	0%
	Obstetrics & Gynecology	19.1	15.9	3.2	3.2	17%
	Ophthalmology	8.8	7.9	0.9	0.9	10%
	Orthopedic Surgery	12	8.7	3.3	3.3	28%
	Otolaryngology	5.9	4.5	1.4	1.4	24%
	Plastic Surgery	5.4	3.4	2	2	37%
	Thoracic Surgery+	2.2	0	2.2	2.2	100%
	Urology+	4.5	1.5	3	3	67%
	Vascular Surgery+	2.1	1.1	1	1	48%
Other	Anesthesiology	21.6	8.7	12.9	12.9	60%
	Emergency Medicine*	28.8	13.8	15	15	52%
	Other Specialties	16.9	8.6	8.3	8.3	49%
	Pathology	7.3	1.5	5.8	5.8	79%
	Physical Medicine & Rehabilitation	3	2.5	0.5	0.5	17%
	Radiation Oncology	2.7	2	0.7	0.7	26%
	Radiology	12.9	6.7	6.2	6.2	48%
	Adult Neurology	5.7	4.3	1.4	1.4	25%
	Child Neurology	1.1	0.3	0.8	0.8	73%
	Adult Psychiatry**	13.9	13.7	0.2	0.2	1%
	Child Psychiatry**	6.2	2.5	3.7	3.7	60%
	Hospital Medicine	15.5	10.5	5	5	32%
Grand Total		395.8	239.5	156.3	158	40%

*Increase in demand to reflect non-resident increase in utilization on each island.

**Calculated at 8,400 individuals to one provider divided between adult & pediatric specialists as indicated by the population based IHS model.

+All residents should be within 60 minutes of care, so each island has at least 2 providers, and Big Island have a minimum of 4 providers.

Table 13: Hawai'i County Supply and Demand Estimates

2021	Specialty	Hawai'i County Demand	Hawai'i Co Supply	Unmet demand	Unmet demand without overage	Hawai'i Co % shortage
Primary Care	Family Medicine	67.4	75.2	-7.8	0	0%
	General Internal Medicine	42.1	29.1	13	13	31%
	Geriatric Medicine	2	1.8	0.2	0.2	10%
	Pediatric Medicine	27.1	24.6	2.5	2.5	9%
Medical Specialties	Allergy & Immunology	2.2	1.1	1.1	1.1	50%
	Dermatology	4.5	5.1	-0.6	0	0%
	Infectious Diseases	5.2	0.4	4.8	4.8	92%
	Neonatology	3.8	0	3.8	3.8	100%
	Nephrology	6.6	2.1	4.5	4.5	68%
	Adult Cardiology	13.2	6.7	6.5	6.5	49%
	Child Cardiology	0.6	1	-0.4	0	0%
	Adult Critical Care+	4	0.4	3.6	3.6	90%
	Child Critical Care	0.4	0	0.4	0.4	100%
	Adult Endocrinology	3	0	3	3	100%
	Child Endocrinology	1.1	0	1.1	1.1	100%
	Adult Gastroenterology	6.9	5	1.9	1.9	28%
	Child Gastroenterology	0.5	0	0.5	0.5	100%
	Adult Hematology & Oncology	5.8	2	3.8	3.8	66%
	Child Hematology & Oncology	0.9	0	0.9	0.9	100%
	Adult Pulmonology	6.4	0.2	6.2	6.2	97%
	Child Pulmonology	0.4	0	0.4	0.4	100%
	Adult Rheumatology	2.9	1	1.9	1.9	66%
	Child Rheumatology	0.2	0	0.2	0.2	100%
	Surgery	Colorectal Surgery	1.6	0	1.6	1.6
General Surgery		16.9	14.2	2.7	2.7	16%
Neurological Surgery+		4	0.9	3.1	3.1	78%
Obstetrics & Gynecology		20.5	17.2	3.3	3.3	16%
Ophthalmology		12.2	6.6	5.6	5.6	46%
Orthopedic Surgery		14.2	11.4	2.8	2.8	20%
Otolaryngology		5	1	4	4	80%
Plastic Surgery		3.9	0.5	3.4	3.4	87%
Thoracic Surgery+	4	0	4	4	100%	

2021	Specialty	Hawai'i County Demand	Hawai'i Co Supply	Unmet demand	Unmet demand without overage	Hawai'i Co % shortage
	Urology+	5	2.5	2.5	2.5	50%
	Vascular Surgery+	4	0	4	4	100%
Other	Anesthesiology	25.2	6.6	18.6	18.6	74%
	Emergency Medicine*	36.7	17.6	19.1	19.1	52%
	Other Specialties	19.8	11.3	8.5	8.5	43%
	Pathology	9	3	6	6	67%
	Physical Medicine & Rehabilitation	7.2	0.4	6.8	6.8	94%
	Radiation Oncology	2.3	2.4	-0.1	0	0%
	Radiology	17.3	8.6	8.7	8.7	50%
	Adult Neurology	6.1	1.4	4.7	4.7	77%
	Child Neurology	0.9	0	0.9	0.9	100%
	Adult Psychiatry**	20.8	11.3	9.5	9.5	46%
	Child Psychiatry**	3.2	3.7	-0.5	0	0%
	Hospital Medicine	19.3	12.6	6.7	6.7	35%
Grand Total		466.3	288.9	177.4	186.8	40%

*Increase in demand to reflect non-resident increase in utilization on each island.

**Calculated at 8,400 individuals to one provider divided between adult & pediatric specialists as indicated by the population based IHS model.

+All residents should be within 60 minutes of care, so each island has at least 2 providers, and Big Island have a minimum of 4 providers.

Table 14: Kaua'i County Supply and Demand Estimates

2021	Specialty	Kaua'i County Demand	Kaua'i County Supply	Unmet demand	Unmet demand without overage	Kaua'i Co % shortage
Primary Care	Family Medicine	23.5	25.4	-1.9	0	0%
	General Internal Medicine	14.7	14.7	0	0	0%
	Geriatric Medicine	0.7	2.4	-1.7	0	0%
	Pediatric Medicine	9.6	9	0.6	0.6	6%
Medical Specialties	Allergy & Immunology	0.7	0	0.7	0.7	100%
	Dermatology	1.5	0.8	0.7	0.7	47%
	Infectious Diseases	1.8	1	0.8	0.8	44%
	Neonatology	1.3	0	1.3	1.3	100%
	Nephrology	2.3	0	2.3	2.3	100%
	Adult Cardiology	4.5	2	2.5	2.5	56%
	Child Cardiology	0.2	0	0.2	0.2	100%
	Adult Critical Care+	2	0	2	2	100%
	Child Critical Care	0.1	0	0.1	0.1	100%
	Adult Endocrinology	1	0	1	1	100%
	Child Endocrinology	0.4	0	0.4	0.4	100%
	Adult Gastroenterology	2.4	3	-0.6	0	0%
	Child Gastroenterology	0.2	0	0.2	0.2	100%
	Adult Hematology & Oncology	1.9	1.1	0.8	0.8	42%
	Child Hematology & Oncology	0.3	0	0.3	0.3	100%
	Adult Pulmonology	2.1	1	1.1	1.1	52%
	Child Pulmonology	0.2	0	0.2	0.2	100%
	Adult Rheumatology	1	0	1	1	100%
	Child Rheumatology	0.1	0	0.1	0.1	100%
	Surgery	Colorectal Surgery	0.6	0.1	0.5	0.5
General Surgery		5.8	7	-1.2	0	0%
Neurological Surgery+		2	0	2	2	100%
Obstetrics & Gynecology		7.3	6.9	0.4	0.4	5%
Ophthalmology		4.2	4.8	-0.6	0	0%
Orthopedic Surgery		4.9	3.2	1.7	1.7	35%
Otolaryngology		1.7	2	-0.3	0	0%
Plastic Surgery		1.3	0	1.3	1.3	100%
Thoracic Surgery+		2	0	2	2	100%

2021	Specialty	Kaua'i County Demand	Kaua'i County Supply	Unmet demand	Unmet demand without overage	Kaua'i Co % shortage
	Urology+	2	3	-1	0	0%
	Vascular Surgery+	2	0.1	1.9	1.9	95%
Other	Anesthesiology	8.7	8	0.7	0.7	8%
	Emergency Medicine*	13.6	17.7	-4.1	0	0%
	Other Specialties	6.9	7.6	-0.7	0	0%
	Pathology	3.1	1	2.1	2.1	68%
	Physical Medicine & Rehabilitation	2.5	0	2.5	2.5	100%
	Radiation Oncology	0.7	2	-1.3	0	0%
	Radiology	5.7	2	3.7	3.7	65%
	Adult Neurology	2.1	1	1.1	1.1	52%
	Child Neurology	0.3	0	0.3	0.3	100%
	Adult Psychiatry**	7.4	2.8	4.6	4.6	62%
	Child Psychiatry**	1.2	2.1	-0.9	0	0%
	Hospital Medicine	6.6	5	1.6	1.6	24%
Grand Total		165.1	136.7	28.4	42.7	26%

*Increase in demand to reflect non-resident increase in utilization on each island.

**Calculated at 8,400 individuals to one provider divided between adult & pediatric specialists as indicated by the population based IHS model.

+All residents should be within 60 minutes of care, so each island has at least 2 providers, and Big Island have a minimum of 4 providers.