

# Hawai'i Journal of Medicine & Public Health

**A Journal of Asia Pacific Medicine & Public Health**

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# Hawai'i Journal of Medicine & Public Health

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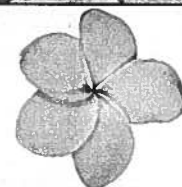
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## Guest Editors' Message

Kelley Withy MD, PhD and Kristen Knudson MPH

In 2009, the Hawai'i Legislature passed Act 18 to give policy-makers a detailed understanding of the physician workforce in Hawai'i through 2020. A \$60 surcharge was added to the physician relicensing fee to fund the assessment project and in collaboration with the Hawai'i Department of Commerce and Consumer Affairs a web-based survey was incorporated into the relicensing process that asked physicians about their specialty, practice location(s), and hours worked. The Hawai'i Physician Workforce Research Team (HiPWRT) at the John A. Burns School of Medicine (JABSOM) Area Health Education Center (AHEC) is now able to track the physician workforce and determine trends and effectiveness of interventions. The report to the legislature can be accessed at [www.ahec.hawaii.edu/workforce.html](http://www.ahec.hawaii.edu/workforce.html). The purpose of this edition of the Hawai'i Journal of Medicine & Public Health (HJMPH) is to provide information on the work that is currently underway to mitigate the physician workforce shortages identified in the assessment.

The JABSOM HiPWRT study found that Hawai'i currently is short 600 physicians when compared to similar communities across the United States. Statewide, about half of the shortage is in primary care and the neighbor islands suffer a disproportionate shortage compared to O'ahu. A number of articles describing research studying the physician workforce are included in this edition of the HJMPH.

In addition to quantifying the shortage and maldistribution of physicians in Hawai'i, the HiPWRT searched for possible solutions through focus groups, interviews, and literature reviews. At a June 2010 conference attended by 144 legislators, providers, educators, students, and community members, ten areas were identified as most urgent. They fall into four categories: Growing the Healthcare Workforce; Enhancing Practice Sustainability; Engaging Consumers & Communities; and Redesigning the Healthcare Delivery System. These are outlined below with descriptions of ongoing activities.

### **Growing the Healthcare Workforce**

**Expand pipeline programs** — health career orientation, internships, training, and mentoring are being expanded on all neighbor islands by the Hawai'i/Pacific Basin Area Health Education Center (AHEC) and other programs in Hawai'i. A resource guide is being developed by the Hawai'i Department

of Labor and Industrial Relations for students in Hawai'i to find information about available educational opportunities. This comprehensive listing will be available on a dedicated website soon and until then some resources are available at [www.ahec.hawaii.edu](http://www.ahec.hawaii.edu).

**Target training to meet the specific needs identified** — training programs in rural areas draw students to practice there. The John A. Burns School of Medicine (JABSOM) and A.T. Stills University branch at the Waianae Coast Comprehensive Health Center have expanded rural training opportunities for medical students. The University of Hawai'i School of Nursing and Dental Hygiene (UH SONDH) is providing advanced practice registered nurse (APRN) training in rural areas, and the Pacific University Physician Assistant training program in Oregon has created a track for Hawai'i students to do their clinical rotations locally. Student reflections on a rural experience are included in this issue (Dilcher article).

### **Enhancing Practice Sustainability**

**Medical malpractice reform** — legislation that revises the Medical Claims Conciliation Panel has been proposed by a workgroup of physicians and lawyers that has been meeting over the past year; HB 1967 and SB2469 have been introduced in the 2012 Hawai'i State Legislature for consideration. This legislation would decrease the MCCC panel size to one doctor and one lawyer, increase the pay to each slightly, rename it the Medical Inquiry and Conciliation Panel indicating that patients can inquire and receive information from the panel before filing a claim of medical malpractice, and make the process less adversarial and without judgments of damages.

**Reimbursement reform** — this is underway both nationally and locally. The initial thrust of the reforms has been to support basic features of the Patient Centered Medical Home (PCMH). Other reimbursement models have appeared in the literature, but their applicability to the Hawai'i delivery system is not clear (see Sakamoto article).

This spring the JABSOM HiPWRT will convene a conference for providers, educators, community members, legislators, insurers, and others to address PCMH implementation for solo



and small group practices. The conference will provide continuing education on PCMH requirements including information for physicians on the practical business aspects of PCMH, care coordination and meeting meaningful use criteria regarding electronic medical records. See [www.ahec.hawaii.edu](http://www.ahec.hawaii.edu) for more information.

**Rural payment differential** — two insurers in Hawai'i provide a 10% higher reimbursement for providers in rural areas and the idea has been discussed with the other insurers. The effects of the present differential will be studied.

### **Engaging Consumers & Communities**

**Community integration in recruitment and retention** — the HiPWRT is partnering with Hawai'i State Rural Health Association (HSRHA) to bring educational resources to communities, as well as working with projects such as the Beacon grant on the Big Island. The Beacon project has dedicated significant resources outside of the healthcare system to encourage local community initiatives to improve healthy eating, physical activity, and prevention of tobacco use. The Beacon project is also launching significant system re-design, including an island-wide approach to improve care for high risk, medically complex patients with chronic disease.

### **Redesigning the Healthcare Delivery System**

Nationally it is recommended that we convert to a "team approach" to primary care that includes the full spectrum of healthcare professionals working together to meet the health challenges faced. Many of Hawai'i's large group practices have or are in the process of converting to the Patient Centered Medical Home (PCMH) model, but it is very challenging for a solo or small group practice to do this with severe resource limitations. Therefore, the April PCMH conference is designed to assist with incorporating PCMH features into a small private practice by focusing on teamwork with non-physician clinicians, patient empowerment, care coordination and the use of Health Information Technology in this environment.

To this end, the increased acceptance of non-physician clinicians will be essential for providing care using the PCMH model, particularly in areas with a shortage of physicians. Yet Hawai'i's use of nurse practitioners and physician assistants has been significantly less than is typically seen across the

United States. JABSOM and UH SONDH have developed an interdisciplinary training program. The early impact of this program is described below by Michelle Yamada, president of the UH SONDH class of 2014:

Through juggling various-sized balls with medical students and acting out a scene of a car-crash victim, my nursing classmates and I practiced working together with medical students. My viewpoint of doctors as being elevated much higher than nurses changed. Instead of viewing medical students with the slightly fearful 'awe of doctors' I had before the workshop, I focused on collaborating with them as another branch of highly skilled healthcare professionals. Together we learned many valuable lessons about how one small slip in communication between members of the healthcare team can result in losing a patient, and we cemented those concepts through several fun and memorable exercises. I believe that all future healthcare providers should have similar opportunities to practice the importance of communication. In this way, we can work to prevent medical errors and save more lives!

**Administrative simplification (paperwork reduction)** — the HiPWRT recognizes this as a potentially important step in reducing the daily frustrations of running a busy practice. Furthermore, preventing premature retirement of our clinicians will help mitigate the projected shortfalls. The HiPWRT team has met with many of the local insurers to explore the different possibilities. Many of these ideas are discussed in the Sakamoto article and are being considered by our Hawai'i carriers. If you would like to voice your opinion about the most burdensome paperwork challenges, please complete the short survey at <http://www.surveymonkey.com/s/HJDBDP2>.

**Electronic health records statewide** — the HiPWRT supports the Hawai'i Health Information Exchange's (HHIE) and the Beacon grant's efforts to aid clinicians in choosing and implementing an electronic health record. This will be emphasized at the upcoming PCMH conference.

The HiPWRT hopes that this edition of the HJMPH provides ideas about solutions to healthcare workforce shortages in the State of Hawai'i. More information is available at [www.ahec.hawaii.edu/workforce.html](http://www.ahec.hawaii.edu/workforce.html). Please contact Dr. Kelley Withy ([withy@hawaii.edu](mailto:withy@hawaii.edu)) with your thoughts and comments.

# Hawai'i Physician Workforce Assessment 2010

Kelley Withy MD, PhD; Tim Dall MS; and David Sakamoto MD, MBA

## Abstract

**Background:** National policy experts have estimated that the United States will be 15-20% short of physicians by the year 2020. In 2008, the Big Island of Hawai'i was found to be 15% short of physicians. The current article describes research to determine the physician supply and demand across the State of Hawai'i.

**Methods:** The researchers utilized licensure lists, all available sources of physician practice location information, and contacted provider offices to develop a database of practicing physicians in Hawai'i. A statistical model based on national utilization of physician services by age, ethnicity, gender, insurance, and obesity rates was used to estimate demand for services. Using number of new state licenses per year, the researchers estimated the number of physicians who enter the Hawai'i workforce annually. Physician age data were used to estimate retirements.

**Results:** Researchers found 2,860 full time equivalents of practicing, non-military, patient-care physicians in Hawai'i (excluding those still in residency or fellowship programs). The calculated demand for physician services by specialty indicates a current shortage of physicians of over 600. This shortage may grow by 50 to 100 physicians per year if steps are not taken to reverse this trend. Physician retirement is the single largest element in the loss of physicians, with population growth and aging playing a significant role in increasing demand.

**Discussion:** Study findings indicate that Hawai'i is 20% short of physicians and the situation is likely to worsen if mitigating steps are not taken immediately.

## Keywords

Physician workforce; assessment; projections; supply; health workforce; manpower

## Background

In 2006 the federal government's Health Resources and Services Administration (HRSA) released a report that forecast a 15%-20% across-the-board, national physician shortage by 2020 with perhaps even greater shortfalls in specialties that care for the elderly, such as cardiology, oncology, and urology. In addition, the federal government calculates that nearly 17,000 more practitioners are needed in HRSA designated shortage areas (rural and inner-city underserved areas) in which 65 million citizens reside.<sup>1</sup> Since 2002 at least thirty-one states and twenty-two medical specialty societies have published independent reports, the large majority indicating current or projected future physician shortages.<sup>2</sup> National organizations, such as the Association of American Medical Colleges (AAMC) and the Council on Graduate Medical Education (COGME), have called for a nationwide expansion of medical school enrollment by as much as 30%.<sup>3</sup> Research in the State of Hawai'i estimated that the Big Island of Hawai'i was short by at least 45 physicians in 2007, with that number expected to climb in the future.<sup>4</sup>

Factors such as changing demographics and implementation of expanded medical coverage enacted under the Patient Affordable Care Act are anticipated to increase demand for health care services in Hawai'i over the next decade. At the same time, the

nation is not producing sufficient numbers of new physicians to maintain current patterns of health care utilization and delivery. Hawai'i, like the nation, has a large number of physicians likely to retire at the same time that a growing elderly population will increase demand for services. Increasing national competition for health care providers requires that the state plan accordingly to train, attract, and retain providers to meet projected demand for services.

## Methodology

Using a combination of Hawai'i and national data, this research examines the size and makeup of the physician workforce in Hawai'i and projects current and future demand for services. Human subjects research exemption was obtained for this project from the University of Hawai'i Institutional Review Board (#15107).

## Provider Supply Analysis

The researchers obtained the 2008 and 2010 licensure lists of all MD, DO, PA and APRN licensees from the Hawai'i State Department of Commerce and Consumer Affairs (DCCA). Information obtained included name, license number, mailing address, and type of license. In December 2009, a voluntary online survey administered at the time of license renewal received 5,820 physician responses (92% response rate for answering at least one question). This survey collected information on practice specialty and practice location(s). All physicians with addresses outside of Hawai'i were excluded from this analysis unless found to be practicing in Hawai'i or evaluating/treating Hawai'i residents (for example teleradiology). The research team used participating provider/staff lists and searched public sources (internet, yellow pages and healthcare directories) to identify practice locations and obtain physician contact information. Physician year of birth and gender were obtained from licensure records and public sources. Community contacts were queried to confirm providers practicing in their communities. The research team contacted physician offices to obtain/confirm practice location, specialty, and hours worked per week when necessary. If a provider office could not be reached but the provider was confirmed as working in the community by two or more sources, their hours worked were estimated by information provided. Specialties were determined by the listing in the American Board of Medical Specialties (AAMS),<sup>5</sup> provider lists, and contact with physician offices. All data is stored in a secure access database.

Although no licensure survey was conducted with physician assistants and advanced practice nurse practitioners, electronic searches, community contacts, and medical groups were queried regarding provider locations and whether specialty was in pri-

mary care. The data on primary care providers (MD, DO, APRN and PA) was combined for mapping and tracking purposes.

Estimates of future physician supply were based on training, retention and licensure data. Between 85 and 90 non-military physicians graduate from Hawai'i residency programs every year and approximately 76 medical students will graduate annually (66 at the University of Hawai'i John A. Burns School of Medicine, and 10 osteopathic physician students from the A.T. Stills University site at Waianae Coast Comprehensive Health Center). The AAMC reports that 40%-50% of the graduates of Hawai'i training programs are actively practicing in Hawai'i.<sup>6</sup> Analysis of physician licensure numbers suggests that about 100 new physicians started practice in Hawai'i each year during 2006-2009. While there is no comprehensive data available on physicians having left practice in Hawai'i, year of birth data provides estimates of the number of physicians turning 65 in a given year (a proxy for retirements).

### Provider Demand Analysis

Estimates of current and projected future demand for physician services came from a Physician Demand Model created by The Lewin Group.<sup>7</sup> The proprietary model has been used to produce demand estimates for national associations and the Federal Bureau of Health Professions.<sup>7</sup> The demand model utilized national healthcare use and delivery patterns to calculate specialty and setting specific provider-per-population ratios by patient age, gender, race/ethnicity, obesity status, and insurance status for physicians, nurse practitioners, and physician assistants. These ratios, combined with population estimates and projections by Hawai'i region, produced estimates of physician demand under alternative healthcare delivery scenarios. The major data sources used to estimate these ratios include:

- 2005-2008 data from the National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, Nationwide Inpatient Sample and Medical Expenditure Panel Survey to model healthcare use by delivery setting and population group;
- 2008 American Medical Association Masterfile Database to estimate number of physicians by self-reported primary specialty;
- data from various years from the American Medical Association, the Medical Group Management Association, the American Board of Internal Medicine Practice Characteristics Survey, and other published sources on the amount of patient care time physicians spend by healthcare delivery setting;
- 2008 American Community Survey and 2007-2008 Behavioral Risk Factor Surveillance System to provide Hawai'i-specific estimates of, respectively, uninsured and obesity rates by demographic; and

- US Census Bureau population projections for the civilian population of each island.

Some exceptions were made for the Hawai'i model due to the geographic differences from the continental United States. Emergency Medicine physician demand was calculated based on local hospital and emergency department volume rather than using national patterns of care use and delivery. An assumption was made that minimal staffing of a full time ED was 5 FTEs. Similarly, critical care patterns of care delivery were expected to differ in Hawai'i compared to the US average. Therefore for critical care we used current supply as an estimate for demand (under the assumption of no current shortfall of critical care physicians). Similarly, it is commonly accepted that Psychiatry is underutilized nationally so applying national use and delivery patterns would underestimate demand in Hawai'i. Therefore, current demand for child and adult psychiatrists was estimated at the current supply level until further research can better identify demand.

Due to uncertainty regarding future healthcare use and delivery patterns, demand was projected under several scenarios. A baseline scenario extrapolated current use and delivery patterns to the future population taking into account changing demographics. This scenario also includes a projected modest increase in demand associated with expanded medical coverage starting in 2014 based on provisions in the national 2010 Affordable Care Act. This scenario assumed that health care use patterns for the newly insured in each demographic group would move from current patterns to patterns similar to those of their commercially insured counterparts.

Alternative scenarios assumed modest improvements in provider productivity and rising per capita use of ambulatory services. Improvements in technology (such as expanded use of decision support systems and electronic medical records) hold the potential to improve provider productivity. Analysis of National Ambulatory Medical Care Survey data over the past decade suggested that for the population aged 40 and older, there is a trend towards higher per capita use of ambulatory services (even after controlling for changing demographics).<sup>7</sup> Such a trend could continue over the next decade if there is greater use of patient centered medical homes, accountable care organizations, or other concepts that increase use of ambulatory services (with the goal of preventing expensive hospital-based services). Under this scenario, the per capita annual number of ambulatory visits continues to rise each year by approximately 1.6%, 1.7%, and 2.9% among the age 45-64, 65-74, and 75 and older populations, respectively. This scenario produced a higher estimate of demand for specialties that provide predominantly ambulatory-based services. These proprietary analyses were conducted by The Lewin Group and are represented in Tables 1 and 2.

Table 1. Projected Demand for FTE Physicians Using Different Scenarios as Calculated by The Lewin Group						
Impact	+	+	+	+	-	=
	Baseline Scenario			Increasing Per Capita Use of Ambulatory Services	Increasing Provider Productivity	Combined Scenario
Year	Starting Year Demand	Changing Demographics	Health Care Reform			Net Total Demand
2008	3,410	-	-	-	-	3,410
2009		40	-	10	(20)	3,440
2010		80	-	20	(30)	3,480
2011		130	-	40	(50)	3,530
2012		180	-	50	(70)	3,570
2013		240	-	60	(90)	3,620
2014		290	20	80	(110)	3,690
2015		340	20	100	(130)	3,740
2016		390	20	110	(150)	3,780
2017		440	30	130	(170)	3,840
2018		500	20	150	(190)	3,890
2019		550	20	170	(210)	3,940
2020		600	30	190	(230)	4,000

Table 2. Projected FTE Physician Demand by Region (Baseline Scenario) from The Lewin Group					
Year	State	Island			
		Hawai'i (Big Island)	O'ahu	Kaua'i	Maui
2008	3,410	470	2,390	170	380
2009	3,450	480	2,410	180	380
2010	3,500	490	2,440	180	390
2011	3,530	500	2,460	180	390
2012	3,590	520	2,490	180	400
2013	3,640	530	2,510	190	410
2014	3,730	560	2,550	190	430
2015	3,770	570	2,570	200	430
2016	3,830	590	2,600	200	440
2017	3,880	600	2,630	200	450
2018	3,930	620	2,650	200	460
2019	3,990	630	2,680	210	470
2020	4,040	650	2,700	210	480

## Results

### Current and Projected Supply

The number of non-military physicians out of residency and fellowship training that provide any direct patient care in Hawai'i (including part time patient care) totaled 3,203 as of January 31, 2010. Of this number, 2,945 worked at least 20 hours a week. The total FTE of patient-care physicians found working in the State of Hawai'i is 2,860. This includes all physician specialties, but did not include time spent performing administration, research and non-patient care education. Of the 8,547 physicians licensed to practice medicine in Hawai'i, only one third actually provided civilian patient-care services in the state.

Projecting future supply of physicians in Hawai'i was challenging, as the patterns of practice in Hawai'i are just now beginning to be studied quantitatively. Demographic analysis indicated that 24% of patient care physicians in Hawai'i are women and that physicians' mean age is 52.5 years. In each year from 2006 to 2009, approximately 100 physicians began practice in Hawai'i. While little data on workforce attrition is available for physicians in Hawai'i, an estimated 30 physicians left the Hawai'i workforce in 2009 for reasons other than retirement based on review of the newly created database. Furthermore, over the next decade nearly 1,200 physicians (42% of the current physician workforce) will reach retirement age (65 or older).



Therefore, factoring in retirements, the best estimate of physician supply in the near-term, if no interventions are made, is that Hawai'i will suffer a net loss of 50 physicians each year, despite a growing demand for services.

### Current and Projected Demand

Applying the 2008 national physician-to-population ratios (Lewin Group model described above) to the 2008 population in Hawai'i and adjusting for differences between Hawai'i and the US in demographics, rates of uninsured, and obesity rates suggested demand for 3,410 FTE physicians. Between 2008 and 2010 demand for physicians in Hawai'i grew to approximately 3,500 based on population growth and aging. Estimates were based on the non-military, resident population in Hawai'i. To estimate demand by tourists, we used medical claims to calculate the percentage of physician encounters that involved patients whose ZIP code was from outside Hawai'i. For example, approximately 4.5% of encounters by Hawai'i emergency physicians were for patients with an address outside of Hawai'i. Across all medical specialties, patients from outside Hawai'i accounted for approximately 1.4% of physician services (equal to demand for approximately 50 FTE physicians). This demand by non-residents includes approximately 5 FTE emergency physicians, 15 FTE primary care physicians, and 30 FTEs across all the other specialties combined. Primary care specialties include: Family Medicine, General Practice, General Internal Medicine, General Pediatrics, and Geriatrics.

We projected future demand for physicians in Hawai'i under alternative scenarios, starting with a demand estimate of 3,410 FTEs in 2008. Between 2008 and 2020, growth and aging of the population is projected to increase demand by 600 FTEs (Table 1). Expanded medical coverage under Health Care Reform will likely increase demand by 20-30 FTEs starting in 2014. Under the baseline scenario, by 2020 demand for physicians is likely to increase to approximately 4,040 FTEs. If the trend of increasing per capita use of ambulatory services continues, then by 2020 there could be an additional demand for approximately 190 FTEs. However, if there were modest (0.5% per year) gains in physician productivity, by 2020 the same level of care could be provided by 230 fewer physicians than projected under the baseline scenario. In the aggregate, the decrease in demand from modest productivity gains offset the trend towards higher per capita use of ambulatory services suggesting that by 2020 Hawai'i will require approximately 4,000 FTEs to provide a level of care comparable to the current US level of care.

The trends, in isolation, form a range of estimates. If health-care use and delivery patterns remain constant, then by 2020 Hawai'i would need slightly more than 4,000 FTEs to provide the current national level of care. If per capita use of ambulatory services were to continue rising, in the absence of productivity gains, then by 2020 demand would rise to over 4,200 FTEs. If there were productivity gains and no increase in per capita use of ambulatory services, then demand would be approximately 3,800 FTEs. This provides a range of 3,800 to 4,200 FTEs, with demand most likely to be approximately 4,000 FTEs by 2020 as demonstrated in Figure 1.

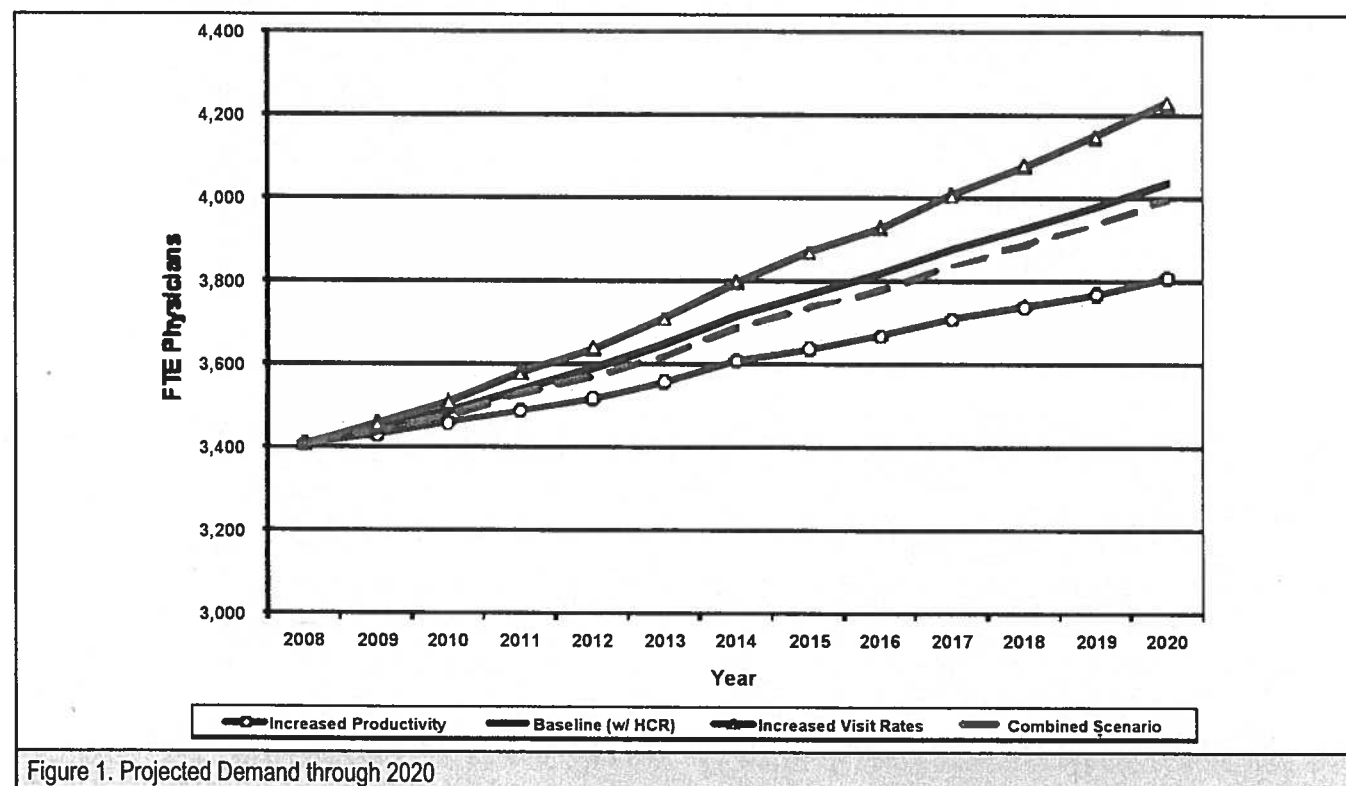


Figure 1. Projected Demand through 2020

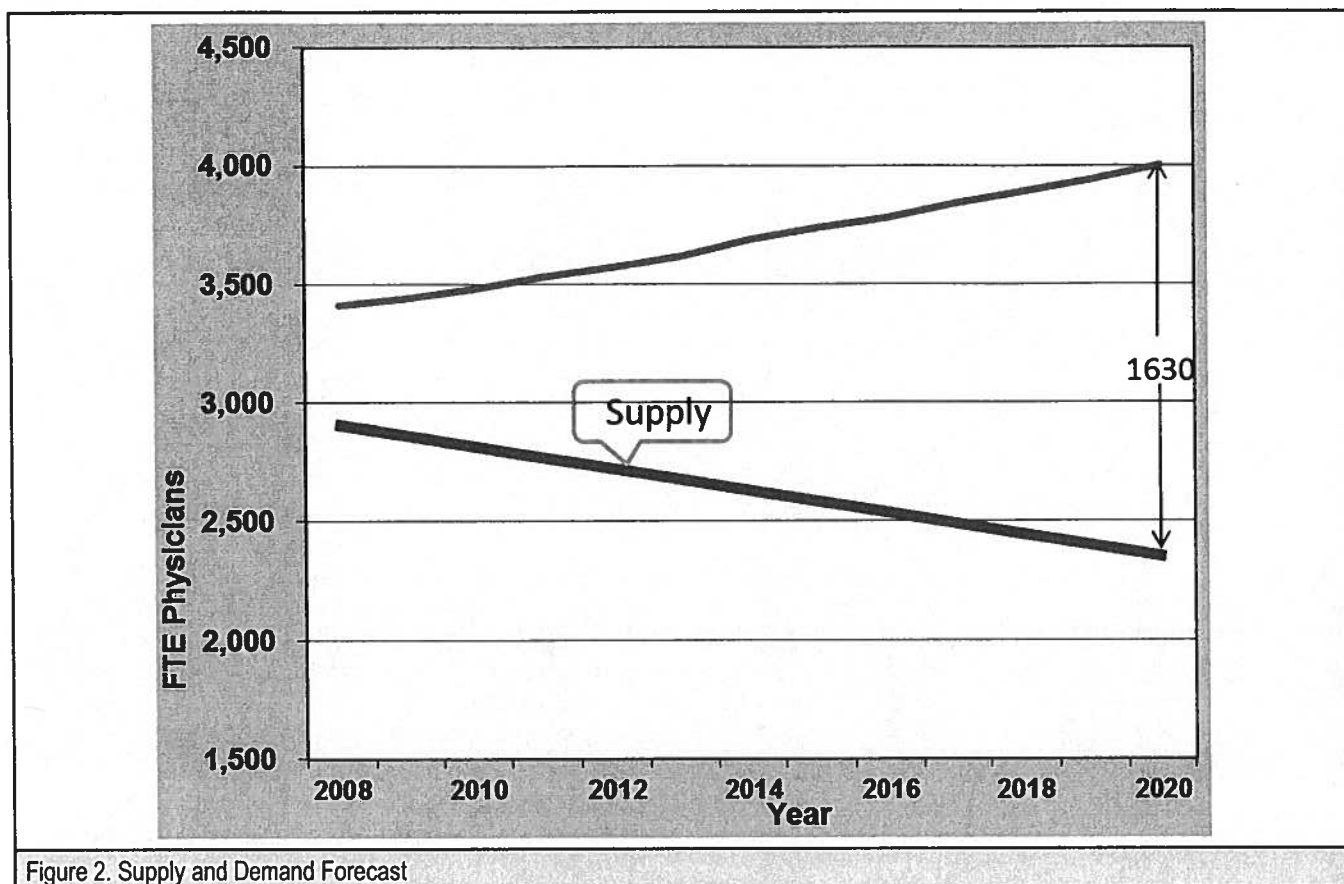


Figure 2. Supply and Demand Forecast

Demand growth will be uneven across medical specialties. Between 2010 and 2020, FTE demand for primary care physicians is projected to grow from 1,240 to 1,430 (15%); demand for internal medicine subspecialties is projected to grow from 460 to 540 (17%); demand for surgical specialties is projected to grow from 690 to 790 (14%); and demand for other patient care specialties is projected to grow from 1,100 to 1,250 (14%).

With 2010 FTE supply and demand of approximately 2,860 and 3,500, respectively, this would suggest the state is short approximately 640 FTEs. However, in some specialties the available supply slightly exceeds projected demand. Summing the shortfall across those specialties where demand exceeds supply suggests a shortfall of approximately 670 FTE physicians. Of this, approximately one half is primary care (with the shortfall primarily among family practice and general internal medicine) and a significant shortfall for cardiology, neurosurgery, infectious disease and general surgery.

#### Adequacy of Supply by Hawai'i Region

Projected growth in demand will be uneven across regions, reflecting differences in demographics and Census Bureau projections of population growth (Table 2). Across Hawai'i, demand is projected to grow approximately 15% between 2010 and 2020 (see figure 2). In percentage terms, growth is highest on the Big Island (33%) and Maui (23%), followed by Kaua'i

(17%) and O'ahu (11%). In absolute terms, the increase in demand of approximately 540 FTEs between 2010 and 2020 (under the baseline scenario) comes primarily from O'ahu (+260 FTEs) and the Big Island (+160), followed by Maui (+90) and Kaua'i (+30).

Finally, based on an analysis of medical claims that indicate the ZIP code of patients who received care, we calculated demand for physicians in each region (controlling for demographics). Summary findings from this analysis suggest that patients on Oahu have greater access to specialist services but use relatively fewer primary care services.

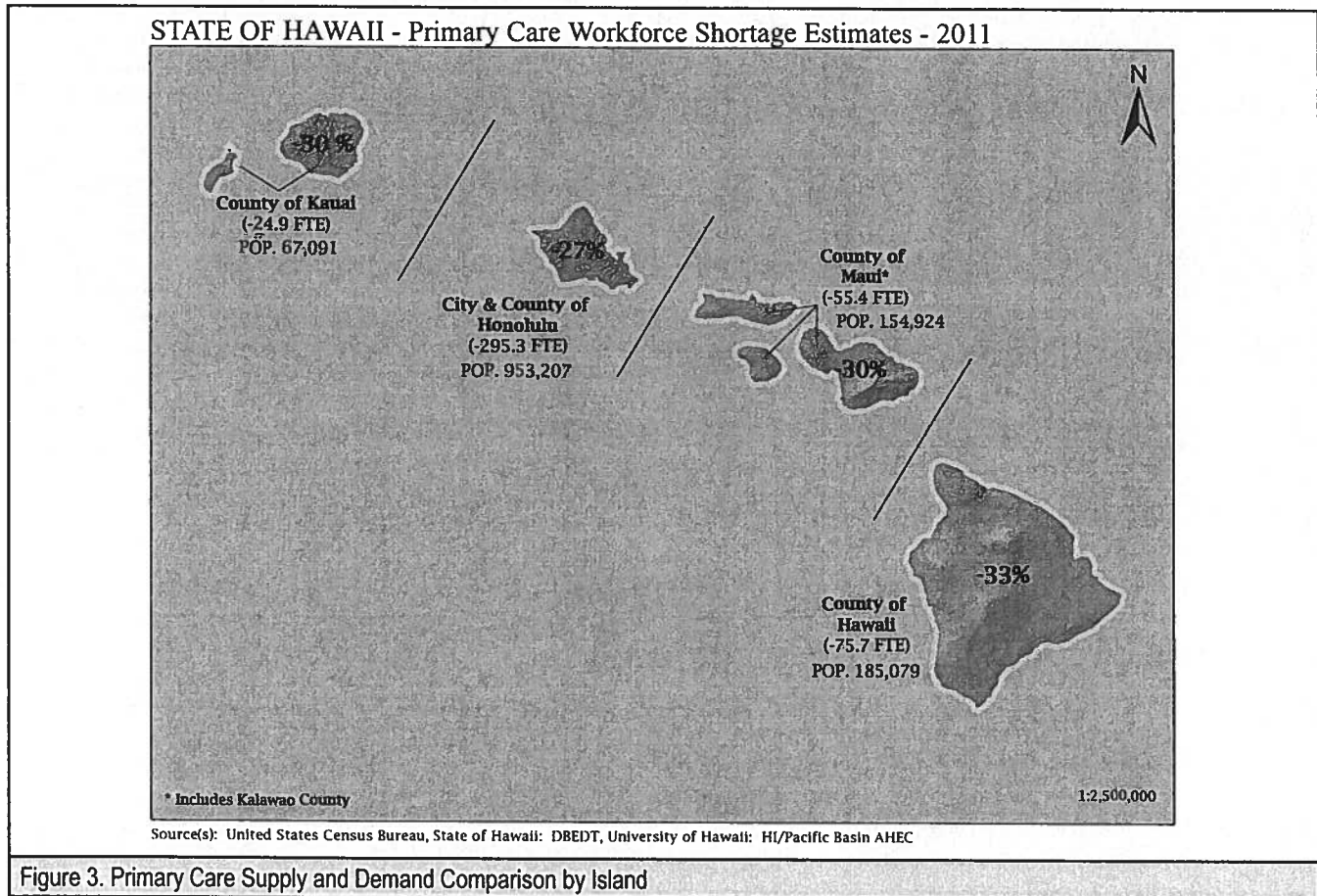
#### Primary Care Data Analysis

ArcGIS mapping software was utilized to map current (2010) supply and demand of the Hawai'i primary care workforce (DO, MD, PA, APRN) based on the calculations described above and the information in Table 3 (see figure 3).

#### Discussion

Prior to this analysis, healthcare experts in Hawai'i generally accepted national estimates based on AMA Masterfile data in which the state consistently ranked in the top ten in terms of physicians per population.<sup>8</sup> The data now shows that Hawai'i is at least 600 physicians, or 15 to 20% short of the number needed to provide services comparable to the nation as a

Table 3. Supply and Demand Estimates for Primary care Physician Assistants and Nurse Practitioners 2011						
	Kaua'i	O'ahu	Lana'i	Moloka'i	Maui	Hawai'i (Big Island)
Physician Assistants (primary care) Demand	4	37	0.2	0.4	7.5	11
Physician Assistants (primary care) Supply	2.6	8.6	0.0	0.0	9.5	4
Nurse Practitioners (primary care) Demand	16	175	0.7	1.7	33.6	45
Nurse Practitioners (primary care) Supply	8.2	113.4	0.8	1.6	7.6	30.9



whole. This shortfall may grow to 1,600 providers by 2020 if systemic changes are not implemented. At present, the greatest shortages are in primary care, cardiology, infectious disease, neurology, gastroenterology, and surgical specialties such as neurosurgery. Furthermore, the state also has a maldistribution problem, as many shortages are significantly worse on the neighbor islands.

The study found that if current trends continue, Hawai'i will suffer a net loss of practicing physicians every year. Physician retirement is the single largest contributor to the projected growing provider shortage, although population growth and aging also play a significant role by increasing demand. Unfortunately,

as the national physician shortage worsens, Hawai'i should expect to encounter growing competition for doctors from communities throughout the country, which may limit the inflow of physicians and put Hawai'i in an even more precarious position with respect to providing consistent access to medical care.

#### Study Strengths and Limitations

Estimates of current supply reflect a labor intensive process to account for each active physician in Hawai'i and found significant discrepancies between the number of physicians licensed to practice in the state and those actually providing

patient care. The demand analysis uses a standardized approach and consistent data sources to model supply and demand by medical specialty and region across Hawai'i. The study uses the most recently available data, with the approach consistent with that used by the Federal Bureau of Health Professions and national professional associations.

Limitations of this study include the use of average US utilization statistics, which may vary from Hawai'i utilization rates even after adjusting for differences in demographics, rates in medical insurance coverage, and obesity rates. Hawai'i, which has the nation's lowest Medicare physician and hospital spending per beneficiary,<sup>9</sup> also has indigenous groups with greater health challenges than most of the US population and a very diverse ethnic mix. While current patterns of care delivery reflect the realities of the health care system in terms of access to care, these patterns do not indicate true need for services. For specialties such as psychiatry where there is a national perception of under-supply, utilization will be lower than actual need. Furthermore, this analysis does not factor in productivity issues related to generational and gender changes in the workforce or the likely growth of the "concierge medicine" business model, which all decrease available physician supply. The scenario modeling productivity increases are based on conservative assumptions, but little information is known about how implementation of new technologies will affect physician productivity. On the supply side, physician hours worked and retirement patterns in Hawai'i and propensity to move out of the state are not well understood.

The authors realize that this study is very physician-centric and that the picture of healthcare in Hawai'i is incomplete without better information on other primary care providers, particularly physician assistants and nurse practitioners. While further research will be performed in this area, a particular challenge faced by researchers was finding practice locations for providers who do not advertise in phone books or on the Internet. Although 91% of physicians who relicensed online filled out part of all of the survey described above, such a survey was not implemented for physician assistants or nurse practitioners. While there are less than 100 full time practicing physician assistants, there are over 300 full-time equivalents of practicing nurse practitioners, many of whom are employed by medical practices or groups, but not publicized, so the researchers could not be sure all practicing primary care APRNs were identified. Therefore the all-provider primary care maps in Figure 4 may reflect an under-documentation of nurse practitioners and this will be further examined.

Other limitations include difficulty in assessing the use of telemedicine in Hawai'i. However, utilization is very low as assessed by the Pacific Basin Telemedicine Association, and it is a target area for meeting workforce shortages. The fact that only a third of the physicians licensed in Hawai'i actually practice patient care is an area for further study. Initial investigations indicate this is a result of the high military presence (the fact that military providers only need to maintain a license in one state, but can practice elsewhere for military facilities),

the low licensure fees, the possibility that some providers hope to move to Hawai'i, and the tendency for retired physicians to maintain their licenses. Finally, it is difficult to compare the result to findings in other states, as there is no comparable data collection and analysis performed in the US to date. However, the authors believe that the counting of FTEs directly (instead of estimating based on national databases), and the use of a national model for demand was the most practical method to follow in order to obtain a statewide demand picture.

### Future Research

The above limitations suggest important areas for future research. Future research will include tracking practice location of physicians trained in, entering and leaving practice in Hawai'i, as well as collaborative efforts to identify all practicing providers. Inclusion of questions in the Hawai'i Health Survey regarding whether patients are able to obtain needed services will help inform the research base. Finally, a qualitative analysis of needs for psychiatric services is being designed to better assess demand in Hawai'i.

### Conflict of Interest

None of the authors report any conflict of interest.

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# Geographical Maldistribution of Native Hawaiian and Other Pacific Islander Physicians in Hawai'i

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## Abstract

**Background:** Native Hawaiians and other Pacific Islanders (NHOPI) have high prevalence of overweight status, obesity, and hypertension, as well as high rates of asthma and cancer mortality. Some barriers to health care delivery for this population are a physician shortage in Hawai'i and a geographical maldistribution of actively practicing physicians. This study examines the distribution of NHOPI physicians compared to the NHOPI population in Hawai'i through Geographical Information System choropleth mapping.

**Methods:** The maps and results were gathered and constructed from Census Tract data from the US Department of Commerce, the Census Bureau, the Physician Workforce Assessment, and the 'Ahahui o nā Kauka reports.

**Results:** With the exception of East Honolulu, all areas of Hawai'i show drastic disparities in the ratio of NHOPI physicians to NHOPI populations as compared to the ratio of total physicians to the total population.

**Discussion:** Given the NHOPI physician shortage and their geographical maldistribution, this study underscores the importance of increasing the number of NHOPI medical school applicants, graduates, residents, and physicians in permanent active practices in rural areas and the neighbor islands. Current institutional and academic programs, such as the John A. Burns School of Medicine, Imi Ho'ola, and the Native Hawaiian Center of Excellence, are contributing to resolving some of the health disparities and should consider expanding their efforts.

## Background

"Native Hawaiians and Other Pacific Islanders," or NHOPI, are defined as persons having their origin in any of the original peoples of Polynesia, Micronesia, and Melanesia.<sup>1</sup> According to the 2000 US census, NHOPI represent 0.4% of the US population or an estimated 1.1 million individuals and there are currently 236,815 NHOPI living in Hawai'i.<sup>2</sup> NHOPI have a disproportionately higher risk for cardiometabolic disease which includes cardiovascular disease, diabetes, and obesity.<sup>3</sup> They also have a higher prevalence of hypertension, asthma, and stroke along with behavioral risk factors for chronic disease development such as drinking and smoking.<sup>4</sup> In addition, they also experience disproportionate rates of cardiovascular disease and cancer mortality.<sup>5</sup> Furthermore, Native Hawaiians have the highest age-sex standardized mortality rates and the lowest life expectancy of all groups in the State.<sup>4</sup>

Factors contributing to these health outcomes include limited access to health care, cultural barriers, and poor nutrition and lifestyle.<sup>6</sup> Withy and Sakamoto found that there is a physician deficit of at least 15%-20% compared to the US mainland, especially in neighboring islands and rural areas of larger NHOPI population.<sup>7</sup> The maldistribution of physicians in practice, largely centered in urban O'ahu, further aggravate, poor health care access for these populations. NHOPI residing in rural areas and neighbor islands must travel outside of their communities in

order to access necessary medical care. A past study conducted in 2001 showed that Native Hawaiian physicians were more likely to specialize in primary care than non-Native Hawaiian physicians. Additionally, the majority of Native Hawaiian physicians served medically underserved populations<sup>8</sup>

## Ethnic Concordance in Health Care

The cultural values of some Native Hawaiians may be incongruous with Western medical practices.<sup>9</sup> Native Hawaiians who identify with their culture are more likely to obtain care from traditional healers over biomedically-trained physicians.<sup>14</sup> Because Native Hawaiians emphasize spiritual conciliation, herbal supplements, and unity, a greater premium is placed on culturally sensitive and community-based participatory approaches to holistically heal the patient.<sup>10</sup> Furthermore, within the sociocultural context of the problematic "local diet," which comprises high salt, carbohydrates, meat, and fat intakes, many patients find difficulty in adhering to unrealistic and non-pragmatic foreign dietary plans.<sup>11</sup> As a result, physicians with similar cultural and ethnic/racial background as these patients may be able to tailor more appropriate health interventions. Furthermore, several studies have demonstrated a particular correlation between the ethnic concordance (eg, having a Native Hawaiian or Pacific Islander physician caring for a Native Hawaiian or Pacific Islander patient, respectively) of patient-physician interactions and a number of patient-related outcomes, such as satisfaction, provider preference, and quality of care.<sup>12,13</sup> In summary, socioeconomic disparity, lack of cultural understanding, and the physician workforce shortage further challenge proper health care, especially in medically underserved areas.

In this paper, we will examine the extent of Native Hawaiian and Other Pacific Islander (NHOPI) physician distributions in comparison to their respective ethnic population through Geographical Information System choropleth mapping. In addition, we aim to explore the historical trends of NHOPI population growth and potential proposals to ameliorate the growing health disparities and physician shortage in these populations.

## Methods

Data were obtained from the sources listed below to determine population and doctors by ethnicity (NHOPI). The results were analyzed as a density ratio measurement from the population and doctor aggregates for (1) the total population of Hawai'i and (2) the NHOPI population of Hawai'i.



## Geographic Information System Mapping

NHOPI population data and digital base maps were collected from the US Department of Commerce, Census Bureau (data File PL94-471, 2010). The most current public digital base maps, which include shapefiles at the state, county, zip codes, and census tract levels, were obtained for mapping purposes.<sup>14</sup>

The State of Hawai'i was subdivided into nineteen regions initially based on zip code level health insurance claim data from 2006. Zip codes were combined to represent regions whose resident populations displayed similar healthcare utilization patterns. For the purposes of this paper, these regions were revised to coincide with 2010 census tract boundary and population data released by the US Census Bureau (Figure 1).<sup>15</sup>

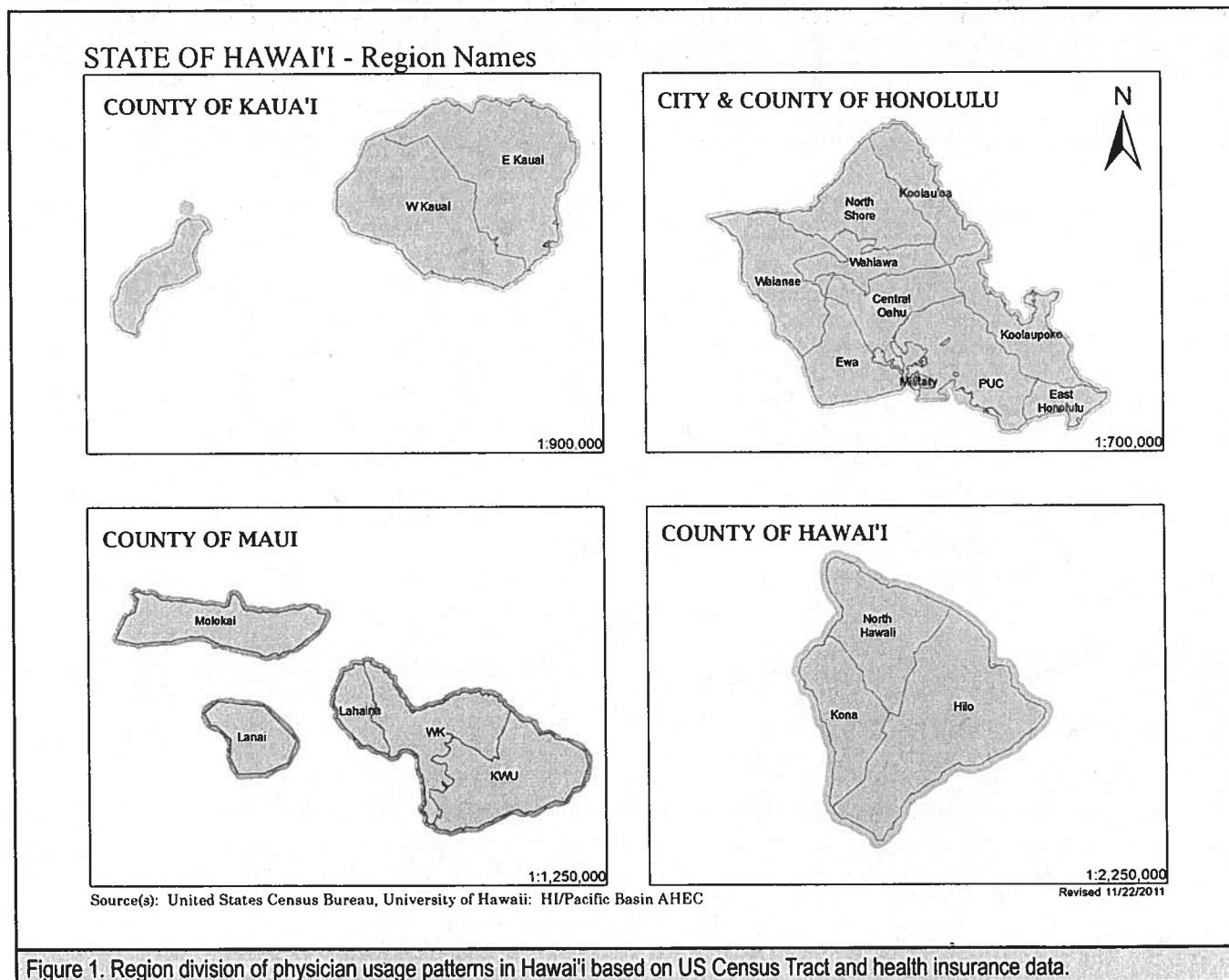
Choropleth maps are quantitative thematic maps and common cartographic techniques are used to display area-aggregated data. In healthcare research, choropleth maps are often used to display a statistic, such as disease rates or risk ratios. Typically, these regions are distinctively shaded according to a color-based classification scheme of varying intensity and communicate how a statistic varies across a geographic area. In

this research, Environmental Systems Research Institute (ESRI, Redlands, CA) ArcGIS 9.3.1 software was used to map the ratio of NHOPI physicians to NHOPI populations. A monochromatic progression was used to depict the NHOPI-specific ratios across each region. Lighter shaded areas indicate lower physician-to-population ratios whereas darker shaded areas indicate higher physician-to-population ratios. The physician-to-population ratio was calculated for each region according to the following formula:

$$\rho_{\text{region}} = (\Sigma \text{Physician FTE}_{\text{region}} / \Sigma \text{Total Population}_{\text{region}}) * 10,000$$

where FTE stands for full-time equivalent.

Population data were obtained from the 2010 US Census and aggregated from the census tract level into regional divisions that previously displayed distinct healthcare access patterns within the State of Hawai'i.<sup>7</sup> Regions within the State of Hawai'i were created using healthcare utilization patterns and distance to services (Table 1). As of July 29th, 2011, the US Census Bureau has not released civilian-only population estimates for the State of Hawai'i.



## Physician Workforce Database

The physician workforce assessment database was compiled using a combination of Hawai'i and national data, the aggregates of which were provided by Kelley Withy and David Sakamoto. Human subjects research exemption was obtained for this project from the University of Hawai'i Institutional Review Board (#15107).

Ethnicity data from the above mentioned physician workforce database were confirmed, and additional Native Hawaiian physicians were identified using membership data from the 'Ahahui o nā Kauka report from the Native Hawaiian Center of Excellence. 'Ahahui o nā Kauka is a non-profit organization of Hawaiian physicians dedicated to improving the health of Native Hawaiians. The Native Hawaiian Center of Excellence is an initiative funded by the US Department of Health and Human Services to promote Native Hawaiian health through education, research, and community initiatives. The remaining physicians were identified through key informants in the Hawaiian physician community.

## Results

There are 2,860 FTE physicians practicing in the State of Hawai'i; the most recent census data indicate a total population of 1,360,301 (including military) for a physician-to-population ratio of 21 per 10,000, with a range of 1.1 (Lāna'i Island) to 39.9 (Honolulu, O'ahu, the primary urban center). As demonstrated by the geographic information system mapping, Hawai'i faces drastic geographical disparities in the total physician coverage (Figure 2). One hundred and eighteen Native Hawaiian

physicians were identified providing patient care in Hawai'i as of 2010 for a total of 105.5 Full Time Equivalents of care. Of these physicians, 96 graduated from John A. Burns School of Medicine (81%).

NHOPI residents make up 26.2% of the total Hawai'i population and 3.7% of the total Hawai'i physician workforce, which translates to an average ratio of 2.96 NHOPI physicians per 10,000 NHOPIs. After separating Native Hawaiian physicians from other Pacific Islander physicians, Native Hawaiian physicians make up 3.4% of the total physician workforce and other Pacific Islander physicians make up only 0.3%. These findings indicate a considerable shortage of NHOPI physician FTE compared to the physician coverage of the general population (Figure 3).

## Physician-to-Population Ratios (Figure 4)

Honolulu (39.9), East Kaua'i (38.7), Wailuku-Kahului Maui (21.4), and North Hawai'i Island (19.7) had the highest physician-to-population ratios. Lāna'i Island (1.1), Wai'anae O'ahu (3.8), Wahiawā O'ahu (5.1), and the North Shore of O'ahu (5.3) had the lowest physician-to-population ratios. Five additional regions had ratios of less than 10, including East Honolulu, Ko'olaupoko O'ahu, Central O'ahu, West Kaua'i, and Lahaina Maui.

## NHOPI Physician Comparisons

One hundred and seven Native Hawaiian physicians were identified providing patient care in Hawai'i as of 2010. On average, there are 2.3 NHOPI FTE physicians for every 10,000

Table 1. List of regions utilized in GIS-mapping for physician coverage ratios in NHOPI and total population.

County	Island	Regions
Hawai'i	Big Island	Kona
Hawai'i	Big Island	Hilo
Hawai'i	Big Island	North Hawai'i
Honolulu	O'ahu	East Honolulu
Honolulu	O'ahu	Primary Urban Center
Honolulu	O'ahu	Ko'olaupoko
Honolulu	O'ahu	Central O'ahu
Honolulu	O'ahu	Ko'olaupoko
Honolulu	O'ahu	Ewa
Honolulu	O'ahu	Wai'anae
Honolulu	O'ahu	Wahiawa
Honolulu	O'ahu	North Shore
Kaua'i	Kaua'i	East Kaua'i
Kaua'i	Kaua'i	West Kaua'i
Maui	Lana'i	Lana'i
Maui	Maui	Wailuku-Kahului
Maui	Maui	Kihei-Wailea-Up Country Hana (KWU)
Maui	Maui	Lahaina
Maui	Moloka'i	Molokai

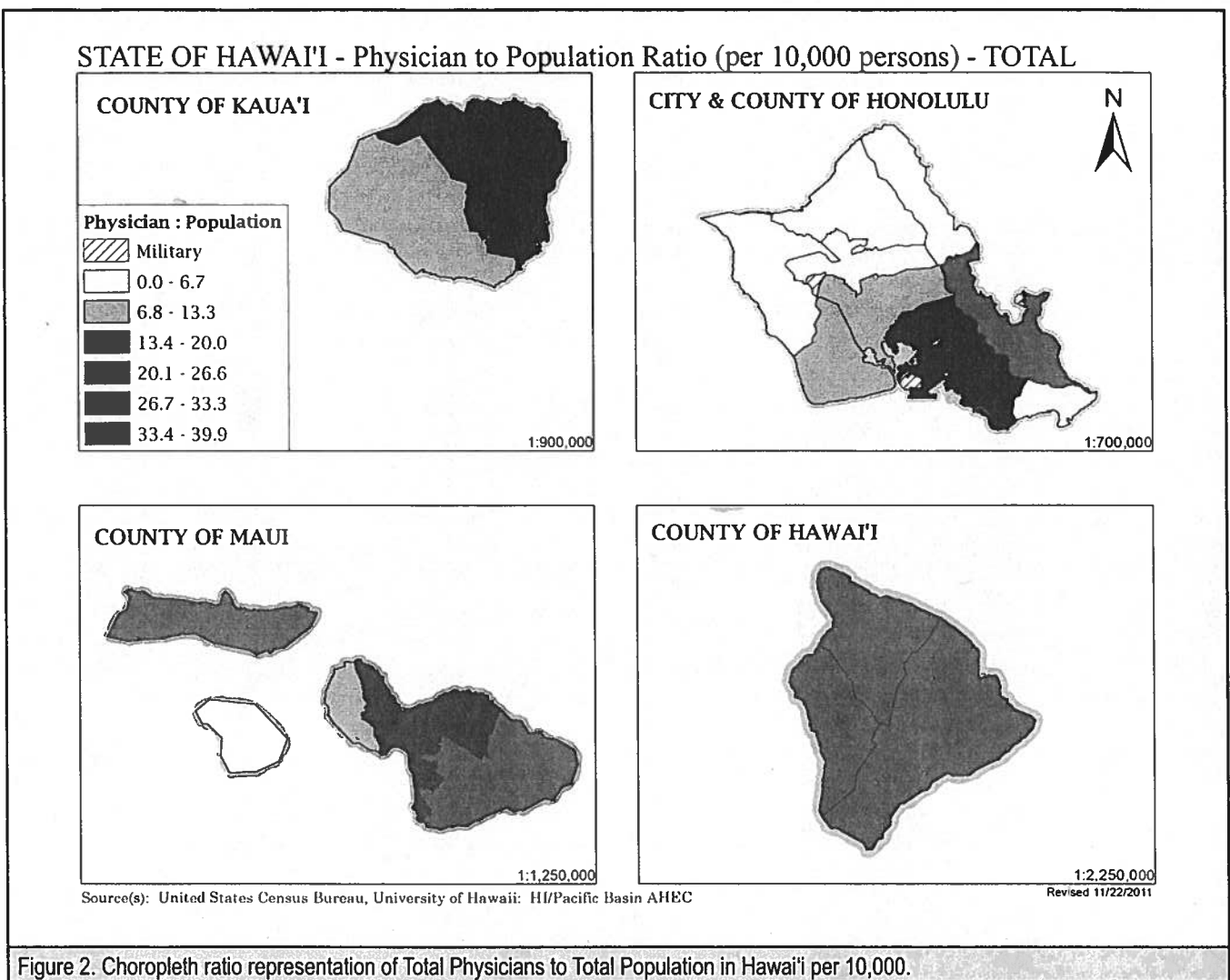


Figure 2. Choropleth ratio representation of Total Physicians to Total Population in Hawai'i per 10,000.

NHOPI residents in the state of Hawai'i. The highest ratio of NHOPI physicians to NHOPI population is seen on the island of Moloka'i (6.6), while there were zero NHOPI physicians on the island of Lāna'i, Lahaina Maui, and the North Shore of O'ahu. Following Moloka'i, the next highest ratios were observed in East Honolulu (6.1) and Honolulu (6.0), both on the island of O'ahu, and in Kona (3.9) on the island of Hawai'i. In addition to the previously stated locations with zero NHOPI FTE physicians, the next lowest ratios were observed on Kihei-Wailea-Up Country-Hana(1.0) of Maui, and the cities of Wai'anae (0.8), and Wahiawā (0.3) on the island of O'ahu.

## Discussion

### Maldistribution of Physicians in Hawai'i

According to the Hawai'i physician workforce assessment, the state is short 600 physicians or 15%-20% from that needed to provide services on par with the national average utilization of physician services.<sup>7</sup> O'ahu's primary urban center, Honolulu, has the largest physician-to-population ratio in the state with

the highest population (430,548) and the largest number of physician FTEs (1,716). Areas such as East Kaua'i, Wailuku-Kahului and North Hawai'i have relatively small populations and have adequate physician-to-population ratios. Conversely, in areas such as Lāna'i (1.1) and Wai'anae (3.8), the physician FTE is dramatically less in comparison to the region's population. For example, Wai'anae's population is about 3 times larger than that of East Kaua'i, but Wai'anae has less than .01 of the physician FTEs.

This disparity reflects the general maldistribution of physicians, with a predilection for certain rural areas and neighboring islands (Figure 2). Access to healthcare services can be an important determinant of health outcomes. Consequently, people living in districts with lower physician-to-population ratios may experience greater difficulties in receiving proper healthcare. As noted by Aday and Anderson more than three decades ago, access is multi-faceted and relies on a number of components besides the existence of healthcare providers.<sup>16</sup> Economic, organizational, and socio-cultural factors must also be considered to examine possible barriers to access.

## STATE OF HAWAII - Physician to Population Ratio (per 10,000 persons) - NHOPI

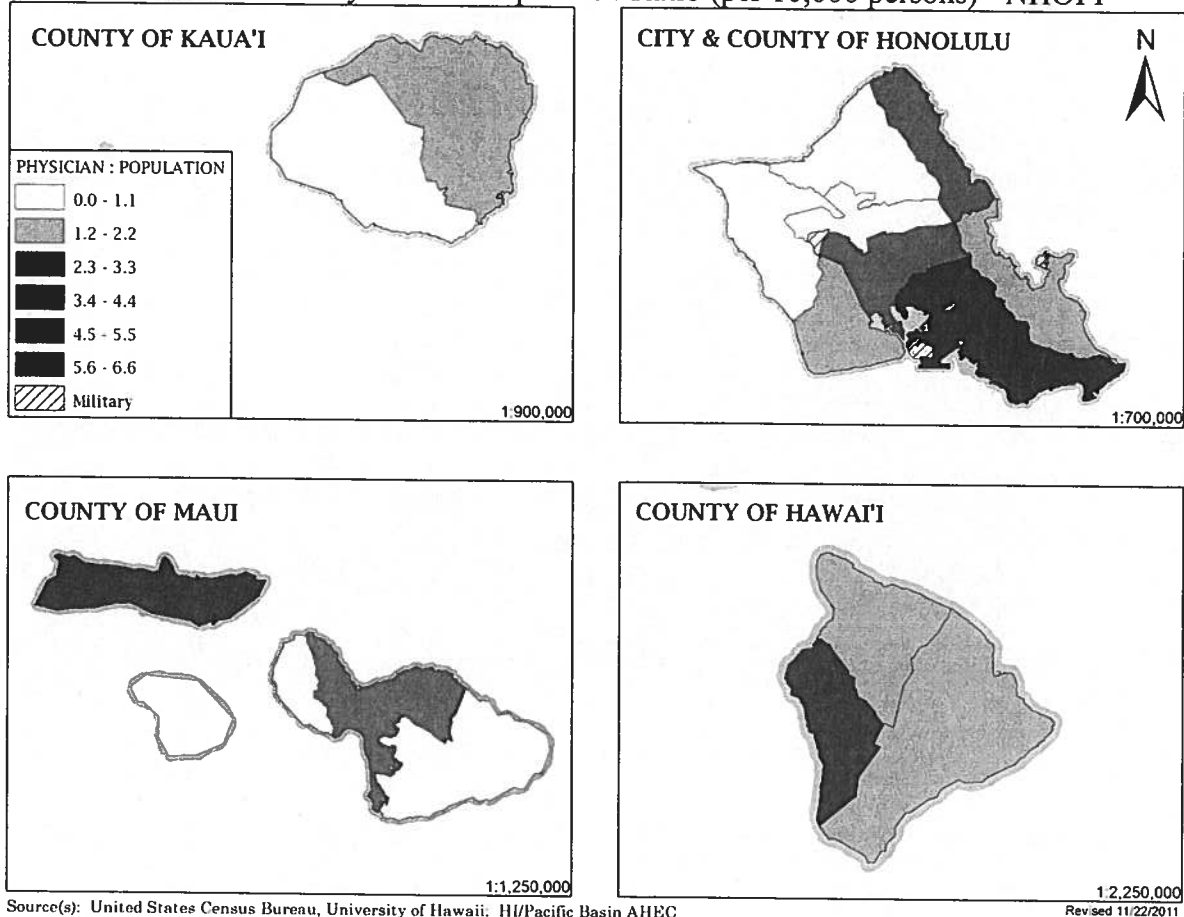
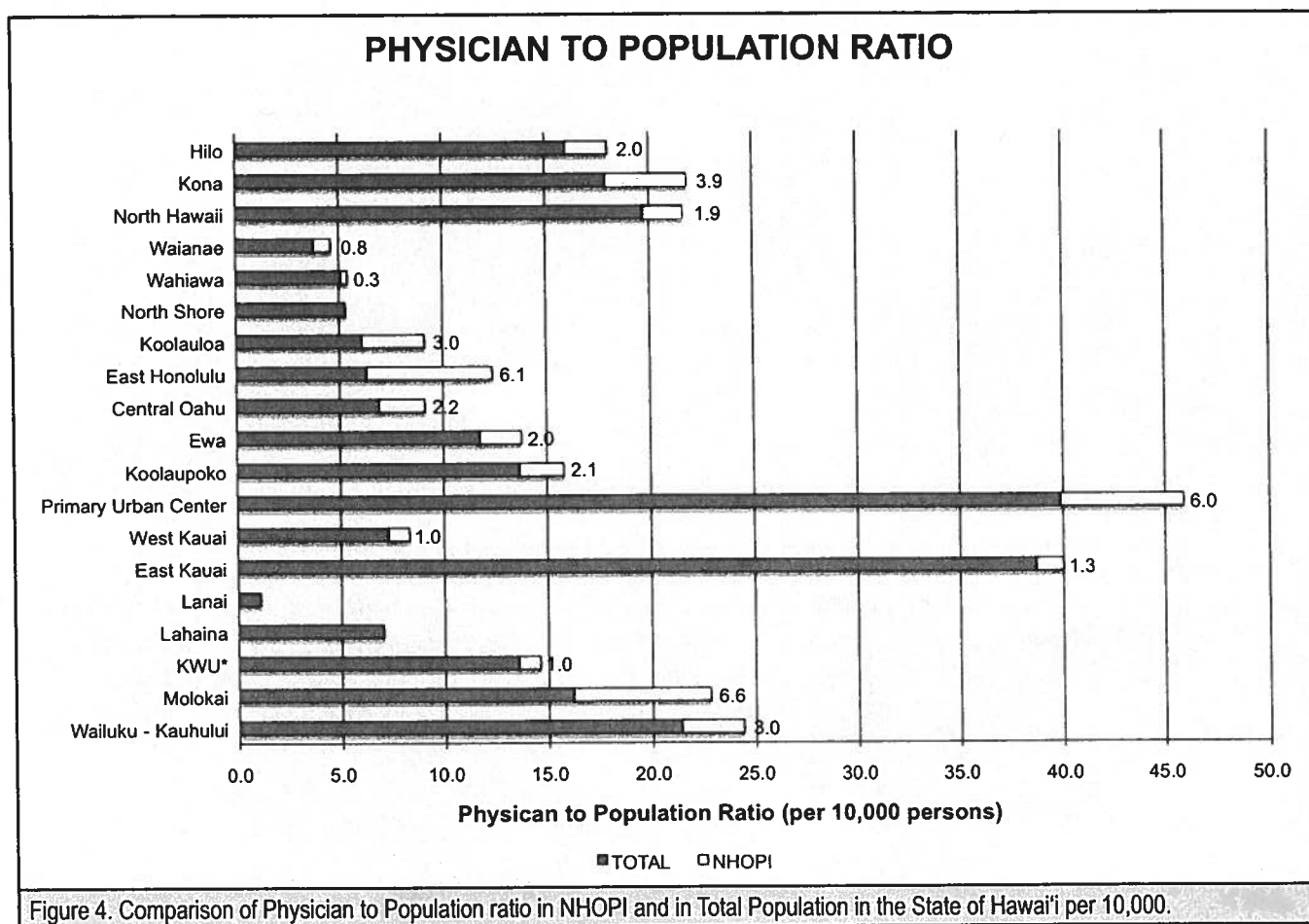


Figure 3. Choropleth ratio representation of NHOPI Physicians to NHOPI Population in Hawai'i per 10,000.

### NHOPI Physician Comparisons

A total of 118 Native Hawaiian physicians were identified in Hawai'i, for a total of 105.5 FTEs. Even in the regions with the highest NHOPI physician-to-NHOPI population ratios such as Moloka'i (6.6), East Honolulu (6.1) and Honolulu (6.0), these ratios are approximately 27 times less than the ratio of total physician-to-population. We observed a general trend (the overall predilection of the geographical maldistribution falling on rural areas and the outer islands) between the regions with the worst ratios: Lāna'i Island, Wai'anae, Wahiawā and the North Shore of O'ahu. This reflects both overall physician workforce shortage and the disparity demonstrated by the low number of NHOPI physicians. It also reveals a substantial demand for services in regions outside of O'ahu's urban center that tend to be populated heavily by NHOPI patients. In all cases, NHOPI physicians are both too few and maldistributed with respect to the NHOPI population. Again, we see the least favorable physician-to-population ratios are clustered in the neighboring islands and rural communities of O'ahu (Figure 3).

Of the 23 hospitals in Hawai'i, 13 are located in rural areas. Nine are classified as critical access hospitals by the Flex critical monitoring team. There are currently no level I trauma centers in the state. The Queen's Medical Center, located in Honolulu, designated level II, serves the most patients in the state.<sup>17</sup> Rural communities on O'ahu rely on two regional health clinics, thus exhibiting gross geographical disparities in terms of access to major health centers. This problem is further compounded for residents on the neighboring islands where transportation to O'ahu is limited to commercial air flights. In 2009, 90.5% of Native Hawaiian adults self-reported receiving any health coverage in comparison with 92.8% of Caucasians, 93.4% of Filipinos, 95.4% of Japanese, and 92.7% statewide.<sup>18</sup> On O'ahu, a smaller disparity between urban Honolulu and central and western regions was noted, which implies that physician maldistribution is a factor contributing to limited healthcare access and thus, may worsen health outcomes.



#### Historical Trend of NHOPI Physicians

In 2001, a study was conducted by Else, et al, in which the practice locations of Native Hawaiian physicians in Hawai'i was analyzed in comparison to the distribution of the Native Hawaiian population.<sup>8</sup> The Native Hawaiian physician data used for this study were from a database compiled by the Native Hawaiian Center of Excellence, and was current as of 1998.<sup>19</sup> This study found that only about 4%, or 104 of about 2,400, of practicing physicians in Hawai'i were Native Hawaiian. In contrast, 18%-22% of the total population of the state was identified by the 1990 US Census as Native Hawaiian. In addition, it was found that a vast majority of Native Hawaiian physicians practice in urban areas, with 72% of those on O'ahu practicing in Honolulu.

The 2010 census indicates that the number of NHOPI in the general population of Hawai'i has increased to 26.2%. This study found that Native Hawaiian physicians made up about 3.3% of the total FTE physicians in Hawai'i, which is similar to the proportion found in the 2001 study (4%). However, this study also found that there is a decrease in the ratio of Native Hawaiian physicians to Native Hawaiians in the total population between 2001 and 2010. The disparity is thus worsening. These findings with regard to Native Hawaiian physician distribution are similar to those from the 2001 study with a majority

of Native Hawaiian physicians in the state practicing in urban O'ahu.

#### Areas of High Disparities

The high physician-to-population ratios can result from a large population of physicians, a low total population utilizing their services, or a combination of both; the converse is true for low ratios. We aim to highlight these particular areas of high disparities for two reasons: low ratio extremes indicate a drastic shortage of physician coverage and high ratio extremes can mask the reality of health care accessibility through inflating the averages on a statewide level.

As demonstrated by the choropleth mapping, one of the highest ratios of NHOPI physicians to NHOPI population is found in Honolulu (6.0), which hosts the highest number of NHOPI residents in the state (80,338) and contains the single largest population of NHOPI FTE physicians (48.3). Conversely, the second largest NHOPI population in the State of Hawai'i is located in Wai'anae on the Leeward Coast of O'ahu (45,173) and despite having NHOPI population numbers exceeding 50% of the Honolulu, Wai'anae has 13-fold less NHOPI FTE-physicians to serve its community. The island of Moloka'i is the only neighbor island to exceed the NHOPI FTE-physician per 10,000 population ratio of 2.1 - 5.0, particularly achieving



the highest ratio as well (6.6). Moloka'i has a ratio of NHOPI physicians to NHOPI population 20 times that of Wahiawā, the region with the smallest ratio (0.3). It was nearly 8 times better than the next smallest ratio in Wai'anae (0.8).

The worst disparities were noted in Lāna'i Island, Lahaina, Maui, and the North Shore of O'ahu, regions with no NHOPI physicians at all. Of the remaining regions, two had less than or equal to one NHOPI physician per 10,000 population, namely West Kaua'i and Kihei-Wailea-Up Country-Hana, Maui. Therefore, nearly 40% of the represented regions had a NHOPI physicians-to-NHOPI population of less than or equal to one. In contrast to the total physician-to-population ratio, whose lowest ratio is 1.1 per 10,000 on Lāna'i, over half of the regions had greater than 10 per 10,000 population.

### Proposed Remedies

The disproportionate ratios of NHOPI physicians to the NHOPI population require a multi-dimensional approach to alleviate physician coverage disparities. Others have proposed a variety of interventions to address the general physician shortages via loan repayment programs, tort/legislative reforms, medical community mentorship and improving professional and financial environments.<sup>7,20,21</sup> With the problems rooted in total number of NHOPI physicians and geographical maldistributions, our proposed solutions focus specifically on institutional and academic reforms in order to (1) increase the number of NHOPI physician applicants, graduate and residency programs, and (2) encourage permanent active practices in rural areas and neighbor islands.

The training of more Native Hawaiian physicians at the institutional level is one component that may play an important role. Since its inception in 1965, the University of Hawai'i's John A. Burns School of Medicine (JABSOM) has educated 226 Native Hawaiian physicians. Approximately 50% of physicians practicing in Hawai'i are graduates of JABSOM and the school is well-positioned to have a positive impact on our physician population. In fact, the current study indicates that JABSOM educates 81% of the NH physicians currently practicing in the State. In the last five years JABSOM has demonstrated its success in recruiting, accepting, and ultimately graduating a number of Native Hawaiian applicants but there is always room for improvement. According to data provided by the Office of Student Affairs at JABSOM, in the last five years (2006-2010) only 12% of in-state applicants to JABSOM were of Native Hawaiian descent, indicating that recruitment efforts must be increased to broaden the number of qualified Native Hawaiian students who choose to apply. Within that same period, 23% of in-state Native Hawaiian applicants were admitted (excluding those matriculating through the *Imi Ho'ola* ["those who seek to heal"] program) compared to 26% of the total in-state applicant pool. Data on graduation rates are currently limited. Between 2001 and 2006, 42 Native Hawaiian students matriculated at JABSOM (including *Imi Ho'ola* students). Within 4 years of matriculation, 39 Native Hawaiian students have graduated, for a minimum graduation rate of 92.9% during that five-year span. These numbers indicate that JABSOM has played a key role in

educating Native Hawaiian physicians and must continue to do so in the future.

It is evident that JABSOM has taken on the challenge of increasing the diversity of Hawai'i's physician workforce by integrating and supporting the *Imi Ho'ola* Post-baccalaureate and Native Hawaiian Center of Excellence (NHCOE) programs at JABSOM's Department of Native Hawaiian Health. The *Imi Ho'ola* program is a 12-month post-baccalaureate program that has provided an alternate pathway to medicine for over 200 college graduates for over 30 years. The *Imi Ho'ola* program accepts individuals of any race or ethnicity who demonstrate a socially, educationally, or economically disadvantaged background and a strong, personal commitment to practice medicine in areas of need in Hawai'i and throughout the US Affiliated Pacific Islands. Since its inception in 1973, over 200 of the *Imi Ho'ola* post-baccalaureate program graduates are currently enrolled or have graduated from JABSOM, 40% of whom are Native Hawaiian.

NHCOE has been in existence for 15 years and is funded by the US Department of Health and Human Resources. Their overall mission is to improve the health of Native Hawaiians through education, outreach, research, faculty development and ultimately increasing the number of Native Hawaiian physicians.

### Limitations

Although data were collected for the most recent (2010) census on Native Hawaiians as distinct from Other Pacific Islanders, this data had not been released by the US Census Office at the time this paper was written. Data used for population mapping purposes were therefore an aggregate of Native Hawaiian and Other Pacific Islander, as these were the only data that had been released. From the Hawai'i/Pacific Basin Area Health Education Center practicing physician database, we identified only 8.2 FTE Other Pacific Islanders physicians versus 97.25 FTE Native Hawaiian physicians, which may serve to exaggerate the shortage of Native Hawaiian physicians when looking at the NHOPI composite. Furthermore, civilian-only population data were not available. Further data mapping will be warranted on these two populations separately when such data are made available by the US Census Office.

There is currently no research indicating that Native Hawaiians prefer receiving care from Native Hawaiian physicians or that such race-concordant care leads to better health outcomes in the Native Hawaiian population. By identifying all Native Hawaiian physicians in Hawai'i and analytically mapping their practice locations to areas in which Native Hawaiians access health care, future steps can be taken to elucidate the extent of these preferences as well as any patterns of quantitative health outcomes that may exist.

By determining the patterns of Native Hawaiian physician service, factors influencing practice location can begin to be addressed. Further research can elucidate those values and priorities that lead physicians to practice in well-served or under-served areas and strategies can then be formulated for attracting more Native Hawaiian physicians to areas of need.

## Addenda

### Nomenclature and Abbreviations

The following abbreviations are utilized to discuss the relationship and distribution of physician coverage in Hawai'i based on FTE.

FTE = Full Time Equivalence; an FTE of 1.0 means that the physician practices full-time

NHOPI = Native Hawaiian and Other Pacific Islander

$\frac{\text{NHOPI Physicians [Number]}}{\text{NHOPI Population [Number]}}$  = NHOPI physician-to-NHOPI population ratio

$\frac{\text{Total Physicians [Number]}}{\text{Total Population [Number]}}$  = physician-to-population ratio

### Conflict of Interest

None of the authors report any conflict of interest.

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# Addressing the Physician Shortage in Hawai'i: Recruiting Medical Students Who Meet the Needs of Hawai'i's Rural Communities

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## Abstract

**Background:** Past studies in the continental US have demonstrated that students from rural areas and those who go into primary care are more likely to practice in rural areas than urban-born and specialty physicians.

**Methods:** This study uses two separate data sets to examine whether medical students and young physicians in Hawai'i follow the same pattern. A retrospective study of graduates of the University of Hawai'i John A. Burns School of Medicine from 1993-2006 was performed examining the relationship between practice location and high school attended for those practicing in Hawai'i. In addition, a survey was conducted with the first, second and third year medical students examining their practice intentions as related to where they grew up. Both data sets were analyzed using Chi Squared tests to determine the significance of associations between individuals from rural backgrounds practicing or intending to practice in rural areas.

**Results:** The relationship in both cases showed that students and physicians from rural areas were more likely to practice in rural areas. However, 81% of all respondents reported being willing to consider practicing in rural area, especially if lifestyle, work environment, and employment opportunities were favorable.

**Discussion:** If the State of Hawai'i wants to expand the physician workforce in the rural areas of Hawai'i, recruiting more students from rural areas and increasing desirability of rural practice settings are excellent paths to take.

## Background

The problem of physician shortage in rural areas is not new<sup>1</sup> and given current supply and demand trends, it is expected to worsen with time.<sup>2-4</sup> Within rural sections of the country, there is a higher prevalence of poverty and chronic disease, the population is typically older, and a greater proportion of residents are without health insurance or receive Medicaid or Medicare.<sup>5</sup> Rural areas of the United States are home to approximately 20% of the overall population (60 million people) but less than 8% of the nation's physicians,<sup>6</sup> resulting in inadequate numbers of physicians to meet the health needs of rural populations.<sup>7,8</sup> Primary care physicians (PCPs) are traditionally the focal providers of health services in rural areas but their supply is insufficient to meet the ever-growing demands of these communities.<sup>9</sup> Physician supply in shortage areas is resistant to even the strongest market pressures — during the period between 1980 and 1999, a time of rapidly increasing aggregate physician numbers in the United States, primary care was the only practice arena to show a steady decline in practitioners.<sup>10</sup>

Several factors have been shown to be predictive of whether or not a medical student will ultimately choose to work in a rural environment. There is ample evidence to support the claim that medical school graduates who were raised in rural environments are more likely to choose to practice in rural areas.<sup>11</sup> The literature also supports the assertion that interest in rural family

medicine is stronger among students who completed high school in a small town (population less than 50,000), and have strong family ties in rural communities.<sup>12</sup> Due to financial constraints and the weak political feasibility of making major changes to the US health care system in the near future, a careful policy approach to altering existing programs affecting physician supply may be the most realistic means of satisfying the nation's current need for physicians in rural areas.<sup>13</sup> One cost-effective approach to addressing physician shortage is for medical schools to recruit and select more students who are inclined to seek careers in rural medicine. A number of US medical schools have chosen this model and through rural program tracks have made significant contributions to the physician workforce in their state's rural regions.<sup>14</sup>

## Methods

Two distinct research projects were conducted to analyze rural origins and practice locations. The first, a retrospective study of rural origins and practice location, was conducted using data on practice location of past University of Hawai'i John A. Burns School of Medicine (JABSOM) graduates working in Hawai'i, and the second, a survey of rural practice intention, was conducted among medical students.

### 1. Retrospective Study of Rural Origins and Practice Location

Information on high school attended was obtained for the graduates of John A. Burns School of Medicine for the years 1993 to 2009 from the JABSOM Office of Student Affairs. Information on classes prior to 1993 is stored in paper format, and location of high school could not be easily isolated from other confidential information, and therefore was not reviewed for this study. The end date of 2006 was selected to allow graduates at least five years for residency training, as longer residencies indicate specialties more likely to be found in urban areas. High school attended was used as a proxy measure for community of residence. The zip code of the high school was identified as either rural or non-rural based on the island where it was located (O'ahu was considered urban; all other islands rural). Practice location information was obtained through physician surveys, internet searches, direct calling, and provider lists as described by Withy, et al. in their healthcare workforce assessment article in this edition. Primary care was defined as: Internal Medicine, Med-Peds, Family Medicine, General Practice, Pediatrics, and Geriatrics.

## 2. Medical Student Survey of Rural Practice Intention

In a separate 2010 study, a survey was administered to all 186 first through third year medical students present at mandatory colloquia in the Spring of 2010. A total of 166 JABSOM students completed the survey that asked them to identify their intended location of practice (89% response rate). The study asked participants if they would consider rural practice and factors that might influence their choice to practice in a rural setting. The participants were asked their ideas for recruiting and retaining physicians in rural areas of Hawai'i. The purpose, risks, and benefits of participating in the survey were explained before it was distributed to class members in compliance with the University of Hawai'i Committee on Human Subjects approval of the study.

Analysis: For both studies "Rural" was defined as Hawaiian islands other than O'ahu and "Urban" as any location on O'ahu.

### 1. Retrospective Study of Rural Origins and Practice Location

An Excel table was created with high school coded as 0 for out of state, 1 for rural, and 2 for urban. Practice location was similarly coded. Because of the limitations of the data, only the graduates who were both from Hawai'i and practicing in Hawai'i could be included. The final data set included 177 individuals meeting the criteria. A 2x2 table was developed and chi square analysis performed to test for an association between rural origin and rural practice location.

## 2. Medical Student Survey of Rural Practice Intention

A dataset was created with codes for rural origin and rural intentions with respect to practice location. If a student listed multiple practice locations under consideration, then the response was counted as "rural" if any of the locations met the definition of rural. Responses from 61 students were excluded from the analysis because they were either undecided, from outside Hawai'i, or intended to practice outside Hawai'i leading to a sample size of 105. Again, a chi square analysis was conducted to compare rural origin to rural intention practice location.

Descriptive responses were included from all respondents. They were reviewed by two researchers for common themes and counted in a category upon concordance by the two researchers. The most common thematic categories are reported in the results section.

## Results

Of physicians practicing in Hawai'i who graduated from JABSOM during a 9-year period (1997-2006), 20 were identified as practicing in rural Hawai'i (Table 1). Nearly half (46%) of physicians from rural backgrounds who stayed in Hawai'i chose to practice in a rural setting, while only 5% of physicians from non-rural backgrounds chose to practice outside of O'ahu. Thus, Hawai'i-schooled physicians from rural settings are nine times more likely to practice in a rural location than those who did not go to high school on a neighbor island. After conducting a chi

Table 1. Comparison of JABSOM graduates rural origin vs. rural practice location,  $P < 0.0001^*$

	Rural Practice	Non-Rural Practice	Total
Rural Background	12	14	26
Non-Rural Background	8	143	151
Total	20	157	177

\*chi square analysis

Table 2. Comparison of JABSOM graduates type of practice and rural practice location,  $P = 0.09^*$

	Rural Practice	Non-Rural Practice	Total
Non-Primary Care Specialty	7	86	93
Primary Care	13	71	84
Total	20	157	177

\*chi square analysis

Table 3. Comparison of current JABSOM students rural origin vs. rural practice location intention based on a 2010 survey of JABSOM medical students regarding practice intention,  $P < 0.0001$

	Rural Practice	Non-Rural Practice	Total
Rural Background	12	4	16
Non-Rural Background	6	83	89
Total	18	87	105

\*chi square analysis

Table 4. Results of a poll of JABSOM students (class of 2010-2013) on suggestions for recruiting and retaining physicians in Hawai'i's rural areas. Listed in order of popularity. Of 134 survey participants, there were 91 respondents to this question, providing these 140 responses

Student Suggestions
Increased Compensation (40)
Increased Loan Repayment Opportunities (33)
More rural training experiences in medical school and residency (17)
Better facilities, infrastructure, and support on neighbor islands (16)
Increased exposure to the culture of rural areas via talks and visits from neighbor island physicians (12)
Increased recruitment of medical students from rural areas (11)
Improve schools (primary and secondary education) in rural areas (3)

square test, the correlation between rural background and rural practice was found to be statistically significant ( $P < 0.0001$ ). Of the subset of JABSOM physicians in primary care, 15% chose to practice in rural Hawai'i compared to 8% of non-primary care physicians. After conducting a chi square test there was weak evidence ( $P = 0.09$ ) for an association between rural practice and primary care specialty (Table 2). The low statistical significance of this test is likely linked to the small number of 1993-2009 JABSOM graduates practicing in rural Hawai'i (12).

The results of the prospective survey of JABSOM students, after excluding those from or intending to practice outside Hawai'i, 17% responded that they intended to practice in a rural setting (Table 3). Students from rural backgrounds were 11 times (75% vs 6.7%) more likely to state a rural location as one of their intended places of practice. While students from rural backgrounds made up only 15% of the total respondents, they represented 67% of those with stated intent to practice in rural settings. The correlation between students' rural background and rural intended practice location was found to be statistically significant ( $P < .0001$ ). Additionally, though less than one fifth of the 105 included respondents intended rural practice, the majority (81%) of the total 166 students polled said they would consider practicing in a rural location. Factors they described as possibly influencing their decision included lifestyle, work environment, and employment opportunities for both themselves and their spouses. Survey participant responses to the question, "What suggestions do you have for recruiting and retaining physicians in Hawai'i's rural areas?" are listed in Table 4. Participants were not given multiple choice options for this question and were instead asked to give free-form answers. The most common responses were increased compensation and loan repayment opportunities.

## Discussion

Although all counties of Hawai'i currently experience physician shortages, the neighbor islands suffer more significant shortages of primary care doctors than O'ahu, according to 2010 Hawai'i Physician Workforce Data.<sup>15</sup> A number of prior studies identified being from a rural area as a predictive factor for working in a rural area. Similarly, studies have shown that practicing family medicine is predictive of work in a rural area, particularly when combined with having a rural background.<sup>2,16-21</sup>

The results of this study affirm the same is true at JABSOM, as 46% of JABSOM-trained physicians from rural backgrounds have chosen to practice on the neighbor islands in comparison to only 5% of those raised on O'ahu. Furthermore, both current JABSOM students and past graduates are statistically more likely to practice in rural areas if they are from an island other than O'ahu. If JABSOM's mission is to train doctors for all of Hawai'i, it is reasonable to conclude that in order to produce more doctors for the neighbor islands, we should increase recruitment and admission of medical students from locations with the greatest unmet needs for physicians.

A small number of undergraduate medical schools in the United States have published outcomes data on their comprehensive rural health programs designed specifically to increase the supply of rural primary care physicians. The most thoroughly studied of these undergraduate medical programs is the Physician Shortage Area Program (PSAP), started in 1974 at the Jefferson Medical College (JMC) in Philadelphia, Pennsylvania. Research within the PSAP has identified the selective admissions process as the most powerful factor influencing the program's success.<sup>5</sup> Through admittance of students based largely on their rural background and commitment to family

medicine (but who also meet academic and other admission criteria), the PSAP is composed of students dissimilar to those comprising the non-PSAP population at JMC (one study notes that more than two thirds of PSAP graduates were not accepted to any other medical school and probably would not have been accepted under regular admissions to JMC) but the attrition rate and undergraduate and post graduate academic performance of PSAP graduates are nonetheless similar.<sup>22</sup> While other successful models differ slightly from the PSAP program in their curriculum and in other areas, they all share a focus on students from rural areas and on the practice of family medicine.<sup>23-25</sup>

Studies have compared PSAP graduates to non-PSAP graduates of JMC, and to all medical school graduates in Pennsylvania. The most recent study was conducted in 1999, and evaluated the program over 22 years.<sup>5</sup> The authors found that compared to non-PSAP graduates, PSAP graduates were three times as likely to practice in a rural area of the United States (34% vs 11%), more than three times as likely to practice in an underserved area (30% vs 9%), four times as likely to practice family medicine (52% vs 13%), and 8.5 times as likely to practice family medicine while also practicing in a rural area (21% vs 2%). When evaluated on a statewide scale, PSAP graduates represent 1% of all graduates from the state but they account for 21% of family physicians practicing in rural areas. Importantly, these physicians are not only more likely to initially practice in rural areas, they are also statistically more likely to stay.<sup>26</sup> Alternately, a 2001 study using a logistic model for predictive factors found that of the non-PSAP graduates who grew up in an urban area and did not express an early interest in family practice, only 1.8% went on to become rural primary care physicians. Of matriculants who did not participate in PSAP, non-PSAP graduates who had grown up in a rural area and had a freshman-year plan for family practice were 75% as likely to practice rural primary care as PSAP graduates, thus suggesting that even without a specially designed undergraduate program to support rural primary care, medical schools could increase rural physician numbers simply by admitting more students from rural areas with an interest in primary care.<sup>27</sup>

Yearly, the PSAP program and five other rural health medical programs produce over 100 physicians likely to practice primary care and to enter rural residency programs, an extremely important resource for rural graduate medical education (GME) programs and rural communities.<sup>28</sup> A 2008 review of these programs in *Academic Medicine* revealed that on average, 64% of program graduates were practicing in populations of < 50,000 and 57% were in rural communities (Table 5).<sup>14</sup> According to this study, if all US medical schools were to expand their class sizes by 30% and include these programs as part of their expansion, they would produce five times as many rural physicians as an expansion without these programs. Because JABSOM is currently expanding its incoming class size, it is an opportune time to consider a specific rural health program as it could increase the supply to Hawai'i's rural areas much more than an increase in class size alone.



Table 5. Specialty and Rural Practice Outcomes of Medical School Programs With a Mission to Increase Rural Physicians <sup>14</sup>						
				Study Outcomes: no (%) of program graduates working in rural communities		
Program	Medical School	Year Started	Sample Size	Rural	Population <50,000	Population <25,000
Rural Physician Associate Program (RPAP)	University of Minnesota (UM) Medical School	1971	284 (practicing in MN)	167 (59)	223 (79)	192 (68)
			869 (practicing in the United States.)	521 (60)		
University of Minnesota Medical School, Duluth (UMD)	University of Minnesota Medical School, Duluth	1972	1264		NA (62)	NA (47)
Upper Peninsula Program (UPP)	Michigan State University College of Human Medicine	1974	28		NA (50)	
Physician Shortage Area Program	Jefferson Medical College, Thomas Jefferson University	1974	NA		NA (76)	NA (68)
Rural Medical Education Program (RMED)	State University of New York (SUNY), Upstate Medical University	1989	86		22 (26)	
Rural Medical Education Program (RMED)	University of Illinois College of Medicine at Rockford	1993	61	56 (92)		
Weighted Average				(57)	(64)	(53)

There are potential weaknesses of the current study that need to be addressed. It should be noted that this analysis does not take into account the number of UH residency graduates who ultimately practice in rural areas of the state, many of whom are graduates of other medical institutions. Furthermore, students currently practicing outside of Hawai'i were eliminated from the data set, since their practice location is not documented as it is for Hawai'i physicians. Thus it is possible that there are a large number of rural practicing physicians outside of Hawai'i. Also, the rural origin of students included in this study was determined by the location of high school zip code, which may not be an accurate lifetime measure. For example, a small number of students from neighbor islands attend high school on O'ahu but do not lose their ties to the neighbor islands and may be therefore miscategorized in this analysis. Additionally, students may have lived in different areas before attending high school. Finally, in the survey of current students, the response rate was 89% and only included those students present at the colloquia, which may provide a skewed description of student practice location intentions if the students who attended the colloquia were different from the students who did not attend.

Future research should address the location of Hawai'i-trained medical graduates who practice outside of Hawai'i as well as continue to study intentions and ultimate practice location of JABSOM students. An outstanding JABSOM program that provides quality education and medical school preparation for disadvantaged students (many of them from rural areas) is the *Imi Ho'ola* (those who seek) Program, a one year post-baccalaureate program with automatic admission to JABSOM, started in 1973 and now institutionalized at the medical school. This program has proven to be extremely successful in supporting students

from underrepresented backgrounds who might otherwise not attend medical school.

The implications of these findings are significant. Admission policies that do not include students raised in rural areas are unlikely to be successful at mitigating rural physician shortages. However, increasing the number of matriculants from rural areas or with freshman-year plans for family medicine will be both effective and cost-saving, particularly considering the high cost of physician recruitment and retention further along the physician pipeline.<sup>29</sup> Besides rural background and stated interest in family medicine, applicants' demonstrated commitment to primary care and underserved populations can be used as a measure of likelihood to practice in rural communities. In addition, rural training increases rate of rural practice and history of working in community-based volunteer programs such as AmeriCorps, Peace Corps, Teach For America, correlate with retention in rural areas.<sup>30</sup> Studies need to be carried out to determine if there is a positive correlation between experience prior to medical school and eventual choice of specialty.

In conclusion, although monies are scarce in these financially difficult times, reallocation of funds toward restructuring, supporting, and strengthening programs already in existence can have profound impacts on health care access for Hawai'i's most underserved populations. The decreased burden of a program that operates within an existing medical school, coupled with the ease with which admission criteria can be adjusted to achieve program objectives, indicates a robustness that is necessary when approaching the physician supply and distribution problem. Furthermore, implementation of a rural health track could be facilitated through the Hawai'i/Pacific Basin Area Health Education Center (AHEC), the University

of Hawai'i Department of Family Medicine, the JABSOM Office of Medical Education, other existing Title VII programs, and the model education programs already in place that could be used as guides for smooth implementation. Due to its low cost, high effectiveness, lack of need for regulatory overhaul, and ease of implementation, this policy option is politically feasible. While these changes may not provide an immediate resolution of Hawai'i's physician shortages, they are likely to create cost-effective and sustainable solutions for the health care needs of this state.

## Conflict of Interest

None of the authors report any conflict of interest.

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# Migration Analysis of Physicians Practicing in Hawai'i from 2009-2011

Laura D. Stephens BA; Kelley M. Withy MD, PhD; and C. Philip Racs MUSA

## Abstract

**Background:** Hawai'i suffers a 20% shortage of physicians. Examining physician migration patterns into and out of Hawai'i may better inform physician recruitment and retention techniques.

**Methods:** 2009-2011 practice location data on all non-military, practicing physicians in Hawai'i were compiled in a database maintained by the University of Hawai'i John A Burns School of Medicine, Area Health Education Center (AHEC). Medical school attended was extracted from an AMA Masterfile list. Physicians were contacted or searched online to ascertain practice location as of September 2011.

**Results:** Currently 3,187 physicians actively practice in Hawai'i; 2,707 (84.9%) trained at a total of 136 US medical schools. Nearly half of all US-trained physicians attended medical school in Hawai'i, California, New York, Illinois, or Pennsylvania. International medical graduates represented 191 medical schools from 67 distinct countries, primarily in the Philippines (23.1%). From 2009-2011, 238 physicians retired from clinical activity, and 329 physicians left Hawai'i to practice in other locations. California received the largest portion of Hawai'i's former physicians (26.4%). Only 15.5% of physicians returned to the state where they attended medical school.

**Discussion:** Medical schools with some of the most alumni practicing in Hawai'i (eg, Creighton, UCLA, Georgetown) all have active Hawai'i student clubs, suggesting a target for recruitment efforts. Physician emigration cannot be fully explained by geography of a physician's medical school alma mater. Analysis of physician residency locations and exit surveys of physicians leaving Hawai'i are recommended for future study.

## Background

Hawai'i currently has a shortage of 600 physicians, or 20% of the total physician workforce.<sup>1</sup> A growing and aging patient population, coupled with the fifth oldest physician workforce in the United States,<sup>2</sup> makes Hawai'i's physician shortfall poised to worsen. Without significant changes in the medical delivery system, the effectiveness of physician recruitment and retention and/or the number of physicians trained in-state, Hawai'i will face an estimated shortfall of 1,600 physicians—more than 60% of the current workforce—by the year 2020.<sup>1</sup>

The John A. Burns School of Medicine (JABSOM) Hawai'i/Pacific Basin Area Health Education Center (AHEC) is working to support the state's efforts to optimize physician recruitment and retention.<sup>3,4</sup> These efforts are far from straightforward, as there are many determinants of a physician's selection of his or her practice location.<sup>1,4-9</sup> Prior research has indicated that the site of a physician's residency is the most important variable in predicting the physician's first practice location.<sup>7</sup> Moreover, a significant proportion of physicians stay in the same area and state where they first set up their practice.<sup>10</sup>

These principles have not fully materialized for Hawai'i, however, perhaps because of its unique cultural, geographic, and practice settings.<sup>1,4,6</sup> While Hawai'i has the highest retention of physicians who completed both medical school and residency in-state, it ranks in the bottom quintile of states for retention

of physicians who completed only their residency in-state.<sup>2</sup> Researchers have used this data to promote increased numbers of JABSOM students,<sup>1,4</sup> as well as support the Waianae campus of the A.T. Still University of Osteopathic Medicine in Arizona, whose inaugural class graduated in May 2011.<sup>11</sup> Additionally, AHEC researchers have begun to note the physicians who come to practice in Hawai'i and those who leave, which may better inform physician recruitment and retention techniques. With the objective to identify physician migration patterns into and out of Hawai'i, the following study was undertaken.

## Methods

This study examined data from AHEC's secure database of all health care workers actively practicing in Hawai'i, including those in private practice. The list was generated in 2009 and 2010 from the Hawai'i Board of Medical Examiners' (HBME) license renewal data. During the renewal process, physicians could also volunteer information about their specialty and practice location in an AHEC-designed survey. Only non-military allopathic and osteopathic physicians were included in this study. Resident physicians and other health care professionals (eg, physician assistants and nurse practitioners) were excluded.

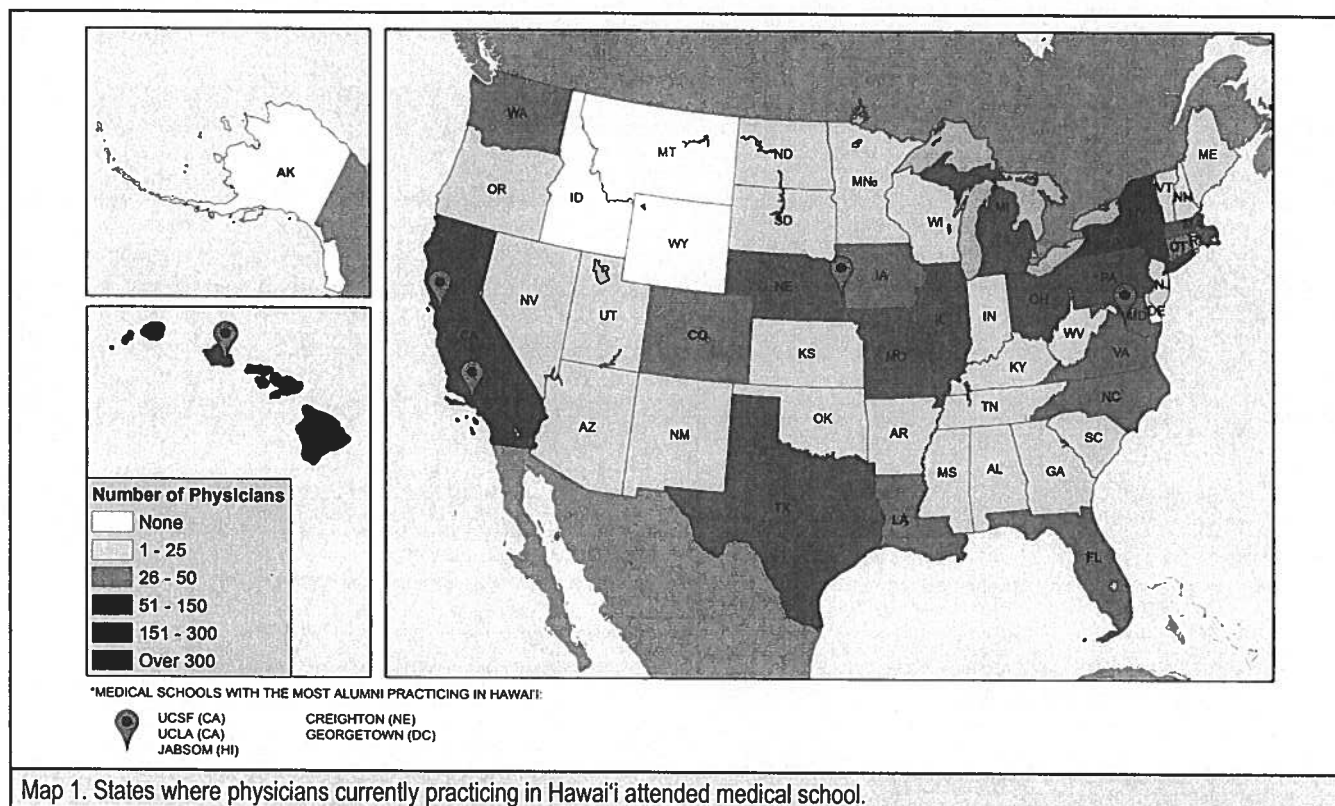
The medical schools at which the database's physicians trained were electronically retrieved from the 2008 American Medical Association Masterfile. Not all licensed physicians are captured in the Masterfile,<sup>12</sup> including a small portion of osteopathic physicians in this study and women whose surnames changed since graduation. In these cases, physicians were contacted by telephone at their listed practice locations and/or they were researched on the Internet. Because websites listing physicians' background information varied in how recently they were updated, search data were triangulated among multiple sites (eg, hospital directories, health insurance lists of network providers, and third-party physician evaluation websites). Internet searches and telephone calls were employed to ascertain each physician's practice location as of September 2011. Physicians whose location could not be verified either in Hawai'i or elsewhere were categorized as "unknown."

## Results

As of September 2011, there were 3,187 physicians actively practicing in Hawai'i. Of these, 2,707 (84.9%) trained at 136 distinct US medical schools, 2,615 (96.5%) of whom attended one of 119 represented allopathic institutions, and 92 (3.4%) attended one of 17 represented osteopathic institutions (Table 1). Every state with a medical school was represented, as well as the District of Columbia and Puerto Rico (Map 1). Alaska, Idaho, Montana, and Wyoming are not represented because they

Table 1. Physicians currently practicing in Hawai'i.

	Number of physicians	Percent
Total physicians practicing in Hawai'i	3,187	-
US-trained physicians	2,707	84.9
Allopathic physicians	2,615	82.1
Osteopathic physicians	92	2.9
Internationally-trained physicians	480	15.1



Map 1. States where physicians currently practicing in Hawai'i attended medical school.

participate in the Washington, Wyoming, Alaska, Montana, Idaho regional medical education program, which is partnered with the University of Washington School of Medicine.<sup>13</sup> Delaware, too, has no in-state medical school but participates in the Delaware Health Sciences Alliance with Thomas Jefferson-Jefferson Medical College in Pennsylvania.<sup>14</sup>

The state of Hawai'i trained the most physicians (Table 2), with its graduates from the University of Hawai'i John A. Burns School of Medicine (JABSOM) representing nearly one-third of all US-trained physicians and over 20% of all physicians practicing in Hawai'i (Table 3). California had the second-largest representation of physicians trained at its medical schools (7.7% of all physicians), followed by New York with its medical graduates representing 5.1% of all practicing physicians in Hawai'i. Nearly 49% of all physicians practicing in Hawai'i trained at medical schools in just five states (Hawai'i, California, New York, Illinois, and Pennsylvania); over one-third of them trained at just five US medical schools (JABSOM, Creighton,

University of California Los Angeles, University of California San Francisco, and Georgetown).

A total of 480 physicians (15.1%) graduated from international medical schools (Table 1). They trained at 191 medical schools from 67 distinct countries. The plurality of internationally trained physicians (23.1%) attended medical school in the Philippines (Table 4), frequently at the University of Santo Tomas in Manila. The physicians trained in either the Philippines, Canada, or the Caribbean composed over 47% of all international medical graduates practicing in Hawai'i.

Between 2009 and 2011, a total of 238 physicians from the AHEC database retired from medicine or transitioned to non-clinical activities and 329 physicians left Hawai'i to practice in other locations (Table 5). Among the physicians who left to practice elsewhere, 10.0% were osteopathic physicians and 14.0% were international medical graduates. Physicians defected to a total of 43 other states/US territories and 4 foreign countries (Map 2). California received the largest portion of

**Table 2. States and US institutions where the most physicians actively practicing in Hawai'i attended medical school.**

Rank*	State	Number of physicians practicing in Hawai'i who attended medical school in each state	Percent of US-trained physicians practicing in Hawai'i (Total: 2,707)	Percent of all physicians practicing in Hawai'i (Total: 3,187)
1	Hawai'i	857	31.7	26.9
2	California	300	11.1	9.4
3	New York	164	6.1	5.1
4	Illinois	126	4.7	4.0
5	Pennsylvania	110	4.1	3.5

\*Rank among the 47 US states and territories with medical schools represented in this study.

**Table 3. US medical schools where the most physicians actively practicing in Hawai'i trained.**

Rank*	Medical School (State/US territory)	Number of physicians practicing in Hawai'i who attended medical school in each state	Percent of US-trained physicians practicing in Hawai'i (Total: 2,707)	Percent of all physicians practicing in Hawai'i (Total: 3,187)
1	John A. Burns School of Medicine, University of Hawai'i (Hawai'i)	857	31.7	26.9
2	Creighton (Nebraska)	61	2.3	1.9
3	University of California Los Angeles (California)	56	2.1	1.8
4	University of California San Francisco (California)	54	2.0	1.7
5	Georgetown (District of Columbia)	43	1.6	1.3

\* Rank among the 136 US medical schools represented in this study.

**Table 4. Foreign countries/regions with where the most physicians actively practicing in Hawai'i received their undergraduate medical education.**

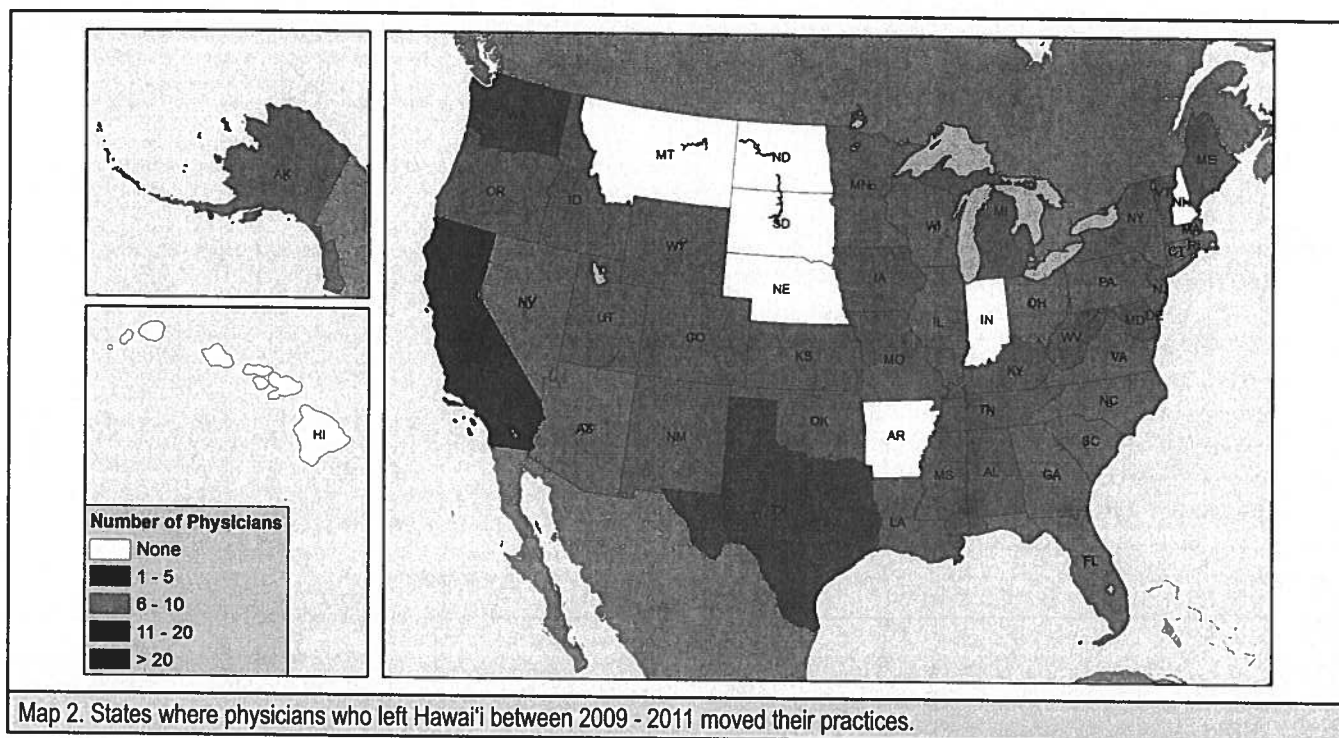
Rank*	Country	Number of physicians practicing in Hawai'i who attended medical school in each country	Percent of internationally-trained physicians practicing in Hawai'i (Total: 480)	Percent of all physicians practicing in Hawai'i (Total: 3,187)	Number of medical schools represented in each country
1	Philippines	111	23.1	3.5	11
2	Caribbean	67	14.0	2.1	12
3	Canada	51	10.6	1.6	12
4	India	29	6.0	0.9	17
5	Taiwan	21	4.4	0.7	6

\* Rank among the 58 countries/regions represented in this study.

**Table 5. Physicians who stopped practicing in Hawai'i between 2009-2011.**

	Physicians	Percent
No longer practicing in Hawai'i	624	-
Practicing outside of Hawai'i	329	52.7
Practicing elsewhere in the United States	298	47.8
Practicing elsewhere in the United States but exact location unknown	25	4.0
Practicing outside of the United States	6	0.1
Retired/non-clinical work	238	38.1
Deceased	14	2.2
Unknown status	43	6.9





Rank*	State/US territory	Number of physicians who moved their practice from Hawai'i to each state/territory	Percent of physicians who moved their practices out of Hawai'i (Total: 329)
1	California	87	26.4
2	Texas	17	5.2
3	Washington, DC	14	4.3
4	New York	9	2.7
5	Nevada	8	2.4

\* Rank among the 43 states/US territories to which Hawaii physicians moved their practices.

Hawai'i's former physicians (26.4%) (Table 6). Only one other state (Texas) received more than 5% of the physicians who left Hawai'i. Only 15.5% of physicians returned to the state where they attended medical school and graduates from California represented 45% of this subset. Among the physicians who left Hawai'i and whose year of medical school graduation was known (317), 22.4% graduated in the 2000s, 30.6% graduated in the 1990s, 24.3% graduated in the 1980s, 16.7% graduated in the 1970s, and the remaining 6.0% graduated prior to 1970.

## Conclusions

Although several other states also face physician shortages,<sup>14</sup> the problem is particularly pronounced in Hawai'i, with its challenges of geographic isolation, cultural complexities, high living costs, and low reimbursement for medical services.<sup>1,3,4,6,15</sup> These factors already contribute to significant disparities in health care access and health outcomes throughout the state.<sup>16-18</sup> As the scarcity of physicians worsens, the areas with the most limited access to health care will be disproportionately affected.<sup>19</sup>

In an effort to mitigate the physician shortage and better inform physician recruitment and retention techniques, this study was undertaken. The data revealed that Hawai'i's physician workforce draws broadly from medical schools across the US and represent nearly 90% of the nation's 134 accredited allopathic medical schools.<sup>20</sup> While this supports the notion that medicine in Hawai'i attracts physicians from diverse backgrounds, it also makes targeted physician recruitment more challenging. The medical schools with some of the most alumni practicing in Hawai'i (ie, Creighton, University of California Los Angeles, University of California San Francisco, and Georgetown) all have active or recently-active Hawai'i student clubs.<sup>21-24</sup> This may indicate larger populations of students from Hawai'i and/or a greater interest in the state. Therefore, this research recommends targeting schools with Hawai'i clubs for recruitment efforts. Additionally, Hawai'i's composition of osteopathic physicians (2.9%) is lower than the national averages (7% and growing),<sup>25</sup> suggesting that this physician workforce may not be maximally recruited or employed in the state. Perhaps recruitment efforts

should also target osteopathic schools that have contributed the most graduates to Hawai'i's physician workforce.

Few trends are apparent when considering the physicians who left Hawai'i to practice elsewhere. Other than California, which gained over a quarter of the physicians departing Hawai'i, no region or alma mater demonstrates notable associations with physician emigration. This is not surprising when considering that many "push" and "pull factors" affect physician migration, both within and between countries.<sup>26,27</sup> The concerning finding is that physicians of all ages are leaving Hawai'i to practice elsewhere; over half of those who left graduated from medical school in the past 20 years. This finding underscores the importance of identifying the measures that will optimize physician retention. Future study recommendations, therefore, include conducting exit surveys of physicians leaving Hawai'i to identify primary reasons for leaving.

There are a number of limitations to this study. Chief among them is that physicians' residency locations, which were unavailable for 41% of the physicians, were not included in this study and may have confounded findings. Future studies would benefit from evaluating physician migration patterns with respect to both medical school and residency locations for the studied physicians. It was neither possible nor practical to directly contact all physicians in the AHEC database. Furthermore, utilizing the 2008 AMA Masterfile vis-à-vis 2009-2010 medical licensure data may not have captured the most recently licensed physicians. As such, this study acknowledges potential error in the counts and percentages of practicing physicians in Hawai'i.

### Conflict of Interest

None of the authors report any conflict of interest.

### Disclosure Statement

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# GIS Residency Footprinting: Analyzing the Impact of Family Medicine Graduate Medical Education in Hawai'i

Allen L. Hixon MD, MA; Lee E. Buenconsejo-Lum MD, FAAFP; and C. Philip Racsa MUSA

## Abstract

**Background:** Access to care for patients in Hawai'i is compromised by a significant primary care workforce shortage. Not only are there not enough primary care providers, they are often not practicing in locations of high need such as rural areas on the neighbor islands or in the Pacific.

**Methods:** This study used geographic information systems (GIS) spatial analysis to look at practice locations for 86 University of Hawai'i Family Medicine and Community Health graduates from 1993 to the 2010. Careful alumni records were verified and entered into the data set using the street address of major employment. Questions to be answered were (1) what percentage of program graduates remain in the state of Hawai'i and (2) what percentage of graduates practice in health professional shortage areas (HPSAs) throughout the United States.

**Results:** This study found that 73 percent of graduates remain and practice in Hawai'i with over 36 percent working in Health Professional Shortage Areas.

**Discussion:** Spatial analysis using GIS residency footprinting may be an important analytic tool to ensure that graduate medical education programs are meeting Hawai'i's health workforce needs.

## Introduction

The University of Hawai'i (UH), John A. Burns School of Medicine, Department of Family Medicine and Community Health has a mission to create family physicians to serve the diverse healthcare needs of underserved areas of Hawai'i and the Pacific. The shortage of physicians in Hawai'i and other areas of the Pacific, specifically in rural and neighbor island settings, has led to a call to expand graduate medical education programs.<sup>1</sup>

Geographic information systems (GIS) are increasingly recognized as a tool for spatial analysis with application to health systems planning.<sup>2</sup> This project analyzed the impact of the University of Hawai'i Family Medicine Residency Program by locating graduate clinical practice sites worldwide. The study attempted to determine the impact on the State of Hawai'i regarding retention of program graduates and percentage practicing in health professional shortage areas.

## Methods

The UH Family Medicine Residency Program has maintained contact with all of its graduates and has a Microsoft Excel database which contains information including: (1) the graduates' year of residency completion; (2) if the graduate meets the HRSA definition of a "medically underrepresented minority" group; (3) practice location and type; (4) designation of the practice in a federally designated health professional shortage area (HPSA), or medically underserved area or population (MUA/P), rural Oahu, neighbor islands of Hawai'i; and (5) whether the graduate is in academic medicine or plays a leadership/directorship role in their practice. The American Academy of Family Physicians database and a Google search

were used to validate the current home and practice location of each graduate. When necessary, emails were sent to the graduates to verify information. ID numbers were assigned to zip codes (or country names for graduates in international settings) and the information was plotted using Environmental Systems Research Institute (ESRI, Redlands, CA) ArcGIS version 9.3.1 GIS software. For the detailed map of Oahu, HPSA designation and number of graduates in each site was overlaid.

## Results

Map 1 shows the global distribution of program graduates (N=86) with the majority (78) remaining in the United States, three in the US Affiliated Pacific, three in the Asian Pacific Rim, and two in Western Europe (Germany).

Map 2 shows the distribution of program graduates throughout the Pacific (N=66) with 63 remaining in Hawai'i and three in the US Affiliated Pacific including one each in the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia (Yap State, and the Territory of American Samoa).

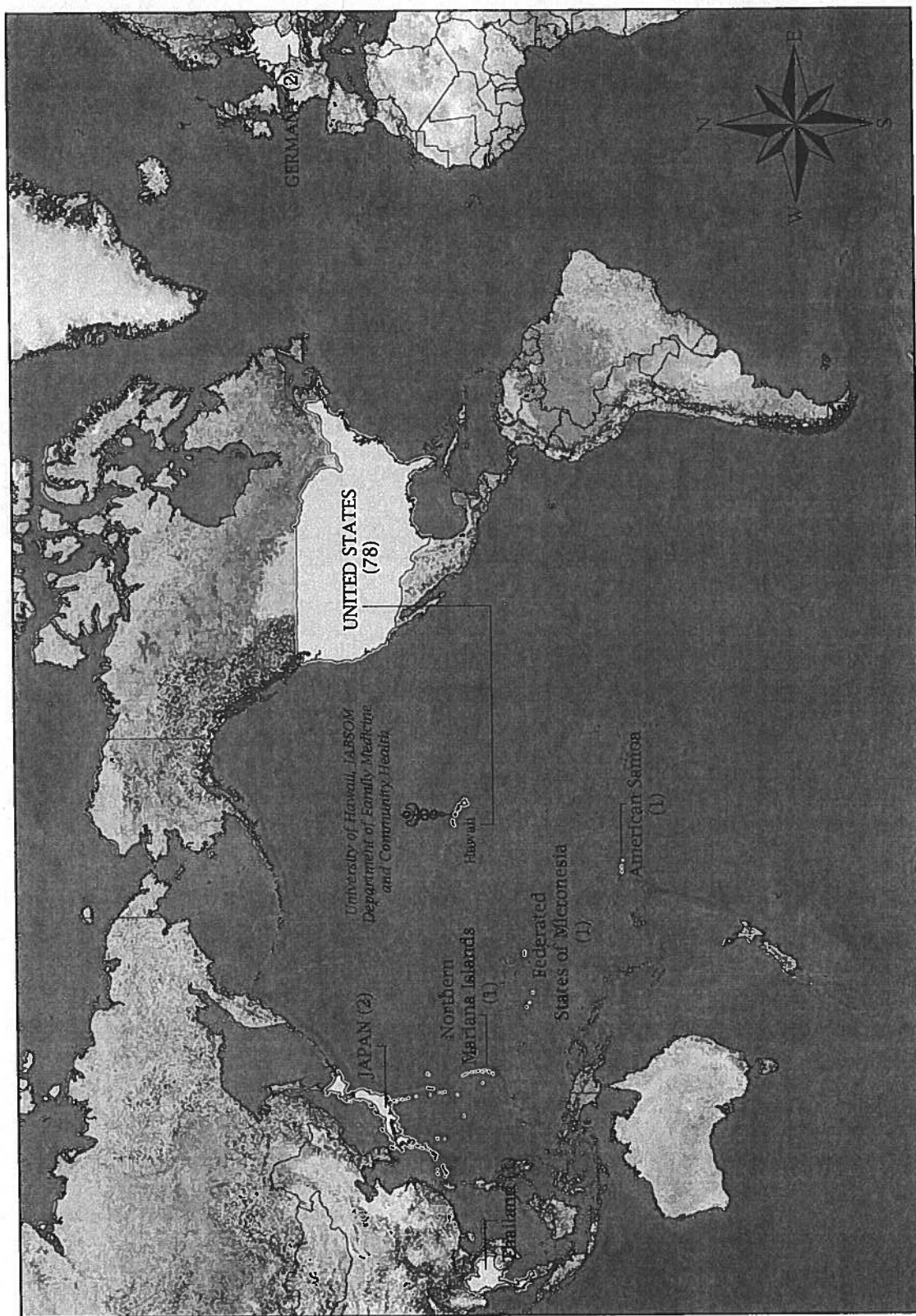
Maps 3 and 4 depict the distribution of graduates across the continental United States by state and county (N=15), and the distribution across the State of Hawai'i by county (N=63) with the majority working on O'ahu.

Map 5 depicts the medically underserved areas on the island of Oahu overlaid with the distribution of family physician practice locations (N=50).

## Discussion

While physician shortage has received a great deal of attention in discussions on improving health in Hawai'i, clearly geographic distribution is an equally vexing problem. The question is not only how many physicians, but also where physicians practice in relation to patient population and needs. This study found that 73 percent of graduates remain and practice in Hawai'i with over 36 percent working in HPSA's. These findings suggest that the UH Family Medicine Residency Program meets its mission of retaining program graduates in Hawai'i and the Pacific and providing physicians to medically underserved areas of the state.

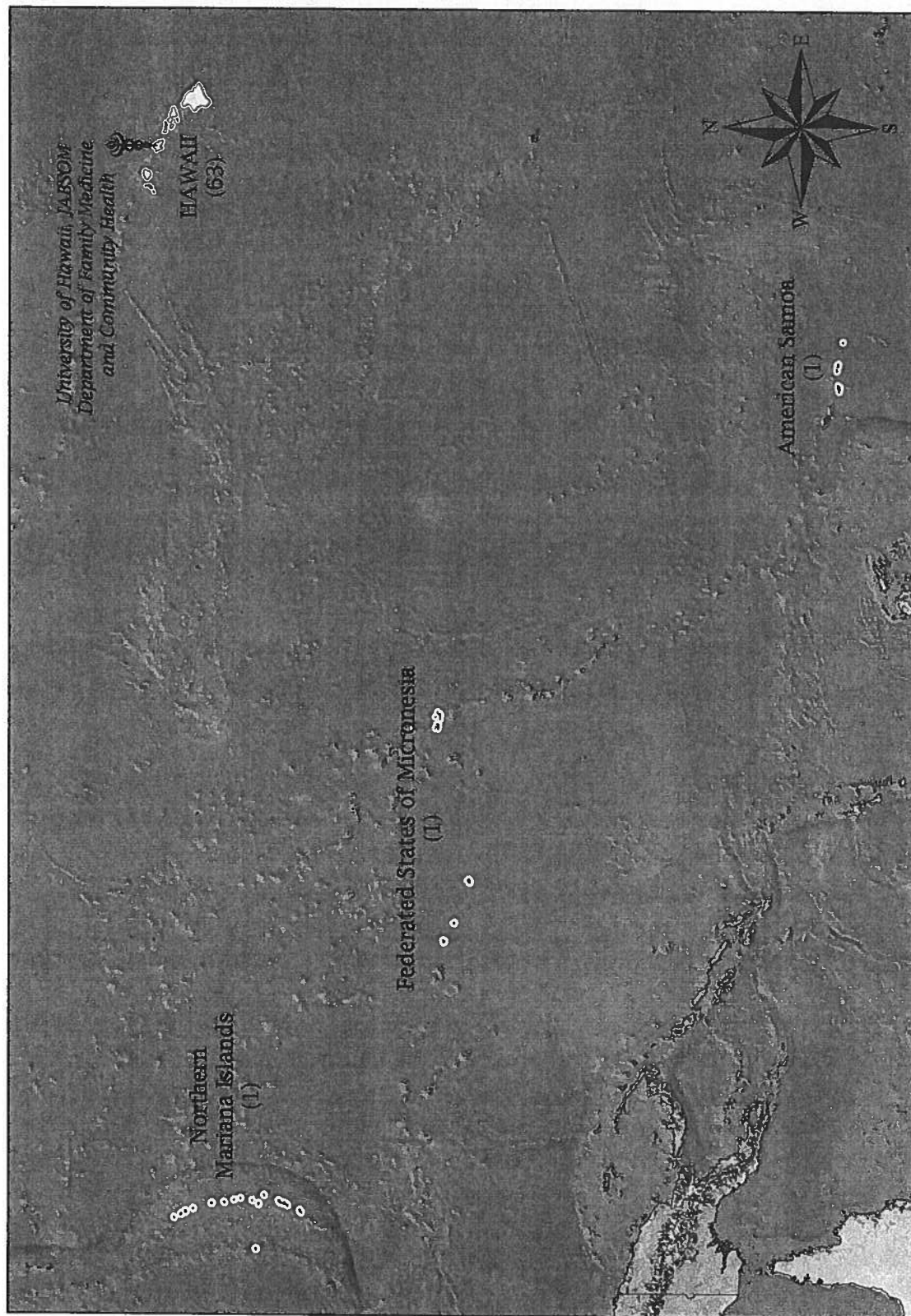
While this project examined a single residency program, other physicians as well as non-physician providers make up the primary care workforce. Understanding the contributions and geographic distribution of all health providers may be useful for health planning. These particular maps fail to depict cultural differences in relation to health seeking behavior. Further mapping projects might identify particular ethnic/cultural groups with disparate health status and link physician capacity in those communities. As the University of Hawai'i and the state



# GLOBAL DISTRIBUTION OF PROGRAM GRADUATES - (n=86)

Source: University of Hawai'i, John A. Burns School of Medicine, Department of Family Medicine and Community Health





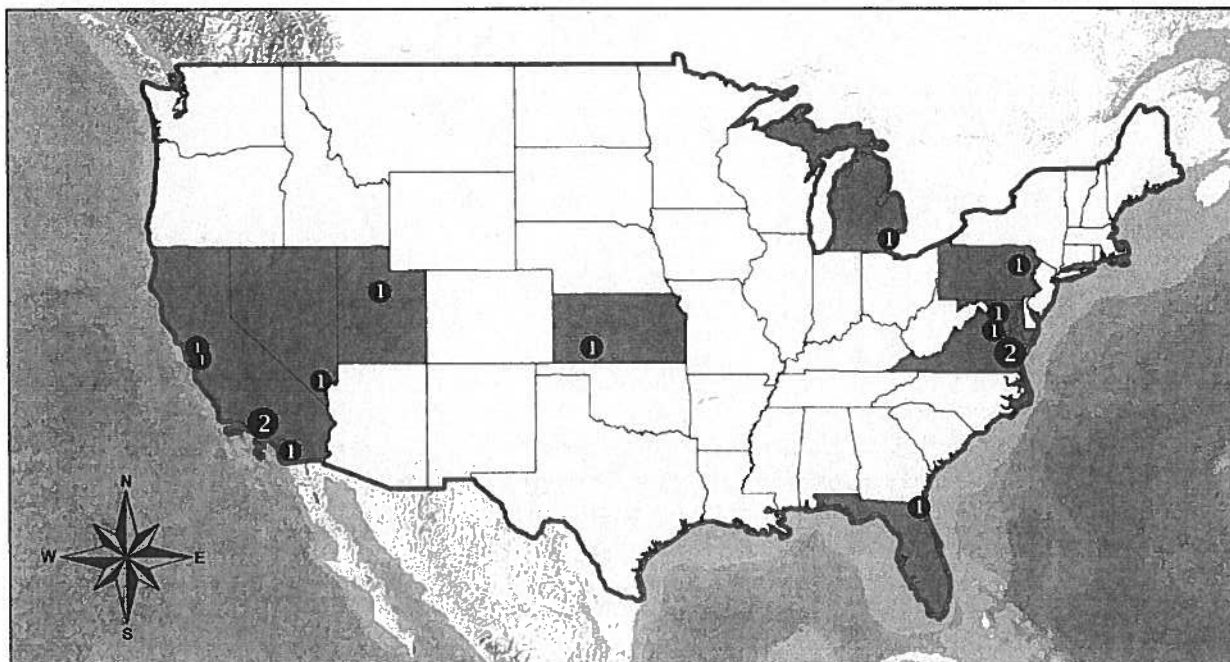
# **DISTRIBUTION OF PROGRAM GRADUATES ACROSS HAWAII AND USAPI - (n=66)**

Source: University of Hawai'i, John A. Burns School of Medicine, Department of Family Medicine and Community Health

Map 2. Distribution of UH Family Medicine Residency Graduates across Hawaii and USAPI

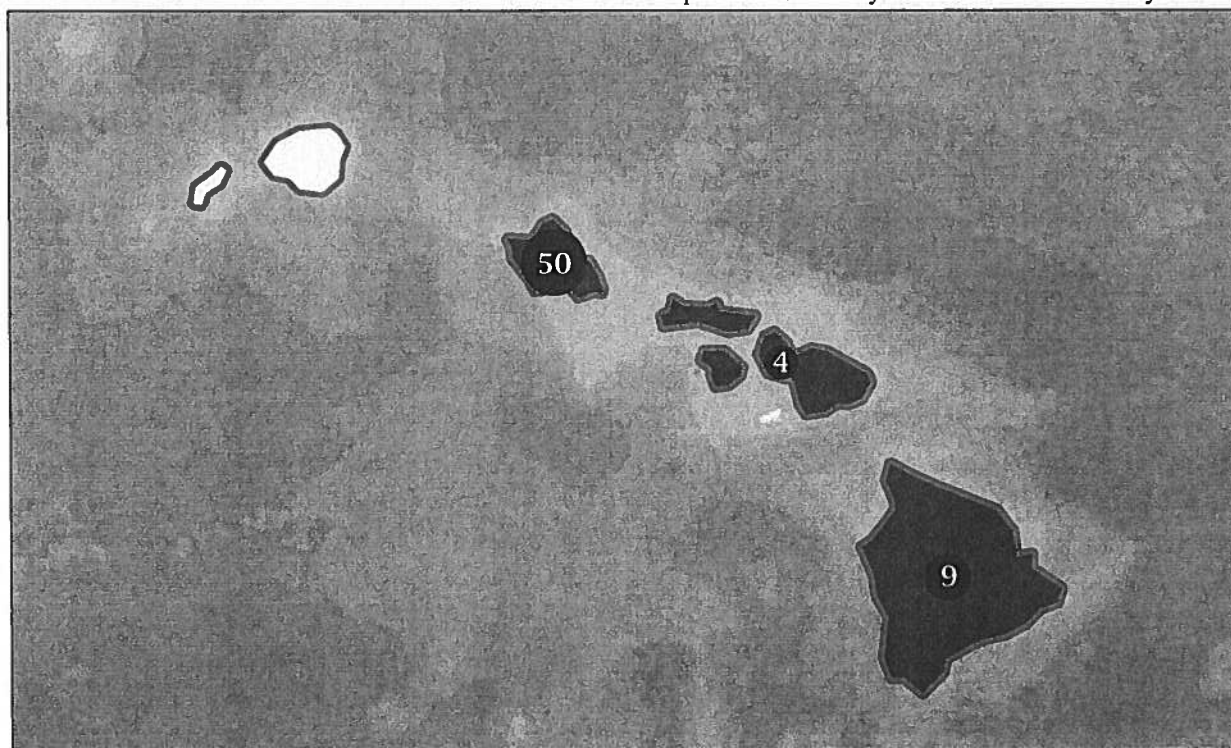
## DISTRIBUTION OF PROGRAM GRADUATES - Contiguous United States (n=15)

Source: University of Hawai'i, John A. Burns School of Medicine,  
Department of Family Medicine and Community Health



## DISTRIBUTION OF PROGRAM GRADUATES - State of Hawai'i (n=63)

Source: University of Hawai'i, John A. Burns School of Medicine,  
Department of Family Medicine and Community Health



Maps 3 & 4. Distribution of UH Family Medicine Residency Graduates across the United States (grouped by county)

*Continues on p. 39*



# The New PCMH Does Not Have To Be A Painful Challenge For Every Physician

"PATIENT-CENTER MEDICAL HOME" or PCMH has, at its core, your patients' relationship with you, their primary care physician. It is a team-based model of health care lead by their medical care professional.

Your PCMH team provides continuous and coordinated care for patients throughout their lifetime to maximize their best health outcomes. PCMH was developed by primary care physicians and is used by large employers to encourage comprehensive healthcare to improve patient outcomes and lower medical costs.

Your office may already have some components of a PCMH as your patient's "Medical Home," providing for all of your patients health care needs or appropriately arranging for care with other specialists as necessary. As a "cradle-to-grave" care provider, your PCMH covers preventive services, treatment of acute and chronic illnesses (such as asthma, hypertension or heart disease), and assistance with end-of-life issues.

For optimal effectiveness to your patient, PCMH features:

## **Better Information**

Use of state-of-the-art information technology and online communication to allows you to centralize and prioritize a patient's medical data in one place for quick access and to collaborate with other medical professionals to provide high levels of quality care, safety and communication.

## **Better Access**

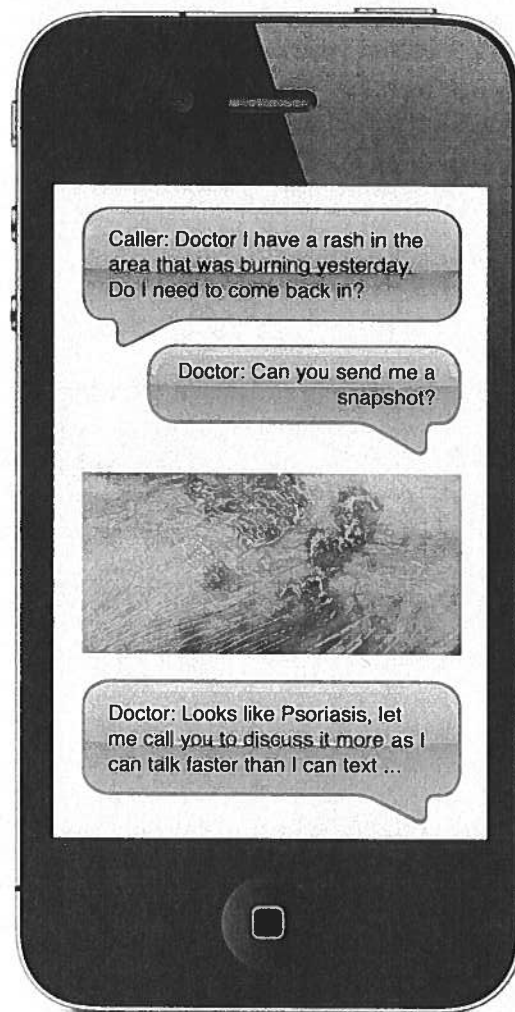
Improved monitoring of a patient's preventive, acute and chronic care with a "home base" for patients to go to as a one-stop shop. Part of the team includes using non-traditional Urgent Care to refer patients after hours and weekends. Neither you or the patient wants to go to the ER (time, increased costs including co-pay, quality) It's better the patient sees a colleague you know and recommend, who communicates regularly with you and gives you feed back. If patients have gaps in their preventive care these providers help your quality scores by ordering the tests on your behalf and send the patients back to you for follow up. Their comprehensive medical records are now shared and in one place and easily accessible to you.

## **Better Health (For your patients and their wallets!)**

Better cared-for patients and lowered costs for health care.

Having a central source of preventive and primary care has been shown to lower individual costs, emergency room use, hospital admissions, unnecessary duplications of tests and procedures, less injury and illness, while creating higher patient satisfaction.

**Better Quality of life for you the PCP.** By having a fully engaged team (including the patient!) you can focus your care and time on patients that really need it, not just those that show up



## **Rxting**

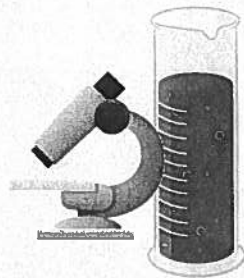
### **Rx-ting [ahr-ekst-ing]**

**Definition:** Getting medication or medical care using your cell phone.

# THE ROAD TO PATIENT CENTERED MEDICAL HOME

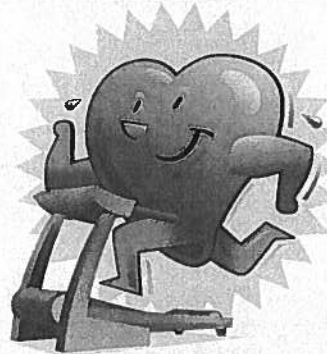
## TRADITIONAL FEE FOR SERVICE

Physical  
Exam = \$



Labs = \$

Tests and  
Procedures = \$\$\$



Discounted FFS

PATIENT IS A REVENUE CENTER WHETHER SICK OR HEALTHY.

## “CAGED” ACRONYM TO HELP IDENTIFY WHEN “CHANGE FATIGUE” HAS SET IN AS YOU TRY TO TRANSFORM INTO A PCMH

- Do you ever feel a need to **CUTDOWN** on your work?
- Have insurers or others **ANNOYED** you about PCMH?
- Do you feel **GUILTY** when you take time away from work?
- Do you find it **EAR-ITATING** when people tell you how to transform your office into a PCMH? (or make silly acronyms)
- Do you feel **DEFEATED** when you look at your quality scores ( or checking account) despite trying to be a better PCMH?

The changes to the workflow, the training, the continuous improvement projects and the ever increasing quality metrics that are being piled on providers, on top of taking care of sicker and more complicated patients in a fragmented healthcare environment are overwhelming. Only practicing providers understand the difficulty in keeping up with not just the medicine but the management and new rules that you are being asked to play by and be measured against. If you feel trapped or CAGED in your practice, you are not alone. We are here to help you get back the joy and freedom you felt when you first opened your office.



## HMSA'S PCMH VISION

### What they pay for:

FFS (Fee For Service) - same discounted- frozen fee structure

PMPM (per member per month)

- \$2 -3 each member population management fee
- \$2 to start and up to \$3 if you get meaningful use
- Rolled into your regular payments

P4Q (Pay for Quality)

- Up to \$4 each member, paid quarterly - but averaged over a year
- HEDIS (Health Effectiveness Data Information Set)
- 76 performance measures insurers are graded on -but do they really measure physician Quality?

PO (Physician Organizations)

- 0.50 pmpm and up to 0.40 as function of P4Q scores=0.90 pmpm/provider
- Help to educate and provide leadership in transformation to PCMH

### What they don't pay for:

- ER Diversion (Urgent Care, Telemedicine)
- Hospital Readmissions -likely to be shared with Hospitals and ACOs not independent docs
- Global fee, Capitation

## WHAT INSURERS ARE NOT SHARING

\$1000 ER visit -\$100 office visit =\$900 to be shared

## URGENT CARE SOLUTION

The Medical Corner has always been a non-traditional Urgent Care and since 2011, an NCQA recognized PCMH. We are a medical home just like yours, a place where families needing care are always welcome and always will be. Like you, we are in the trenches, on call 24/7, staying late, working weekends and caring for patients and their families. We strive to be a reliable resource for offices to outsource workers' comp, no fault claims and other types of care. We even act as an extension of your office, matching your referral patterns and practice style, maintaining you as the primary resource for patient care. We always send your patients back to you.

We are attempting to build a new organization of committed providers like you who will play by the rules but at the same time want to be heard on the issues that affect us and the way we care for patients. We recognize that care coordination can only occur as a result of physician efforts. We want to help you build your medical home across a network of like-minded healthcare providers. There are significant efficiencies that can be achieved by partnering together and offering better continuity of care, both in your office and across your PCMH team.

We have expended considerable time and resources with HMSA and other organizations trying to make this particular healthcare reform work. If you are a provider wishing to impact the status quo or are frustrated with the future that has been laid out for you, you do not have to do it alone. Join us and other providers in a quest for better care, clinical integration, comfort, education, and fellowship, and let's start building a healthier Hawaii together.

Thank You,  
Robert Sussman MD

## CURRENT BARRIERS

Too insurer driven?

Fee For Service - Docs do not recognize that "loss aversion" is partially responsible for their resistance to change

Cost of office transformation - workflow, EMR, getting to meaningful use, staff and patient education is simply too high. Quality of life issues .

- Population Management - not risk stratified (same \$2 for healthy vs. sick pts) - need to be paid more to "manage" to keep high risk patient out of the hospital or ER.
- Pay For Quality - measuring versus managing the right metrics? Measuring HgbA1C is not same as managing it.
- Patients not engaged (non complaint patients who refuse testing or vaccinations).
- Employers have no mechanisms or incentives to try to lower cost by enforcing healthy options or Quality metrics on employees.
- Shared Saving - unwillingness to share data or money (ER diversion, Re-admission).
- Lack of Education, Infrastructure, Organization, Goal alignment, and Trust.



## PRACTICAL WORKSHOP

- Hands on training customized to your practice needs.
- Intensive enough to get providers and their staff up to speed by the end of the day.
- You leave with tools that you can begin to use immediately.
- CME
- Fun! Yes, Fun!
- Future of PCMH - based on local trend analysis and constraints.
- Practicing Provider based and Driven.

"The secret to the care of  
the patient is caring for the patient"  
- Francis Peabody





# BUDGET FOR PCMH

## ASSUMPTIONS

Assuming you have a typical PCMH you will have approximately 1,000 HMSA patients. If you distribute their visits over the course of a year, with perhaps half of them coming in only once and the other half coming in 2-3 times per year you get the following numbers:

$(1000 \text{ visits} \times 74.90 \text{ HMSA Established Patient Fee}) + (500 \text{ sick visits} \times 74.90) + (500 \text{ sick visits w/ lab testing} \times 100.00) = \$162,350/\text{year}$

Don't forget about the PCMH payments!

$(1000 \text{ patients} \times \$2 \text{ per member per month}) = \$24,000/\text{year}$

$\$162,350 + \$24,000 = \$186,350/12 \text{ mos} = \$15,529.17/\text{month}$

Keep in mind, you still have your other insured patients who aren't HMSA members. The objective here is not to say that PCMH isn't financially viable, but merely to illustrate that with all the added work that goes into becoming a PCMH you are going to need to see more patients and ideally focus on those patients with the same level of detail required for PCMH. This could be a lot easier if you are part of a clinically integrated team of healthcare providers. Also, we have not included all costs eg. Health Care cost for staff, retirement etc.

INCOME		\$15,529.17	
EXPENSES (MONTHLY RECURRING COSTS)	PRICE	YOUR NUMBERS	
RENT	(\$5,000.00)		
ELECTRIC	(\$700.00)		
PHONE	(\$100.00)		
PARKING	(\$250.00)		
STAFF SALARIES (INCLUDING CARE MANAGER)	(\$8,500.00)		
SUPPLIES	(\$1,000.00)		
EQUIPMENT LEASE	(\$500.00)		
LAB COSTS	(\$500.00)		
INTERNET	(\$500.00)		
EMR	(\$500.00)		
IT SUPPORT	(\$500.00)		
MARKETING	(\$250.00)		
BILLING COMPANY @ 6%	(\$931.75)		
MALPRACTICE	(\$1,000.00)		
WHAT'S LEFT FOR YOU?	(\$4,702.58)		

## Find out how much you will benefit. Contact us today for a free situation audit.

To learn how we can help PCP physicians broaden their scope, coordinate care, and view their specialty in a more modern, expansive and relevant light, we offer a hands-on workshop that will include: 1) sharing of PCMH visions 2) rethinking of patient encounters and daily workflows 3) establish and maintain PCMH neighborhoods using more meaningful referral relationships 4) integration of registries into your practice 5) include disease management principals into every office visit every time... 8) group visits with relevant non profits organization for win win win solutions, 9) communicate more effectively and 10) improve the quality of your care AND your quality of life

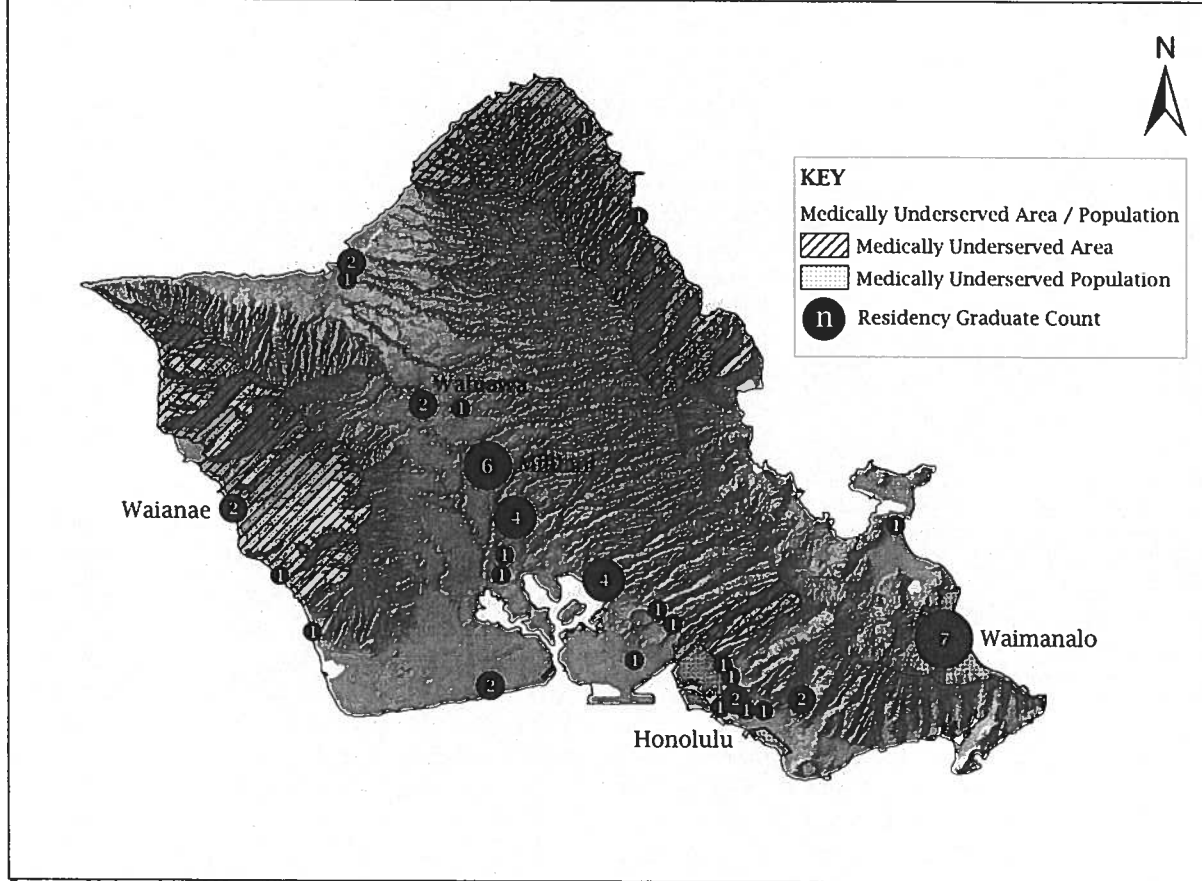


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STATE OF HAWAII: City and County of Honolulu - Family Medicine Residency Graduate Practice Location



Sources: University of Hawai'i, John A. Burns School of Medicine, Department of Family Medicine and Community Health, US Department of Health Services (HRSA)

Map 5. Distribution of UH Family Medicine Residency Graduates across O'ahu (grouped by practice address)

go forward to plan the health workforce of the future, understanding the ability of graduate medical education programs to retain their graduates and place them in areas of high need will be important. This residency footprinting project suggests that local training is an important strategy to retain physicians in communities of need and should be expanded. Spatial analysis using GIS residency footprinting may be an important analytic tool for guiding this process.

### Conflict of Interest

None of the authors identify any conflict of interest.

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# Demographics, Clinical Practice Patterns, and Concerns of Physiatrists in the State of Hawai'i: 2011

Myles M. Mitsunaga MSII; David X. Cifu MD; Cedric K. Akau MD; Gary A. Okamoto MD; Kelley Withy MD, PhD; Joseph J. Chen MD; and Henry L. Lew MD, PhD

## Abstract

**Background:** Although the State of Hawai'i overall may have an adequate number of physiatrists, there are physiatrist shortages on the neighbor islands. This study describes the demographics, practice type, and most important concerns of current practicing physiatrists within the state of Hawai'i.

**Methods:** A phone survey was conducted of 44 actively practicing Hawai'i physiatrists. Eligible participants were members of either the American Academy of Physical Medicine and Rehabilitation (AAPMR) or the Hawai'i Society of Physical Medicine and Rehabilitation.

**Results:** Thirty-six of 44 local physiatrists responded to the survey. Thirty-two of the thirty-six (89%) respondents were currently practicing on O'ahu, nine (25% of respondents) completed medical school at University of Hawai'i, 19 (58% of respondents) were not planning on recruiting in their practice for at least five years and the physiatrists' most common concerns included poor reimbursement, practice management problems, and high workload.

**Discussion:** Further recruitment efforts should be tailored to attracting physiatrists to our neighbor islands. Increasing reimbursement, addressing hospital administration issues, developing a musculoskeletal fellowship program, and increasing incentives to practice on neighbor islands are proposed changes that would directly address the concerns of Hawai'i's physiatrists.

## Keywords

Physical Medicine, Physiatry, Hawai'i, Demographics

## Background

PM&R (physical medicine and rehabilitation) physicians, or physiatrists, are medical doctors board certified in the medical specialty of physical medicine and rehabilitation. There are currently 77 Accreditation Council for Graduate Medicine (ACGME)-accredited PM&R residency programs and over 8,000 board certified physiatrists.<sup>1,2</sup> Physiatrists are focused on diagnosing and treating musculoskeletal and neurological disabilities resulting from disease or injury. They treat a variety of conditions, from brain and spinal cord injuries, osteoarthritis, and back pain, to stroke and burn injuries. With the goal of restoring or preserving maximum function lost through injury or illness, physiatrists work in a wide variety of settings.

The medical specialty of PM&R has exhibited unequal growth throughout the country, with some parts of the country having many physiatrists per capita and others having significantly fewer. For example, in 2009 the District of Columbia had one physiatrist per 16,207 people, the highest number of physiatrists per capita. In contrast, Wyoming had only one physiatrist per 90,712 people.<sup>3</sup> In 2009, Hawai'i was ranked fifteenth with one physiatrist per 30,120 people.<sup>3</sup>

This lopsided trend of varying number of physiatrists per capita within the country is evident even within the different islands of Hawai'i. As of December 2010, there was a supply of 1.3 physiatrists (and a shortage of 3.7 physiatrists) working on the island of Hawai'i, a supply of 1.0 physiatrist (and a shortage of

1.0 physiatrist) working on the island of Kaua'i, and a supply of 3.3 physiatrists (and a shortage of 0.7 physiatrists) working on the island of Maui. However, on the most populated island of O'ahu, home to the state capitol of Honolulu, there was a supply of 32 physiatrists, while the demand was only 25 physiatrists.<sup>4</sup> Thus, although the islands of Hawai'i, Kaua'i and Maui have physiatrist shortages, O'ahu has seven physiatrists more than current demand, bringing the overall total supply of physiatrists in the state of Hawai'i higher than what is theoretically needed. The purpose of this study is to describe the demographics of physiatrists in the state of Hawai'i, characterize their clinical practice patterns and identify their most important concerns.

## Methods

This study was approved by the University of Hawai'i Institutional Review Board and oral informed consent was obtained. Eligible phone survey participants included all 44 non-retired Hawai'i physiatrists in 2011. Eligible participants were members of either the AAPMR or the Hawai'i Society of PM&R, and each had working telephone numbers. Hawai'i Society of PM&R meets quarterly and is a voluntary tax-exempt networking organization comprised of physiatrists licensed to practice medicine in the State of Hawai'i. Survey questions were modified from Chen's 2006 study regarding the state of PM&R in Iowa.<sup>5</sup> Questions explored include physiatrist demographics, their practice setting and hours, patient demographics, clinical focus and whether participants felt there was a current shortage of physiatrists in the United States and in Hawai'i. If the physician did not know the patient demographics, they were asked to estimate. The participants were also asked to rank their top five out of twelve concerns: on-call responsibilities, hospital administrative issues, practice management, continuing medical education (CME), high workload, low workload, recruiting new physiatrists, retention of current physiatrists, costs of malpractice insurance, reimbursement, recertification, and other. These concerns were given five points if ranked number one, four points if ranked number two, three points if ranked number three, two points if ranked number four and one point if ranked number five. If no particular ranking was specified by the respondent, three points were given for each concern.

## Results

Thirty-six phone surveys were completed, yielding an 82% response rate. The results are summarized in Table 1. Thirty-two physiatrists were currently practicing on the island of O'ahu, three were on Maui and one was practicing on Kaua'i. Fourteen worked in multispecialty groups, 11 were solo practitioners, six



were from single specialty groups, three were from hospital practices, and one was from administration. The average length of time lived in Hawai'i was  $19 \pm 14$  years (range 1-48), and the overall time as a practicing physiatrist was  $15 \pm 11$  years (range 0.08-36). The average age of the responding physiatrists was  $48 \pm 11$  years of age (range 31-69). Physiatrists reported working on an average of  $48 \pm 12$  hours per week. Their practices were on average 18 percent inpatient and 82 percent outpatient. Seventy-five percent of respondents spent 90% to 100% of their time only on outpatient care, while 11% of respondents spent 90%-100% of their time only on inpatient care. Twenty-five respondents treated primarily musculoskeletal conditions, followed by neurological/spinal cord injuries (five respondents), pain disorders (two respondents), rheumatological/arthritis disorders (two respondents), and general medical conditions (one respondent).

The physiatrists interviewed performed an average of 17 new outpatient consultations, four inpatient consultations, 47 outpatient follow-up visits, five EMGS, four spinal injections, ten peripheral injections, and two manipulation procedures per week. They also spent an average of eight hours performing administrative work and supervised or taught two medical students, residents, or fellows per year. The average time before seeing a scheduled new patient was  $14.7 \pm 14.2$  days (range 0.0-60.0).

Estimated payer mix included, on average, 36 percent from commercial insurance, 33 percent of patients from Medicare, 11 percent from Medicaid/Quest, two percent self-pay, and 18 percent from other payers, including Hawai'i Workers' Compensation, No-fault, and Tricare.

Seventy-three percent of patients were referred to the responding physiatrist by other physicians, 14 percent by self-referral, two percent by physical or occupational therapists, and 11 percent from other sources, including worker's compensation carriers, no-fault insurance, attorneys, or non-physician providers.

Eighty-six percent of respondents were graduates of allopathic medical schools, while 14 percent were graduates of osteopathic medical schools. Nine respondents graduated from University of Hawai'i John A. Burns School of Medicine (JABSOM), 11 graduated from medical schools in the Midwest, four were from West Coast medical schools, three were from Southern US medical schools, six were from East Coast medical schools, and three were International Medical Graduates. For PM&R residency, 16 attended schools on the West Coast, 12 attended schools on the East Coast, six attended schools in the Midwest, and two attended schools in the Southern United States.

When asked to rank their top five out of a list of twelve possible concerns, the greatest concerns included poor reimbursement (114 points), practice management problems (106 points), high workload (51 points), hospital administrative issues (44 points), recertification requirements (32 points), continuing medical education (27 points), on-call responsibilities (23 points), other concerns (23 points), high malpractice costs (21 points), low workload (11 points), difficulty recruiting (8 points), and retention of current physiatrists (8 points). Other concerns included "inconsistency in workload," "being an employee rather than

an employer," "a healthcare system based on capitalism," "a general ignorance of what physiatrists do," "requiring prior authorization for procedures," and "running a business."

When asked if they were currently recruiting additional physiatrists, only one said yes, 13 stated they planned on recruiting within five years, and 19 did not plan on recruiting for at least five years. When asked whether PM&R was a specialty in shortage in the United States, 21 said yes, while eight said no. When asked whether PM&R was a specialty in shortage in Hawai'i, 17 said yes, while 16 said no.

## Discussion

Currently, the state of Hawai'i is short 669 physicians.<sup>4</sup> Certain islands are in need of physicians more than others. For example, O'ahu is short 331 physicians, while the island of Hawai'i is short 174 physicians.<sup>4</sup> Medical specialties such as neurosurgery, cardiology, infectious disease, and general surgery, in particular, are in need. Neurosurgeons are needed on the islands of Hawai'i, Kaua'i, Maui, and O'ahu. The field of PM&R is unique in that on the islands of Hawai'i, Kaua'i, and Maui there is a current shortage of 3.7, 1.0, and 0.7 working physiatrists, respectively. However, there are seven more physiatrists than the current demand on the island of O'ahu.<sup>4</sup>

Seventy-two percent (26 of 36) of respondents in our study were under 55 years of age. On the other hand, 25% of respondents were older than 55 years of age. It is fortunate that only 25% of Hawai'i's PM&R physicians are over the age of 55, since 41% of all Hawai'i physicians are 55 or older.<sup>4</sup> As physicians 55 or older reach retirement age within the next decade, Hawai'i's PM&R physicians may be less affected, since they are, on average, younger.

Ninety-two percent of respondents were graduates of United States medical schools. Nine out of 36 (25%) respondents were JABSOM graduates. In Iowa, retention of Iowa-trained physiatrists has been higher and Chen 2006 reported seven out of 15 (47%) of responding Iowa physiatrists lived in Iowa during training.<sup>5</sup> Previous data show that over one half of all JABSOM graduates practice in Hawai'i and more than 85% of all JABSOM graduates who also complete a residency training program will end up practicing in Hawai'i.<sup>6</sup> Thus, perhaps increasing the training opportunities by expanding the medical school class, recruiting medical students from the neighbor islands, encouraging more rural health care training, increasing reimbursement rates, reducing costs and reducing workload, could all be potential, albeit idealistic, solutions to PM&R shortage problems on the islands of Hawai'i, Kaua'i and Maui.

Hawai'i physiatrists saw an average of 64.2 patients in an outpatient setting, while physiatrists in 1997 saw only 38.7 patients in an office or outpatient clinic.<sup>7</sup> Additionally, Hawai'i physiatrists saw the same number of new patients per week (16.8 in Hawai'i 2011; 16.8 nationwide 1997), with four more days wait for a new patient to be seen (14.7 in Hawai'i 2011; 11.0 nationwide 1997). Hawai'i's population is expected to increase 28% between 2000 and 2030, and the number of Hawai'i resi-

**Table 1. Summary of Hawai'i Physiatrists Survey, 2011**

<b>Survey Respondents/Total</b>	<b>36/44 (82%)</b>	
<b>Demographics</b>		
Multispecialty Group	14	
Solo	11	
Single Specialty Group	6	
Hospital	3	
Administration	1	
Island of primary practice		
O'ahu	32	
Maui	3	
Kaua'i	1	
Average Age (years)	48 ± 11	Range 31-69
Male	26/36	
Time in Hawai'i (years)	19 ± 14	Range 1-48
Time as a physiatrist (years)	15 ± 11	Range 0.08-36
Medical School Training	Hawaii West Coast Midwest South South West South East East Coast International	9 4 11 1 1 1 6 3
PM&R Residency	West Coast East Coast Midwest Southern	16 12 6 2
Average hours worked per week	48 ± 12	Range 15-70
Average hours performing administrative work per week	8 ± 7	Range 0-20
Average time spent on inpatient care	18%	
No. Inpatients/week	4	
Average time spent on outpatient care	82%	
No. New consults/week	17	
Next available new patient appt	14.7 ± 14.2 days	Range 0-60
No. of return patients/week	47	
No. Electrodiagnostic medicine/week	5	
No. Spinal injections/week	4	
No. Peripheral injections/week	10	
No. Osteopathic manipulations/week	2	
Percentage of physiatrists spending 90-100% of their time on outpatient care	75%	
Percentage of physiatrists spending 90-100% of their time on inpatient care	11%	
No. of students/residents/fellows taught/year	2	
What is the primary category of conditions that you treat?	Musculoskeletal Neurological/spinal cord injury Pain disorders Rheumatological/arthritis General medical conditions	25 5 2 2 1

Table 1. Summary of Hawai'i Physiatrists Survey, 2011 (Continued)		
Currently Recruiting?	Yes	1
	No, but plan on recruiting within next 5 years	13
	No, not planning on recruiting for at least 5 years	19
<b>Patient Referral Sources</b>		
Other MD	73%	
Self	14%	
Non-MD provider	11%	
PT or OT	2%	
<b>Payer Mix</b>		
Commercial insurance	36%	
Medicare	33%	
Other/Work Comp/No-fault/Tricare	18%	
Medicaid/Quest	11%	
Self-pay	2%	
<b>Top Concerns of Physiatrists</b>		
1. Poor Reimbursement	114 points	
2. Practice Management Problems	106 points	
3. High Workload	51 points	
4. Hospital Administrative Issues	44 points	
5. Recertification Requirements	32 points	
6. Continuing Medical Education	27 points	
7. On-call Responsibilities	23 points	
8. Other Concerns	23 points	
9. Increasing Malpractice Premiums	21 points	
10. Low Workload	11 points	
11. Recruiting New Physiatrists	8 points	
12. Retention of Current Physiatrists	8 points	
Shortage of PM&R in US?	Yes 21	No 8
Shortage of PM&R in Hawai'i?	Yes 17	No 16

dents older than age 65 is projected to double during this same time period.<sup>8</sup> Thus, Hawai'i's demand for musculoskeletal and rehabilitation care will rise, especially on islands other than O'ahu, where physiatrist shortages are already apparent.

Hawai'i physiatrists spent a lower percentage of their time doing inpatient versus outpatient care as physiatrists did in Iowa in 2003 (18% and 82% Hawai'i 2011; 33%, and 67%, Iowa 2003). Additionally, Hawai'i physiatrists performed more electrodiagnostic medicine, spinal injections, and peripheral injections Iowa physiatrists did in 2003 (five, four, ten, respectively vs three, two, seven).

The number one concern among Hawai'i physiatrists is poor reimbursement, a top concern shared among Iowa physiatrists in 2003.<sup>5</sup> Practice management is another concern shared by physiatrists in Hawai'i and Iowa. While physiatrists in Iowa reported "difficulty recruiting" as their number four concern, Hawai'i physiatrists ranked "difficulty recruiting" tied with "retention of current physiatrists" at number 11 and 12 out of

12 concerns. And, although Iowa physiatrists work on average four hours more than Hawai'i physiatrists (48 hours per week Hawai'i vs 52 hours per week Iowa), "high workload" was concern number seven for Iowa physiatrists, while "high workload" was concern number three for Hawai'i physiatrists.

Although the majority of Hawai'i physiatrists believed there was a shortage of physiatrists within the United States (21 of 29 responded yes), they were more divided about whether there was a shortage in Hawai'i (17 of 33 responded yes). The notion that fewer Hawai'i physiatrists believe there is a shortage of physiatrists in Hawai'i is consistent with the majority of PM&R practices not looking to recruit new physiatrists for at least five years (19 of 33 respondents). Furthermore, "difficulty recruiting new physiatrists" was not much of a concern among Hawai'i physiatrists (tied for number 11 and 12 of 12 concerns). As an alternative to recruiting and hiring more physiatrists to work in remote areas, telemedicine could be a potential cost-effective solution to the psychiatry shortages on the neighbor islands. By

decreasing physician workload, telemedicine could decrease the physician demand in areas where physiatry demand is greater than its supply.

Because 32 of 36 of the responding physiatrists were currently practicing on the island of O'ahu, there could possibly be sampling bias. That is, O'ahu physiatrists' concerns, demographics, and practice types could be different and unique from those of their colleagues practicing on the other islands of Hawai'i. The estimated 1.3 physiatrists working on the island of Hawai'i, for example, were not represented in this data.<sup>4</sup>

## Conclusions

In comparison with other medical specialties within the state of Hawai'i and to the relative need for more physiatrists in other states, PM&R in 2011 Hawai'i is not in a public health care crisis. However, with expected population growth and aging, as well as the anticipated retirement of 41% of Hawai'i's practicing physicians, physician shortages, large or small, should not go unnoticed.<sup>4</sup> Since Hawai'i lacks a PM&R residency, further recruitment efforts should be focused on attracting both physiatrists completing residency programs on the mainland United States and physiatrists on O'ahu to our neighbor islands. Reimbursement changes, addressing hospital administrative issues, hosting more PM&R conferences, developing a JABSOM musculoskeletal fellowship program, and increasing incentives to practice on neighbor islands are possible solutions that would directly address the concerns of Hawai'i's physiatrists. Furthermore, another possible resolution would be creating a Telehealth system for O'ahu's physiatrists to consult on neighbor island patients without anyone having to travel. This has been accomplished by Shriners Hospital to distant sites and could be expanded as need increases.

## Conflict of Interest

None of the authors identify any conflict of interest.

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# A Brief Survey to Identify Priorities for Improving Clinician Recruitment and Retention: Results from Hawai'i Island Physicians

Karen L. Pellegrin PhD

## Abstract

**Background:** In light of the documented physician shortage on Hawai'i Island, the Hawai'i Clinician Recruitment and Retention survey was designed and implemented to assess perceptions of quality of life and the work environment among clinicians on Hawai'i Island and to identify aspects of the environment on Hawai'i Island that predict responses to questions regarding recruitment and retention.

**Methods:** The respondents were 127 Hawai'i Island clinicians, specifically 96 physicians, 15 nurses, five pharmacists, four physician assistants, two social workers, and five "other" healthcare workers. The internal reliability of the survey was high ( $\alpha=.91$ ) and its convergent validity was supported by the significant correlation of item total scores with anchor items that measured overall ratings of the environment and likelihood of recruitment and retention. Given the small number of non-physician clinicians responding, descriptive analyses included only physicians. Physicians who indicated they plan to retire within 5 years were excluded from the correlation analyses to focus on patterns within the target group for retention.

**Results:** Overall, results indicate that, while the majority of physicians who relocated to Hawai'i Island did so primarily for the quality of life, the best predictors of retention are financial sustainability, professional opportunities, community support, and access to good K-12 schools. Survey results also indicate that Hawai'i Island will lose 32% of its current physicians within the next five years due to retirement or other causes.

**Discussion:** These findings indicate that increased urgency to find solutions is warranted.

## Introduction

Physician shortages in rural areas continue to be well documented.<sup>1</sup> Interventions have focused on strategies to recruit clinicians/trainees from rural areas and/or expose them to rural practice during their training.<sup>2</sup> Using results from a qualitative study using a semi-structured interview design and incorporating previous research findings, Hancock and colleagues have proposed a model of physician recruitment and retention.<sup>3</sup> This 2009 model begins with the importance of exposure to rural environments and, absent that, factors that increase the propensity to practice in rural settings. Once practicing in a rural setting, according to this model, physicians are likely to stay to the extent that they have a sense of place, comfort, outdoor opportunities, community, efficacy, and freedom. In contrast, those who experience greater financial trouble, lack of services, limited social network, or desire a career change are more likely to leave. The model provides a useful framework for designing and testing recruitment and retention interventions.

On a local level, projections indicate that the physician shortage in Hawai'i is significant and growing.<sup>4</sup> The physician shortage is more severe in rural counties. Applying Hancock's model to this unique setting, the geographic isolation and relatively high cost of living are likely to be significant barriers to effective recruitment and retention. The unique quality of life factors in rural Hawai'i may offset these barriers. On rural Hawai'i

Island, the largest county in Hawai'i with the lowest population density, physician shortages have been well-documented<sup>5</sup> and significant efforts are underway to better understand and address this problem. In particular, the launch of the University of Hawai'i School of Medicine Rural Family Practice Residency Program at Hilo Medical Center is a critical, evidence-based approach to improving recruitment of physicians to Hawai'i Island. This approach is supported by research indicating that exposure to rural settings during clinical training, particularly longitudinal rotations, are good predictors of retention in rural areas.<sup>3,6,7</sup>

While there is strong local support for the residency program, there is also significant interest in finding other solutions to the shortage. The Hawai'i Island Healthcare Alliance is a diverse group of stakeholders focused on achieving a vision where Hawai'i Island residents lead healthy and productive lives, make healthy choices, and have access to quality healthcare. The Alliance Recruitment and Retention Committee has been focused on addressing the broad range of workforce issues that impact the achievement of this vision. Discussion among committee members led to the decision to design and administer a survey to facilitate the prioritization of efforts to improve clinician recruitment and retention. Therefore, the purpose of this research was to assess perceptions of quality of life and the work environment among clinicians on Hawai'i Island. The goal was to identify aspects of the environment on Hawai'i Island that predict retention and that could be used to recruit clinicians to work there. The Hawai'i Clinician Recruitment and Retention survey was designed to measure clinician ratings of the general environment as well as aspects of the environment specific to healthcare and to shed light on the applicability of Hancock's model of recruitment and retention to the unique factors of practicing on Hawai'i Island.

The survey included an item response format that has been shown by Ware and Hays to produce more sensitive measures of satisfaction.<sup>8</sup> Many surveys attempting to assess perceptions of quality yield highly skewed response distributions with low variability.<sup>6</sup> In their study, Ware and Hays compared two response formats: a five-point scale offering the response options of "excellent, very good, good, fair, and poor" and a six-point scale with response options of "extremely satisfied, very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, and very dissatisfied." The former format yielded less skewed results with greater variability across settings, producing a more sensitive instrument for measuring satisfaction. Furthermore, the "excellent, very good, good, fair, poor" response format better predicted behaviors and behavioral intent. Thus, the recruitment and retention survey

used this optimal response format (5 = excellent, 4 = very good, 3 = good, 2 = fair, 1 = poor) to minimize positive response bias and optimize variability and predictive validity.

## Methods

The Hawai'i Clinician Recruitment and Retention survey was designed to be brief enough to be practical and user-friendly but thorough enough to cover key environmental, community, and work-related factors that might be important to practicing clinicians based on a review of the literature. The draft survey was then distributed to Hawai'i Island Healthcare Alliance leaders for feedback and suggestions were incorporated. The final survey was transferred to surveymonkey.com format for administration.

In addition to identifying clinician type, the survey included basic information about the clinician's practice setting, location of clinical training, location of previous clinical experience, reason for relocating to Hawai'i Island, years in practice, and plans to retire (shown in Table 1). Clinicians were asked to indicate their ratings of specific aspects of living and working on Hawai'i Island (shown in Table 2), as well as their overall ratings and their intentions to continue practicing and refer colleagues to practice there. These overall ratings and behavioral intent questions were the "anchor" items included to identify the best predictors of overall satisfaction, recruitment (as measured by the question "Would you recommend Hawai'i Island to your healthcare colleagues who are interested in relocating?"), and retention (as measured by the question "Do you plan to continue practicing on Hawai'i Island for the next 5 years?"). The recruitment and retention questions had a response format of "4 = Yes, definitely, 3 = yes probably, 2 = no probably not, and 1 = no definitely not" as used in the Ware and Hays study.<sup>8</sup>

This study was determined by the University of Hawai'i Committee on Human Studies to be exempt from IRB review and all procedures with regard to informed consent and data confidentiality were followed. In July 2010, key healthcare leaders, including senior leaders of Hawai'i Island hospitals, federally qualified health clinics and physician groups were contacted regarding the distribution of the survey on behalf of the Hawai'i Island Healthcare Alliance. These leaders were asked to send a standardized email with link to the survey at surveymonkey.com to the clinicians working in their respective organizations with the request that the survey be completed within three weeks. Before the survey deadline, these leaders were sent two reminders, including an update on the number of clinicians that had responded to date. The intent was to obtain survey responses from all clinician types, including physicians, nurses, pharmacists and others. Because the survey invitation was sent to clinicians through these healthcare leaders, response rates based on those invited to complete the survey are not known.

From this convenience sample, descriptive statistics were obtained to identify key aspects of the clinician sample as well as mean scores on each item. Analyses of the reliability and preliminary validity of the Hawai'i Clinician Recruitment and

Retention survey were performed. Correlation analyses were performed to identify predictors of clinician intention to continue practicing on Hawai'i Island and to recommend Hawai'i Island as a place for other clinicians to practice. Given that the survey produced ordinal data, Kendall's tau-b was selected to obtain correlations using SPSS software (PASW Statistics 18).

## Results

The respondents were 127 Hawai'i Island clinicians, including 96 physicians, 15 nurses, five pharmacists, four physician assistants, two social workers, and five "other" healthcare workers. The internal reliability of the Hawai'i Clinician Recruitment and Retention survey, as measured by Cronbach's alpha, was high ( $\alpha = .91$ ). Preliminary convergent validity of the instrument was supported by the finding that total scores for the items were significantly correlated with the scores for the four anchor items,  $P < .001$  ( $r = .77$  for "overall rating of the healthcare environment,"  $r = .73$  for "overall rating of the community environment,"  $r = .68$  for "would you recommend Hawai'i Island to your healthcare colleagues who are interested in relocating?" and  $r = .38$  for "do you plan to continue practicing on Hawai'i Island for the next 5 years?"). Given the small numbers of non-physician clinicians responding, the remaining descriptive analyses include only the 96 physicians who completed the survey to allow greater certainty about applying results specifically to physicians. Based on an estimate of 310 practicing physicians on Hawai'i Island,<sup>5</sup> 31% of physicians completed the survey. Descriptive statistics for this physician sample are shown in Table 1. Table 2 presents mean ratings for each survey item, standard deviations and correlation analyses designed to identify priorities for improving recruitment and retention of physicians. The physicians who reported that they planned to retire in the next five years were omitted from these analyses to maximize relevance to those who are retention targets, leaving a sample of 77 physicians. Correlation coefficients indicate the strength with which answers to specific item ratings predict answers regarding recruitment and retention. Two-tailed significance tests were selected due to the exploratory nature of this survey such that hypotheses about whether significant correlations would be positive or negative were not stated a priori. The strongest item predictors of recruitment and retention, defined as items that significantly predict both recruitment and retention questions at the  $P \leq 0.01$  level, were all positive correlations and are highlighted in Table 2.

## Discussion

The majority of physicians who relocated to Hawai'i Island from a different island in Hawai'i, another state, or another country, did so primarily for the quality of life; very few relocated to improve earnings. However, the best predictors of retention were financial sustainability, professional opportunities, community support, and access to good K-12 schools. Not surprisingly, these were also the strongest predictors of physician recruitment of colleagues to Hawai'i Island. This means that physicians who gave high ratings in these areas were significantly more



Table 1. Physician sample characteristics		
Question (n)	Response	Percent
Primary clinical area (95)	Primary care Specialty care	52.6% 47.4%
Primary practice setting (95)	Outpatient, owner Outpatient, employee Hospital Other	32.6% 23.2% 24.2% 20.0%
Plan to retire in the next 5 years (96)	Yes No	19.8% 80.2%
No. of years practicing on Hawai'i Island (96)	Less than 1 year 1-5 years 6-10 years 11-20 years More than 20 years	5.2% 32.3% 19.8% 21.9% 20.8%
Location of previous clinical experience (excluding training) (96)	none (all experience on Hawai'i Island) relocated from another island in Hawai'i relocated from another state relocated from another country	28.1% 12.5% 56.3% 3.1%
Setting of previous clinical experience for those who relocated to Hawai'i Island (69)	Primarily urban area Primarily rural area	72.5% 27.5%
For those who relocated to Hawai'i Island, primary reason (69)	Closer to family Improved earnings Quality of life Other	14.5% 2.9% 62.3% 20.3%
Primary location of advanced clinical training (96)	Hawai'i Island Another island in Hawai'i Another state Another country	3.1% 11.5% 85.4% 0%
If not Hawai'i Island, setting of advanced clinical training (93)	Primarily urban area Primarily rural area	92.5% 7.5%
District where you currently live (94)	Hamakua Hilo Kau North Kohala South Kohala Kona Puna	3.2% 45.7% 2.1% 5.3% 13.8% 21.3% 8.5%
District where you currently work (94)	Hamakua Hilo Kau North Kohala South Kohala Kona Puna	1.1% 51.1% 2.1% 3.2% 17.0% 20.2% 5.3%

likely to recommend Hawai'i Island to colleagues interested in relocation and significantly more likely to report they plan to continue practicing there. Likewise, those who gave low ratings in these areas were significantly less likely to recommend Hawai'i Island or to plan to continue practicing there. These findings support elements of Hancock's model. However, inconsistent with Hancock's model, ratings of opportunities to enjoy outdoor activities and amount of time away from work were not significant predictors of recruitment and retention.

While cause and effect were not tested, this simple, cost-efficient survey methodology allows the identification of priorities for interventions based on items that best predict recruitment and retention questions. For physicians on Hawai'i Island, the

survey results suggest that improvements in financial sustainability, professional opportunities, community support, and access to good K-12 schools are most likely to improve physician recruitment and retention and, thus, should be priorities. The reliability and preliminary validity of the Hawai'i Clinician Recruitment and Retention survey are strong, suggesting that it could be used to track changes over time and adapted for use in other communities to identify and compare priorities for improvement.

It is noteworthy that twenty percent of physicians reported that they planned to retire within five years. Of those who were not planning to retire, 12 (16%) indicated that they do not plan to continue practicing on Hawai'i Island for the next five years.

**Table 2. Survey item means (standard deviations) and correlations with anchor items (and 2-tailed significance), excluding physicians planning to retire in the next 5 years; strongest predictors of recruitment and retention are highlighted**

Survey item (n)	Mean (SD)	Overall rating of the healthcare environment	Overall rating of the community environment	Correlation coefficient with anchor items (2-tailed significance)	
				Recommend Hawai'i Island to colleagues?	Plan to continue practicing on Hawai'i Island?
Access to cultural activities (77)	2.83 (.979)	.091 (.353)	.238* (.016)	.128 (.202)	.172 (.090)
Opportunities to enjoy outdoor activities (77)	4.43 (.802)	.237* (.020)	.226* (.029)	.141 (.178)	.091 (.389)
Access to shopping and other services (77)	2.29 (.792)	.264** (.008)	.166 (.100)	.238* (.020)	.222* (.032)
Cost of living (77)	2.08 (.914)	.183 (.064)	.171 (.087)	.275** (.007)	.244* (.017)
Access to good K-12 schools (72)	2.15 (1.083)	.372** (.000)	.226* (.026)	.437** (.000)	.282** (.006)
Social support in the community (75)	2.81 (1.023)	.373** (.000)	.443** (.000)	.338** (.001)	.268** (.008)
Support from the business community (74)	2.59 (1.072)	.435** (.000)	.427** (.000)	.354** (.000)	.307** (.002)
Support from elected officials (75)	2.21 (1.017)	.433** (.000)	.294** (.003)	.246* (.015)	.122 (.232)
Amount of personal time away from work (75)	2.81 (1.182)	.199* (.039)	.307** (.002)	.097 (.333)	.027 (.786)
Earnings from main practice (77)	2.74 (1.093)	.473** (.000)	.323** (.001)	.424** (.000)	.398** (.000)
Stability of earnings (75)	3.13 (1.082)	.359** (.000)	.317** (.001)	.400** (.000)	.340** (.001)
Quality of healthcare facilities and equipment (76)	2.80 (.938)	.431** (.000)	.332** (.001)	.260* (.010)	.233* (.022)
Quality of health information technology (77)	2.81 (1.077)	.296** (.002)	.278** (.004)	.234* (.018)	.211* (.034)
Quality of healthcare workforce (76)	2.88 (1.070)	.429** (.000)	.437** (.000)	.298** (.003)	.231* (.021)
Access to Continuing Education opportunities (76)	2.59 (.941)	.305** (.002)	.259** (.010)	.230* (.023)	.086 (.400)
Opportunities to achieve professional goals (77)	2.96 (1.019)	.575** (.000)	.431** (.000)	.421** (.000)	.389** (.000)
Access to current scientific literature (77)	3.21 (1.207)	.371** (.000)	.348** (.000)	.286** (.004)	.259** (.009)
Access to consultants for referrals (77)	2.06 (.978)	.336** (.001)	.243* (.015)	.198 (.050)	.126 (.217)
Degree of acceptance by other clinicians in the community (77)	3.56 (1.019)	.370** (.000)	.460** (.000)	.359** (.000)	.247* (.014)
Quality of clinician-patient relationships (77)	3.88 (.888)	.294** (.003)	.360** (.000)	.147 (.150)	.226* (.027)
Cooperation among healthcare providers (76)	3.34 (.917)	.646** (.000)	.413** (.000)	.385** (.000)	.347** (.001)

\* Correlation is significant at the 0.05 level (2-tailed), \*\* Correlation is significant at the 0.01 level (2-tailed).

Combined, this suggests that Hawai'i Island will lose 32% of its current physicians within the next five years. These findings indicate that increased urgency to find solutions is warranted. While efforts to improve the pipeline of medical students and residents with extended training on Hawai'i Island are greatly needed and should continue, it is unlikely that these efforts will be sufficient to address the current and projected shortage.

Models of care that result in physicians and other clinicians functioning "at the top of their license" are likely critical to addressing the problem of physician recruitment and retention. This means the formation of teams in which physicians delegate tasks to other healthcare workers who can perform the tasks more cost-effectively. Such models extend the capability of physicians to optimally manage a greater volume of patients. From an economic perspective, this allows a more efficient use of health care dollars and an opportunity for all clinicians to be paid at a license-appropriate level. From a professional perspective, this allows physicians and other clinicians to do the work

they were uniquely trained to do. Analyses also indicate that community support and infrastructure are important predictors of recruitment and retention, so these avenues should be further explored.

A potential limitation of this study is that the survey was distributed via leaders of hospitals, clinics, and physician groups and associations, which could have resulted in under-representation among solo, unaffiliated practices. It is also possible that the responders differed from non-responders in some way that biased the results. Furthermore, while the administration of this survey produced a sufficient response from physicians, there were insufficient responses from other clinicians for meaningful analysis. Future research should attempt to identify recruitment and retention priorities for other clinicians. Additional research is also needed to causally test the predictors identified in this survey. Finally, follow up surveys should be implemented to track progress of interventions designed to improve recruitment and retention on Hawai'i Island.

## Conflict of Interest

The author has identified no conflicts of interest to disclose related to the content of this manuscript.

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# Transforming and Improving Health Care through Meaningful Use of Health Information Technology

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## Abstract

*Use of electronic health records (EHRs) is becoming more and more common. It is anticipated that their use will improve patient care, decrease practice costs, and increase provider productivity and revenue. The State of Hawai'i has received funding to assist Hawai'i and Pacific providers in their selection of qualified EHR products that will meet federal Medicare and Medicaid requirements for "Meaningful Use." This article describes federal recommendations and resources available to Hawai'i providers. While it can be fairly overwhelming for small practices to convert to EHRs, there is technical assistance available to support Hawai'i providers in meeting the Meaningful Use requirements of EHR usage in order to become eligible for financial incentives and to improve positive health outcomes for patients. On October 31st, 2011, there were 138,570 eligible professionals and eligible hospitals registered for the Medicare and Medicaid EHR Incentive Programs nationally. These providers have received \$1,238,000,000 in incentives since January 2011. In Hawai'i there are approximately 400 active registrations for the Medicare program, of which 95 have been successful at meeting Meaningful Use criteria and have received \$8.1 million in incentive payments from Medicare. The State of Hawai'i is preparing to launch its Medicaid EHR incentive program in mid-to-late 2012, which should produce additional payments to Hawai'i's health care providers.*

## Background

The Institute of Medicine estimated that approximately 98,000 Americans die each year from preventable medical errors.<sup>1</sup> Medical errors are killing more people per year in the United States than breast cancer, AIDS, and motor vehicle accidents combined. Eighty percent of errors were initiated by miscommunication.<sup>2</sup> A major transformation in the current American health care system is underway, and the demand for more accountable care and better communication is creating the momentum to address the need for improvement in clinical care management, the capture of data for continuity of care, and the definition of measures to monitor costs and quality of care.

The Office of the National Coordinator for Health Information Technology (ONC) was created in 2004 to be a resource for the entire US health care system.<sup>3</sup> In 2009, the ONC was mandated through the Health Information Technology for Economic and Clinical Health (HITECH) Act to support and coordinate efforts to improve health care through the adoption of health information technology (HIT) and the development of a nationwide health information exchange (HIE). This is the HIT component of the American Recovery and Reinvestment Act (ARRA) signed into law on February 17, 2009, with provisions of 17.2 billion dollars for EHR use and HIE development. The vision of the HITECH Act is to furnish tools to begin a transformation in our nation's health care system so that each patient can receive optimal care. The adoption of Meaningful Use of electronic patient data and the development of a nationwide exchange of health information over the next several years will

serve to optimize and align our combined efforts to improve health outcomes, reduce costs, and increase patient, staff, and provider health care experience and satisfaction.

In 2011, the National Center for Health Statistics estimated that the rate of providers using any EHR was between 40% in Louisiana to 84% in North Dakota, with Hawai'i having a 70.5% adoption rate.<sup>4</sup> Any EHR system was defined as an affirmative response to the question, "Does this practice use electronic health records (not including billing records)?"

In comparison, a "basic EHR system" is one that has all of the following functionalities: patient history and demographics, patient problem list, physician clinical notes, comprehensive list of patient's medications and allergies, computerized orders for prescriptions, and ability to view laboratory and imaging results electronically. This may or may not include certified electronic health record technology as specified by ONC Certified Health IT Product List.<sup>5</sup> Nationally, about 34% of physicians reported having a system that met the criteria for a basic system, up from 25% average in 2010. The lowest state was New Jersey at 16% and the highest was Minnesota at 61%. In Hawai'i, the EHR adoption rate for a basic system is 46.3%.

Nationwide, approximately 52% of physicians reported intending to apply for Meaningful Use incentives, up from 41% in 2010. While the barriers to the implementation of EHRs include potentially high financial investments, an increase in initial physician and staff training time, workflow redesign efforts, and the need to hire new staff for HIT support, an EHR creates a database of information that will assist in the coordination of patient care and improvement of communication about shared patients among health care providers.

Benefits of using EHRs can include, but are not restricted to, reduced paperwork for patients and doctors, expanded access to affordable care, improved patient quality of care, prevention of medical errors, decrease in health care costs, increase in administrative efficiencies, and engagement of patients/families in their own health care.

An EHR converts a paper medical record into electronic format for faster communication, recall, and clinical decision-making. The goal of clinical decision support is designed to deploy electronic and non-electronic tools to effectively make use of best practices and evidence-based guidelines to help guide care in a more timely manner. Furthermore, the use electronic health records fundamentally changes a practice's communications by redesigning workflows that allow for better access to patient information almost immediately. Transcription costs will be reduced, patients with specific conditions can be more quickly identified and clinical decision support tools will be in place.

## The What and Why of Meaningful Use

The term “Meaningful Use” applies to the extent to which a health care provider or organization utilizes electronic health records. The American Recovery and Reinvestment Act (ARRA) defines Meaningful Use as the following:

- (1) Use of certified EHR in a meaningful manner (eg, E-prescribing);
- (2) Use of certified EHR technology for electronic exchange of health information to improve quality of health care; and,
- (3) Use of certified EHR technology to submit clinical quality reporting and other measures.

The government has identified three stages toward meeting their definition of Meaningful Use. The Stage 1 goal is to capture data electronically. The Stage 2 goal is to expand upon Stage 1 criteria and to report health information and track key clinical conditions. The Stage 3 goal is to improve quality, safety, efficiency, and performance and health outcomes. Meaningful Use includes both a core set and a menu set of objectives that are specific to eligible professionals or eligible hospitals and critical access hospitals. All of the metrics are described in detail at the Centers for Medicare and Medicaid Services (CMS) website.<sup>6</sup>

An example of a core objective is for an eligible professional to “generate and transmit permissible prescriptions electronically (eRx).” The definition of e-prescribing is a prescriber’s ability to electronically send an accurate, error-free, and understandable prescription directly to a pharmacy from the point-of-care. This is an important element in improving the quality of patient care. In Stage 1, this requirement is successfully measured when more than 40% of all permissible prescriptions written by the eligible professional are transmitted electronically using certified EHR technology. In Stage 2, the suggestion is for the percentage requirement to increase to 50% of orders transmitted as eRx. In Stage 3, the suggested threshold for this measure is to increase to 80% of orders transmitted as eRx. See Table 1.

This HIT-enabled health reform approach aims to capture data in a coded format and expand exchange of information in the most structured format possible in order to advance clinical processes and improve health outcomes by placing emphasis on high priority clinical conditions, patient self-management, and access to comprehensive data. Therefore, the focus is not just about technology, but about improving health and transforming health care through Meaningful Use of HIT.

## Financial Incentives for Achieving Meaningful Use

Through the Centers for Medicare and Medicaid Services (CMS) EHR Incentive Programs, Medicare and Medicaid are providing financial incentives for “eligible professionals” (EPs) who have adopted a certified EHR and can demonstrate “Meaningful Use.” Participating eligible professionals must choose to be reimbursed either through Medicare or Medicaid and cannot receive incentive payments from both programs at the same time. Below is a description of each program.

### Medicare EHR Incentive Program

The Medicare eligibility criteria for EPs include doctors of medicine, osteopathy, dental surgery, podiatry, optometry or chiropractic care. Excluded from this list are EPs who furnish 90% or more of their services in either the inpatient or emergency department of a hospital. (Eligible hospitals include subsection (d) hospitals and Critical Access Hospitals).

Beginning January 2011, EPs who adopt and demonstrate Meaningful Use of an EHR may be eligible for up to \$44,000 in Medicare incentive payments spread out over five years. (This amount is increased by 10% for EPs who predominantly furnish services in a health professional shortage area.) The last year to initiate the Medicare program is 2014 with the last payment in 2016. It is important to note that from 2013, the incentive payments start to decrease every year thereafter. Medicare payment reductions begin in 2015 for providers that do not demonstrate Meaningful Use. The reporting period for meeting Meaningful Use the first year is 90 continuous days within the calendar year and for subsequent years it is the full calendar year.

### Medicaid EHR Incentive Program

The Medicaid eligibility criteria for EPs are inclusive of physicians, dentists, certified nurse-midwives, nurse practitioners, and also for physician assistants working in a federally qualified health center / rural health center that is physician-assistant led. Under Medicaid, EPs must practice in a setting where 30% of patient encounters are attributed to Medicaid patients, with the exception of pediatricians who must have a minimum volume of 20% Medicaid patients. However, their incentive payments are limited to two-thirds of the maximum amount or \$42,500. Pediatricians with 30% Medicaid population are eligible for the maximum payout of \$63,750. (Eligible hospitals include acute care hospitals and critical access hospitals with at least 10% Medicaid patient volume, as well as children’s hospitals with no Medicaid volume requirement.) As with Medicare eligibility, Medicaid EPs who furnish 90% or more of their services in either the inpatient or emergency department of a hospital are excluded from the list.

Table 1. Stages of ePrescribing

Stage 1	Proposed Stage 2	Proposed Stage 3
More than 40% of permissible prescriptions are transmitted electronically.	More than 50% of orders (outpatient and hospital discharge) transmitted as eRx.	More than 80% of orders (outpatient and hospital discharge) transmitted as eRx.

In some states, eligible professionals have begun receiving Medicaid payments as early as January 2011. Unlike Medicare, EPs can participate in the Medicaid program and receive the maximum payment through 2016. This means that the last year for eligible professionals to both initiate and register for the Medicaid EHR incentive program is 2016. EPs may receive up to a maximum of \$63,750, with the first year payment being \$21,250 for providers who are engaged in efforts to “adopt, implement or upgrade” (AIU) to certified EHR technology. The Medicaid program payments are made over a six-year time period. The last Medicaid EHR payment year is 2021.

An eligible professional has “adopted” a certified EHR when they have evidence of acquiring and installing the technology. When the EP has “implemented” a certified EHR, then he/she has commenced utilization of the technology, eg, staff training and data entry of patient demographic information into the EHR. The EP has “upgraded” the existing EHR by expanding its current technology or adding new functionality to meet the definition of certified EHR technology. In their first year, the eligible professional will not have to demonstrate Meaningful Use in order to receive the payment; he/she just needs to adopt, implement, or upgrade certified EHR technology. In the second year, he/she will have to demonstrate Meaningful Use for a 90-day period only. An EP who has already achieved Meaningful Use will need to demonstrate Meaningful Use of their certified EHR for a 90-day period the first year, and then in subsequent years, he/she will need to demonstrate Meaningful Use of their certified EHR for the full calendar year.

Medicaid Meaningful Use requirements are reported through a means that is developed by each individual state that chooses to participate. The final Meaningful Use rule mandates that the objectives of Meaningful Use for Medicare be the minimum for Medicaid. The State of Hawai‘i Medicaid Program (Department of Human Services, Med-QUEST Division) received funds to begin development of the advanced implementation plan and reporting process for Hawai‘i’s eligible professionals to submit documentation to CMS, with the intent of administering the Medicaid EHR incentives in the fall of 2012. The purpose of the advance planning document is to describe the Hawai‘i Department of Human Services, Med-QUEST Division’s (DHS-MQD) implementation activities for the development of a State Medicaid Health Information Technology Plan (SMHP) for

Hawai‘i. The SMHP will serve as a strategic vision to enable the DHS-MQD to achieve its future vision by moving from the current “As-Is” HIT landscape to the desired “To-Be” HIT landscape, including a comprehensive HIT road map and strategic plan over the next five years. The plan will also describe the processes, procedures and resources required to implement and oversee the incentive payments to be paid to eligible Hawai‘i Medicaid providers for the Meaningful Use of certified EHRs. It is encouraged that Hawai‘i EPs begin preparing now to achieve Meaningful Use, regardless of the program chosen, in order to prepare for future financial incentive opportunities.

### Differences in Medicare and Medicaid EHR Incentive Programs

Eligible professionals (EPs) must select only one method to receive the financial incentives, and are allowed to switch programs one time prior to 2015 after they have completed their attestation. Providers practicing in multiple states can only participate in one state’s program. Table 2 below shows the notable differences between the Medicare and Medicaid EHR Incentive programs.

### Demonstrating and Reporting Meaningful Use

For 2011, results for all objectives and measures, including clinical quality measures, is reported via attestation to the Centers for Medicare and Medicaid Services (CMS). For 2012, measures must be submitted via certified EHR technology. In the provider’s first year of participation, the reporting period will be any 90-day period that occurs within the calendar year. For subsequent years of participation, the reporting period will be the entire calendar year.

### Penalties for Non-Adopters of Meaningful Use

To receive the maximum EHR incentive payment, Medicare eligible professionals must begin participation by 2012. For 2015 and later, Medicare eligible professionals who do not successfully demonstrate Meaningful Use will have a payment adjustment to their Medicare reimbursement. The payment reduction starts at 1% and increases 1% each year that a Medicare eligible professional does not demonstrate Meaningful Use, to a maximum of 5%.

Table 2. Notable Differences Between the Medicare and Medicaid EHR Incentive Programs	
Medicare	Medicaid
Federal Government will implement (will be an option nationally)	Voluntary for states to implement (may not be an option in every state)
Payment reductions begin in 2015 for providers that do not demonstrate Meaningful Use	No Medicaid payment reductions
Must demonstrate Meaningful Use in Year 1	Adopt/Implement/Upgrade option for 1st participation year
Maximum incentive is \$44,000 for EPs (10% bonus for EPs in HPSAs)	Maximum incentive is \$63,750 for EPs
Meaningful Use definition is common for Medicare	States can adopt certain additional requirements for Meaningful Use
Last year a provider may initiate program is 2014 Last year to register is 2016; Payment adjustments begin in 2015	Last year a provider may initiate program is 2016 Last year to register is 2016
Only physicians, subsection (d) hospitals and Critical Access Hospitals	5 types of EPs, acute care hospitals (including critical access hospitals) and children’s hospitals



There are no penalties for EPs who choose the Medicaid method, which means that there is no payment adjustment imposed if an eligible provider that qualifies for Medicaid and subsequently chooses NOT to adopt, implement, or upgrade to certified EHR. If an eligible professional adopts, implements or upgrades to certified EHR in the first year, the EP will not have to demonstrate Meaningful Use in order to receive the first year's payment.

### **What Can Your Practice Do Now to Achieve Meaningful Use?**

For practices with no EHR, develop an EHR implementation strategy by focusing on the following:

- begin pre-work by performing a financial assessment and return on investment calculation, assigning a physician as a champion and selecting staff for an EHR implementation team;
- determine where you are now in the process by performing a readiness assessment, evaluate staff computer skills, analyze your current workflow, and review hardware and software needs;
- start planning by deciding where you want to be in the future and how to get there, by defining EHR goals and measurements and drafting an internal project plan for implementation;
- evaluate the certified vendors to see which system meets your needs by scheduling demonstrations and negotiating contracts;
- begin the EHR implementation process and effectively install the EHR by working with your vendor on implementation planning, system customization /testing/practicing/backup and establishing down time procedures; and,
- prepare a post go-live evaluation by reviewing goals, Meaningful Use status, clinical measure reports, and subsequent phase planning.

For practices with an EHR, start now by focusing on the following:

- inquire on EHR vendor status of ARRA certification and find out when upgrades will be available;
- review reporting requirements and work backwards to ensure that documentation supports required reports;
- if possible, implement a lab interface and eRx with interaction checking;
- begin using computerized physician order entry (CPOE);
- perform gap analysis of documentation: medications, problem, and allergy lists, vitals, etc;
- create lists of patients within the EHR using clinical decision support rules and send patient reminders;
- implement a patient portal;
- implement a medication reconciliation process;
- develop a source of statewide information on community

HIE and test one exchange of key health data to other providers, health department, or immunization registry; and,

- conduct a HIPAA security analysis and address issues.

### **Overview of the Regional Extension Center Program**

The HITECH Act<sup>7</sup> has established 62 nationwide regional extension centers, including the Hawai'i Pacific Regional Extension Center (HPREC), in order to offer technical assistance, guidance and information on best practices to support and accelerate health care providers' efforts to become "meaningful users" of EHRs. The coordinated adoption and use of secure EHRs will ultimately enhance the quality and value of health care across the country.

Regional Extension Centers focus their most intensive technical assistance on priority primary care providers (PPCPs), including MDs, DOs, nurse practitioners, physician assistants, and certified nurse mid-wives furnishing primary-care services (ie, adolescent medicine, family practice, general practice, internal medicine, OB, GYN, geriatrics, or pediatrics), with a particular emphasis on individual and small group practices (fewer than ten providers with prescriptive privileges). PPCPs in such practices deliver the majority of primary care services, but have the lowest rates of adoption of EHR systems and the least access to resources to help them implement, use, and maintain such systems. Regional Extension Centers also focus rigorous technical assistance on providers providing primary care in public and critical access hospitals, community health centers, and in other settings that predominantly serve uninsured, underinsured, and medically underserved populations.

As of December 2011, over half of the individual and small group practices in Hawai'i have not yet implemented basic EHR systems. The HPREC is prepared to assist practices in Hawai'i with or without EHR systems currently in place and can support health care providers with direct, individualized, and on-site technical assistance in: (1) selecting a certified EHR product that offers the best value for the providers' needs; (2) achieving effective implementation of a certified EHR product; (3) enhancing clinical and administrative workflows to optimally leverage an EHR system's potential to improve quality and value of care; (4) observing and complying with applicable legal, regulatory, professional, and ethical requirements to protect the integrity, privacy, and security of patients' health information; and (5) preparing the required reports to become eligible to receive EHR incentive payments.

The HPREC was established to serve all of the Hawaiian Islands, as well as Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands. The HPREC is a program that is managed by the Hawai'i Health Information Exchange (Hawai'i HIE).<sup>8</sup> The Hawai'i HIE partners with health care providers to improve patient care, improve operational efficiency, reduce operating costs, receive financial incentives, and become part of a statewide information network for the exchange of electronic health records.

## **EHR Vendor Identification and Selection Process**

Eligible professionals will need to implement an EHR technology that is certified for meeting Meaningful Use and is listed on the ONC certified health IT product list. Certification will promote EHR adoption by giving providers assurance that products and systems will help them achieve Meaningful Use. The choice of the specific, certified technology used should be driven by clinical goals and operations rather than by restrictive certification requirements.

The HPREC is open to working with any certified EHR vendor who meets the selection criteria and who is preferred by the health care provider. Notably, the vendor selection criteria developed by the HPREC goes beyond the national EHR vendor certification requirements and accounts for other requirements, including reliable on-island support needed for Hawai'i and Pacific island providers.

The HPREC has developed an analytical process utilizing vendor milestone reviews and due diligence in order to determine a list of qualified electronic health record vendors, which included the following steps:

- (1) Identifying EHR vendors with installations in Hawai'i;
- (2) Identifying other national vendors to participate in process;
- (3) Creating pre-screening list of questions;
- (4) Creating survey for interested vendors to complete which helps to profile their business in Hawai'i;
- (5) Holding meetings or sent out correspondence explaining our process and asked all interested vendors to respond by completing pre-screening questions and survey;
- (6) Reviewing detailed Request for Proposal (RFP) and provided input regarding any Hawai'i specific requirements;
- (7) Identifying short list of vendors to receive detailed RFI;
- (8) Selecting pre-qualified vendors,

Furthermore, the selection process consisted of meeting the following milestones:

- (1) Reviewing and analyzing EHR vendor pre-screen responses;
- (2) Reviewing and analyzing EHR vendor survey data;
- (3) Reviewing and analyzing EHR vendor Request for Information responses;
- (4) Vendor reference checking;
- (5) Vendor price negotiating and structuring;
- (6) Vendor contract negotiating and structuring.

These milestones encompass analysis of Hawai'i specific functionality and requirements, clinical features and functionality, vendor business and organizational profiles, implementation

and training models, support and maintenance models, and technology platform, framework, and scalability of systems.

## **The Hawai'i Health Information Exchange**

In September 2009, the Hawai'i HIE was recognized as the State Designated Entity (SDE) through a cooperative agreement from the State Health Information Exchange Cooperative Agreement Program funded by the ONC. The mission of the Hawai'i HIE is to facilitate the exchange of health information that enables quality health care statewide and to provide reliable health information when and where it is needed.

This will be accomplished by:

- Achieving widespread and sustainable HIE within and among states through the Meaningful Use of electronic health records (EHRs);
- Establishing and implementing appropriate governance, policies, and network services within the national framework to build connectivity between and among health care providers;
- Improving the capability of providers to actively exchange health care data focusing specifically on electronic orders and receipt of labs and test results as well as e-prescribing;
- Developing and implementing up-to-date privacy and security requirements for HIE;
- Organizing directories and technical services to enable interoperability within and across states and remove barriers that may hinder effective HIE;
- Coordinating with Medicaid and state public health programs to enable information exchange and support monitoring of provider participation in the HIE;
- Convening health care stakeholders who can provide support for a statewide approach to HIE.

## **Implications and Conclusion**

According to a press release on November 30, 2011 by the US Department of Health and Human Services (HHS),<sup>9</sup> Secretary Kathleen Sebelius released a new report revealing that doctors' adoption of health information technology has doubled in two years. Doctors who responded quickly will qualify for CMS EHR incentive payments in 2011 as well as 2012 for meeting Stage 1 of Meaningful Use of certified EHR technology. To encourage acceleration in EHR adoption, the Secretary announced that HHS intends to continue to allow doctors and hospitals to adopt HIT in 2012 and 2013 without meeting the new Stage 2 Meaningful Use requirements until 2014.

There are many benefits for early adopters of Stage 1 Meaningful Use. Providers are given additional time to implement new software and meet the new requirements of Stage 2 and vendors are given added time to develop certified EHR technologies for Stage 2. Maintaining the current expectations for those first attesting to Meaningful Use in 2012 will mean that all providers attesting in 2011 and 2012 will not need to begin

Stage 2 until 2014. There is added incentive for providers to attest as soon as possible and receive the rewards of being an early participant. Those providers attesting in 2012 will have two payment years under the less stringent Stage 1 criteria, rather than one year. The Stage 2 and Stage 3 criteria are expected to be more robust in coming years.

As EPs and health care organizations reach Meaningful Use of EHRs that ultimately enable the exchange of critical information across a health care system, the health care system will realize improvements in individual and population health outcomes, increased transparency and efficiency, and improved ability to study and improve care delivery.

With advances in recent HIT, workforce development roles across the nation are being created and new skill sets are being developed for health care professionals to support the implementation of EHRs, practice workflow redesign, and information management training.

Meaningful Use of EHRs is an initiative to expand as well as standardize, streamline, and improve the use of health information technology in our country. The target for nationwide health care reform is to improve the quality of health of our patient population which leads to more patient-centered as well as transparent and accountable care. This can be accomplished effectively through the wide-spread use of EHRs and exchange of health information.

Health care providers in Hawai'i will benefit from HIT because they will have accurate and complete information about a patient's health, thus enabling the provider to give the best possible care, whether during a routine visit or a medical emergency. Providers will also have the ability to better coordinate the care they give, which is especially important if a patient has a serious medical condition. They will have a way to share information with patients and their family caregivers through secure information technology network communication. This means patients and their families can more fully participate in decisions about their own health care. In addition, health care providers will have information and data necessary to diagnose health problems sooner, reduce medical errors, and provide safer care at lower costs. Communication between health professionals and health entities will become more efficient and effective.

## Conflict of Interest

None of the authors identify any conflict of interest.

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# Administrative Simplification, Simplified for Hawai'i

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## Abstract

**Background:** The American health care system contains a layer of administrative controls that has become increasingly burdensome to medical practices in terms of uncompensated physician and staff time and practice costs. A primary care physician in solo practice spends between 4 and 10 hours a week directly interacting with health insurance companies and his or her staff will spend an additional 60 hours a week. This reduces patient-care availability, net practice income and physician job satisfaction.

**Methods:** A literature review was conducted to determine possible solutions to administrative burdens physicians face in Hawai'i. A total of 51 articles were found matching search criteria with five being reports from major organizations.

**Results:** Twenty-seven articles were found that related to administrative simplification. The "administrative complexity" problem has been defined and its financial impact quantified. Promising solutions have been developed and proposed by private not-for-profit organizations and by the government, both state and federal.

**Discussion:** A successful administrative simplification plan would: (1) Provide rapid access to insurance information; (2) Allow medical practices to readily track specific claims; (3) Streamline the preauthorization process through the use of decision-support tools at the practice level and by directing interactions through real-time network connections between insurers and provider electronic health records, thus minimizing phone time; (4) Adopt the Universal Provider Datasource system for provider credentialing; and (5) Standardize (to the greatest degree possible) provider/insurer contracts. These solutions are outlined in detail.

## Keywords

Administrative simplification; paperwork; cost containment; Hawai'i

## Introduction

In a typical business a bill is submitted by a seller and a remittance paid by the purchaser, a very straightforward process. In healthcare, however, there is a third party, an insurer or a government payer, which adds a layer of "administrative controls" for ostensibly legitimate purposes such as cost containment. In this paper the term "insurer" refers to an insurance company and/or a health plan while the term "payer" means all parties who reimburse (pay) providers, the insurers, and Medicare/Medicaid. Unfortunately, the billing/remittance process then becomes a complex knot of paperwork. Multiple eligibility rules must be strictly followed when basic insurance information (eligibility, co-pays, deductibles, plan benefits/exclusions, and medication formularies) is not readily accessible. Requested tests and treatments must match the payer's non-transparent clinical criteria, such that routinely, over lengthy telephone calls, a provider is forced to defend her clinical judgment to a clerk wielding a protocol book. Invalid bills (claims), when denied, must be corrected, resubmitted, and appealed, taking significant time. In addition, the doctor must prove and reprove her qualifications (credentials) to deliver the services, and must negotiate and renegotiate fee-schedule and payment rules, sometimes necessitating the services of an accountant and/or attorney.

With Hawai'i having a growing shortage of physicians and potentially losing more than 40% of its physician workforce to retirement over the next decade,<sup>1</sup> now is the time to make changes to this cumbersome system. Improving the "practice environment" through simplification of the administrative controls should reduce both the cost and the "hassles" of running a medical practice.

## Methods

In mid 2011, a literature review was conducted to determine possible solutions to administrative burdens physicians face in Hawai'i. The search was performed on Medline using the MESH terms, "administrative simplification," "administrative complexity," and "billing," limited to the last five years and the English language. Of the over 3,000 articles found on the topic, 51 presented material on some aspect of administrative simplification, complexity, or billing. Five were reports from large national organizations. Six of the articles were studies that used a survey methodology. These provided useful information on one or more aspects of office administrative procedures.

## Results

Using differing methodologies, the cost of "administrative complexity" has been estimated in the literature. The Institute of Medicine estimates that 6.5% of total healthcare expenditures in the United States is spent on billing and insurance related activities, while in other industries the comparable number is less than one percent.<sup>2</sup> In 2007 the accounting firm, Price, Waterhouse, Cooper estimated that 15-30% of US healthcare costs are spent on "administration," and up to 10% (\$210 billion in 2008) comprises the "excess cost of claims processing."<sup>3</sup> Casalino, using a survey methodology, estimated that a solo primary care physician (PCP) and staff spend thousands of hours each year interacting with health insurance companies — time away from their patients.<sup>3</sup> The value of this uncompensated time averaged \$68,000 per year for each practice. Moreover, as healthcare costs have escalated, so has the rigor of the administrative controls. In Casalino's physician survey more than three-quarters of the respondents said that the cost to physician practices of interacting with health plans from 2004-2006 had increased, with the majority saying it had "increased a lot."<sup>4</sup>

## Eligibility Verification

The Oregon Health Authority recognizes that many processes which have long been automated in other industries are still largely performed manually by healthcare providers and even some payers. The primary cause cited in the Oregon report rests with regulations established in the Health Insurance and Portability and Accountability Act of 1996 (HIPAA) and later by the federal Department of Health and Human Services (HHS).

Because many issues were left unresolved, the private sector developed individualized practices that suited each health plan's particular business or information system needs. An example included in the report specifically addresses a medical practice's need to verify which health insurance company covers any given patient. The current regulations allow payers to provide both confirmation of coverage and specific information about benefits, co-pays, formularies, etc. However, the regulations do not require that payers provide these details. Hence, though the payers all verify eligibility, many choose not to transmit the additional information unless a provider submits a specific request, usually by phone or Fax.<sup>5</sup> Minnesota and other states are years ahead in the effort to verify insurance eligibility electronically. Indeed, Minnesota has had a multi-stakeholder committee working together to standardize administrative processes for over 20 years.

Although standardization of these electronic data transmissions would significantly reduce everyone's costs, private health insurers generally have had difficulty in reaching agreement on specific standards. Therefore, a private, not-for-profit coalition of more than 600 organizations, the Council for Affordable Quality Healthcare (CAQH), was created to serve as a catalyst for collaboration on proposals that simplify healthcare administration for providers and payers.<sup>6</sup> Several health plans that do business in Hawai'i are member organizations. This coalition's Committee on Operating Rules for Information Exchange (CORE) is developing voluntary operating rules that build on existing HIPAA and HHS requirements by adding and/or clarifying

standards for transmission, security, error resolution, and more. Health plans would have to become CAQH members, adopt its rules, then create internal systems that allow them to quickly and economically send healthcare information electronically, such as eligibility information to physician offices. Each CAQH member pays an annual fee, which sustains the CAQH programs.<sup>7</sup>

### Health ID Cards

A different approach to the health plan eligibility problem entails the use of standardized patient ID cards, which the state of New Jersey is interested in piloting. Most private practices photocopy a patient's health insurance ID card and then type the information into their database, which contributes to the claims error/reject rate. A machine-readable health ID card system that uses bar code, magnetic strip, or other technology would reduce clerical errors and significantly speed up the eligibility verification task. In support of this concept, the Affordable Care Act requires that electronic data-transmission operating rules allow for machine readable ID cards.<sup>8</sup>

### Claims Processing

The Oregon Health Authority estimates "claims status inquiry and response" accounts for almost a quarter of the administrative cost.<sup>9</sup> Claims processing is complex, as illustrated in the Massachusetts Hospital Association's flow diagram in Figure 1.<sup>10</sup> Although this refers to bills generated in a hospital ER, a medical practice's process is similar.

## Paper Trail of Insurer – Denied Claim From 1st ER Visit to Insurer Reversal

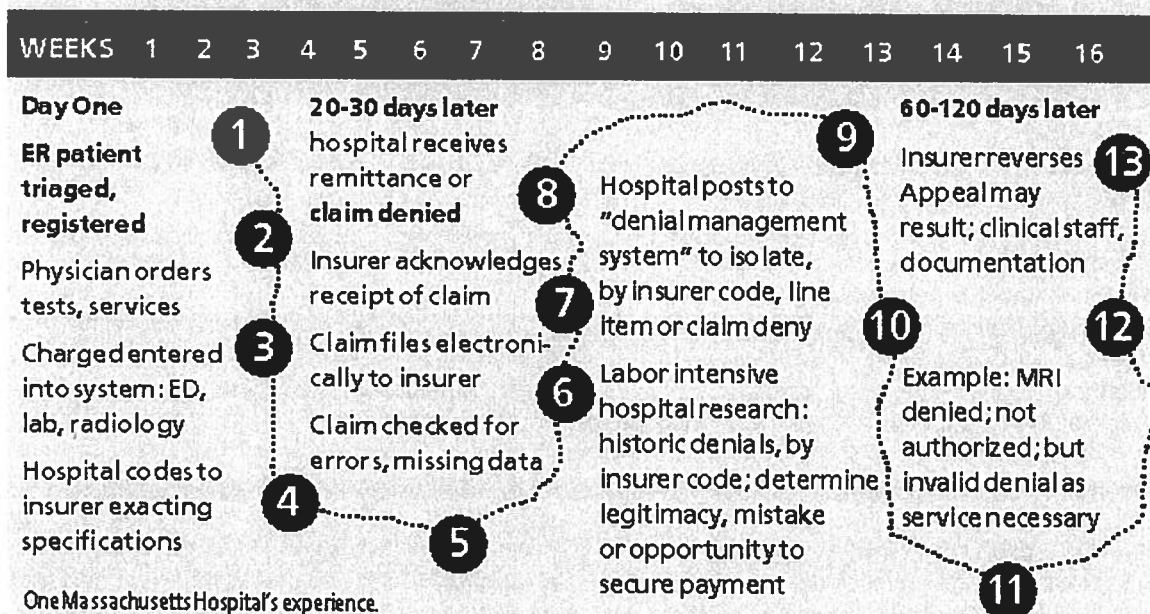


Figure 1. Massachusetts Hospital Association Flow Diagram



Because of the complexity of insurance claims processing and because insurers have on average a 20% error rate,<sup>11</sup> the American Medical Association (AMA) recommends the mandated use of "health claims acknowledgements" (HCA) in the operating rules. HCAs are signals sent when a specific step in a health insurer's claims processing has been completed. They allow the insurer and provider to track a claim. If further documentation is required, the provider can expedite the matter; if incorrect or incomplete information was sent, the provider can identify the problem and send corrections to avert a denial and the need to resubmit the claim. The CORE operating rules will facilitate the adoption of HCAs and a provider's ability to respond appropriately to insurer inquiries.<sup>3</sup>

### Preauthorization

In Casalino's study each solo PCP spends 4.3 hours per week on interactions with payers. Two-thirds of this physician time is spent on requesting approval from a payer to order a test, perform a procedure, or prescribe a medication not on a patient's health plan-approved formulary.<sup>12</sup> In primary care practices that no longer employ a nurse the PCP's 4.3 hours might rise significantly. Tice, et al. estimate that a physician in Hawai'i spends two hours every day interacting with health plans.<sup>13</sup>

The Healthcare Administrative Simplification Coalition (HASC) recommends that health plans support automation, simplification, transparency, clear communication, and, to the extent possible, standardization of prior authorization processes among health plans and pharmacy benefits plans. HASC supports electronic prescribing national networks in product offerings by electronic health record (EHR) vendors, health plans, and pharmacy benefits plans to achieve the goal of providing real-time, patient specific formulary access into e-prescribing functionality.<sup>14</sup>

The American Academy of Family Physicians (AAFP) in an issue brief on insurance company prior authorization called for greater simplification, transparency, and standardization. It recommends the development and implementation of evidence-based decision support tools at the point of care, presumably as electronic health record add-ons that will be congruent with appropriateness criteria used by the insurers. Demographic and clinical data needed by insurers in this context should be auto-generated and transmitted electronically. Feedback reports to providers on ordering patterns and compliance to clinical guidelines should be done to support physician education.<sup>15</sup>

### Credentialing

The CAQH also created the Universal Provider Datasource (UPD) in 2002 to enable providers in all 50 states to upload credentialing documentation, free-of-charge, into a secure central database. Authorized healthcare organizations can then access that information. The UPD participating organizations pay an administrative fee and a set fee per provider to access the data. If all of the organizations that credential providers used the CAQH system, virtually all of the redundant paperwork would be eliminated, thereby reducing the administrative burden.<sup>15</sup>

The Universal Provider Datasource, which has already gained wide acceptance throughout the United States, appears to be an ideal credentialing platform. Health plans and hospitals in Hawai'i have long understood the desirability of the shared service, both in terms of effectiveness and cost. Exploring the UPD system would seem to be the next logical progression in that direction.

### Standard Provider/Insurer Contracts

Recently New Jersey and Ohio submitted legislation that would create a uniform health plan/provider contract. Their reasoning was that this would simplify contract review and negotiation. Ohio also sought to do away with "predatory" clauses in their insurer/provider contracts.<sup>19</sup> Whether these are significant problems in other states is not clear at the time of this writing.

### Discussion

The administrative controls imposed by health plans and government payers have escalated to an alarming degree. Because healthcare costs will continue to rise, this administrative burden can be expected only to increase over time. In the face of a growing physician shortage, efforts should be taken to maximize practice efficiency and to minimize the intrusiveness of administrative requirements, while maintaining or improving patient care and safety. These goals can be advanced in Hawai'i by:

- (1) giving medical practices rapid access to their patients' insurance information, including the ability to determine patient eligibility, co-pays, deductibles, restrictions, insurance company rules, forms, and drug formularies;
- (2) giving practices the ability to readily track a specific claim, correct errors, and provide additional patient information or documentation;
- (3) implementing a preauthorization process where provider/insurer communication is directed seamlessly through a provider's EHR with transparent criteria and reasonable uniform rules are established; in addition, embedding decision-support tools in the EHR that are congruent with the health plan's criteria;
- (4) adopting a statewide, centralized credentialing system that requests standardized information at reasonable intervals with no duplicated requests, such as the CAHQ's UDC system, used by large national-level provider corporations, such as Humana;
- (5) standardizing (to the greatest degree possible) provider/insurer contracts.

Standardization and uniformity have become the watchwords of simplification, along with substituting automated/electronic processes for human labor. The CORE operating rules, if used by all of the health plans and government payers in Hawai'i, would facilitate the development and adoption of fundamentally uniform processes that would give medical practices access to insurance information and allow claims tracking. Note that the

CORE operating rules represent only one option. Having all of the payers agree on a set of standards is the key.

Preauthorization programs that require a provider to phone a benefits company (often in another state) or that require a handwritten/typed form should be considered overly burdensome and phased out. Health plans that service any given community should work among themselves and with their providers to reach agreement on the to document tests and treatments of concern. Health plans should then work with EHR vendors to create a seamless system in which health plan requests for information would appear automatically on the EHR screen when the physician orders a test or treatment on the preauthorization list. Decision support should be available upon request. The EHR would provide the patient identification and demographic data, and the provider would click on the criterion that applies to her patient or key in the justification. The information would be sent electronically to the health plan via a secure network connection. The cost should be borne primarily by the health plans, as they are the beneficiaries. If the provider does not have an EHR, many of the steps can be done through a secure web portal created by the payers.

Certainly there is a cost to the payers to implement these solutions, but they are also asking providers to pay a cost every day in the form of uncompensated time and unnecessary aggravation. These relentless hassles inevitably contribute to a higher rate of provider burnout and early retirement. These modest costs should be looked at as an investment, which over the years will pay off in number of providers pleased with their work environment. For their part providers have to be cognizant of the fact that automation plays a pivotal role in administrative simplification. These labor-saving solutions will give providers obvious additional incentives for EHR implementation. Beyond that, providers must accept that preauthorization systems and other administrative controls have proven value and that working with payers in a constructive way will lead to an overall stronger delivery system.

## Conflict of Interest

The author has identified no conflicts of interest.

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# State's Labor Department Working to Increase Hawai'i's Primary Care Workforce 20% by 2020

Jillian B. Yasutake MA; Ruth R. Caldwell MA; and Anna S. Powell MA, MBA

## Abstract

*Hawai'i lacks the number of skilled professionals needed to meet current and future healthcare demands. In order to meet the growing needs of Hawai'i's residents, the Workforce Development Council, a state agency attached to the State Department of Labor and Industrial Relations, is looking to expand the primary care workforce 20% by the year 2020. Using funds from a Healthcare Workforce Planning grant, the state formed several Healthcare Industry Skill Panels, a workforce development best practice from the State of Washington, to address the gap in healthcare services and healthcare workforce opportunities for Hawai'i residents. Over 150 stakeholders—from employers, education, the public workforce system, economic development and labor—contributed their time and expertise to identify current workforce issues and develop action-oriented strategies to close industry skill gaps. So far these Skill Panels have developed a Critical Care Nursing Course Curriculum, a Workforce Readiness Curriculum and Certification pilot project, and a group to address specific barriers that are impeding Certified Nurse Aides (CNA). Upcoming initiatives include the distribution of a comprehensive statewide healthcare workforce development plan entitled Hawai'i's Healthcare Workforce 20/20 Plan & Report: Addendum to the Comprehensive State Plan for Workforce Development 2009-2014, and the creation of HawaiiHealthCareers.org, a website to both recruit and support individuals interested in pursuing careers in the healthcare industry.*

## Background

In a recent status report for the Governor's *A New Day in Hawai'i* Plan, the Abercrombie administration called the transformation of Hawai'i's healthcare systems "our most complex challenge."<sup>1</sup> Rising healthcare costs, an increasingly aging population and an insufficient number of skilled workers have contributed to a "critical condition" for Hawai'i's healthcare sector. The state faces many challenges, including significant health disparities in groups such as Native Hawaiians and Pacific Islanders, rural residents, homeless families, and recent immigrants. These could be mitigated by expanding the primary care healthcare workforce. Healthcare employers in general have difficulty finding skilled workers in many occupations, especially in specialty positions where there are few or no local training resources. While there are many organizations working to assess and solve these and other challenges, until recently there has been no organization taking responsibility for creating a coordinated, statewide effort to address the issues through workforce planning.

Some of the state's major barriers to developing a skilled healthcare workforce include a lack of labor market information for high-demand and particularly "specialized" occupations, the high cost of living and transportation that inhibits training for neighbor island residents, and rural and isolated areas where residents have limited access to healthcare services. As described elsewhere in this journal, when compared to average US healthcare utilization rates, these and other barriers have led to an estimated 20% lack of primary care providers in the state, as well as shortages in many other healthcare occupations.

Long-term projections show an increasing demand for health

occupations. Citations include: "Personal care and service occupations are expected to lead growth with 20.4 percent" and "healthcare support will expand significantly by 19.0 percent, followed by healthcare practitioners and technical occupations with a 15.0 percent growth."<sup>2</sup> In addition, the Hawai'i Comprehensive Economic Development Strategy 2010 Report noted, "Health services will likely show the sharpest growth, with the number of workers increasing nearly 54 percent from 2007 to 2035."<sup>3</sup> If the state does not have enough skilled healthcare professionals, it can never meet the growing healthcare needs of Hawai'i's residents.

The US Department of Health and Human Services (DHHS) is charged with implementing many aspects of the Affordable Care Act of 2010. Within DHHS, the Health Resources and Services Administration (HRSA) created grant opportunities for Healthcare Workforce Planning and in 2010 Hawai'i was one of 22 states awarded a \$150,000 grant. The Workforce Development Council (WDC), attached to the State Department of Labor and Industrial Relations, is the lead agency for the grant's implementation.

The WDC is a private-sector led body responsible for advising the Governor and Legislature on preparing Hawai'i's workforce development infrastructure to support economic development and employment opportunities for all. The WDC is also the Statewide Workforce Investment Board for purposes of statewide oversight and direction of federal job training dollars funded through a formula fund from the Workforce Investment Act (WIA) of 1998. Additionally, the WDC assists the Governor and Legislature in developing and updating the state's comprehensive five-year strategic workforce investment plans and oversees workforce investment activities in the state.

Under the leadership of WDC members representing Hawai'i Pacific Health, the Hawai'i Primary Care Association, the University of Hawai'i Community College System, the Chamber of Commerce of Hawai'i, and in partnership with the John A. Burns School of Medicine's Area Health Education Center and the State Board for Career and Technical Education, the WDC had already implemented a sector-based approach known as Industry Skill Panels to identify and resolve specific workforce issues for Hawai'i's health care industry. The panels brought together stakeholders throughout the state to identify barriers and solutions. This initial work was one of the reasons Hawai'i was well positioned to win the grant under the Affordable Care Act.

By using broad-based collaboration, leveraging resources and aligning state efforts, the grant report, *Hawai'i's Healthcare Workforce 20/20 Plan & Report: Addendum to the Comprehensive State Plan for Workforce Development 2009-2014* (the "Plan"), was published in December 2011 to identify and address

workforce shortages, especially in high-demand occupations. This Plan has a primary goal of increasing the primary care workforce in Hawai'i by 20% by the year 2020, where primary care is defined as occupations which provide or support basic health services, based on the extensive definition of "required primary health services" from section 330(b)(1) of the Public Health Service Act.

## Methods

Industry Skill Panels were first pioneered in Washington State in 2000. Since then, Washington has launched more than 40 panels and the concept has expanded geographically and within industries. Some of Washington's successes include reducing the vacancy rate of Invasive Cardiovascular Technicians by 100% between 2003 and 2007, and initiatives of the original four Skill Panels leveraging over \$18 million in additional investments (30 times the public funds invested).

Industry Skill Panels can be described as private/public partnerships working to ensure employees in key industries have the skills needed to meet the changing needs of businesses quickly and competently. These panels harness the expertise of leaders in business, labor, education, economic development, and other sectors to identify workforce development strategies while closing skill gaps in a specific industry. Industries using

Skill Panels in other states have included healthcare, construction, agriculture and food processing, information technology, electronics, energy, transportation, aerospace, and advanced manufacturing.

Skill Panel leaders build consensus, prioritize their local and regional industry workforce needs, and are better able to mobilize partners and leverage resources to make the greatest impact. Additionally, their mutual efforts are more influential with government, businesses, associations, and educational institutions, than filling workforce needs alone within silos.

## Results

Using this best practice framework, the WDC formed a number of Healthcare Skill Panels to address the gap in healthcare services and healthcare workforce opportunities for Hawai'i residents in nursing, long-term care, primary care, technical disciplines, and work readiness (see Figure 1: Anatomy of Industry Skill Panels). Over 150 stakeholders from employers, education, the public workforce system, economic development, and labor contributed their time and expertise to work toward desired outcomes that would benefit the state as a whole. Participants identified current workforce issues and developed strategies to close industry skill gaps.

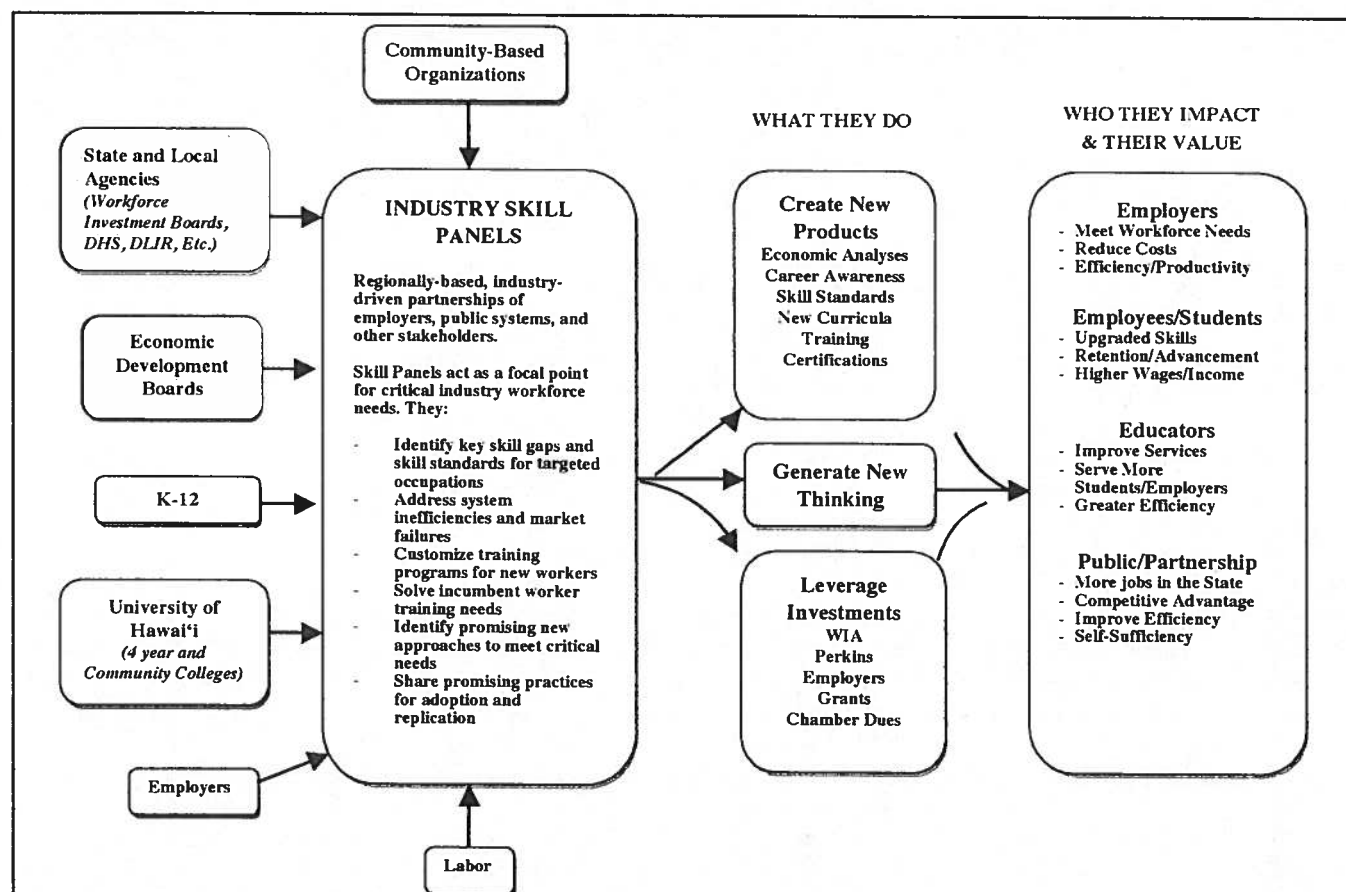


Figure 1: Anatomy of Industry Skill Panel

(Source: Evaluating Industry Skill Panels: A Model Framework, June 2008)

A major issue identified at the first group of Skill Panel meetings was that while statistics show a large increase in healthcare occupations in the coming years, current Labor Market Information (LMI) has been misleading. For instance, in the past five years, statewide LMI has shown a high need for Registered Nurses (RNs). However, this data was not segregated to show which types of nurses were most needed. Therefore, many nursing schools began training RNs as quickly as possible to meet the upcoming workforce needs. Unfortunately, many of these RN were gaining the bare minimum credential, an Associate's degree, and were not meeting the needs of employers who required Bachelor's degrees with specialty experience. Therefore, many new RN graduates were compelled to take jobs below their level of training and expected pay grade or move away, while employers were driven to hire expensive temporary RNs from outside of the state until their current employees could be trained to fill the available high need specialty positions. Had the LMI been segregated into more detailed data segments, this consequence may have been avoided. This and other LMI issues that must be addressed in order to create a healthy workforce are further described in the Plan followed by stakeholder inspired solutions.

Though much of the Plan's success will take place in the future as funds are secured for implementation, there have been a number of "quick wins" from the Skill Panel sessions, including:

- A Critical Care Nursing Course Curriculum, an initiative of the Nursing Skill Panel, is a collaboration between several employer and education organizations which surveyed employers to find the highest need nursing specialty area (identified as Critical Care), and then collaborated to develop specialty training for current RN and new graduates in order to fast-track them into these high need critical care specialties. This Critical Care pilot program is expected to launch in April 2012 with a total of eight participants, two of whom will be recruited to participate through local colleges and universities. If this pilot is successful, best practices from this employer driven model will continue to guide future healthcare curriculum development for additional high need specialty areas;

- The *Ready, Set, Grow* work readiness curriculum and certification pilot project is partially a product of the Workforce Readiness Skill Panel. Employers at the first Skill Panel session indicated that workforce readiness was a top priority. The UH Community College system identified an appropriate curriculum and testing vendor and is conducting the pilot project using blended funding from several sources. While the pilot program uses a broad platform, the curriculum is adaptable to the needs of healthcare employers and can be customized as needed. A total of 92 students enrolled in the pilot course from summer through the fall of 2011 at either Windward Community College (WCC) or Leeward Community College (LCC). At this point, no students have taken the National Career Readiness Credential (NCRC) test, but once the set-up and contract for the testing site

have been completed, the program aims for at least 60 percent of participants to earn the NCRC. More information about the pilot can be viewed at [www.readysetworkhawaii.com](http://www.readysetworkhawaii.com); and,

- The formation of a group of stakeholders to address specific barriers that are impeding Certified Nurse Aides (CNA). The group has been actively working with state agencies to identify and find solutions for issues such as recertification, safety and oversight, training, and testing. As Hawai'i's aging population grows, the need for skilled CNA will only increase. Some of this group's recommendations can be found in the Legislative Barriers section of the Plan.

Information from an Initial Skill Panel Report as well as months of gathering additional data and feedback from stakeholders has led to the development of the Plan, which will be utilized by all collaborating partners to address the identified needs. The Skill Panels began as statewide groups focused on specific industry interest areas (Primary Care, Long-Term Care, Technical Disciplines, Nursing, and Workforce Readiness), yet over time the Skill Panels recommended that Local Workforce Coordinator positions be created to facilitate the coordination of local Skill Panels to be formed in each county, which will meet regularly to address unique regional workforce issues. Each Local Workforce Coordinator position will also have a specialty focus—Human Resources, Health IT, Academics (including Facilities and Preceptorships), or Long-Term Care. Other goals of the Plan include: improving LMI data through the collection and analysis of more detailed LMI; completing, maintaining and regularly updating the *HawaiiHealthCareers.org* website as a recruitment strategy; and organizing "Aloha Committees" to welcome new primary care professionals, particularly in rural areas, for increased retention.

## Discussion

The four main strategies to reach the Plan's goal include:

Strategy 1: Create an early warning system for impending workforce shortages.

Strategy 2: Fill gaps in education and training.

Strategy 3: Strengthen the pipeline into health careers.

Strategy 4: Leverage resources to maximize their benefit to the state as a whole.

The Plan has been discussed at length in Skill Panel meetings in each county as well as through individual outreach and conference calls with Skill Panel members to ensure maximum statewide stakeholder support. The Plan was published in December 2011 and made available to all stakeholders, legislators, and the general public. The plan is viewable online at: <http://hawaii.gov/labor/wdc>. Funding for implementation of this plan has not yet been procured. However, federal funds may become available for a subsequent Healthcare Implementation Grant such as is currently operating in the State of Virginia. A funding request for the Affordable Care Act: State Health Care Workforce Development (SHCWD) program has been included



in the President's proposed budget for FY2012 for approval by Congress. WDC will continue to seek other federal, state, and private funds to implement the Plan leading to a final impact of increasing Hawai'i's primary care workforce by 20% by the year 2020 while improving LMI for all health careers to fill current and future workforce gaps.

### **Conflict of Interest**

None of the authors identify any conflict of interest.

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# Projects in Medical Education: "Social Justice In Medicine" A Rationale for an Elective Program as Part of the Medical Education Curriculum at John A. Burns School of Medicine

Teresa Schiff MSIII; and Katherine Rieth MSIII

## Abstract

**Background:** Research has shown that cultural competence training improves the attitudes, knowledge, and skills of clinicians related to caring for diverse populations. Social Justice in medicine is the idea that healthcare workers promote fair treatment in healthcare so that disparities are eliminated. Providing students with the opportunity to explore social issues in health is the first step toward decreasing discrimination. This concept is required for institutional accreditation and widely publicized as improving health care delivery in our society.

**Methods:** A literature review was performed searching for social justice training in medical curricula in North America.

**Results:** Twenty-six articles were discovered addressing the topic or related to the concept of social justice or cultural humility. The concepts are in accordance with objectives supported by the Future of Medical Education in Canada Report (2010), the Carnegie Foundation Report (2010), and the LCME guidelines.

**Discussion:** The authors have introduced into the elective curriculum of the John A. Burns School of Medicine a series of activities within a time span of four years to encourage medical students to further their knowledge and skills in social awareness and cultural competence as it relates to their future practice as physicians. At the completion of this adjunct curriculum, participants will earn the Dean's Certificate of Distinction in Social Justice, a novel program at the medical school. It is the hope of these efforts that medical students go beyond cultural competence and become fluent in the critical consciousness that will enable them to understand different health beliefs and practices, engage in meaningful discourse, perform collaborative problem-solving, conduct continuous self-reflection, and, as a result, deliver socially responsible, compassionate care to all members of society.

## Background

In our increasingly diverse society, the imperative to understand cultural pluralism becomes undeniable. In the health professions this is especially true, as lack of attention to sociocultural variations in the understandings of health and illness lead to patient dissatisfaction, non-adherence, and poor health outcomes.<sup>1</sup> The racial/ethnic disparities in health addressed in the Institute of Medicine report, *Unequal Treatment*, make it clear that the duty of a physician includes social responsibility and accountability toward the emotional, cultural, and socioeconomic context of the patients he/she seeks to treat. In medical education, cultural competence refers to knowledge, attitudes, and skills that enable health care professionals to communicate with and understand the culturally diverse health beliefs and practices of their patients. Aspects of diversity include, but are not limited to, race, ethnicity, gender, sexual orientation, religion, and country of origin.<sup>1,2</sup> The Liaison Committee on Medical Education (LCME) has recently included cultural competency educational objectives (ED-21 and ED-22) necessary for medical school accreditation. These objectives state that medical students must demonstrate an understanding of how culturally diverse perceptions of health and illness affect response to symptoms, disease, and treatment. They also require students to understand how gender and cultural biases affect health care delivery.

To foster active ownership and understanding of this duty to future patients, the authors proposed an elective curriculum that was accepted by the John A. Burns School of Medicine (JABSOM) at the University of Hawaii. Beginning with the class of 2015, JABSOM has launched a four year adjunct elective program leading to its first "Dean's Certificate of Distinction" in Social Justice. The program is dedicated to addressing the necessity to improve health care delivery by future physicians. The certificate encompasses a variety of activities that cultivate humanitarianism and social responsibility throughout medical school with the expectation that students will continue such activities in their practice, and have the skills and desire to care for those most in need. This certificate program challenges its participants not only to internalize required objectives in cultural competency but to translate their understanding of biases and inequalities into tangible strides toward eliminating disparities.

## Methods

To identify publications addressing undergraduate medical education requirements in cultural competency as well as the current recommendations for implementing these standards, the authors systematically searched the PubMed database. Search terms were: *cultural competency, education; cultural competence, education; social justice, education; social justice, program development*. Relevant articles focused on social justice and cultural competency training through medical school curriculum. Only English-language studies were chosen and the search was limited to the past ten years. Studies and reviews were limited to those published regarding United States and Canadian medical education, as that is the scope of the LCME governance. Reviews were also limited to undergraduate medical education and excluded residency or clinician-level training. Search criteria included nursing school programs in social justice and cultural competency training, as a means of comparing similar programs. The authors searched for additional publications in the bibliographies of those that had been already discovered, as well as in literature reviews that included descriptions of important publications on these topics.

## Results

Twenty six articles were found addressing social justice curriculum or cultural humility training. The Carnegie Foundation for the Advancement of Teaching and the Future of Medical Education in Canada (FMEC) Project are two widely respected authorities on medical education reform. The Carnegie Foundation provided the foundation for progressive medical education reform at the beginning of the 20th century with its *Flexner Report*, which laid the foundation for current medical educa-

tion. In 2007, the FMEC Project looked at current and future undergraduate medical education, and like Flexner, created a set of recommendations that summarized new priorities for medical education in light of the new challenges facing medicine in the 21st century.<sup>3</sup> In addition to FMEC, the Carnegie Foundation also released a report in 2010, *Educating Physicians: A Call for Reform of Medical School and Residency*.<sup>4</sup> A follow up to the Flexner Report of 1910, this report calls for new innovations in medical education to address the ever-changing climate of medical practice.

FMEC makes it clear that medical education in the areas of cultural competence and social responsibility is required to improve the delivery of care and health outcomes. The mandate of this report dovetails with goals to promote “civic professionalism” in which physicians and medical students feel obligated not only to the individual patient, but also to local and global communities. The American Board of Internal Medicine released a document entitled *The Charter on Medical Professionalism* in 2002. Among their three fundamental values defining medical professionalism is the principle of social justice, which requires physicians to work actively to “eliminate discrimination in health care” and to “promote fair distribution of health care resources.”<sup>5</sup> Further, a 2010 national study from the Center for Studying Health System Change revealed that 48.6% of physicians are not comfortable communicating with patients due to language or cultural barriers.<sup>6</sup> Thus, it is imperative to provide students early opportunities to obtain the skills necessary to overcome potential barriers that will otherwise hinder patient care.

A number of articles address cultural competency and medical education. It is clear that future physicians need these skills and it has been shown that cultural competence training is, indeed, effective.<sup>7</sup> Research has shown that cultural competence training improves attitudes, knowledge, and skills of clinicians to care for diverse populations. This is most evident in the doctor-patient encounter during which physicians are able to engage in a richer dialogue with the patients and increase both seeking and sharing information during the medical visit.<sup>10</sup> Previous efforts in cultural competence education have employed the categorical approach in which attitudes, beliefs, and behaviors of specific cultural groups are taught. Unfortunately, this approach often leads to oversimplification and stereotyping of a culture, and this loses utility in clinical practice as a patient's cultural context is much more complex than a list of features. The realization of this unintended outcome has resulted in a shift toward teaching a set of skills and a framework that allow a clinician to assess individually what sociocultural factors might affect that patient's care.<sup>1</sup> Learning these skills can be especially helpful to physicians in providing care for patients who have different cultural backgrounds, health care experiences, and understandings of the biomedical model. Kumagai and Lyson point out that it is not enough to aim to become culturally competent. It is important to emphasize the idea of “critical consciousness,” which is to develop a reflective awareness of one's own biases, assumptions, and beliefs, and then to push beyond that understanding in order to take action toward

creating justice.<sup>8</sup> Many authors echo the belief that education must go beyond informative cultural competency training to transform learners to develop the long-term “critical consciousness.”<sup>6,9-12</sup>

A 1998 article in the *Journal of Health Care for the Poor and Underserved* offers the term “cultural humility” instead of “cultural competence.” The term humility exchanges the notion of cultural mastery for a “lifelong commitment to self-reflection and self-critique” and acknowledgement of patient-physician imbalances.<sup>13</sup> DasGupta, et al, describe how these shifts in thought processes can lead to significant changes in the patient-physician relationship, and ultimately in health outcomes. If one is to develop a “critical consciousness,” it is clear that social justice and cultural humility cannot be taught in a one-hour lecture format. It is a way of thinking that must be integrated throughout the whole of the educational experience and continued as a lifelong skill.<sup>14</sup> Suggested strategies from the FMEC include linking social accountability objectives to measurable health care outcomes, providing students with opportunities to learn in low-resource and marginalized communities, and providing greater support to medical students and faculty as they work in community advocacy and develop closer relationships with the communities they serve.<sup>15</sup>

Hage and Kenny describe a Social Justice Approach to Prevention, which focuses on empowering trainees and engaging them in community conditions through education, research, interventions, and political processes.<sup>16</sup> The FMEC provides specific recommendations to increase the integration of prevention and public health into the MD education curriculum. This involves: (1) working in multidisciplinary, inter-professional teams; (2) understanding the role of physicians in health promotion, assessing health policy, and health systems, providing culturally safe care, “thinking upstream prevention” to develop a social justice program; and (3) understanding the social determinants of health, which include education, employment, culture, gender, housing, income and social status, and how these affect patients and communities.<sup>3</sup> Suggestions for developing this change include teaching learners how to look at individuals in the context of their environments, consider both patient-doctor and population-doctor relationships, and identify patients who are part of “at-risk” populations, as well as teaching learners to apply critical appraisal of evidence to individual patient care (building on the concept of “critical consciousness” mentioned earlier). The importance of these concepts must be echoed in the objectives of a program in social justice.

The recommendations made by the Carnegie Foundation are grouped into a number of themes. Within the theme of standardization and individualization of the curriculum, this report recommends offering elective programs for students and residents to work in areas of special interest, such as public health/advocacy and global health. They envision learners taking on “multiple professional roles and commitments associated with being a physician,” which include advocacy and interprofessional collaboration to achieve the best health outcomes for their patients. A social justice curriculum would address this

recommendation by offering students opportunities to pursue in these areas. In addition, it may serve as a platform for other disciplines, such as public health, law, and/or social work, to offer electives in their area of expertise.

Finally, the University of Massachusetts Medical School has developed a Global Longitudinal Pathway to afford their students domestic and international experiences with poor populations. The longitudinal program is based on the idea that cultural competence is not "acquired at a given period but is a continuous process of self-examination and global perspective taking."<sup>17</sup> These authors also prefer the term cultural humility in order to emphasize continual learning and self-reflection. By integrating opportunities in patient advocacy, cultural humility, and civic engagement throughout their students' four-year undergraduate medical education, participants clearly demonstrate increased confidence in their skills and attitudes toward serving diverse populations. This program is just one example of how to impart lifelong skills in cultural humility while fulfilling LCME guidelines according to FMEC and Carnegie Foundation recommendations.

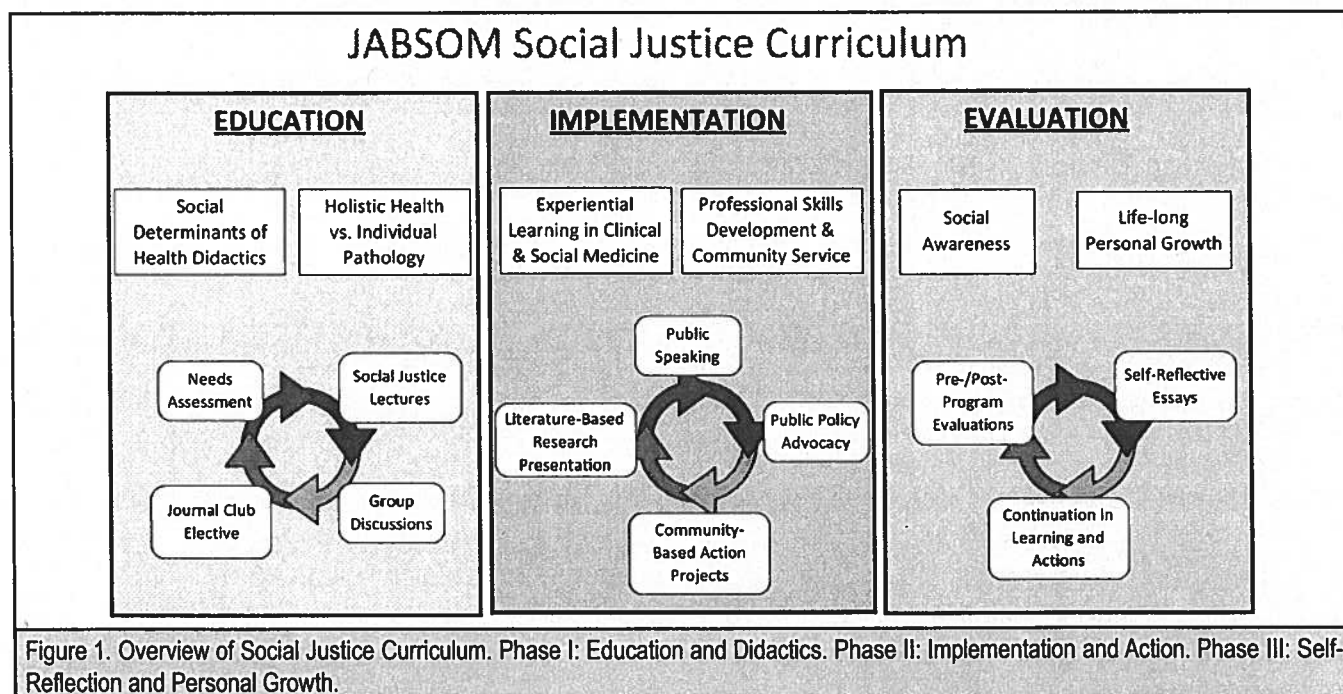
## Discussion

As Hawai'i's only MD granting institution and the leading provider of doctors for Hawai'i<sup>18</sup> JABSOM is uniquely obligated to address the need for its students to develop skills in cultural humility. To help students in the pursuit of meeting the goals and recommendations described above, JABSOM has launched a pilot four year adjunct elective program leading to the "Dean's Certificate in Social Justice," the first Dean's Certificate in the JABSOM curriculum. This is the first such program in America or Canada specifically addressing social justice (though other programs may share similar principles).

This unique curriculum and opportunity for medical students at JABSOM echoes the national efforts regarding reform in medical education for improving health care delivery. The pilot program consists of a series of activities over a time span of four years to encourage medical students to further their knowledge and skills in cultural competence longitudinally as it relates to their future practice as physicians. An overview of the program is summarized in Figure 1.

The authors designed the curriculum to link social accountability to health care outcomes by requiring participants to engage in a community and/or scholarly project that addresses social determinants of health. In addition, participants are required to be active members of JABSOM's resident interest group in social justice (Partnership for Social Justice), which will promote greater support for medical students and faculty as they work in community advocacy, interdisciplinary collaboration, and develop closer relationships with the communities they serve. Thirdly, in partnership with the existing medical education curriculum at JABSOM, and activities such as the HOME (Homeless Outreach and Medical Education) project and the Department of Native Hawaiian Health's cultural competency curriculum, the social justice certificate program encourages students to participate in opportunities to learn in low-resource and marginalized communities through the various rural health and community health center options for various clinical requirements throughout the standard JABSOM curriculum.

An important aspect of the curriculum is the integration of classroom education with clinical experience. The concept of gaining knowledge and experience to help gain understanding of the patient's narrative is a key element in this pilot program described by Kumagai and Lyson.<sup>7</sup> Through both didactic and experiential learning, the goal is to engage participants in



precisely this type of integration. By encouraging students to participate in course work, readings, and lectures that focus on different aspects of social justice in health, while simultaneously encouraging students to be active in local communities through volunteer service, community-based projects, and/or research, students will integrate the concepts of social justice with action and experience.

Furthermore, this program utilizes a particular strength of JABSOM, the problem based learning curriculum. Studies of curricular implementation in this area have shown that facilitated small group discussions are an effective method in eliciting self-reflection on beliefs, values, and experiences.<sup>19</sup> This environment provides a mutually supportive atmosphere that encourages students to explore their own biases, and this is the critical first step in appreciating broader cultural differences. Based on this and other research, our program is designed to utilize the benefits of the small-group experience to encourage discussion and self-reflection regarding social issues inherent in health and medicine in both formal and informal classroom and meeting settings.

An essential aspect of this pilot program is assessment and evaluation of its efficacy in achieving the program's goal to produce culturally competent, socially responsible physicians dedicated to serving the underserved. The four-year program requires an entry and exit assessment of its participants to evaluate growth in competence of the curriculum objectives. Administrative support will be required to engage in longitudinal assessment of the participants after graduation from JABSOM as they choose type and geographic location of their careers in medicine. Because of the amount of time it takes to complete undergraduate medical education and residency, the authors estimate it may take more than ten years to establish meaningful data on the efficacy of this program.

This pilot program at JABSOM rests on a strong foundation of understanding social determinants of health. This requires medical students to engage in collaboration with students and faculty of education, law, social work, business, public health, and various community organizations. Using a holistic definition of health to include such things as access to affordable housing, healthy foods, quality education, and fair legal action, the need to collaborate becomes obvious. Importantly, we strive to encourage a self-reflective attitude, the crux of developing a "critical consciousness" that is vital in practicing socially responsible medicine.<sup>6</sup> The principles of social justice go beyond acknowledgement and understanding of cultural differences to promote equity and the dignity of each individual. The hope of this program is to foster ideals of humanitarianism and social responsibility throughout the medical education experience so that it may become a life-long enterprise.

This supplement to the existing medical education curriculum at JABSOM is more than a novel addition; it is part of the currently evolving mandate of medical education reform. Providing students with the opportunity to explore social issues in health care is not only part of the current guidelines for institutional accreditation, it is a widely publicized component of improv-

ing future doctors and health care delivery in our society. This is true on a national level, and the issues manifest uniquely in the state Hawai'i. It is the hope and the focus of the authors' efforts to encourage medical students to go beyond cultural competence and become fluent in the critical consciousness that will enable them not just to understand different health beliefs and practices, but engage in meaningful discourse, collaborative problem-solving, and continuous self-reflection that allows for the delivery of socially responsible, compassionate care to all members of society.

## Conflict of Interest

None of the authors identify any conflict of interest.

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# Reflections on an Eye-Opening Rural Health Experience of a Second Year Medical Student

Kendra E. Dilcher MSII

## Introduction

Idyllic perceptions of American Samoa are quickly dispelled when one considers the health of its inhabitants. Samoa is one of the most obese nations in the world, with 93.5% of the population being overweight (body mass index [BMI] of 25 to 29), and 74.6% being obese (BMI of 30 or greater).<sup>1</sup> In comparison, 73.6% of the United States' population is overweight, while about one-third is obese.<sup>2</sup>

In addition, the World Health Organization reports that 47% of adults in American Samoa have diabetes<sup>3</sup> and there are high rates of hypertension, hyperlipidemia, coronary artery disease, congestive heart failure, stroke, peripheral vascular disease, chronic kidney disease, venous stasis, cholelithiasis, amputations, degenerative joint and disk disease, and gastroesophageal reflux disease, all conditions associated with obesity. In what follows, the causes of and potential solutions for this epidemic will be explored from a physician's perspective, through the eyes of a visiting medical student.

Dr. Fred Uhrle, the local attending for the rotation, was born and raised in American Samoa, came to the United States for college and medical school, worked in private practice for about 20 years, then returned to Samoa four years ago to pursue a federal job with the US Department of Veteran's Affairs (VA). Shadowing him in the VA clinic and evaluating patients during their examinations brought to light the severity of the obesity problem in Samoa.

The first patient was a 59-year-old obese man with uncontrolled diabetes, hypertension, and sleep apnea, currently taking six prescription medications. Despite being on several medications to control his diabetes, his hemoglobin A1c was 8% and his feet were swollen. His nuclear stress test was not completely reliable because his weight decreased the clarity of the images given by the machine. He wanted to get bariatric surgery to help control his weight, yet he needed to lose 5% of his weight in order to be eligible, and had not managed to lose any pounds over the previous six months. Dr. Uhrle advised him accordingly and continued his regime.

Next, a 57-year-old obese woman with hypertension, gastric esophageal reflux disease, chronic low back pain, and diabetes came in for a checkup. The third patient, a 52-year-old obese man, also had diabetes, hypertension, and sleep apnea. He was on four medications. It was impossible to tell if his legs were swollen, due to his large size. The fourth and fifth patients with similar profiles were also on numerous medications and still had multiple uncontrolled health problems.

It was difficult to imagine all Samoans as having such severe health problems. The attending explained that Samoa is a different place now than it was 40 years ago. When he was a child "most [people] were active, working on family planta-

tions and fishing. Very few were obese. Lawns and fields were cleared with machetes." Today, Samoans "have become very sedentary. Few work on plantations and even fewer fish. It used to be that driving the coast in the evenings, you would see folks out on their canoes or in small wood rafts fishing – reflections of lanterns on the water. Not today, and very few even during the day. Villagers used to go out together and shared the catch with everyone."<sup>4</sup>

This decrease in physical activity has been compounded by Americanization of the Samoan diet, particularly with food high in fat, processed carbohydrates, sugar, salt, and foods low in fiber, vitamins, and minerals. Portion sizes have increased greatly. Patients at the VA clinic commented that it was rather common to eat three or more eggs, several thick slices of Spam, a few scoops of rice and toast for breakfast, four to five sandwiches for lunch, and meat and rice for dinner, in addition to snacks such as Bongo chips and Saimin throughout the day. It is distressingly common to see children eating bags of chips with sodas and popsicles on their way to school in the morning. Furthermore, people tended to report going to one of the five fast food restaurants at least once a week, most often to McDonald's. When visiting McDonald's, people often order a burger (250-900 calories), a 16 oz soda (150 calories), and a large fries (500 calories),<sup>5</sup> even at 10am in the morning. The amount of calories people were eating for one meal was nearly as much as healthy individuals eat in an entire day! Thus, it came as no surprise that the McDonald's in Samoa is one of the most lucrative in the world.

It has also long been a Samoan cultural custom to center family gatherings around food. However, "Samoan culture has taken on a Western flavor and the food that is offered generally consists of kegs of high fat beef [known locally as *pisupo*]. Food served is supplemented with salty side orders, white rice, soda and dessert, and each person served on 1 or 2 large aluminum foil trays." Asking patients about their views on how this affects their weight, some responded by saying that they "know the foods are no good but can't stop eating them because they taste good." They did not have fast foods, frozen, or canned foods when they were younger. They ate foods from their land, not wasting things or having as many leftovers, because there weren't ways to save the food. Today, people can package foods into containers and store them in refrigerators, allowing them to have constant access to leftover unhealthy foods.

The attending remembers that there was only one overweight child in his class until 8th grade, and very few overweight students in his high school. Yet today he feels that "now it is the norm. It is acceptable that people are overweight. No one thinks much of it anymore." When he carefully reminds a patient that he or she is obese or overweight, "many just smile or nod that

they realize they are obese, but since they don't feel ill they do not see it as a problem." He feels that it doesn't mean much to patients when he tells them they are obese. Moreover, he believes that "to some it is somewhat a sign that you can afford a lot. [Samoans] have not yet associated it with poor health." Compounding the problem is the misconception locals have as to the prevalence of obesity in their communities: patients commonly believe that obesity affects only 40%-60% of the population, and are shocked to learn the number is closer to 75%. However, they do acknowledge the fact that things are getting worse, as children are getting bigger and having more significant health problems.

### Potential Solutions to Combat Obesity in Samoa

So what can be done in a society that has completely changed its ways over a few decades? Can Samoa return to its traditional ways of living? How can Samoa overcome obesity? "Education" seemed to be the most common answer, when asking people these questions. Dr. Uhrle feels that constant reminders in the office and through the media can provide relevant information to Samoans to promote physical health. "We have to teach our kids and not wait until they are obese adults," he suggests.

Some people in Samoa are starting to try to combat the obesity problem. Local churches and other organizations have begun programs like "The Biggest Loser" to encourage weight loss and physical fitness. However, people compete to lose weight for a monetary reward and the weight loss is not sustained. People starve themselves to get prize money without learning to change their eating habits or lifestyles, and they gain the weight back over time. Radio stations are beginning to encourage proper nutrition, weight management, and exercise as well. They are also advising people to seek help from diabetes educators. Yet there is only one such individual in the entire South Pacific. Other sources of education come from people like football star Troy Polamalu, known as the "Samoan Headhunter," who returns to Samoa in the summers to organize and administer football camps for the youth. According to locals, he encourages healthy eating and exercise and is a positive role model for the younger generations, motivating them to live healthy lifestyles.

Dr. Uhrle continues to explain the risks of being obese, to motivate patients to lose weight. Just telling them, however, doesn't help. He also encourages daily exercise and changes in eating habits, advising people to cut down on processed foods, rice, soda, juice, noodles, salt, and fatty foods. He tries

to push for diets high in vegetables and lean meats. Since many of his patients are diabetic as well, he counsels them on ways to maintain healthy blood glucose levels, including checking their levels daily and following up with him every few months. However, even though he educates patients about how to lose weight and control their sugar, it is hard to gain compliance. He finds that although people have the knowledge and tools necessary to lose weight, they lack the motivation to change.

### Conclusion

Of the 61 patients encountered over the 4 week time period, 43 were obese based on their BMI scores, and most others were overweight. Many of these patients would tend to apologize to Dr. Uhrle when he commented that they hadn't lost weight and needed to start changing their lifestyle before their health worsened. He would respond by telling them not to be apologetic, but to be aware that they were putting themselves at a higher risk of health complications, due to obesity and its associated difficult-to-control medical problems. When asked about how they felt when Dr. Uhrle spoke about their obesity, most patients reported liking how straightforward he was. It was helpful for them to be fully aware of their health and the problems they would face if they didn't take control over their weight. Although the obesity problem in Samoa may be alleviated by educating the people, especially the children, about healthy diets, lifestyles, and weight management, it is apparent that this will be a difficult uphill battle. A battle that this medical student is drawn to help solve after this excellent clinical experience.

### Conflict of Interest

The author identifies no conflict of interest.

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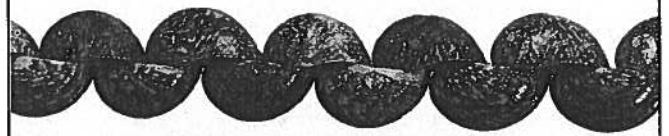
List of Abbreviations	
EHR	Electronic Health Record
AAFP	American Academy of Family Physicians
AAMC	Association of American Medical Colleges
AAMS	American Board of Medical Specialties
AAPMR	American Academy of Physical Medicine & Rehabilitation
ACGME	Accreditation Council for Graduate Medicine
AHEC	Area Health Education Center
AIU	Adopt, Impliment or Upgrade
AMA	American Medical Association
APRN	Advance practice registered nurse
ARRA	American Recovery & reimbursment Act
BMI	Body Mass Index
C N A	Certified Nurse Aid
CAQH	Council for Affordable Quality Healthcare
CME	Continuing Medical Education
COGME	Council on Graduate Medical Education
CORE	Committee on Operating Rules for Information Exchange
CPOE	Computerized Physicain Order Entry
DCCA	Department of Commerce & Consumer Affairs
DHHS	US Department of Health & Human Services
DHS-MQD	Hawaii Department of Human Services , Med-QUEST Division
EPs	Eligible Professionals
EHRS	Electronic Health Record
ESRI	Envionrmental Systems Research Institute
FMEC	Future of Medical Education in Canada
GIS	Geographical Information Systems
GME	Graduate Medical Education
HASC	Healthcare Administrative Simplification Coalition
HBME	Hawaii Board of Medical Examiners
HCA	Health Claims Acknowledgement
HHIE	Hawaii Health Information Exchange
HHS	Health & Human Services
HIE	Health Information Exchange
HIPAA	Health Insurance & Portability and Accountability Act
HiPWRT	Hawaii Physician Workforce Research Team
HIT	Health Information Technology
HITECH	Health Information Technology for Economic & Clinical Health
HJMPH	Hawaii Journal of Medicine & Public Health
HMA	Hawaii Medical Association
HOME	Homeless Outreach & Medical Education
HPREC	Hawaii Pacific Regional Extension Center
HPSAS	Health Professional Shortage Areas
HRSA	Health Resources and Service Administration
HSRHA	Hawaii State Rural Health Association
JABSOM	John A. Burns Schhol of Medicine
JMC	Jefferson Medical College

LCC	Leward Community College
LCME	Liaison Committee on Medical Education
LMI	Labor Market Information
MCCP	Medical Claims Conciliation Panel
MUA/P	Medically Underserved Area or Population
NCRC	National Career Readiness Credential
NH	Native Hawaiian
NHCOE	Native Hawaiian Center of Excellence
NHOPI	Native Hawaiians & Other Pacific Islanders
ONC	Office of National Coordinator for Health Information Technology
PCMH	Patient Centered Medical Home
PCPs	Primary Care Physicians
PM&R	Physical Medicine & rehabilitation
PPCP	Priority Primary Care Providers
PSAP	Physician Shortage Area Program
RFP	Request for Proposal
RN	Registered Nurse
SDE	State Designated Entity
SHCWD	State Health Care Workforce Development
SMHP	State Medicaid Health Info Technology Plan
UCERA	University Clinical, Education & Research Associates
UH	University of Hawaii
UH SONDH	University of Hawaii School of Nursing & Dental Hygiene
UPD	Universal Provider Datasource
USAPI	US Affiliated Pacific Island
VA	Veteran's Affairs
WCC	Windward Community College
WDC	Workforce Development Council
WIA	Workforce Investment Act

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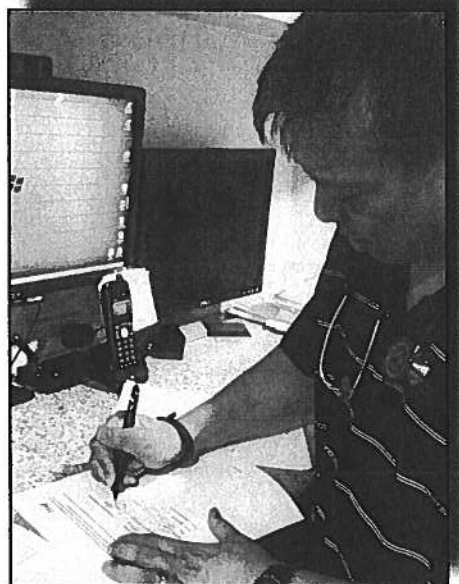
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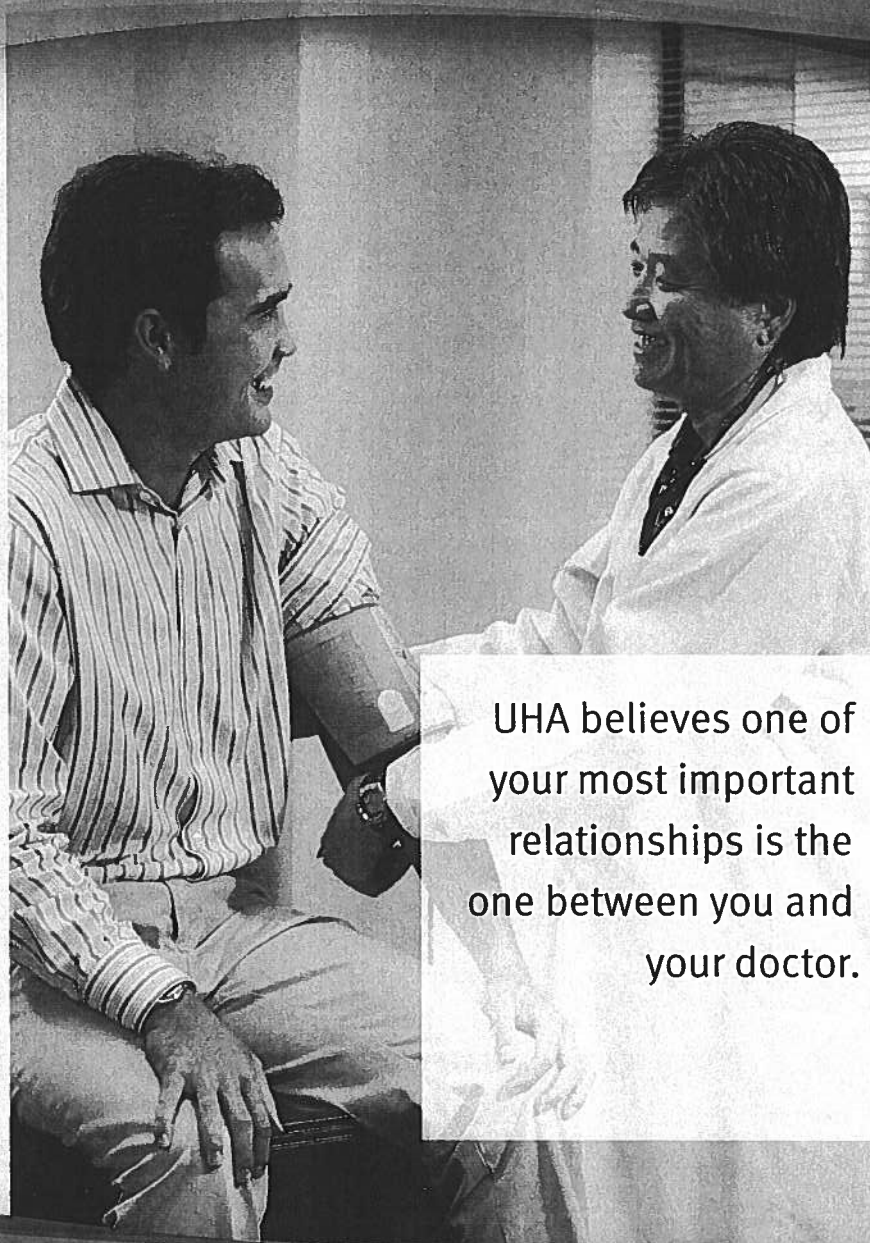
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