UNIVERSITY OF HAWAI'I SYSTEM REPORT

REPORT TO THE 2011 LEGISLATURE

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

Act 18, SSLH 2009 (Section 5)

December 2010

Hawai‘i Physician Workforce

What are the facts?
Where are we headed?
What can we do?

In accordance with Act 18, SLH, 2009
A report to the 2011 Hawai‘i State Legislature:
Findings from the Hawai‘i Physician Workforce Assessment Project

Prepared by:
John A. Burns School of Medicine
Area Health Education Center
December 2010

Forward

The purpose of Act 18, SLH, 2009 is to "implement statewide physician workforce assessment and planning." It builds on work begun by Act 219, SLH, 2007 and has resulted in: 1) A secure database of non-military practicing physicians in Hawai‘i; 2) Identified supply/demand gaps; 3) Projections of physician supply and demand through 2020; and 4) Development of a plan to mitigate the supply/demand imbalances.

The results of this study demonstrate a current shortage of 600 physicians (more than 20% of our total supply) and an impending shortage of 1,600 by 2020. Because physician shortages of the magnitude described will directly impact the health and well-being of virtually all residents of Hawai‘i, something must be done. Unfortunately, there is NO easy fix to the problem. If we are to overcome this growing shortage, all sectors of society must play a part. Ten actions are described in this document as the first steps and the researchers strongly advise that they be implemented as soon as possible in order to have a chance of mitigating severe shortages.

The researchers would like to acknowledge the Hawai‘i State Legislature and Hawai‘i State Board of Medical Examiners for their foresight in appreciating the potential seriousness of

the physician shortage problem and providing the funds to bring us to this point. We respectfully submit this report to the 2011 Legislature.

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Executive Summary

While anecdotal reports of physician shortages in Hawai‘i have long been entertained, there are now hard data that show that we currently have a shortfall that exceeds 600 physicians, when compared with a community of the same size on the mainland. Hawai‘i needs over 200 additional adult primary care providers and is particularly short of Neurosurgeons, Cardiologists, Infectious Disease specialists and General Surgeons. Geographically, although the problem is most acute on Hawai‘i Island, residents throughout the state are beginning to experience problems accessing physician services.

Our statistical supply-demand model indicates that if significant changes are not made soon in the medical care delivery system, our recruitment and retention effectiveness and the number of doctors that are trained in-state, Hawai‘i will have a shortage of over 1,600 physicians by 2020. The imbalances are driven principally by population growth and aging, combined with the anticipated loss of over 40% of our practicing physicians to retirement.

In order to mitigate the shortage problem, ten interventions have been prioritized by Hawai‘i healthcare experts and stakeholders. They include investing in pipeline activities that get more local students into healthcare careers, expanding medical training that addresses geographic distribution and specialty needs, enhancing incentives for physicians to practice on the neighbor islands, involving communities in the recruitment and retention of physicians, creating a more favorable physician practice environment through tort reform, administrative simplification and reimbursement changes and moving the model of care toward a team-based “patient-centered medical home” integrated delivery system that will allow a much smaller physician workforce to

care for a larger and older Hawai‘i populace. The extent of changes needed is very challenging and can only be achieved if all sectors of society (physicians, healthcare administrators and personnel, government, insurers, educators, business and the community) work together to create changes that increase the supply of practicing physicians and decrease the demand for healthcare services in Hawai‘i.

Hawai‘i Physician Shortage: Only a Neighbor Island Problem?

We have a shortage of over 600 physicians in Hawai‘i today, a gap that exceeds 20% of the total physician workforce. The problem is most acute on the island of Hawai‘i, but people everywhere, including urban O‘ahu are also starting to feel the effects in a variety of specialties.

Table 1. Physician Shortage by Island, 2010

Island	Supply	Demand	Shortage
Hawai‘i	313	487	174
Kaua‘i	136	183	47
Lāna‘i	0.4	5	4.6
Maui	268	375	107
Moloka‘i	11	16	5
O‘ahu	2130	2461	331
Total	2858	3527	669

Please see Appendix A for island-specific estimates by specialty.

*To gain a perspective on the magnitude of the problem, consider the following: If one were to add up **all** of the physicians who work within our two largest medical groups, Straub and Kaiser, the total would be fewer than 500 physicians.*

What are the Facts?

Supply:

As of December 2010, approximately 2,860 full time equivalents (FTE) of non-military physicians provide patient care services in Hawai‘i. Although more than 8,300 physicians are licensed to practice medicine in our state, only about a third actually provide patient care services here. The specialties that are more than 20% short are listed below.

Table 2: Hawai‘i Statewide Physician Deficit: Specialties in Greatest Need

Specialty	Supply	Demand	Shortage	% short
Neurological Surgery	10.4	24	13.6	57%
Pediatric Cardiology	4.0	8.0	4.0	50%
Cardiology	61.4	107	45.6	43%
General Surgery	73.1	125	51.9	42%
Infectious Disease	17.2	29	11.8	41%
Neurology	32.9	53.8	20.1	39%
Gastroenterology	47.1	76	28.9	38%
Endocrinology	15.6	25	9.4	38%
Pulmonary	28.8	45.6	16.8	37%
Thoracic Surgery	18	27.6	9.6	35%
Anesthesiology	147.3	226	78.7	35%
Medicine/Med Peds	388.7	575.7	187	33%
Diagnostic Radiology	130.9	186	55.1	30%
Urology	35	49.6	14.6	29%
Rheumatology	14.8	14	4	29%
Neonatology	15.8	22	6.2	28%
Otolaryngology	31.6	44	12.4	28%
Oncology/Hematology	31.3	43	11.7	27%
Family Med/General Practice	316.5	404.4	87.9	22%

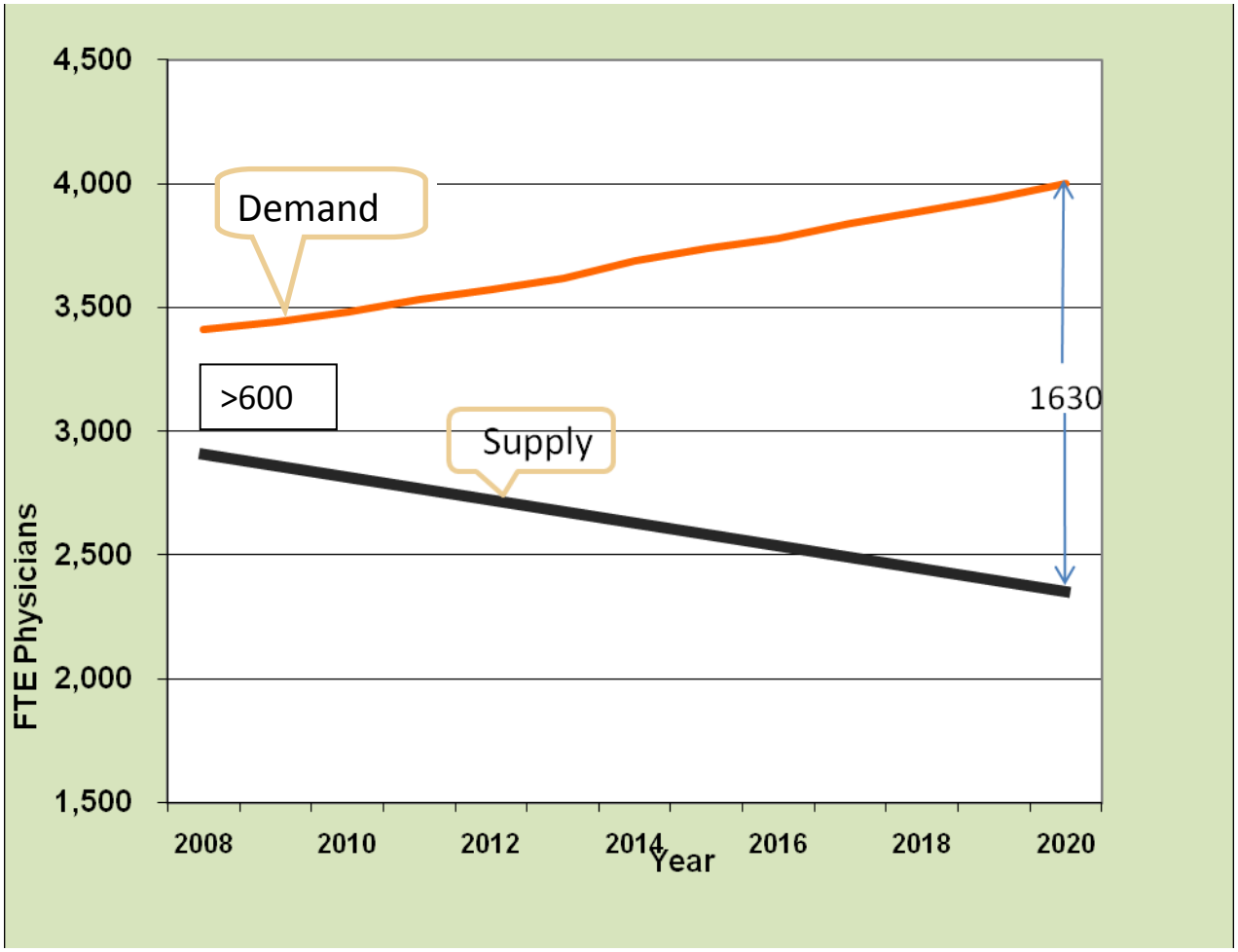
Refer to Appendix A for a detailed listing of the physicians on each island by specialty. Other specialties with large unmet need that are being researcher further are Radiation Oncology, General Pathology and Pediatric subspecialties.

Demand:

If Hawaii's utilization of physician services were to match the average mainland usage, our current demand for physicians would be about 3,500. If our population grows as anticipated and no changes are made in the system of care or current utilization patterns, our state will need over 4,000 doctors by the year 2020. More in-depth analyses are provided in Appendix C, where different health care scenarios are postulated.

Combining all of the factors included in the research, the best estimate of supply and demand is displayed in the figure below:

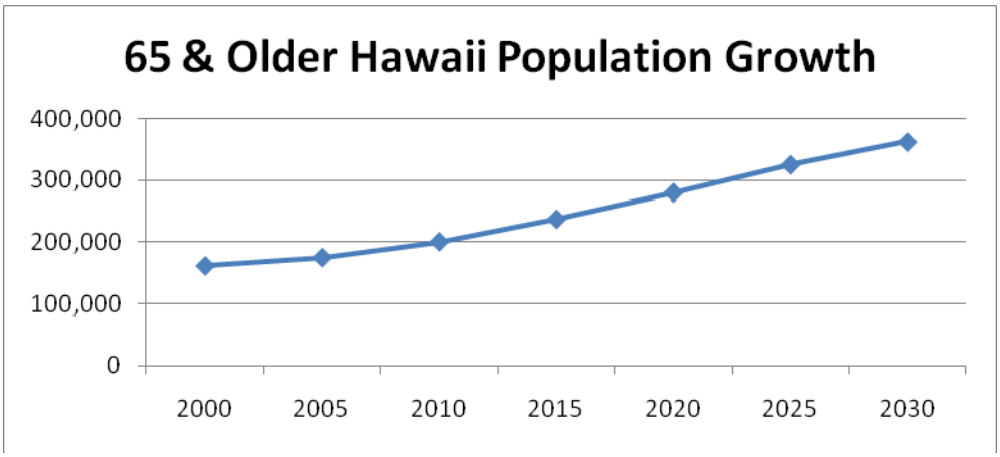
Figure 1: Hawai'i Physician Supply and Demand Projections



What is Causing the Physician Shortage?

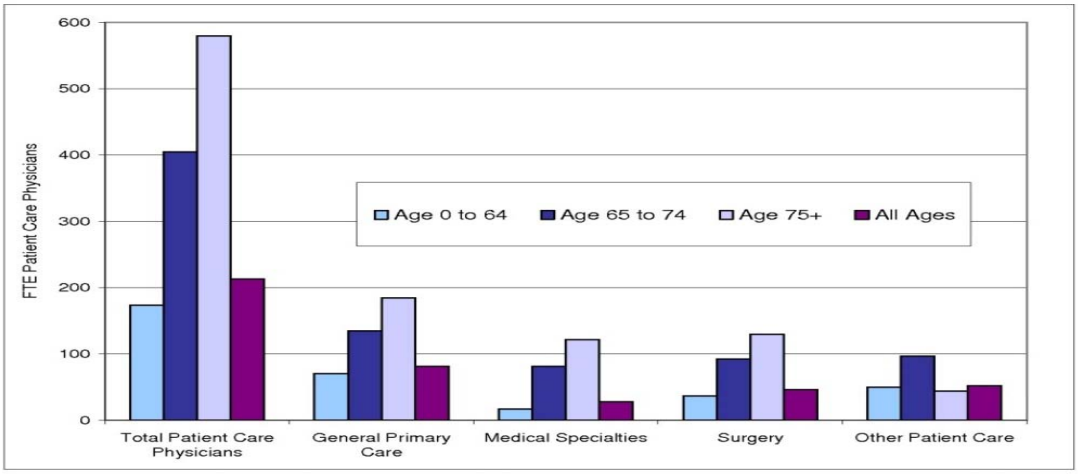
The Hawai‘i population is expected to grow from 1.21 million to 1.55 million between 2000 and 2030, a 28% increase.[1] Furthermore, the Hawai‘i population is aging at a rapid rate. During this same period of time, the number of Hawai‘i residents age 65 and older is projected to double.

Figure 2: Population Aging and Growth in Hawai‘i[1]



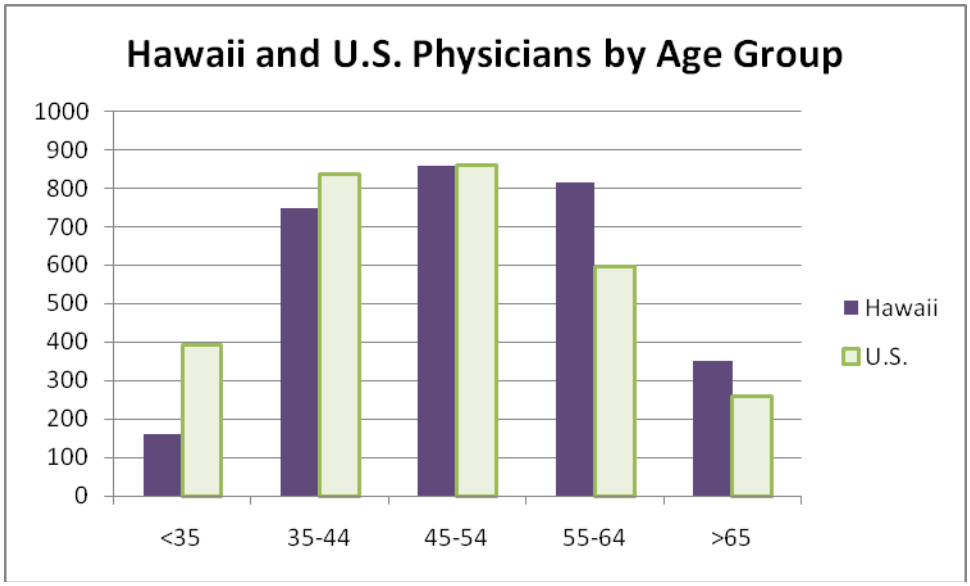
This is significant because the 75 and over age group uses more than three times the physician services as the under 65 population.[2] Therefore Hawaii's utilization of physician services will be rising significantly faster than it has in the past.

Figure 3: Use of FTE Patient Care Physicians per 100,000 Population[3]



Unfortunately, our doctors are getting older, too. Across the U.S, 29% of the physicians are 55 years of age or older. However, in Hawai‘i, 41% of our physicians are 55 or older and will reach retirement age during the coming decade (Figure 4). According to the Association of American Medical Colleges (AAMC), Hawai‘i has the 5th oldest physician workforce of all the states (percent of practicing physicians 60 and older) and the 6th smallest percentage of young physicians (practicing physicians under 40). [4] Taken together, Hawai‘i is in the least advantageous position of all the states.

Figure 4: Comparison of proportionate ages of US and Hawai‘i Physicians[5]



When examined more closely, many of our specialties are particularly in jeopardy when the ages of the providers are examined.

Figure 5: Hawai‘i General Surgeons by Age Group

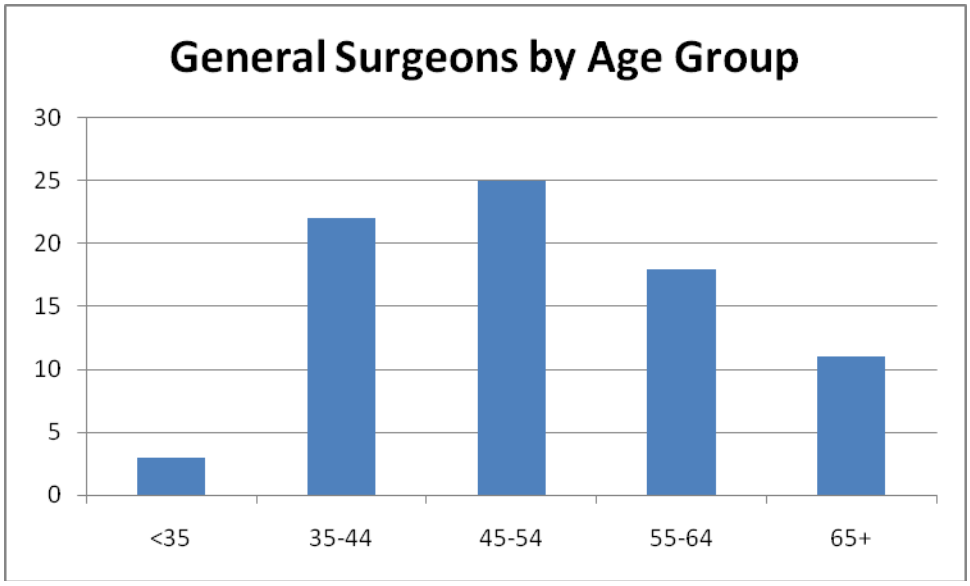
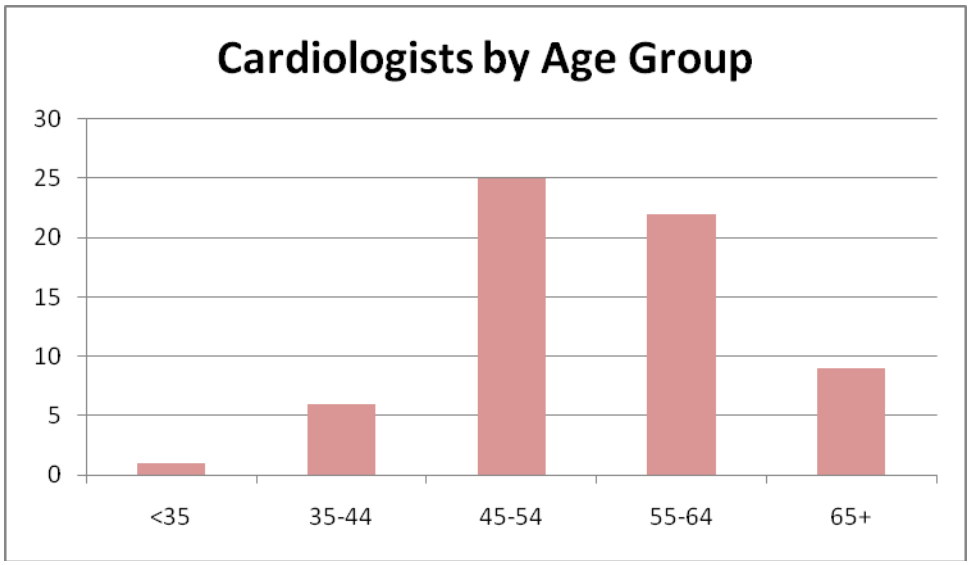


Figure 6: Hawai‘i Cardiologists by Age Group



Half of our cardiologists will be retirement age by 2020 and we are not attracting nearly enough to replace them. Fortunately, a Cardiology training program has been established in Hawai‘i this year, educating two cardiologists annually, but this will not solve the current severe shortage of 45 cardiologists.

Concurrent with these demographic trends, the U.S. has simply not trained enough physicians to keep up with our growing needs. In the late 1990's when the prevailing sentiment was that there would be a large physician surplus, the number of physicians trained annually was capped at the 1996 level. This federal restriction was not relaxed until 2009. It is now recommended that medical schools increase their class size by 20-30%.[6] However, due to the length of medical training (11 years for a primary care doctor and 15 years for a neurosurgeon), this impact will not be felt for many years. There are several other factors that affect the physician workforce, including productivity, employment opportunities and generational trends. A discussion of these is included in Appendix B.

What Will This Mean for Healthcare in Hawai'i?

In the context of a deepening national physician shortage, simply maintaining the current annual inflow will be challenging. As stated earlier, despite active recruitment activities, Hawai'i will probably suffer a net loss of 50 physicians every year in the face of dramatically rising demand. If the delivery system remains the same as today, many Hawai'i residents will not have timely access to care. Newcomers, the indigent and the elderly will feel it first. As the shortage deepens, we'll all experience the effects. Harried PCPs will spend precious little time with each patient, focusing primarily on immediate acute problems. Preventive care, health screening, early diagnosis and even physician job satisfaction will be triaged to the sideline. Our emergency departments will be over-flowing, our hospitals will be running at above 100% occupancy and the costs will be staggering.

This scenario is clearly unacceptable. Before we reach this point our health insurers will most likely be compelled to approach large physician groups on the mainland to contract for services. These groups would hire physicians and send them to Hawai‘i to provide medical care. The quality of the people they send will probably depend on how much we're willing to pay and it would be very expensive.

On the other hand, if appropriate changes are made in our healthcare delivery system, a smaller physician workforce will be able to adequately care for a larger, older Hawai‘i population. Mainland healthcare organizations have shown that physicians, when practicing within an integrated delivery system such as the Mayo Clinic or the Geisinger Health System, can care for many more people, while generating better quality outcomes at lower costs. Moreover, in these team-based "integrated delivery systems" both the patients and the physicians have higher levels of satisfaction.[7]

The predictions discussed are based on the health care system remaining as it is today. Many variables can change. For example, if there are advances in medical science that cure chronic disease, demand will decrease. Increasing medical insurance coverage will increase demand, especially for primary care services. If the primary care provider shortage continues, much of the initial care of patients will be shifted to emergency departments, driving up both demand for Emergency Physicians and cost of care.[8]

Why is the Physician Shortage Hard to Fix?

Every state is facing the same demographic trends as Hawai‘i, making physician shortages a national phenomenon. Each doctor in a shortage specialty will be highly sought after, making it harder and harder for Hawai‘i to recruit. The most common barriers to recruitment and retention are listed in Appendix D and have to do with incentives, practice environment and family needs. Efforts to retain physicians are complicated by the fact that many of the doctors who move here from elsewhere never fully assimilate into the community or do not find the medical groups, jobs or schools they expected. Many have overriding family concerns or leave for better income potential on the mainland. The physicians most likely to stay in Hawai‘i long term are the ones who grew up in and/or trained in Hawai‘i.

Training:

Currently 74 medical students and between 75 and 80 residents are trained in Hawaii each year. Due to the number of years required to train a physician (11 to 15 years), we cannot simply "train our way out of the problem." However, it is far easier to recruit a physician trained in-state. About half of all John A. Burns School of Medicine (JABSOM) graduates practice in Hawai‘i and more than 80% of JABSOM graduates who also complete a residency training program here will practice in Hawai‘i. Therefore if we can expand the training for local students and target it to our specific needs we will maximize the benefit of our medical educational system and are likely to retain more of our local providers. For example, if we need more primary care physicians in Hilo, then we should select more qualified students from Hilo and provide much of their primary care training in Hilo.

Unfortunately, expanding our medical training capacity will require a substantial amount of funding and the federal government only pays part of the cost. Because Hawai‘i is a small state with limited clinical teaching resources, we will never be able to train the entire scope of specialists that are needed. Therefore we must look to complementary solutions to the physician workforce shortage.

Enticements:

Enticements such as loan repayment, tax incentives, effective malpractice reform and supportive networks have not been widely adopted in Hawai‘i. In addition, a majority of young physicians are looking for an employment situation, rather than a private practice opportunity that entails more financial risk. In Hawai‘i, we have a large percentage of solo and small group practitioners, and limited physician job opportunities. Some feel that the solo practice/small group structure of our delivery system, where few have the ability to offer employment positions, is the most notable reason Hawai‘i is not attracting young physicians.

Productivity:

If we can’t increase the supply of physicians fast enough, then we can only hope to mitigate the damage by increasing system-wide productivity and decreasing unnecessary care. Interventions such as Electronic Health Records, creating care teams with non-physician clinicians and striving for administrative simplification (less paperwork, fewer billing/payment obstacles and more reasonable procedures for obtaining authorization for diagnostic tests or surgery) have been successfully implemented in other states, but have met resistance in Hawai‘i.

Because of the doctor shortages, the traditional model of care delivery will have to change. Best case scenario is that medical teams composed of a range of health professionals from home caregivers to neurosurgeons must work together to provide the care we need. Ideally, we will all have timely access to a primary care provider via a Patient Centered Medical Home, where our medical records will be kept in electronic form, where we will receive individualized care by providers that we know and trust, where referrals to specialists or for tests will be tracked and where we can expect consistent follow up care.

Solutions to act on now:

The solutions tend to fall along two lines: 1) growing the physician workforce by optimizing our recruitment and retention activities and expanding our training; and 2) transforming the delivery system so that a smaller physician workforce will be able to adequately care for an older and larger Hawai‘i population. The researchers emphasize that both must be successfully achieved within a relatively small window of time.

An extensive literature review, fourteen focus groups and interviews with local healthcare experts were completed across the state to identify potential solutions to the physician shortage. More than 50 interventions were uncovered with responsibilities that could be allocated to physicians, hospitals, insurance companies, businesses, education, government and communities. The researchers urge the interested reader to examine Appendix E for details.

Because there are so many solutions, assistance was needed to identify the ones to engage in first. In June, 2010, the John A. Burns School of Medicine hosted the **Hawai‘i Physician**

Workforce Summit. A total of 144 policy makers, administrators, health professionals and stakeholders spent the day prioritizing potential solutions. A brief summary is included at the end of Appendix D and the presentations and documents from this meeting are available at www.ahec.hawaii.edu/workforce.html. The ten priority steps identified at the summit are listed in Table 3 below.

Table 3: Solutions to Address First (in alphabetical order):

1. Administrative Simplification
2. Change System of Care
3. Community Integration in Recruitment/Retention
4. Electronic Health Records
5. Expand Pipeline Programs
6. Increase Net Physician Income
7. Increase Targeted Training
8. Increase Usage of Non-physician Clinician Teams
9. Institute Rural Pay Differential and Other Incentives
10. Tort Reform

What's Being Done?

The JABSOM Area Health Education Center (AHEC) Workforce Researchers (Researchers) are working to make advances in the ten areas prioritized above. A brief overview is included here.

1. Researchers created a secure database of practicing physicians.

2. Researchers have compiled data from both a physician survey and a population survey to measure access to physician services in Hawai‘i (see Appendix D). The researchers intend to repeat these surveys annually or biennially to trend our access to care.
3. JABSOM AHEC is coordinating recruitment activities for young students considering careers in medicine (particularly those from areas of unmet demand).
4. JABSOM has increased its medical school class size and AT Stills University has established a site in Wai‘anae that trains Osteopathic doctors.
5. Medical educators in Hawai‘i are working to expand support for rural training opportunities on neighbor islands.
6. JABSOM’s Department of Family Medicine and Community Health is establishing the Hilo Family Medicine Residency Program and Queens Medical Center has started a Cardiology fellowship.
7. Researchers are working with the Hawai‘i State Rural Health Association to plan a conference in April, 2011, titled: Communities Taking Action to Build Their Workforce.
8. A Medical Malpractice Reform workgroup of physicians and lawyers has been established and will meet regularly to develop a possible grant application and draft legislation for the 2012 session.
9. Insurance carriers are implementing payment reform based on the patient centered medical model and one insurer had instituted a 10% rural differential.
10. Hawai‘i Health Information Exchange and the Beacon Grant Project on the Island of Hawai‘i are working to expand utilization of electronic health records.
11. Researchers have met with insurance carriers to develop ideas to simplify administrative burdens and reduce paperwork, such as creating a website that would house standardized

billing rules and forms for all Hawai‘i insurers, as well as drug formularies and other insurance information.

12. Researchers will survey physicians born in Hawai‘i but practicing on the mainland to determine the reasons they are not presently in Hawai‘i and for those with an interest in returning to Hawai‘i, what it would take to bring them back.
13. Researchers are collaborating with Hawai‘i Medical Education Council to plan a conference in 2011 to bring medical community together to better understand the patient centered medical/health care home model and discuss systems reform.
14. JABSOM AHEC is partnering with Hawaii Department of Labor and Industrial Relations to accomplish the aims set forth in the new Hawai‘i State Healthcare Workforce Planning Grant for fiscal year 2010 from the U.S. Health Resources and Services Administration.
15. The researchers are involved in preliminary discussions to introduce the patient-centered medical home model into local medical education.
16. The researchers are developing a network to share aggregate physician workforce data and a discussion board for idea sharing.

Next Steps?

Like many difficult and complex problems, our physician shortage will take leadership, organization and resources to overcome. The authors recommend that a Center for Physician Workforce Development be established with a board of directors comprised of healthcare and community leaders, supported by permanent public funding. This center would provide the Legislature with regular reports on the status of the physician workforce and the public's access to physician care. It would work with all sectors of society and have the expertise and

experience to develop and facilitate the implementation of solutions we need. Subcommittees could be formed for specific tasks and staffed as needed to bring people together, implement solutions and track the impact. The authors offer this as the most practical way to support and monitor the many interventions that are needed to address Hawaii's growing physician shortage.

Appendix A: Supply and Demand Comparison by Island

This appendix includes tables of the best estimate of supply and demand of physician full time equivalents in Hawai‘i by specialty by island as of 12/31/2010. A brief description of the assumptions and limitations of the data are first described.

Supply numbers are obtained by using the names of all the physicians licensed in Hawai‘i who listed a Hawai‘i address. Of these physicians, 72% completed the voluntary physician survey which provides the best source of information on practice location. Physicians who did not complete the survey were searched for using all available staff lists, insurance sources, local contacts and on-line searches. Therefore physicians who are new to the state, especially if they do not accept any of the local insurances, are difficult to find and may not be included in the dataset. Physicians who live on the mainland but provide patient care services to Hawai‘i patients, such as **Radiologists** and **Pathologists,** who read images/slides remotely, are difficult to locate. In addition, **Anesthesiologists** are often hired by groups or hospitals and may not be listed in public directories, so if they did not fill out the on-line physician renewal survey, they may not be included in the data. Every attempt was made to include the employed, new and remote physicians. However it was difficult to quantify their time spent serving Hawai‘i patients and therefore the tables may represent a falsely low supply. It should also be noted that specialty groups in Hawai‘i are very active at recruiting physicians to meet their particular demand, as opposed to the difficulty faced in recruiting a sole providers to set up a practice in a rural area.

Demand in this model is estimated by the average US utilization of services with adjustments for Hawai‘i age, gender, ethnicity, insurance rates and obesity rates (as a marker of chronic disease).

In order to take into consideration Hawaii's unique geography, adjustments had to be made for specialties that must have a critical mass in an isolated geographic area such as **Emergency Medicine** and **Critical Care**. Emergency Medicine is calculated at the number of providers it takes to staff the number of emergency departments in our state (25), with five being the minimum number of doctors needed for the small volume hospitals to cover the emergency room around the clock (24/7). Similarly Critical Care demand was set at current supply if the supply surpassed the demand.

Psychiatry demand is still being studied. Psychiatry is a specialty with anecdotal reports of high unmet need in Hawai‘i, yet the national modeling methodology failed to demonstrate this. It may be that in Hawai‘i, we don't have the base of primary care physicians, psychologists and other behavioral health professionals to provide care for basic mental health needs that are traditionally cared for by these providers on the mainland. Therefore we have set demand at the level of supply until further investigation can be conducted.

Finally, there is no national estimate for demand in emerging specialties for which there is no residency training such as **Urgent Care** or **Hospitalist physicians**. Therefore providers in these specialties are listed in the "Other" category for supply.

For the small isolated islands of Moloka‘i and Lāna‘i that cannot support specialist physicians on a full time basis, demand is estimated based on primary care and any specialties that are found there currently. More detailed analysis is needed to assess hours per week of specialty services required on these islands. Finally, please note that "Unmet Need" is specific to specialty on each

island, therefore it does not always total the difference between" Total" physician supply and "Total" physician demand.

Island of Hawai'i	Dec, 2010		
Specialty	Supply	Demand	Unmet Need
Adult Psychiatry	17.0	18.0	1.0
Allergy/Immunology	1.0	2.0	1.0
Anesthesiology	16.0	31.0	15.0
Cardiology	5.4	15.0	9.6
Child Psychiatry	6.9	4.0	0.0
Critical Care	0.0	2.0	2.0
Dermatology	3.3	5.0	1.7
Diagnostic Radiology	14.2	24.0	9.8
Emergency Medicine	26.9	41.0	14.1
Endocrinology	1.3	4.0	2.7
Family/General Practice	65.8	58.0	0.0
Gastroenterology	6.6	10.0	3.4
Medicine/Med Peds	35.0	75.0	40.0
General Surgery	9.4	17.0	7.6
Geriatrics	1.5	5.0	3.5
Infectious Disease	0.0	4.0	4.0
Neonatology	0.1	3.0	2.9
Nephrology	1.2	4.0	2.8
Neurological Surgery	0.1	3.0	2.9
Neurology	1.1	7.0	5.9
OBGYN	18.8	27.0	8.2

Oncology/Hematology	2.5	6.0	3.5
Ophthalmology	5.7	13.0	7.3
Orthopedic Surgery	7.0	13.0	6.0
Otolaryngology	1.4	6.0	4.6
Pathology, General	6.5	11.0	4.5
Pediatrics, General	20.4	33.0	12.6
Peds Cards	1.0	1.0	0.0
Peds Heme Onc	0.5	1.0	0.5
PM&R	1.3	5.0	3.7
Plastic Surgery	2.0	4.0	2.0
Preventive Medicine	0.8	3.0	2.2
Pulmonary	2.4	6.0	3.6
Radiation Oncology	1.4	3.0	1.6
Rheumatology	1.0	2.0	1.0
Thoracic Surgery	0.5	4.0	3.5
Urology	2.3	7.0	4.7
Vascular Surgery	1.2	1.0	0.0
Urgent/Hospitalist/Other	24.0	9.0	0.0
TOTAL	313	487	199

Kaua‘i	Dec, 2010		
Specialty	Supply	Demand	Unmet Need
Adult Psychiatry	6.3	***6.3***	0.0
Allergy/Immunology	0.0	1.0	1.0
Anesthesiology	9.0	11.0	2.0
Cardiology	3.0	6.0	3.0

Child Psychiatry	2.3	***2.3***	0.0
Critical Care	0.0	1.0	1.0
Dermatology	2.0	2.0	0.0
Diagnostic Radiology	5.0	9.0	4.0
Emergency Medicine	18.0	***18.0***	0.0
Endocrinology	0.0	1.0	1.0
Family/General Practice	20.0	21.0	1.0
Gastroenterology	1.0	4.0	3.0
Medicine/Med Peds	18.0	28.0	10.0
General Surgery	5.0	6.0	1.0
Geriatrics	0.0	2.0	2.0
Infectious Disease	1.0	1.0	0.0
Neonatology	0.0	1.0	1.0
Nephrology	1.1	2.0	0.9
Neurological Surgery	0.0	1.0	1.0
Neurology	1.0	3.0	2.0
OBGYN	6.0	9.0	3.0
Oncology/Hematology	1.1	3.0	1.9
Ophthalmology	4.0	5.0	1.0
Orthopedic Surgery	6.0	5.0	0.0
Otolaryngology	2.0	2.0	0.0
Pathology, General	2.0	4.0	2.0
Pediatrics, General	10.0	12.0	2.0
PM&R	1.0	2.0	1.0
Plastic Surgery	0.2	1.0	0.8

Preventive Medicine	0.0	1.0	1.0
Pulmonary	1.0	2.0	1.0
Radiation Oncology	0.0	1.0	1.0
Rheumatology	0.0	1.0	1.0
Thoracic Surgery	0.0	1.0	1.0
Urology	1.6	3.0	1.4
Vascular Surgery	0.6	1.0	0.4
Urgent/Hospitalist/Other	7.5	3.0	0.0
TOTAL	136	183	52

Lānaʻi	Supply	Demand	Unmet Need
Total	0.4	5.0	4.6

Maui	Dec, 2010		
Specialty	Supply	Demand	Unmet Need
Adult Psychiatry	9.8	14.0	4.2
Allergy/Immunology	1.0	1.0	0.0
Anesthesiology	13.6	24.0	10.4
Cardiology	8.0	11.0	3.0
Child Psychiatry	5.2	***5.2***	0.0
Critical Care	0.0	2.0	2.0
Colorectal Surgery	1.0	1.0	0.0
Dermatology	8.3	4.0	0.0

Diagnostic Radiology	13.7	19.0	5.3
Emergency Medicine	16.7	***16.7***	0.0
Endocrinology	1.7	3.0	1.3
Family/General Practice	49.8	46.0	0.0
Gastroenterology	4.0	8.0	4.0
Medicine/Med Peds	29.4	59.0	29.6
General Surgery	5.5	14.0	8.5
Geriatrics	0.0	4.0	4.0
Infectious Disease	1.2	3.0	1.8
Neonatology	0.0	2.0	2.0
Nephrology	4.0	3.0	0.0
Neurological Surgery	1.0	3.0	2.0
Neurology	3.0	6.0	3.0
OBGYN	15.5	22.0	6.5
Oncology/Hematology	4.4	5.0	0.6
Ophthalmology	4.0	10.0	6.0
Orthopedic Surgery	8.5	10.0	1.5
Otolaryngology	4.5	5.0	0.5
Pathology, General	2.5	9.0	6.5
Pediatrics, General	19.0	28.0	9.0
Peds Cards	0.0	1.0	1.0
Peds Heme Onc	0.0	1.0	1.0
PM&R	3.3	4.0	0.7
Plastic Surgery	1.7	3.0	1.3
Preventive Medicine	2.8	2.0	0.0

Pulmonary	3.0	5.0	2.0
Radiation Oncology	2.0	3.0	1.0
Rheumatology	0.0	2.0	2.0
Thoracic Surgery	1.5	3.0	1.5
Urology	4.0	5.0	1.0
Vascular Surgery	1.0	1.0	0.0
Urgent/Hospitalist/Other	13.1	7.0	0.0
TOTAL	268	375	123

Moloka‘i	Dec, 2010		
Specialty	Supply	Demand	Unmet Need
Adult Psychiatry	0.5	0.7	0.2
Child Psychiatry	0.5	***0.5***	0.0
Emergency Medicine	2.3	5.0	2.7
Family/General Practice	3.5	2.4	0.0
Medicine/Med Peds	3.3	3.0	0.0
OBGYN	0.0	1.0	1.0
Pediatrics, General	0	1.7	1.7
Other	1.0	2	1
TOTAL	11	16	7

O‘ahu	Dec, 2010		
Specialty	Supply	Demand	Unmet Need
Adult Psychiatry	114.6	***114.6***	0.0
Allergy/Immunology	15.8	7.0	0.0
Anesthesiology	108.7	160.0	51.3
Cardiology	45.0	75.0	30.0
Child Psychiatry	27.4	***27.4***	0.0
Colorectal Surgery	2.5	4.0	1.5
Critical Care	23.8	***23.8***	0.0
Dermatology	34.8	21.3	0.0
Diagnostic Radiology	98.0	134.0	36.0
Emergency Medicine	122.0	***122.0***	0.0
Endocrinology	12.6	17.0	4.4
Family/General Practice	177.0	272.0	0.0
Gastroenterology	35.5	54.0	18.5
Medicine/Med Peds	303.0	410.7	107.7
General Surgery	53.2	88.0	34.8
Geriatrics	35.0	32.7	0.0
Infectious Disease	15.0	21.0	6.0
Neonatology	15.7	15.4	0.0
Nephrology	26.2	21.0	0.0
Neurological Surgery	9.3	17.0	7.7
Neurology	27.8	37.8	10.0

OBGYN	138.2	132.6	0.0
Oncology/Hematology	23.3	29.0	5.7
Ophthalmology	85.3	66.9	0.0
Orthopedic Surgery	57.3	62.3	5.0
Otolaryngology	23.7	30.0	6.3
Pathology, General	37.3	62.0	24.7
Pediatrics, General	154.6	153.6	0.0
Peds Cards	3.0	6.0	3.0
Peds Heme Onc	5.8	3.0	0.0
Peds Other Subspecialty	14.4	14.0	0.0
PM&R	32.0	25.0	0.0
Plastic Surgery	25.9	18.0	0.0
Preventive Medicine	22.2	13.0	0.0
Pulmonary	22.4	32.6	10.2
Radiation Oncology	7.0	19.0	12.0
Rheumatology	13.8	9.0	0.0
Thoracic Surgery	16.0	19.6	3.6
Urology	27.1	34.6	7.5
Vascular Surgery	7.4	7.0	0.0
Urgent/Hospitalist/Other	110.1	48.2	0.0
TOTAL	2130	2461	386

Appendix B: Background and Literature Review

Recent History of the U.S. Physician Workforce

The adequacy of the size of the American physician workforce has been a matter of debate since the end of the Second World War. The federal government's estimate of the relative size and adequacy of the physician workforce has been a swinging pendulum for the last five decades. In 1986 Congress created the College of Graduate medical Education (COGME) to assess physician workforce trends, training issues, and financing policies, as well as to recommend appropriate federal and private-sector efforts to address identified needs. COGME has conducted studies and submitted biennial reports, but the organization never developed the systems to track physician workforce supply, demand, need, and distribution at the county level on a regular and consistent basis.

From the 1950s through the early 1970s the pervasive sentiment was that the U.S. needed more physicians. The creation of Medicare (federally funded insurance program for the elderly) and Medicaid (federal and state funded insurance program for the indigent) in the mid-1960's undoubtedly accentuated this perception. During the late 60's and early 70's the federal government invested heavily in the medical education infrastructure, so that by 1980 the cumulative output of medical school graduates had essentially doubled from just over 8,000 in 1970 to 16,500+ per year.

The physician to population ratio increased rapidly during the 1980s, raising concerns of a physician surplus. With the apparent success of Medicare's prospective payment system for inpatient care, healthcare experts began to believe that Managed Care could easily become the

dominant delivery system throughout the country. Extrapolating its lower physician to population ratios to the U.S. as a whole produced wildly reduced demand estimates for physicians, particularly specialists. By the mid-90s Managed Care's increasing penetration throughout the country gave great credibility to the surplus camp, and soon COGME, the Association of American Medical Colleges (AAMC), the academic community, and the private sector were predicting substantial surpluses. Ultimately, this dominance of opinion swayed Congress and the Clinton Administration to include language in the Balanced Budget Act of 1997 (BBA) that caps the number of residency positions (physician post-graduate training) at the Dec. 31, 1996 level. This, in effect, continues to limit the number of physicians that can be trained in the U.S., regardless of need/demand.

The rather abrupt end of the Managed Care era in the early 2000's eliminated the most compelling argument for physician surpluses. At the same time studies with well-reasoned contravening points of view began to surface in the literature. Cooper in Milwaukee found that the demand for health care services closely tracks the nation's overall economic activity (Gross Domestic Product or GDP). He showed that over time, economic growth would spur increased demand for physician services, and since the growth in physician supply is constrained by federal statute (BBA), shortages were sure to ensue. Etzioni at UCLA looked at the impact population growth and aging would have on the demand for surgical services. Assuming that everything else would remain constant, he demonstrated that the expected demographic trends would dramatically escalate demand for the surgical specialties that provide care to the elderly.

In 2006 the federal Department of Health and Human Services (DHHS), through the Health Resources and Services Administration (HRSA), released a seminal report that details their forecast of an across the board national physician shortage by 2020 in the 10-20% range. Principally due to population growth, aging, changes in expectations of medicine, increasing prevalence of lifestyle-related chronic diseases and the impact of new technology, HRSA's model projects a 35-60% shortage of physicians in specialties that care for the elderly and similar shortages of nurses and mental health professionals.

In the past five years twenty-four states and twenty-one medical specialty societies have published independent studies. COGME, the AAMC, the Association of Academic Health Centers and Merritt, Hawkins & Associates, one of the largest private physician recruitment firms, have released their findings. The debate is over. Though the numbers may vary, all of these organizations anticipate broad physician shortages over the coming decade.

National Picture

In October 2003 the U.S. General Accounting Office (GAO) published a report on the U.S. physician workforce that focuses on physician supply changes in metropolitan and nonmetropolitan areas from 1991 to 2001. The overall number of physicians increased by 26%, about twice the national population growth. During this period, the average number of physicians per 100,000 people increased from 214 to 239, while the ratio of generalists to specialists remained about the same at about 1:2.[9]

Table 1: Physicians Per 100,000 People in the United States, 1991 and 2001[10]

Table 1: Physicians Per 100,000 People in the United States, 1991 and 2001

	1991	2001	Change from 1991 to 2001 (percentage)
All physicians	214	239	12
Generalists	78	87	13
Specialists	133	150	13

Sources: AMA, AOA, Bureau of Census, and Centers for Medicare & Medicaid Services (CMS).

Notes: Physicians refer to active, nonfederal, patient-care physicians with a known address. We could not categorize some physicians as generalists or specialists because there was no information about their specialty in the AMA or AOA Masterfiles. Specifically, records for 7,185 physicians (1 percent) in 1991 and 4,982 physicians (0.7 percent) in 2001 did not have information that would allow us to classify them as generalists or specialists. These physicians are included in the all physicians total but not in the generalist and specialist totals. The percentage change calculations are based on rates prior to rounding.

When it comes to physician supply, despite the gains, as seen in Table 2, the disparity between metropolitan and nonmetropolitan communities persists. Although this disparity is the "norm" across our nation, rural communities experience the same lack of access to physicians.

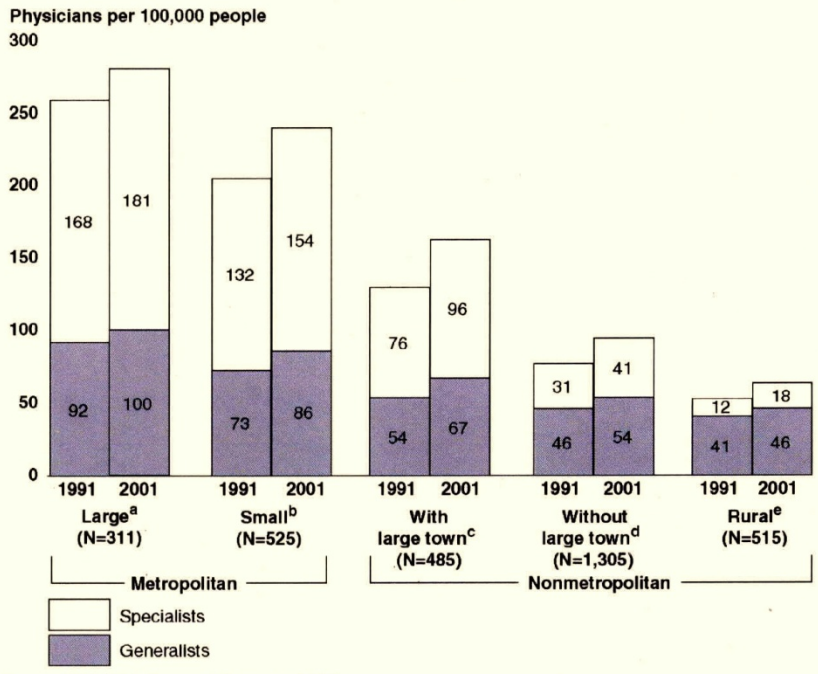
Table 2: Physicians Per 100,000 People in Statewide Nonmetropolitan and Metropolitan Areas, 1991 and 2001

	1991	2001	Change from 1991 to 2001 (percentage)
Nonmetropolitan			
All physicians	99	122	23
Generalists	49	59	19
Specialists	49	63	28
Metropolitan			
All physicians	242	267	10
Generalists	85	94	11
Specialists	154	171	11

Sources: AMA, AOA, Bureau of Census, and CMS.

Notes: Physicians refer to active, nonfederal, patient-care physicians with a known address. We could not categorize some physicians as generalists or specialists because there was no information about their specialty in the AMA or AOA Masterfiles. Specifically, records for 7,185 physicians (1 percent) in 1991 and 4,982 physicians (0.7 percent) in 2001 did not have information that would allow us to classify them as generalists or specialists. These physicians are included in the all physicians total, but not in the generalist and specialist totals. The percentage change calculations are based on rates prior to rounding.

Figure 1: Physicians Per 100,000 People by Metropolitan and Nonmetropolitan County Categories, 1991 and 2001



Sources: AMA, AOA, Bureau of Census, and CMS.

Notes: Counties without urban influence codes are not included in these figures. Physicians refer to active, nonfederal, patient-care physicians with a known address.

[a]Large metropolitan areas have at least one million residents.

[b]Small metropolitan areas have 50,000 to 999,999 residents.

[c]Large towns have 10,000 to 49,999 residents.

[d]Counties without large towns include those with or without a town of 2,500 to 9,999 residents.

[e]Rural counties have fewer than 2,500 residents.

Figure 1 above illustrates the final point that the GAO report makes. Nonmetropolitan areas with a "large town" do significantly better in recruiting physicians. There is a continuum from rural communities with less than 2,500 people to the metropolitan environment with more than a million people. This will be relevant when we discuss the physician numbers in our state.

The consistency of this continuum stems from the following three factors that physicians in virtually all of the specialties have to balance when making a location/relocation decision: [11]

1. Need for a sufficient caseload (i.e. population size) to provide a financial base competitive with other opportunities.

2. Professional satisfaction to include enough interesting cases/procedures and sufficient peer interaction.

3. Quality of lifestyle to include reasonable frequency of call and adequate vacation/off-time coverage.

Supply and Demand Factors

Many other factors impact the supply of healthcare providers:

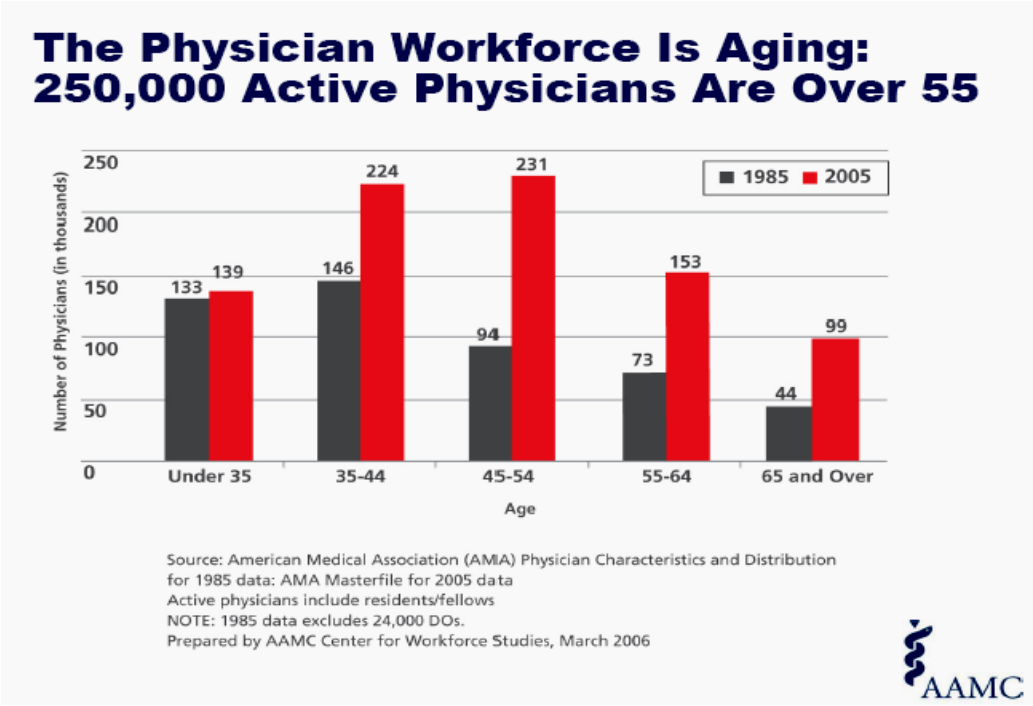
- Aging of the workforce (more than one third are over age 55)
- Earlier retirement
- Mass "boomer" retirement
- Productivity influences
  - Generational
  - Gender related
  - Age related
  - New technology
  - Non-physician clinicians
  - "Concierge" medicine

Aging of the Workforce

Data from an American Association of Medical Colleges (AAMC) Workforce Research Conference in 2006 show that in 1980 the average age of retirement was just under 70. In 1995 the average age of retirement decreased to 67.4. [12] At the same conference a researcher presented the results of a poll which found most physicians did not intend to practice past the age

of 65. In fact, one third of practicing physicians said they would retire today if it were financially feasible.[13] While it remains to be seen whether the baby-boomer physicians will actually retire "en masse," the impact would be particularly severe on rural communities that already find it difficult to recruit and retain providers.

Figure 2. Aging of the Physician Workforce[14]



Physician Productivity

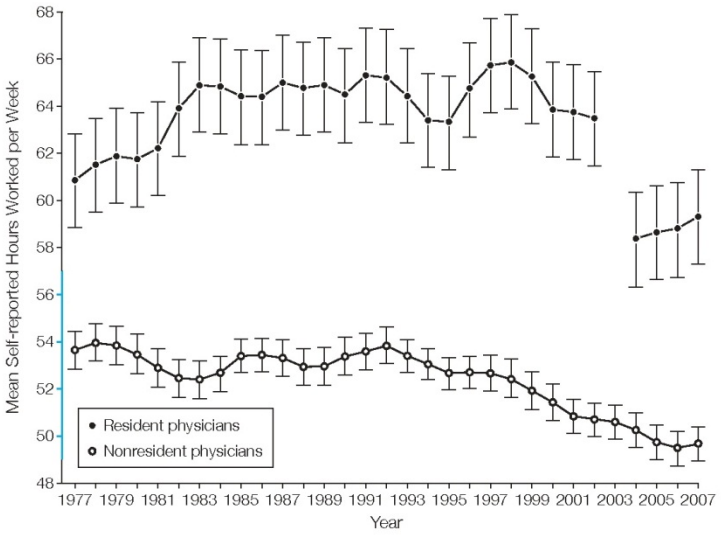
In this assessment physician productivity is neither measured nor factored into the projections. Hawai'i, because of its circumscribed, non-contiguous borders with other states and because there are a relatively small number of third-party payers, it is theoretically feasible to measure physician productivity directly and to include this parameter in a projection model.

The literature does provide some guidance that the reader can use to make independent adjustments to the projections in this report. A survey by the nationally known physician recruitment firm, Merritt and Hawkins, found that nearly two thirds of the practicing physician respondents said that new doctors coming out of training were "less dedicated than previous generations."[15]

A 2010 study published by Douglas Staiger, PhD, a Dartmouth economist, used the Current Population Survey (CPS), a monthly household survey administered by the U.S. Census Bureau, to look at the weekly hours worked by physician and surgeons. During the last decade he found a steady decline in hours worked, from 53 hrs/wk to 50 hrs/wk or 5.7%. Physicians under 45 years of age worked 7.4% fewer hours and those 45 or older worked 3.7% fewer hours.

Figure 3: Mean Self-reported Hours worked per Week Between 1977 and 2007[16]

Figure Mean Self-reported Hours Worked per Week by Resident and Nonresident Physicians Between 1977 and 2007



Current Population Survey data based on hours worked in the previous week. Data represent 3-year moving averages for each year plotted (eg, 1977 represents 1976-1978 and 2007 represents 2006-2008) and are weighted using sampling weights. Error bars indicate 95% confidence intervals. The 2003 data for residents are excluded and are also not used in the 2002 and 2004 moving averages, because duty hour restrictions for residents went into effect on July 1, 2003 (80-hour work week was implemented). The blue portion of the y-axis indicates 49 to 57 self-reported hours worked per week, the range for all physicians (Figure 1).

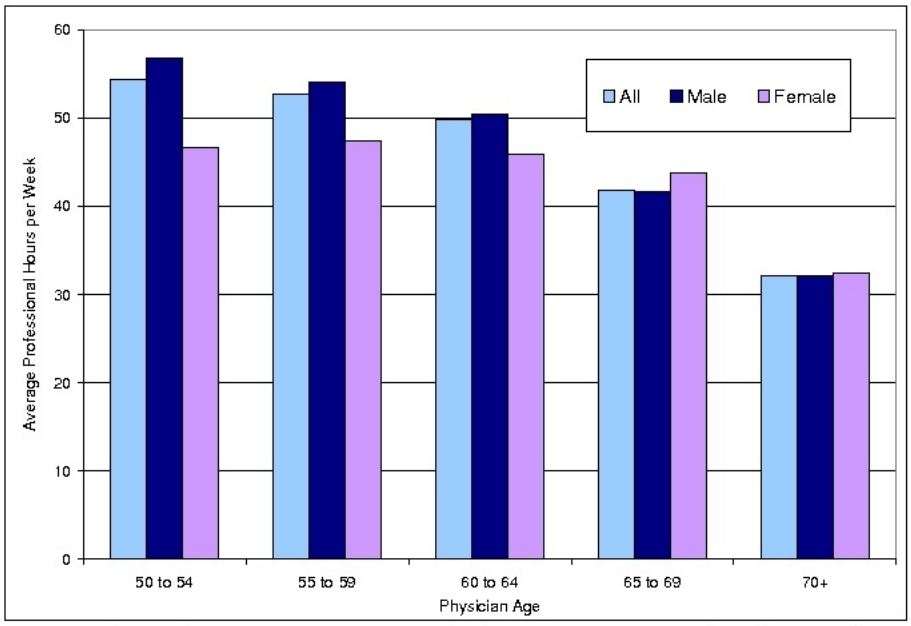
For a workforce of 630,000 physicians in 2007 the 5.7% decline is equivalent to losing 36,000 physicians. Unfortunately, the CPS survey does not capture physician specialties, and it must be noted that all of the data elements were self-reported. Nevertheless, the trend is statistically significant.[17]

Data from the AMA's *Physician Socioeconomic Statistics 2003* show that older physicians tend to reduce their workload by 10% when they reach 55 and another 10% when they reach 60 years of age.[18] A recent Canadian study, through an analysis of population-based services and physician survey results collected by the Canadian Medical Association, examined the productivity of their primary care physicians (PCP) from 1992 to 2001. When the researchers separated the physicians into age groups, striking differences appeared. Across six provinces,

PCPs under age 35 provided 18% fewer office assessments in 2001 compared with their under 35 counterparts in 1992, and those ages 35–44 provided 23% fewer. Yet overall measures of service volume remained stable over the time period because primary care providers aged 55–64 saw 11% more patients, and those age 65 and older saw 45% more. Not surprisingly, the researchers concluded that, "The coming wave of physician retirements could cause unprecedented annual rates of shrinkage in [PCP] service volumes."[19]

In 1980 10% of physicians were women; the typical medical school class today has more than 50% women. The AMA's *Physician Socioeconomic Statistics 2003* shows that due to family considerations, women physicians work 15% fewer hours than their male counterparts. A recent small survey showed that women physicians on average retire 4.5 years earlier than male physicians (13% of a 35 year career).[20] Data from a 2006 survey of physicians over the age of 50 conducted by the AAMC and the AMA and from a 2002 survey of physicians under the age of 50 revealed the following: men worked an average of 46 hrs/wk and women worked 38.6 hrs/wk. This 19% gap narrows when adjusted for specialty, as specialties with higher average patient-care hrs/wk had a disproportionate number of male physicians.[21] The "feminization" of the physician workforce entails that the delivery system as a whole loses approximately 10% of its capacity, which appears manageable.

Figure 4: Average Patient Care Hours Worked per Week[22]



Source: Analysis of AAMC-AMA Survey of Physicians Over Age 50 and BHPr Physician Hours Survey.

New practice models such as 'Concierge' medicine, or 'retainer medicine', if widely adopted could reduce the productivity and accessibility of primary care physicians (PCP) significantly. 'Concierge' medicine is a business model in which each patient pays a retainer fee (typically $1,000/year, with a range of $50 to $20,000 per year) to be a member of that provider's practice. The principal benefit of Concierge medicine is that a patients has around-the-clock access to the physician and can "jump the queue" when asking for an appointment. The doctor is able to maintain a smaller practice population so that s/he can spend the time necessary to accomplish all of the recommended treatment and preventive measures. The down-side is equally clear. If Concierge medicine were to become a widely disseminated business model/practice style, the already limited pool of primary care providers could become shockingly inadequate to meet a community's needs. A 2005 General Accounting Office report shows that the number of practices nationwide that adopted this 'Concierge' business model is "small but growing" and

largely confined to upscale urban areas.[23] States have been trying different legislative and regulatory approaches to limit the growth of 'Concierge medicine.'

Provider Supply

National movements to increase number of physicians are having beneficial effects. Several new medical schools have opened in the last few years, more are planned and class sizes have expanded. All together there will be perhaps a 15% increase in the number of new physicians trained each year. This will offset part of the productivity loss, but overall, the trend is for decreasing physician productivity, as least through 2020.

Another important factor influencing available medical services is supply of non-physician clinicians. These practitioners, such as Advanced Practice Registered Nurses (APRN) and Physician Assistants (PA) are providing increasing amounts of direct patient care. According to a 2008 General Accounting Office publication, the number of non-physician clinicians is increasing by 5-10% per year.[24] However their baseline numbers are small and schools often face the challenge of not having sufficient faculty to expand.

Demand for healthcare services

Many factors influence demand for health care services, including:

- Population growth
- Aging of the population
- Rising expectations
- Increasing wealth

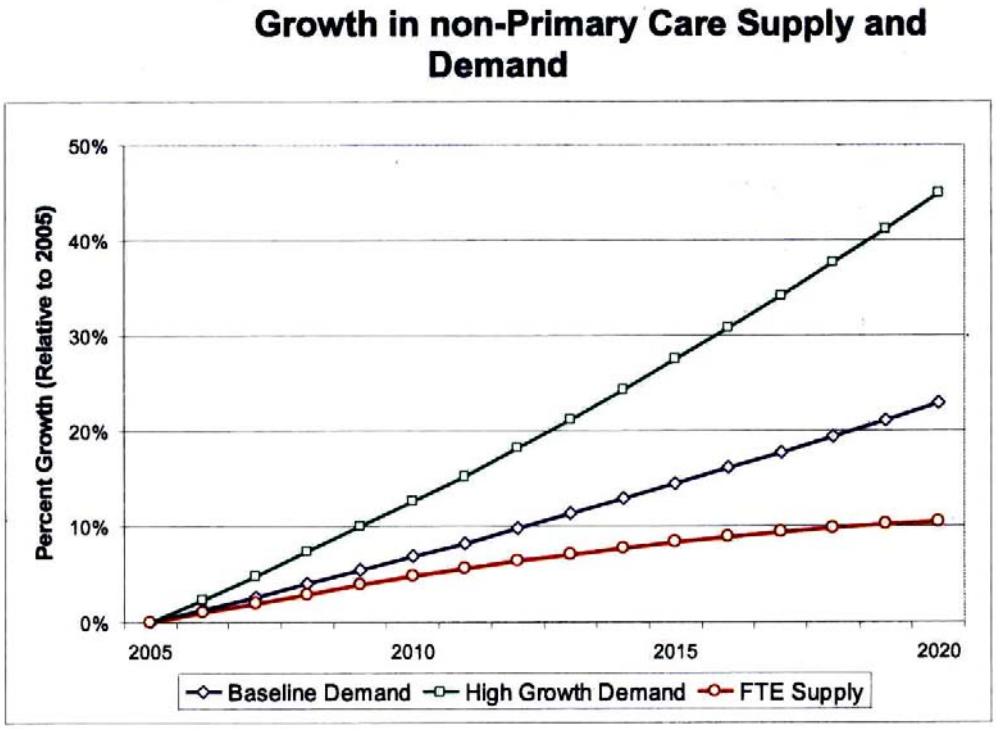
- Increasing incidence of chronic diseases perpetuated by lifestyle choices

The demand factors, population growth and aging, along with the higher incidence of chronic diseases are easily understandable. As the senior population increases, services utilized by this group will increase as well, particularly health care services. In addition, Dr. R. Cooper in a 2002 publication in *Health Affairs* also demonstrated the statistical correlation of increasing societal wealth with a proportionate increase in demand for physician services. He posits that healthcare acts like a normal economic good with an income elasticity of 0.75[25] meaning a 1% increase in GDP produces a 0.75% increase in demand for physician services. Other researchers argue that the income elasticity is only about half of Cooper's estimate.[26] With the increase in advertising of health related products, high expectations of 'medical miracles' and access to Internet, consumer expectations will increase health care expenses. Thus, the expansion of the population, the increasing number of senior citizens and changes in the economy will impact health care demand significantly.

Projections

An October 2006 publication by the U.S. Department of Health and Human Services, Health Resources Services Administration (HRSA) provides national projections of physician supply and demand through 2020. The forecasting models were developed by the Lewin Group and the Altarum Institute.[27]

Figure 5: Growth in non-Primary Care Supply and Demand[28]



The Baseline scenario assumes that patterns of healthcare use and delivery remain unchanged over the projection horizon (2005 to 2020). Growth and aging of the United States population are the primary drivers of the demand for physician services. Therefore in a Low Growth environment, primary care is adequate, but the supply of specialty care will fall 10% short. In the High Growth scenario the per capita income (total personal income divided by the total population) will rise 2% annually. Every one percent increase in GDP has been shown to produces a 0.75% increase in the demand for healthcare services resulting in an increased demand, up to a 30 to 40% shortfall.[29] In reality however, the HRSA report points out that this income effect is probably non-linear (reaches a threshold) and will be less than what is assumed in the scenario.

There are numerous other factors that must be considered when quantifying physician demand. Any of these variables can change in unpredictable ways, making the physician projection exercise fraught with potential inaccuracies.

- State of the economy
- Technological advances
- Overall population health
- Non-physician clinicians
- Reimbursement and insurance
- Globalization of healthcare
- Healthcare Reform

New technologies such as advances in fertility technology will increase the demand for physician services, while gene therapy may reduce demand.[30] A pharmaceutical that raises high-density lipoprotein (good cholesterol) and improved medications for high blood pressure could eradicate atherosclerotic heart disease and significantly decreasing the need for heart specialists. Therefore a generation from now the need for healthcare providers may be significantly different, however to what degree is impossible to predict.

The federal government's Health Resources and Services Administration (HRSA) released a report that forecasts a 10-20% across the board physician shortage in 2020.[31] The distribution of providers is skewed to rural areas such that HRSA estimates that 7,000 more practitioners are needed in nationally designated shortage areas (rural and urban underserved).[32] National

organizations, such as the Association of American Medical Colleges and the College of Graduate Medical Education, have called for a nationwide expansion of medical school enrollment by up to 30%.[33] An additional challenge is that the aging of the workforce will accelerate the need for specialties that care for seniors. Those specialties may see national shortages in the 30-50% range.

Table 3: Projections of U.S. Physician Supply and Demand[34]

Specialty	Increase in Supply	Increase in Demand
Primary Care	18%	20-30%
Cardiology	8%	33-59%
Other Internal Medicine	12%	27-49%
General Surgery	-3%	25-45%
OB/Gyn	14%	10-19%
Orthopedics	2%	23-54%
Anesthesiology	20%	25-48%
Psychiatry	9%	16-46%

There are numerous other factors that must be considered when quantifying physician demand. The percent insured/uninsured, physician productivity, overall population health, technological advances, telemedicine, non-physician clinicians, the medical-legal environment, public expectations, globalization of healthcare, and healthcare system reform are factors that will influence physician demand. Any of these variables can change in unpredictable ways, making the physician projection exercise fraught with potential inaccuracies.

The models also do not tell us anything about geographic distribution of our physicians. At present, having an overall "adequate" number of primary care physicians does not preclude the fact that 7,000 more practitioners are needed nationally in our designated shortage (rural) areas.

Despite these limitations and despite the uncertainties of how our healthcare delivery system will change in the future, the projection models help us understand and anticipate the needs that the demographic changes are sure to bring. Policy makers and educational institutions must have the information they need to adjust their priorities.

Appendix C: Methodology

This research examines the size and makeup of the physician workforce in Hawai‘i and collates potential ideas for expanding the physician workforce that are consistent with interventions that have been documented to be effective in balancing supply and demand of physicians. Human subject's 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 and DO licensees from the Hawai‘i State Department of Commerce and Consumer Affairs. Information obtained included name, license number, mailing address and type of license for all providers with a zip code in Hawai‘i. All physicians with addresses outside of Hawai‘i were excluded from the database unless they were subsequently found to be practicing patient care here. In addition, in December 2009, the Department of Commerce and Consumer Affairs administered a voluntary on-line survey with questions on practice location, specialty, future plans and if other physicians were needed. Sixty four percent of physicians answered the questions.

The survey results were taken as the most reliable data. To identify practice locations/addresses of providers who did not complete the survey, the research team used participating provider/staff lists and searched all available public sources (Internet, yellow pages, and healthcare directories). Physician year of birth and gender were obtained from licensure records and public sources. Community contacts were queried regarding providers who practice in their communities. The research team contacted physician offices to obtain/confirm practice location, specialty and hours worked per week at each location. 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 listing in the American Board of Medical Specialties,[35] provider lists and contact with physician offices. Primary care specialties include: Family Medicine, General Practice, General Internal Medicine, General Pediatrics, Internal Medicine/Pediatrics and Geriatrics. All data is stored in a secure Access database.

Supply projections

There are 64 medical students trained at JABSOM, 10 Osteopathic physician students at A.T. Stills University site at Waiʻanae Coast Comprehensive Health Center, and between 85 and 90 residents trained every year in Hawaiʻi. According to the AAMC, approximately 40-50% of the graduates of Hawaiʻi medical school and residency training programs are actively practicing in Hawaiʻi.[36] Analysis of the physician database finds that about 100 new physicians started practice in Hawaiʻi each year during 2006-2009. While there are no data available on physicians having left practice in Hawaii, 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 both current demand for physician services in Hawaiʻi and future demand through the year 2020 come from The Lewin Group's Physician Supply and Demand Model (PSDM). A detailed description of the data and methods used in the PSDM is available elsewhere.[37] The PSDM uses current 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. These ratios, combined with population estimates and projections by

Hawaii region, produce estimates of physician demand under alternative healthcare delivery scenarios. 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 primary specialty; and
- Data from the American Medical Association, the Medical Group Management Association, and other published sources on the amount of patient care time physicians spend by healthcare delivery setting.

Hawai‘i-specific estimates of uninsured and obesity rates, by demographic, come from the 2008 American Community Survey and 2007-2008 Behavioral Risk Factor Surveillance System. Population projections for each island in Hawai‘i come from the U.S. Census Bureau. Applying the national physician-to-population ratios to the population in Hawai‘i produces estimates of the number of full time equivalent (FTE) physicians required to serve that population. Demand projections under four scenarios are modeled:

- **Baseline Scenario:** This scenario estimates the number of FTE physicians required to provide a level of care equivalent to the national average—controlling for differences between Hawai‘i and the U.S. in demographics, uninsured rates, and obesity rates—by applying national healthcare use and delivery patterns to the state’s population. One exception to this approach is the calculation for emergency physicians. The average size of

emergency departments in Hawai‘i is significantly smaller than the national average, so national provider-per-population ratios for emergency physicians will underestimate demand in Hawai‘i. Consequently, demand estimates for emergency physicians are based on the sum of budgeted positions from individual hospitals throughout the state. This Baseline Scenario takes into account provisions in the 2010 Patient Protection and Affordable Care Act that will increase the proportion of the population with medical insurance starting in 2014. This demand analysis assumes that healthcare use patterns for the newly insured in each demographic group will be similar to patterns for their commercially insured counterparts.

- **Increasing Provider Productivity Scenario:** Improvements in technology (e.g., expanded use of decision support systems and electronic medical records) will likely contribute to increases in provider productivity. This scenario assumes that provider productivity will increase by ½ percent per year, with a cumulative increase of slightly more than 5% increase between 2010 and 2020. This scenario produces a lower estimate of demand, as it assumes that increased productivity allows the same level of services to be provided by fewer physicians.

- **Increasing Use of Ambulatory Services Scenario**: Analysis of National Ambulatory Medical Care Survey data over the past decade suggests that for the population age 40 and older, there is a trend towards higher per capita use of ambulatory services (even after controlling for changing demographics). Such a trend could continue over the next decade if there is greater use of patient centered medical homes or 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 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 produces a higher estimate of demand for specialties that provide predominantly ambulatory-based services.

Focus Groups

The quantitative analysis of provider adequacy was supplemented with fourteen focus groups held across the state between January 2008 and May 2009. These focus groups examined beliefs regarding the adequacy of the current Hawai‘i physician workforce, the barriers to developing and maintaining an appropriately sized physician workforce, and potential solutions to meet the challenges. Focus group participants included physicians, business leaders, administrators, and medical students. The participating physicians represented a mix of specialties, demographics, and practice settings. The groups were based on a convenience sample, with participants largely drawn from among established, highly respected physicians with a long practice history in his/her community.

Two researchers present at each focus group took notes that were transcribed and reviewed. Constant comparative analysis was performed by the researcher team to identify common themes. Themes were combined and concept mapping was performed using TextSmart software. If a solution was mentioned in more than one focus group, it was included on a list of potential solutions to meet the physician workforce needs. The full list is available in Appendix D.

Population Survey

The administrator of the Hawai‘i Health Survey was contracted to include an additional question on their annual telephone survey in 2009. A total of 13,996 people were included in the survey from 4,765 households. The questions asked were:

- 1. Was there a time in the past 12 months that you did not go to a doctor when you thought you should have gone?

- 2. What type of doctor or specialist did you wish to see?
- 3. What were the main reasons why you were not able to see that doctor?

2009-2010 Hawai'i Physician licensure renewal survey
All physicians applying for on-line renewal of their medical license in November 2009 until present are requested to complete a voluntary five question survey:

1. Do you currently practice medicine in HAWAI'I?
Do you provide patient care at least 20 hours a week in HAWAI'I?
Are you a resident or fellow in training?

2. Specialty information:
a) Primary Specialty:
b) Other specialties (if applicable):

3.Hawaii Office Address(es):
a) Primary Office Address:
City/Town: Island: Zip
b) Secondary Office (if applicable):
City/Town: Island: Zip

4.Within the next two years, are you planning to retire, leave HAWAII or decrease your patient care hours to less than 20 hours a week?

5.Within the next two years, do you think your island will need more physicians?
If yes, which specialties?

Appendix D: Results

Current and Projected Supply

The number of non-military physicians out of residency and fellowship training providing direct patient care in Hawai'i (including part time patient care) totals 3,203. This includes all physician specialties, but does not include time spent performing administration, research and non-patient care education. Total FTE patient-care physicians found working in the State of Hawai'i is 2,860.

Projecting future supply in Hawai‘i is challenging, as the patterns of practice in Hawai‘i are just now beginning to be studied quantitatively. Demographic analysis indicates that 24% of the patient care physicians in Hawai‘i are women, and the mean age of physicians is 52.5 years. By examining physicians currently practicing by when they received their license, approximately 90 physicians entered the Hawai‘i physician workforce in calendar years 2006 and 2007. In 2008 and 2009, 130 new practicing physicians were identified per year and approximately 100 remain who were licensed in 2008.

Current and Projected Demand

Applying the 2008 national physician-to-population ratios to the 2008 population in Hawai‘i—adjusting for differences between Hawai‘i and the US in demographics (age group, gender, and ethnicity), rates of uninsured and obesity rates—suggests demand for 3,400 FTE physicians. This estimate takes into account higher per capita requirements for emergency and critical care physicians in Hawai‘i, relative to the US, to reflect differences in population density and geographic dispersion. The model suggests that between 2008 and 2010, demand for physicians in Hawai‘i grew to approximately 3,500.

The demand estimates are based on the non-military, resident population in Hawai‘i, adjusting for estimated demand for health care services by tourists. To estimate demand by tourists, using medical claims we calculated the percentage of physician encounters that involve patients whose ZIP code is from outside Hawai‘i. For example, approximately 4.5% of encounters by Hawai‘i emergency physicians are for patients with an address outside of Hawai‘i. Across all medical specialties, patients from outside Hawai‘i account for approximately 1.4% of physician services (equal to demand for approximately 50 FTE physicians). This demand for non-residents includes

approximately five FTE emergency physicians, 15 FTE primary care physicians and 30 FTEs across all the other specialties combined.

We project 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—which incorporates trends that can be quantified, 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 this trend could result in additional demand for approximately 190 FTEs. However, assuming modest (1/2 percent per year) gains in physician productivity suggest that 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 offsets 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.

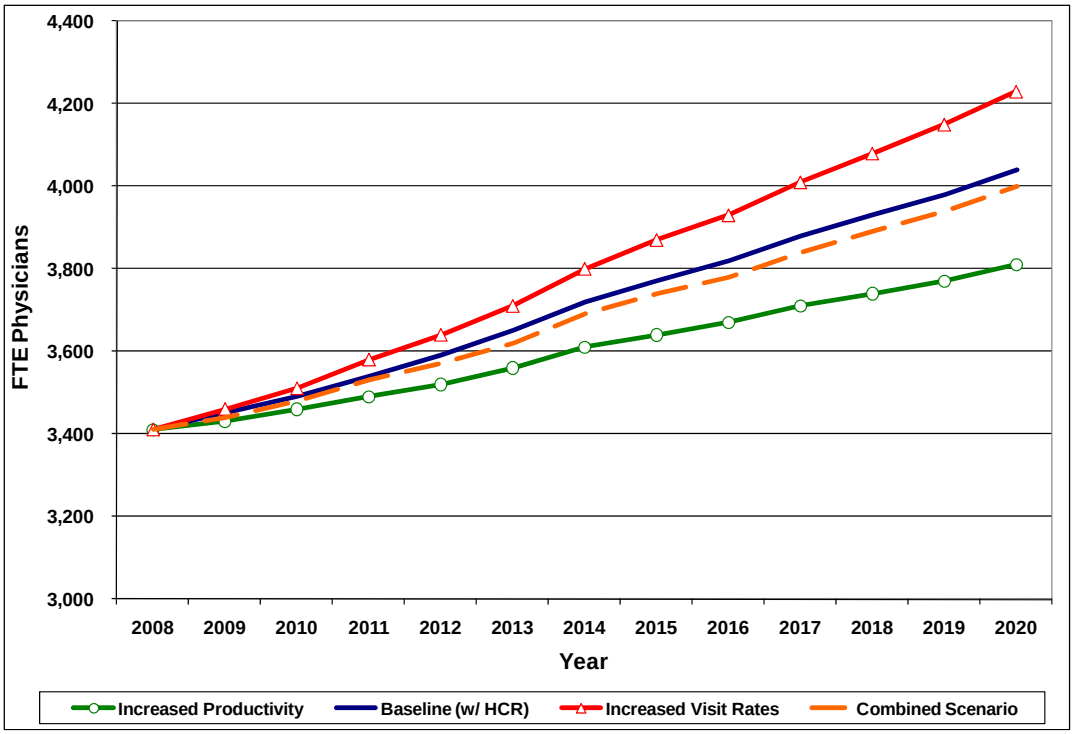
Table 1. Projected Demand for FTE Physicians

Impact	+	+	+	+	-	=
	Baseline Scenario		**Health Care Reform**	**Increasing Per Capita Use of Ambulatory Services**	**Increasing Provider Productivity**	**Combined Scenario**
Year	**Starting Year Demand**	**Changing Demographics**				**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

The trends, in isolation, form a range of estimates. If healthcare use and delivery patterns remained 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.

Figure 1. Projected Supply and Demand through 2020



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. This study

suggests a shortfall of approximately 133 FTEs in primary care (with the shortfall primarily among family practice and general internal medicine).

Adequacy of Supply by Hawai‘i Region

Projected growth in demand will be uneven across regions, reflecting differences in demographics and in Census Bureau projections of population growth (Table 2). Across Hawai‘i, demand is projected to grow approximately 15% between 2010 and 2020. In percentage terms, growth is highest on the Island of Hawai‘i (33% increase) 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 Island of Hawai‘i (+160), followed by Maui (+90) and Kaua‘i (+30).

Table 2. Projected FTE Physician Demand by Region (Baseline Scenario)

Year	State	Island			
		Big	Oahu	Kauai	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

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 if (controlling for demographics) the patients in each region had similar access to care as do patients on O‘ahu. Summary findings from this analysis suggest that patients on O‘ahu have greater access to specialist services but use fewer primary care services. If patients in other regions had similar patterns of healthcare use and delivery as is seen on O‘ahu, the total demand for physicians in these other regions would increase only slightly in the aggregate (by approximately 2%). However, there would be a modest shift away from care delivery by primary care physicians to greater delivery of care by specialists. These imbalances are particularly significant in specialties such as endocrinology and pediatric subspecialties (e.g., neurology and oncology).

Focus Group Results

Research conducted prior to Act 18 included 14 focus groups across the state with physicians (private practice and group; specialists and generalists); administrators; human resource personnel, business leaders and medical students.

Barriers:

- Low reimbursement
- High cost of doing business/running a medical practice
- High cost of student loans, making income a higher priority
- Recently trained physicians now prefer an employment position rather than an opportunity to establish a private practice
- High cost of housing
- Lack of adequate employment opportunities for spouse
- Limited cultural activities
- Perceived inadequacy of schools
- More on-call requirements
- Unpredictable and uncontrollable workload
- Inability to sustain a specialty practice because low patient volume
- Limited peer interaction/support (professional isolation)
- Not welcomed by specialty peers (medical staff politics)
- Perceived inadequate quality of the local hospital
- Lack of tort reform
- Low number of neighbor island students entering medical school

- Distance from friends and family on the mainland

Solutions:

When asked how the focus group participants would address supply/demand disparities, over 100 ideas were mentioned in at least two of the 14 sessions. The most common response was improving net income. The list of most common solutions is outlined below by general category.

Decrease demand:

1. Public education (Wellness, health education and prevention programs)
    a. School-based
    b. Work based
    c. Community based
2. Change model of payment to reward prevention, not just manage disease
3. Address public health issues globally
4. Increase personal awareness of costs and personal responsibility for health status
5. Increase insurance rates/tax for risky behavior, provide incentives for healthy living.
6. Mobile wellness center for screening services, perhaps staffed by PA/APRNs.

Increase supply:

1. **Increase pool of future providers through pipeline programs**
    a. Coordinate and expand existing programs,
        i. Centralize recruitment experiences, shadowing, mentoring, internships
        ii. College prep support, med school application assistance
        iii. Increase contact with community docs

b. Provide mentoring throughout the educational system
    i. Gender specific
    ii. Home-town based
    iii. Electronic and face to face, must continue through training
c. Increase recognition of student importance and let students know they are wanted
d. Change medical school selection criteria to increase primary care and rural health
e. Increase respect for the profession and the local institution
f. Educate parents and public about value of health professions

2. Increase training opportunities

a. Expand medical school class with emphasis on important qualities (altruism, primary care, rural/underserved focus), expand programs like Imi Hoola
b. Expand residency spots for professions in need
c. Provide training where the needs are greatest so that graduates are more likely to stay in these areas and have the necessary skills to care for the patients there.
    i. Encourage more rural primary care training to decrease urban specialty bias
        a. Incentivize teaching through pay or recognition
        b. Require rural training experience for students and residents

3. Recruit more physicians

a. Increase J-1 visa physicians /international medical graduates
b. Retraining retired or out of practice docs
c. Improve advertising
    i. Community collaboration

1. Create community profiles, use 3RNet, one-stop shopping
2. Community welcome wagon

d. Targeted advertising (Web, print, mail)
   i. Compile listing of openings and of resources
   ii. Create local recruitment team
   iii. Create DVD, fairs, understand generational difference, customize advertising, alumni, social networking
   iv. Increase community involvement
   v. Evaluation the benefit of contracting with national recruitment firm

e. Targeted benefit package
   i. Loan repayment
   ii. Employment model, for example hospitals could hire
   iii. Address COL, housing, jobs for spouse, quality of facilities and schools.

f. Create a system to stay in contact with grads and utilize alumni network

4. Retention-increase job satisfaction

a. Welcome, integrate and mentor new docs

b. Support professional community/Medical societies

c. Create social support system, especially for new docs and their families

a. Provide continuing education

b. Centralized call system to decrease physician calls

d. Recognition and appreciation
   i. Involvement of physicians in healthcare policy, insurance company leadership

e. Decrease hassles
    i. Paperwork control: for billing, consults, medications, Standardize formularies, levels of care, credentialing
    ii. Universal info exchange
    iii. Make telephone/internet specialty consults readily available
f. Increase revenue
    i. Increase reimbursement rates
    ii. Obtain island designation for federal programs
    iii. Reduce costs
        1. Liability reform
        2. Low cost office space
        3. Decrease tax, especially excise tax on services
        4. Provide loan repayment
        5. Create physician groups for sharing of expenses
        6. Industry can provide business assistance
        7. Decrease time to payment for docs
        8. Provide incentive for rural docs, especially those doing call
        9. Teach business skills in residency
g. Decrease workload
    i. Call sharing
    ii. Group formation
    iii. Job sharing
    iv. Locums availability

v. Facilitate patient transport

vi. Create hospitalist program in all hospitals

h. Improve communication and collaboration between medical groups/hospitals/community/academia/insurers

i. Transparency of fee schedules

5. Additional care delivery methods to decrease physician workload

a. Telemedicine

b. Team care approach/medical home model

i. Group visits, electronic visits, use a team of health care workers

c. Regionalization of services

d. Fly over provider network

e. Expand non-physician clinician pool

f. Increase home care

g. Make a cooperative system, not competitive.

h. Regional specialty clinics

6. Other ideas

a. Legislate against physician abuse

b. External audit of insurance companies

c. Value based payment with incentives

d. Increase pay for primary care

e. Form non-profit organization to track local kids and get them back to Hawaii

f. Expand urgent care centers

g. Create collegial environment

h. Transportable medical records-

i. Rotate docs in and out of rural areas through all residencies

j. Recruit part time docs when they come to CMEs.

Ongoing research: physician registry, track where grads go, exit surveys

Population Survey Results

- 12% surveyed were unable to see a doctor (includes an emergency room doctor)

  By island:

  - Big Island 15 %
  - Maui 13 %
  - Kauai 12 %
  - Oahu 10 %

People without health insurance were 3 times more likely to NOT see doctor.

What type of doctor did they have trouble getting in to see?

- 41% could not see primary care physicians
- 19% can't see specialists

Why can't they see a doctor?

- 38% financial reasons (which could include airfare)
- 23% access reasons
- For primary care: 40% cost; 24% Access
- For specialists: 36% cost; 41% Access

Physician Survey Results

Approximately 73% of physicians renewed their license on-line (6,252 out of 8,552 licensed physicians). Of those who renewed on-line, 89% answered the survey questions (5,535 out of 6,252). Thus, data was obtained on 65% of the physicians licensed in Hawai‘i. However, of the physicians found to be actively practicing in Hawai‘i, survey information was obtained for 72%.

The data on specialty and office address were entered into the physician database and utilized for the supply assessment. The responses to the open ended questions regarding need for additional physicians are as follows:

- 5,012 answered, 39% said need more doctors.
- 55% of Hawai‘i based physicians (>20hrs) said we need more physicians
- A total of 2,070 answers were provided for the type of specialty needed. The most common type of physician lacking is “primary care” second most common is “all”
- Docs in rural areas more likely to describe shortage
- 35% of respondents said their area was short of their own specialty

Hawai‘i Physician Workforce Summit 6/29/2010 Summary

Hawai‘i Physician Workforce Summit was held 6/29/2010 at the Waikiki Beach Marriott. A total of 144 guests attended, representing legislature, University of Hawai‘i, physician groups, medical groups, third party payers, rural health associations, physician assistants, nurse practitioners, business community and medical students. After four morning presentations addressing national and local physician workforce statistics and trends (all can be viewed at www.ahec.hawaii.edu), the participants separated into three working groups. The topics were 1) Supply (approximately 40 participants); 2) Demand; and 3) Support and Retention. Each group was given a sheet of the most common solutions reported by focus groups conducted by Drs. Withy and Sakamoto over the prior 2 years. The groups discussed the offered solutions, added other solutions, and then voted on the most urgent solutions to work on (those that should be addressed in the next 12 months). Each participant was allowed to vote for three solutions to address first, and could only place one vote per solution.

The ten top solutions identified by the working groups to address most urgently are listed ALPHABETICALLY below:

- Administrative Simplification
- Change system of care
- Community integration
- Electronic Health Record System (statewide)
- Increase net physician income
- Increase targeted training
- Non-Physician Clinicians
- Pipeline programs

- Rural payment differential
- Tort reform

Summit follow up:

On 6/30/2010, a follow up meeting was held to better outline the priorities identified by the Hawai‘i Physician Workforce Summit on 6/29/2010. The group of ten members represented: JABSOM, Hawai‘i IPA, Hawai‘i Island Healthcare Alliance, Papa Ola Lokahi, Department of Labor, Lewin Group, Physician Assistant from Big Island, Hawai‘i Medical Association, lead facilitator.

The group identified the need for collaboration to address the growing physician/healthcare provider workforce shortage in Hawai‘i. In order to improve the supply and decrease the demand of physicians, the group outlined three major categories that describe the prioritized activities:

Hawai‘i Physician Workforce Summit Recommendations for Interventions by 6/2011

A. Growing the Healthcare Workforce

I. Increase and disseminate information on Pipeline Programs

i) Increase targeted healthcare training

II. Enhance Practice Sustainability

i) Medical malpractice reform

ii) Rural payment differential

iii) Reimbursement reform

B. Engage Consumers & Communities

I. Community Integration in recruitment and retention

C. Redesign Healthcare Delivery System

II. "Team approach" to care that includes the full spectrum of providers (particularly NP and PAs)

III. Administrative Simplification

IV. Electronic Health Records statewide

After reviewing the notes, tapes and evaluation from the Summit, an action plan was developed as follows:

1. Provide Summary Document to Summit participants (by 8/13/2010)

2. Develop resource, partnership and idea bank (by 9/13/2010)

3. Create leadership groups to guide efforts for main topics (by 9/27/2010)

4. Hold follow up meetings with invested parties (by 10/30/2010)

5. Expand working partnerships, collaboration and communication through web page with video links and discussion board (by 10/30/2010)

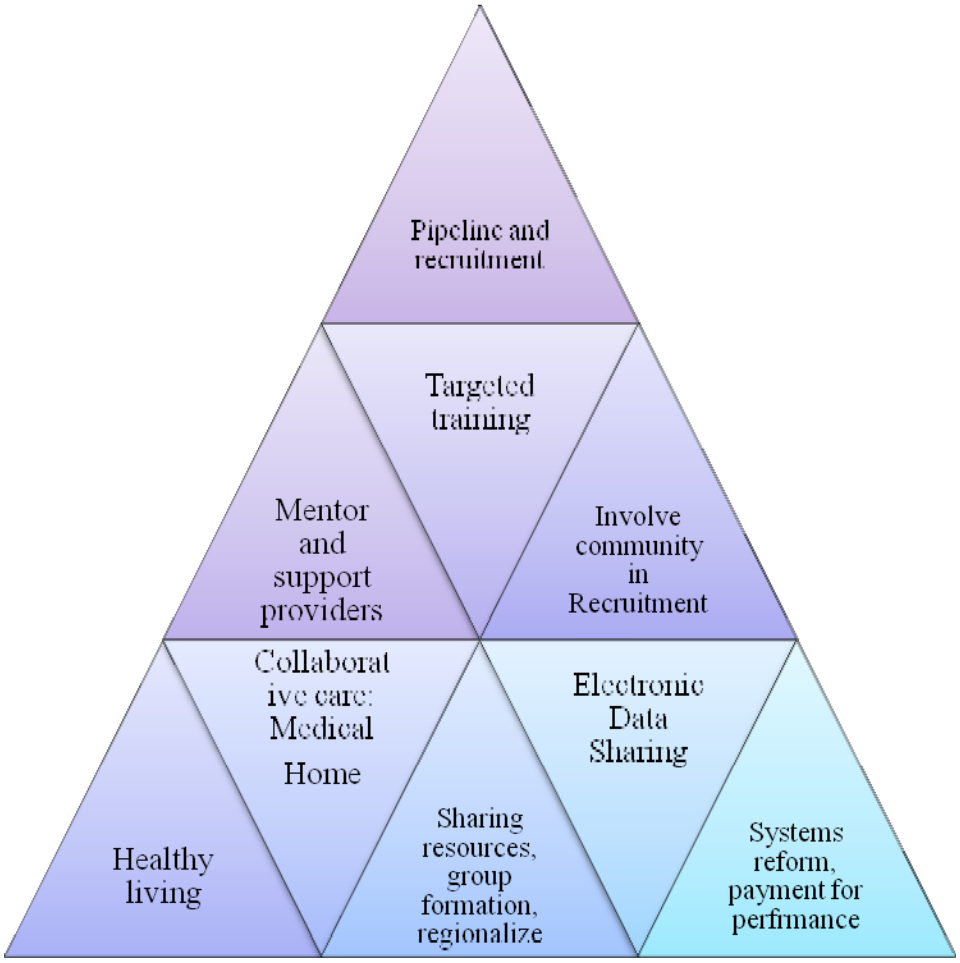
6. Hold quarterly meetings for leadership groups (first ones by 10/30/2010) to discuss pros, cons and feasibility of plans.

7. Hold Summit follow up 6/2011 with report of one year success.

Appendix E: Potential Solutions

When examined together, the solutions can be categorized graphically as nine interconnected activities. The first solution to decrease demand for services— disease prevention and healthy living— forms the basis of any medical care system. Other solutions with the potential to decrease demand for physician services include adopting a team approach to care that leverages the expertise of physicians who work collaboratively with nurse practitioners, physician assistants, and other health professionals; greater use of the medical home model; collaboration between organizations to provide care in the most practical manner through regionalization and sharing of resources; greater use of technology such as electronic data sharing and medical records that can share information between systems, and electronic decision support systems; and system changes that include payment structures that reward prevention and maintaining optimal patient health status and administrative simplification (or decreasing the number of different forms that must be completed).

Figure 1: Solutions

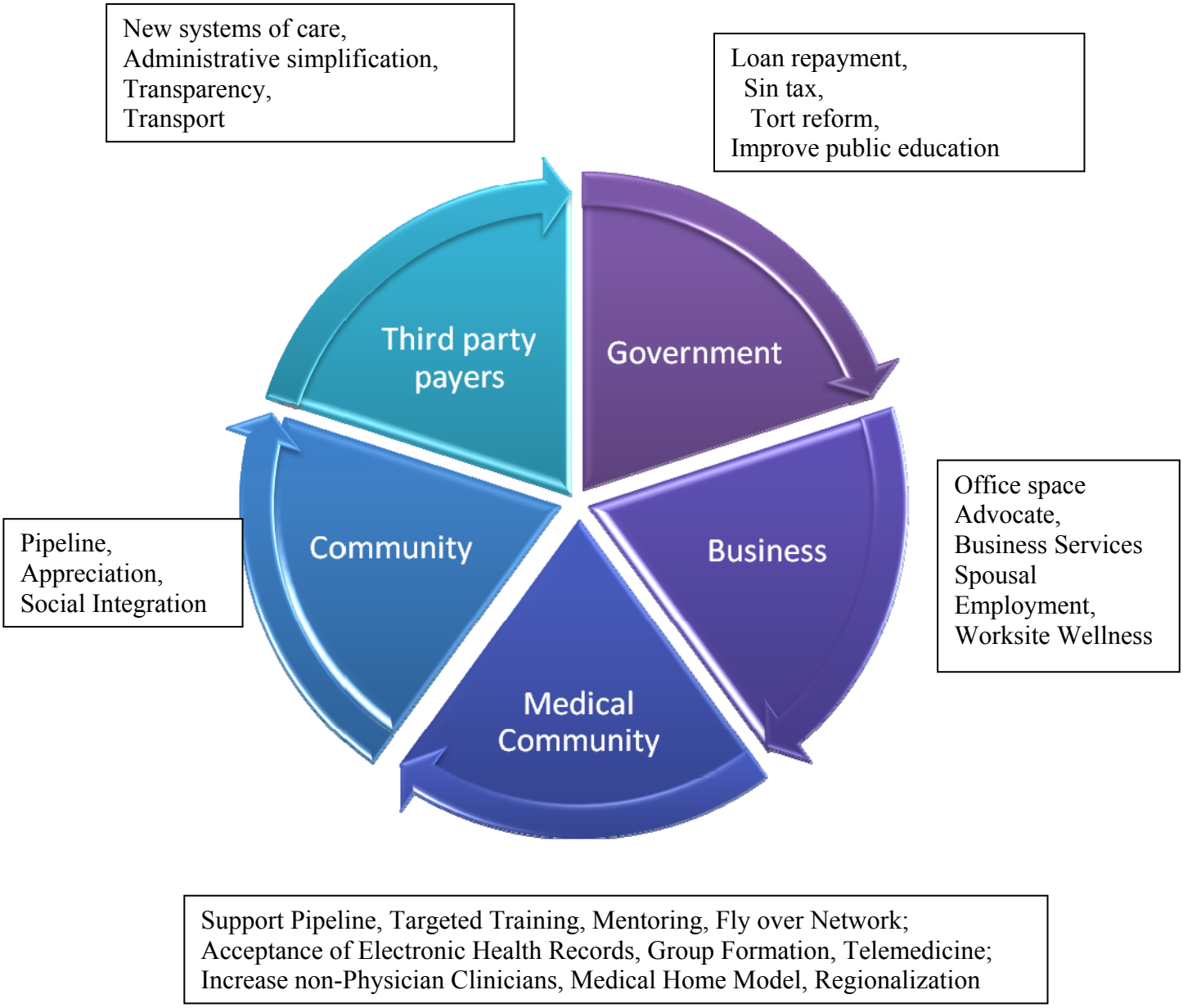


The top of the pyramid is the entry point for students from a young age into health careers activities. These students must be mentored, selected and trained with attention to the needs of the state, with respect to both specialty and regional distribution. Education, mentoring and other support must be provided throughout a person's career to both recruit and retain physicians. Finally, the heart of the pyramid is the community playing a pivotal role in supporting, selecting and retaining the health care workers that will be providing care for them.

These actions can be divided into clusters based on which group could realistically implement the proposed solutions. However, no single group alone will be able to create the necessary

changes to meet the entire need for health care providers, nor is there one particular activity that would completely fill the provider gap Hawai‘i faces.

Figure 2: Solutions Listed by Group to Take Action



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