
Shasta County

Physician Workforce Assessment

July 2016



Prepared by:



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Executive Summary

There is a long history of community collaboration among healthcare delivery system partners, county agencies, and local policy makers in Shasta County, California. In 2009 the Shasta Health Assessment and Redesign Collaborative (SHARC) established itself to build a more organized healthcare delivery system for Shasta County. Membership in the collaborative includes federally qualified health centers (FQHCs), hospitals, Partnership HealthPlan of California, North Valley Medical Association, the County Health and Human Services Agency, and other key stakeholders. In 2013, SHARC's strategic plan identified three priorities which included increasing access to health services, promoting integration of behavioral health into primary care, and developing capacity for Health Information Exchange (HIE).

Following the Affordable Care Act's implementation and Medi-Cal's managed care program expansion, SHARC established an Access Committee to recommend local strategies to address the subsequent, increased demand for primary care services in the county. The committee has monitored network adequacy and inappropriate use of the hospital emergency rooms, and promoted recruitment and retention activities, such as loan repayment for providers. Local anecdotes suggested that an older physician workforce and impending retirements could further impact network adequacy. As such, the committee chose to focus this study on physician supply to investigate these concerns.

The Shasta County Physician Workforce Assessment endeavored to:

- Compile an inventory of all active in-county doctors of medicine (MDs) and doctors of osteopathy (DOs);
- Survey practicing physicians to evaluate the county's physician supply and service capacity;
- Identify current and future gaps in the local healthcare delivery system based on the data collected; and,
- Provide recommendations for meeting current and future service capacity goals.

While this community-wide assessment was a step forward to quantifying the physician supply for Shasta County, the SHARC Access Committee determined that national efforts outside of this assessment to assess physician supply have been varied, non-standardized and irregularly implemented. So, comparisons to similar efforts were limited. Physician-to-population ratios used to evaluate physician supply were inconsistent and outdated. The delivery of primary care has also changed, and existing physician-to-population ratios have not yet been adjusted to address or accommodate the change. Further, ratios for rural, non-HMO healthcare markets are limited or non-existent.

When evaluating physician supply, one must also consider the health of the population that is served. Community health data shows that Shasta County ranks 33rd for health factors and 50th for health outcomes out of 57 California counties. The county performs poorly in broad determinants of health, behaviors affecting health, health outcomes, and serves a growing and higher-utilizing senior population. The management of these complex patients places additional demands on Shasta County's healthcare system and must be considered when evaluating the supply of healthcare services.

Key Findings

Shasta County's Physician Workforce Assessment found the following:

1. For those who live outside of the Redding and the I-5 corridor, access to physician services is reduced. Specifically, 90% of primary care physicians and 99% of non-primary care physicians practice in town or in communities along the Interstate-5 corridor. However, more than a third of the residents live in outlying communities.
2. The number of physicians practicing in Shasta County is below the estimated physician-to-population needs for most provider types, according to nationally recognized physician-to-population ratios. Rates are especially low for primary care, dermatology, psychiatry and general surgery.
3. Access to PCP services for seniors with Medicare and for patients with Partnership HealthPlan (Medi-Cal Managed Care) is relatively lower as compared to patients with private insurance. A total of 47% of physicians accepting Medicare indicated that they were closed to new patients, and almost 50% of physicians accepting Partnership HealthPlan indicated that they were closed to new patients. In contrast, 28% of physicians accepting private insurance indicated that their practices were closed.
4. Of the 314 physicians whose ages were identified: 51% of the PCPs and 55% of the non-PCPs were found to be over 56 years of age.
5. Many Shasta County physicians will retire in the next five years. A total of 20% of PCPs 56 or older indicated that they may retire or relocate in the next five years, and 35% of specialists 56 or older indicated that they may retire or relocate in the next five years.

Recommendations

To address the geographic access disparity, the limited access to specialty care, the limited care options for senior and Medi-Cal patients, and the high number of physicians who are aging and intend to retire, Shasta County must be prepared to:

1. Maintain an accurate community-based provider directory that is reflective of the Shasta County healthcare market as part of a larger commitment to continued medical workforce assessments. One of the biggest hurdles in implementing this workforce assessment was the lack of a centralized, up-to-date provider directory.
2. Establish a regular process and methodology for standardized physician supply assessments. Advocate for up-to-date physician-to-population ratios for use in future physician supply assessments.
3. Make physician training, recruitment and retention an urgent priority given the county's aging physician workforce. For example, loan repayment opportunities for physicians to practice in underserved communities must be made more available and repayment amounts should be increased so that they are proportional to the current cost of obtaining an advanced degree.
4. Work with key stakeholders to expand trainings and continue the implementation of team-based primary care models. Medical providers must be ready and able to adopt methods to most efficiently utilize the supply of physicians they do have in order to meet the increasing demand for services.
5. Advocate for continued investment in workforce development programs that address the gaps identified in this and future workforce assessments. Such investments should also be made to support the training and expanding roles of Nurse Practitioners (NPs) and Physician Assistants (PAs) as advanced practice clinicians are relied on to meet primary and mental healthcare demands. Federal, state and local resources should be committed to support programs such as post-graduate residencies and fellowships for new NP/PAs.

6. Family Practice Residency programs such as the Mercy Family Health Program based at Mercy-Redding and the Family Practice Residency program at Shasta Community Health Center need to be supported and recognized as a major primary care physician workforce supplier in Shasta County. Without these programs, the shortage among primary care physicians in our community would certainly be substantially greater.
7. Educate local, regional and statewide elected officials on the importance of supporting policies that promote access to healthcare services in rural areas like Shasta County.

Introduction

Healthcare leaders across the nation are concerned that there is and will continue to be a physician shortage, leaving millions of Americans without healthcare.¹ In California, healthcare stakeholders report that the Affordable Care Act, its associated Medi-Cal expansion, and the Medi-Cal managed care program expansion has caused a demand for services that outpaces physician supply. Policy makers are looking for ways to understand the shortage beyond anecdotal accounts, conflicting reports, and evidence siloed in individual healthcare sectors. In response, statewide organizations have recognized the necessity for collaboration to affect policy change and achieve greater investment in workforce development initiatives.²

Rural healthcare providers and patients face drastically different obstacles compared to those in urban areas, according to the National Rural Health Association (NRHA). Rural Americans face distinct social, economic and political factors such as geographic isolation, limited post-secondary educational prospects, as well as mostly seasonal, part-time or self-employed job opportunities. Further, state and national policies often reflect the realities of urban living because rural residents are fewer in number and therefore not as widely represented.

The following facts from the NRHA reflect some of these disparities:

- Ten percent of all physicians practice in rural America, which is home to nearly 25% of the population, or more than 59 million people.
- Rural residents are less likely to have employer-provided healthcare coverage or prescription drug coverage.
- Rural Americans are more likely to live below the poverty level; per capita income is \$7,417 lower than in urban areas and nearly 24% of rural children live in poverty.
- There are 2,157 Health Professional Shortage Areas (HPSA's) in rural and frontier areas in the United States compared to 910 in urban areas.
- Medicare payments to rural hospitals and physicians are lower than those to their urban counterparts for equivalent services.
- More than 470 rural hospitals have closed in the past 25 years.
- With few rural providers dispersed about a large geography, rural residents must often travel long distances to access services.

In 2015, Shasta Health Assessment and Redesign Collaborative (SHARC) identified a physician workforce assessment as an important step toward answering for its local market the same questions about physician supply that statewide advocates and policy makers seek to answer at a state level: is there a physician shortage, and, if so, how severe is it?

¹ Merritt Hawkins (2015b) states: “the shortage of physicians in the United States – particularly primary care physicians – has been well documented, with a variety of organizations, including the American Medical Association (AMA), the Health Resources and Service Administration (HRSA), the Association of American Medical Colleges, and multiple state medical and specialty societies projecting doctor deficit.”

² See CPCA (2016). *Horizon 2030: Meeting California's Primary Care Workforce Needs*.

About Shasta County

Rural Geography

Shasta County, located in northern California, is approximately 230 miles north of San Francisco and 160 miles north of Sacramento. Covering 3,785 miles of widely varied rural, semi-rural and urban terrain, Shasta County's average of fewer than 47 persons per square mile is home to 4% of Californians. Though the county is primarily rural, two percent of the land use is classified as urban or suburban. This rural portion of the county is sparsely populated, geographically isolated and mountainous, with severe weather conditions that often make roads impassable. The city of Redding, with a population of 89,861, is the county seat and population center (U.S. Census, 2010).

As a primarily rural county with a population of 177,223, 50.7% of the population lives in Redding, with another 20,096 (11%) residents residing in communities of Anderson or Shasta Lake City, which are situated along the Interstate 5 (I-5) corridor.



Other than Redding, all geographic areas of the county are designated as a Health Professional Shortage Area, and are either considered rural or frontier, according to California's Office of Statewide Planning and Development (OSHPD). According to OSHPD's Medical Service Study Areas definition, rural areas have a population density of 250 persons or less per square mile and no incorporated area greater than 50,000 persons, and frontier areas have a population density equal or less than 11 persons per mile.

Health Status

Shasta County currently ranks 50th out of 57 counties in CA according to the 2016 County Health Rankings & Roadmaps report³. The county performs poorly on three key determinants of community health metrics: broad determinants of health, health affecting behaviors, and health outcomes:⁴

Broad Determinants of Health - The following table identifies some key indicators for the broad determinants of health in Shasta County. For example, the county's population is older and has less income when compared to California:

Broad Determinants of Health Indicators	Shasta County	CA
Age 65+	19.2%	12.9%
Median Income	\$43,700	\$61,900
Free/Reduced Lunch	46%	48%
Unemployment	10.9%	8.9%
Children in Poverty	28%	24%

³ County Health Rankings & Roadmaps (2016).

⁴ Ibid: CDPH: County Health Status Profiles 2016; and the UCLA Center for Health Policy Research

Health Behaviors - The following table describes some of the key health behaviors that impact Shasta County residents' health. For example, rates of smoking, excessive drinking and death rates due to drug overdoses are higher when compared to California.

Health Behavior Indicators	Shasta County	CA
Access to exercise opportunities	74%	91%
Physical inactivity	20%	18%
Food environment index (lower score indicates lesser access to healthy food)	6.8	7.6
Adult smoking	25%	13%
Excessive drinking (5+drinks/day)	20%	18%
Drug poisoning death/Drug overdose	27 per 100,000	10 per 100,000

Health Outcomes - Health outcomes for Shasta County residents are poorer, on average, when compared to overall California rates. This trend is apparent in overall death rates, which are 39% higher when compared to state rates. Notably, cancer death rates are 22% higher with most deaths occurring from colorectal, lung and prostate cancer. According to the National Rural Health Association, the suicide rate among men in rural areas is higher than in urban areas, which is true in Shasta County; suicide death rates are twice the state average. Additionally, death rates from firearms are 87% higher and drug-induced death rates are 141% higher than California overall. These outcomes may be attributed to the lack of access to exercise, decreased access to healthy food, higher smoking rates and higher drug overdoses for Shasta County as noted in the previous section.

Shasta County Physician Workforce Assessment

Shasta Health Assessment and Redesign Collaborative

In 2009 the Shasta Health Assessment and Redesign Collaborative (SHARC) established itself to build a more organized healthcare delivery system for Shasta County. Membership in the collaborative includes federally qualified health centers (FQHCs), hospitals, Partnership HealthPlan of California, North Valley Medical Association, the County Health and Human Services Agency, and other key stakeholders. In 2013, SHARC's strategic plan identified three priorities: to increase access to health services, promote the integration of behavioral health into primary care, and develop a Health Information Exchange (HIE).

Following the Affordable Care Act's implementation and Medi-Cal's managed care program expansion, SHARC established an Access Committee to recommend local strategies to address the subsequent, increased demand for primary care services in the county. The committee began to monitor inappropriate use of the hospital emergency rooms, and promote recruitment and retention activities, such as loan repayment for providers.

The Shasta County Physician Workforce Assessment was prepared by The Health Alliance of Northern California (HANC). HANC is a network of community health centers working to promote the health and well-being of communities in the frontier and rural parts of northeastern California. HANC provides staff support to SHARC and worked with the SHARC Access Committee to conduct this assessment.

Methodology

Physician Directory- An accurate physician inventory was necessary to use for outreach to physicians and practices to complete the assessment. Before creating a new inventory, though, attempts were made to acquire an accurate list of practicing physicians from pre-existing sources, including purchasing data from a national research institute. These pre-existing sources, however, were found to be unusable due to high level of inaccuracies.

An accurate inventory of active Shasta County physicians was created using hospital medical staff rosters, the Partnership HealthPlan of California (PHC) provider directory, North Valley Medical Association's (NVMA) membership roster, and input from local healthcare professionals.⁵ Despite using the most current community data available to create the directory, the initial list of over 500 physicians, was ultimately reduced as out-of-county, retired, administrative, deceased, and relocated physicians were identified and scrubbed from the list. For purposes of this survey, a total of 424 physicians were determined to be actively practicing in Shasta County.

Survey Tool- An online survey was created to obtain more complete information about the practicing physicians than what was available through the inventory, such as insurances accepted, if they were accepting new patients, and average weekly patients seen. The survey also assessed the average weekly hours practiced, and any plans for retirement within 5 years.⁶ The survey was constructed based on committee feedback, ensuring that the data collected would reflect the project's goals.

The online survey's response rate was low despite large-scale promotion. For large practices, the on-line survey was very time consuming to complete for each individual physician. Because of this feedback, the online survey was shifted to a one page sheet that was much easier for large practices to complete. The revised survey was administered via telephone, email, fax, and in-person. It was determined additional resources would be needed to administer the revised survey tool. As such, a Program Coordinator was hired and assigned solely to gathering this data, whose effort included meeting with numerous practices in person to facilitate the completion of the surveys. Because of the revised approach and the additional staff time, response rates increased.

Survey Results

Response Rate- Surveys were disseminated to a total of 424 physicians that were determined to be actively practicing in Shasta County. A total of 347 surveys were completed by Shasta County respondents yielding an 82% response rate (347/424). The complete response rate is as follows:

Practice Type/Specialty	Respondents/Total # Physicians	Response Rate
Primary Care	126/132	95%
• Family Medicine	61/64	95%
• Internal Medicine	18/21	85%
• OB/GYN	11/11	100%
• Pediatrics	12/12	100%
• Residents	24/24	100%
Specialists	164/235	70%
Hospitalists/Emergency Room	57/57	100%

⁵ See Acknowledgments

⁶ See Appendix A for the hardcopy survey

Key Findings

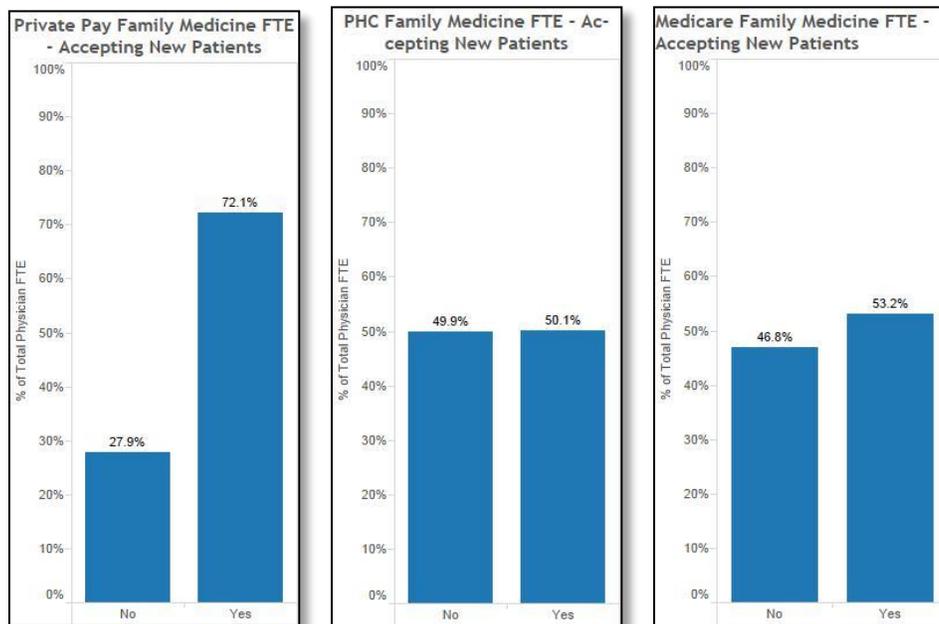
Location of Physician Practice—The study found that 90% of primary care physicians and over 99% of specialists practice in Redding or within communities situated along the Interstate 5 (I-5) corridor, yet only 61% of the population live in those areas.⁷ Compared to California's average population density of 239 people per square mile or San Francisco County's 17,179 people per square mile, Shasta County's population density is much lower at 47 people per square mile thereby affecting access to healthcare services.⁸

Key Point

90% of primary care physicians and over 99% of specialists practice in Redding or within communities situated along the I-5 corridor, yet only 61% of the population live in those areas.

Payor Mix—Primary care survey results indicated that 47% of physicians accepting Medicare were closed to new patients and almost 50% of physicians accepting Partnership HealthPlan of California (PHC) were closed to new patients. In contrast, 28% of physicians accepting private insurance indicated that their practices were closed to new patients⁹:

Physicians Accepting New Patients FTE by Payor Type



⁷ 61% population data from 2010 Census Data.

⁸ Ibid.

⁹ Even though data on physicians accepting Covered California insurance plans was collected, the data was omitted from analysis because the survey template failed to clearly differentiate between Covered CA plans and other products. For example, many respondents were not aware of the difference between Anthem Blue Cross Pathway PPO, which is a Covered CA product, and Anthem Blue Cross's non-Covered CA products. See Appendix A for full insurance list.

Key Point

Access to primary care is more restricted for PHC members and Medicare enrollees.

Survey results indicated that 96.5% of all specialists were open to new patients, 91.7% of specialists accepting Medicare were open, 90.3% accepting private insurance were open, and 83.7% specialists accepting PHC were open. This specialist data, however, is potentially over-reported because the survey did not differentiate between insurance acceptances for in-patient vs. out-patient services.

Ratios—Three recognized physician-to-population ratios were used to benchmark the Shasta County physician supply. The following are the names of the ratios and the year the ratio was established:

1. Graduate Medical Education National Advisory Committee (1980);
2. Hicks & Glenn (1989); and,
3. Solucient (2003).

The following table illustrates the percentage of Shasta County primary care FTEs per 100,000 persons compared to the three standards, which are nationally used to assess physician supply.

SHASTA COUNTY PRIMARY CARE RATIOS						
Primary Care Type	Total Shasta County FTEs	Shasta County FTEs per 100,000 persons	Recommended FTE & % of GMENAC (est. 1980)		HICKS & GLENN (est. 1989)	SOLUCIENT (est. 2003)
Family Medicine	53	29.5	(25.2)	117%	(16.2) 182%	(22.5) 131%
Internal Medicine	11.83	6.6	(28.8)	23%	(11.3) 58%	(19.0) 35%
Pediatrics	9.43	5.3	(12.8)	41%	(7.6) 69%	(13.9) 38%
OB/GYN	9.3	5.2	(9.9)	52%	(8.0) 65%	(10.2) 51%
Total	83.56	46.5	(76.7)	61%	(43.1) 108%	(65.6) 71%

Key Point

In most primary care categories Shasta County's physician workforce supply falls below the three recommended thresholds.

While Shasta County Family Medicine FTEs exceeded all three benchmark recommendations, FTEs for all other primary care types were low. One possible reason may be that family medicine physicians in rural communities often provide care typically provided by other primary care physician types.

The above table illustrates the variance among accepted benchmark ratios (e.g. the supply of internal medicine physicians is 23% of the GMENAC benchmark and 58% of the Hicks and Glenn benchmark). Although these ratios are used for evaluating the adequacy of physician supply, according to COGME (2005), large-scale provider-patient ratio assessments and projections are based on aggregate data sets and do not capture the

variable distribution of the physician supply (i.e. the rural versus urban shortage). Moreover, the available benchmarks for recommended physician to population ratios do not take into account the local “patient demographics, physician demographics, physician practice styles, payment systems, and disease incidence, which vary widely from market to market.”¹⁰

The current benchmarks serve only as rough measures of workforce adequacy as they do not account for local contexts and have not been updated to account for the changes in healthcare since their establishment.¹¹ Despite the widespread prevalence among organizations to use the large aggregate data sets to predict state and national trends in physician workforce, the benchmarks do not address the local physician workforce needs nor trends. Future studies should take into account factors not recognized by current benchmarks, like local demographics, payment systems, health status, and healthcare needs.

The above sources also do not provide benchmarks for many important specialty care types, which are listed in Appendix B.¹² Of the specialties with available benchmarks, the Psychiatry benchmark is prominent. Psychiatry in Shasta County was found to be 22.4% of the GMENAC recommended ratio, highlighting the necessity to further inspect the workforce standard. Further inquiry into Shasta County’s service distribution of its Psychiatry FTEs provides more information. For example, only 1.8 FTE of psychiatrists accept Partnership HealthPlan patients. Of that 1.8 FTE, 0.8 FTE are not accepting new patients. Despite the increased importance and focus placed on access to mental health services, what some call the “silent shortage” in psychiatry is projected to worsen (Merritt Hawkins 2015b).

Age and Retirement- To assess how the current physician workforce may change within the next several years, this study catalogued respondents’ retirement projections and reviewed ages of county physicians. The aging of the physician workforce is a growing concern as retiring physicians leave capacity gaps. Adding to the worrisome maturation of the physician workforce and their impending retirement, the United States’ growing senior population, and the associated upsurge in chronic illness, the demand for physicians is only projected to increase.¹³

In Shasta County, survey respondents indicated that a total of 20% of primary care physicians and 35% of specialists 56 or older may retire or relocate in the next five years. However, there was concern this question was understated because of physician’s hesitancy to state their plans for retirement or relocation.

Further research was conducted on the age of Shasta County physicians. Shasta County physician age data was gathered using healthgrades.com and intelius.com and cross-validated. Age was identified for 73% of the physician workforce in Shasta County.

¹⁰ Merritt Hawkins, A Review of Physician-To-Population Ratios

¹¹ Ibid.

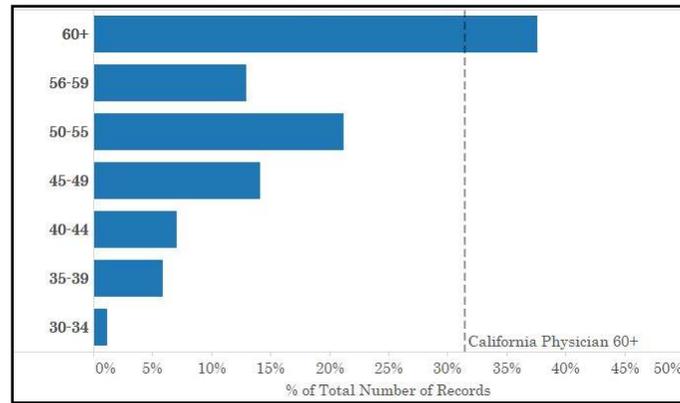
¹² See Appendix B for all unavailable and available ratios

¹³ For age see Merritt Hawkins (2015a). *The Aging Physician Workforce: A Demographic Dilemma*.

For demand projections see IHS Inc. (2016). *The Complexities of Physician Supply and Demand 2016 Update: Projections from 2014 to 2025*; And Robert Graham Center (2014). *California: Projecting California Primary Care Physician Workforce*

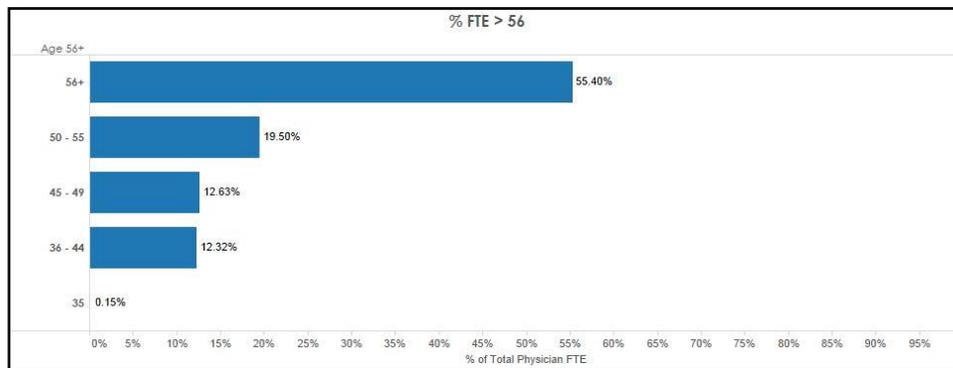
For primary care physicians, a total of 85 out of 106 (80%) physician ages were identified.¹⁴ Of those 85 physicians, 51% were over 55 years old. Thirty-eight percent of Shasta's primary care physicians were over 60 years old compared to 31.5% of California primary care physicians.¹⁵

Primary Care Physicians 60+



For non-primary care physicians¹⁶, ages for 229 physicians (85%) were identified. Among them, 55% were over 55 years of age.

Non-Primary Care Physicians 56+



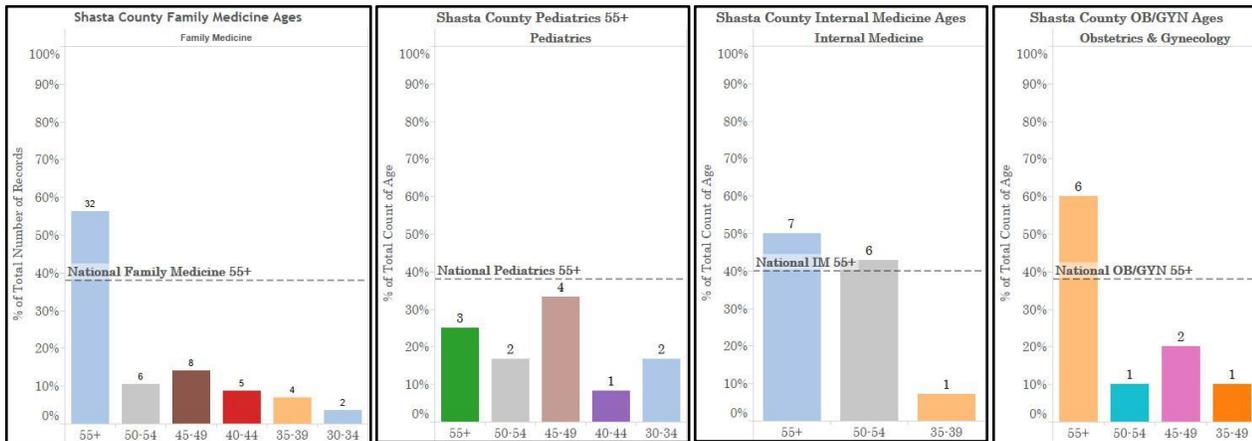
This age distribution provides evidence that a number of the county's physicians will retire in the near future.

¹⁴ The 106 Primary Care physicians excludes the 24 FM residents because of their limited contribution to FTE and the need for their retention rate post-graduation to be taken into account.

¹⁵ Association of American Medical Colleges, (2013) State Physician Workforce Data Book.

¹⁶ Non – primary care includes: Specialists, Urgent Care, Hospitalist, and ER

It should also be noted the age mix of Shasta County’s family medicine, OB/GYN, and internal medicine workforces are all well over the national averages found in the American Medical Association Workbook¹⁷:



Over half of Shasta County’s physician workforce was over 55 years old. With between 20-35% percent of physicians over 55 planning to retire within five years, the findings in Shasta County substantiate a national concern about the aging physician workforce.

Key Point
 The Shasta County physician workforce is older than the state and national benchmarks.

¹⁷ American Medical Association Masterfile Data (2013)

Conclusion

This assessment's goal from the outset was to account for the active physicians in Shasta County, and then assess the capacity of the physician workforce to meet the community need for healthcare services, now and into the future. One of SHARC's priorities is to evaluate and improve the county's healthcare delivery system. As national and statewide healthcare experts project physician shortages, SHARC decided that to best understand the implications of those projections, it must also understand what the local reality is. This study uncovered information that provides local credence to these widespread claims.

First, physician services in Shasta County are maldistributed. Because these services are centralized, there are barriers inherent in serving a population living across a county that is three times the size of Rhode Island, such as transportation, accessing specialty care, etc. Further inquiry into the geographic barriers for accessing services is necessary.

Next, the data demonstrated that Partnership HealthPlan members or Medicare enrollees have less access to a new primary care provider compared to those with private insurance. With limited access to physicians for new indigent and senior patients, Shasta County's already poor health status will likely get worse. This is a barrier that SHARC must address.

According to recommended physician-to-population ratios, Shasta County does not meet two of three primary care benchmarks. Although these benchmarks provide a rough estimate given the population size, they do not account for other access barriers, like geographic physician location, nor do they address the economic and social disparities, like the fact that Shasta County has, on average, an older, poorer, and sicker population compared to the rest of California. However, these benchmarks provide a baseline comparison from which to measure an initial supply and need. The value of this local data reinforces the necessity for regular workforce evaluation and the development of locally relevant benchmarks that take into account the health of the community.

Finally, age and retirement data signal reason for urgent intervention. With over half of Shasta County's physician workforce over 55 years of age, the supply of physicians will reach a critical level unless corrective measures are taken to locally train, recruit and retain new physicians.

The findings validated the county's belief that the current physician workforce is insufficient to keep pace with local demands.

At the time of this writing, California Governor, Jerry Brown, approved a 2016-17 State Budget that includes \$100 million in support of workforce development programs, such as primary care residency training and provider recruiting programs to practice in medically underserved areas. Several healthcare workforce bills are moving through the legislature that aim to relieve physician shortages. For example, AB 2024, if passed, would improve physician recruitment to critical access hospitals.

While state budgetary and legislative solutions are critical to improving the looming crisis, community healthcare collaboratives like SHARC must first understand their local delivery system. Local workforce assessments offer an opportunity to inform future legislative decisions that will address communities' healthcare needs.

Recommendations

This brief validates and begins to quantify local workforce concerns. These findings will help target, organize, and coordinate corrective action. National, state, and local efforts are already underway to address present and future network adequacy needs, but based on the results of the assessment the following efforts are high priority for Shasta County workforce development efforts:

- 1. Implement accurate local and state medical directories. One of the biggest hurdles in implementing this workforce assessment was the lack of a centralized, up-to-date provider directory.**
 - a. Efforts are underway to implement SB137, which is a step in the right direction for consumers, but it does not address the system-wide need for comprehensive medical professional directories.
 - b. The continued pursuit of accurate directories through local and state efforts is essential for conducting regular and efficient workforce assessments.

- 2. Establish uniform methodology for locally relevant physician-to-population ratios that adjust for population health.**
 - a. Given that available benchmarks are commonly cited as outdated, more up-to-date and locally applicable ratios need to be created in order to understand a community's physician workforce.
 - b. Community health indicators should be considered in future physician supply studies as measurement of demand on the local healthcare delivery system.

- 3. Increase the number of primary care residencies in California, including increasing federal and state support for the Teaching Health Center program and including the funding and recognition of NP/PA Post-Graduate Residency/Fellowships.**
 - a. As Shasta County's physician workforce ages out of practice, recruiting and retaining physicians to replace the retirees is paramount.
 - b. Evidence suggests that residents tend to practice within 100 miles of where they train.¹⁸ Investing in programs like the Teaching Health Center program that will allow a community to train its own workforce is vital.
 - c. As primary care physicians and psychiatrists continue to be in a significant shortage status, rural communities must invest in the development of NP/PA Residency/Fellowships as a way to improve the training and competency of those practitioners who will be asked to take care of increasingly complex patients.

¹⁸ Graham Center Policy One-Pager (2013). *Migration After Family Medicine Residency*.

4. Expand trainings and continue the implementation of team-based primary care models.

- a. It will take time to recruit and retain physicians to replace retirees. Until that gap is filled, medical providers must be ready to adopt methods to most efficiently utilize the supply of physicians they do have in order to meet the increasing demand for services.¹⁹

5. Investments must be made to expand training and loan repayment programs that encourage physicians to practice in underserved communities.

- a. The UC PRIME program, which was launched in 2004 to train clinicians to better practice in underserved communities, is one such program whose admissions in the rural specific training program could be increased.
- b. Loan repayment opportunities for physicians must be made more available and repayment amounts should be increased so that they are proportional to the current cost of obtaining an advanced degree.

¹⁹ Bodenheimer, Thomas S., Smith, M. (2013). *Primary Care: Proposed Solutions to the Physician Shortage Without Training More Physicians*. Health Affairs, 32. No.11 (2013): 1881-1886

Appendix B: Shasta County Physician-to-Population Ratios

SHASTA COUNTY PRIMARY CARE RATIOS									
Primary Care Type:	Total FTE	Shasta County FTEs per 100,000 persons	Recommended FTE & % of GMENAC	HICKS & GLENN	SOLUCIENT	%FTE 55+	FTE 55+	Physicians 55+	
Family Medicine ¹	53	29.5	(25.2) 117%	182%	131%	58.3%	24.4	31	
Internal Medicine	11.8	6.6	(28.8) 23%	58%	35%	46%	5.5	7	
Pediatrics	9.4	5.25	(12.8) 41%	69%	38%	24.9%	1.9	3	
OB/GYN	9.3	5.2	(9.9) 52%	65%	51%	62.1%	5.2	6	
Total	83.6	46.5	(76.7) 61%	108%	68%	54%	-----	-----	
SHASTA COUNTY SPECIALISTS RATIOS									
Specialist Total	160	89/100,000	(105) ² 85 % (80) ² 111 %	NA	NA	57.7%	82.1	103	
MEDICAL SPECIALTIES									
Allergy/Immunology	0.74	0.41/100,000	(0.8) 51.5 %	NA	23.8%	100%	0.74	1	
Cardiology	I: 7.7 V: 0.8 D: 4.5	7.2/100,000	(3.2) 226%	276.9%	170%	81.2%	9	11	
Dermatology	3.2	1.78 /100,000	(2.9) 55.6%	84.8%	56.9%	100%	3.2	4	
Endocrinology	0.7	0.39 / 100,000	(0.8) 48.8%	NA	NA	0	0	0	
Gastroenterology	6.8	3.8 /100,000	(2.7) 141%	NA	108.6%	22.5%	1.3	2	
Hematology & Oncology	4.5	2.5/100,000	(3.7) 68%	NA	231%	40%	1.8	2	
Infectious Disease	1.2	0.67/100,000	(0.9) 74.3%	NA	NA	0%	00	0	
Nephrology	0.74	0.41/100,000	(1.1) 37%	NA	32%	100%	.74	1	
Neurology	2.7	1.5/100,000	(2.3) 65.4%	107.1%	83.8%	63.5%	1.74	2	
Psychiatry	6.4	3.56/100,000	(15.9) 22.4%	91.3%	62.1%	62.5%	4	5	
Pulmonology	1.5	0.84/100,000	(1.5) 100%	NA	NA	100%	1.48	2	
Rheumatology	2	1.1/100,00	(0.7) 157%	NA	83%	100%	2	2	
Critical Care	12	6.7/ 100,000	NA	NA	NA	56%	5	5	
SURGICAL SPECIALTIES									
Primary Care Type:	Total FTE	Shasta County FTEs per 100,000 persons	Recommended FTE & % of GMENAC	HICKS & GLENN	SOLUCIENT	%FTE 55+	FTE 55+	Physicians 55+	
General Surgery	6.7	3.7/100,000	(9.7) 38.5%	90%	61.6%	66.7%	4	4	
Neurosurgery	2.5	1.4/100,000	(1.1) 127%	NA	NA	100%	1.7	2	
Orthopedic Surgery	15.6	8.7 /100,000	(6.2) 140%	207.1%	140%	52.6%	6.6	8	
Urology	5	2.8 /100,000	(3.2) 87%	147.3%	97.9%	55.4%	2.5	3	
Cardiothoracic	2.2	1.2/100,000	NA	NA	NA	66.7%	1.5	2	
HOSPITAL-BASED AND URGENT CARE									
Emergency Medicine	28.3	15.8/100,000	(8.5) 186%	NA	127%	21.6	4.6	5	
Anesthesiology	25.2	14/100,000	(8.3) 169%	NA	NA	59%	13.1	15	
Hospitalist	30.74	17/100,000	NA	NA	NA	35.3%	6	6	
Urgent Care	7.8	4.3/100,000	NA	NA	NA	44.6%	3.5	4	

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