

Research Report

The State of California's Physician Workforce

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Abstract / Overview

This report provides California policymakers with up-to-date information about the state's physician workforce and the pipeline of trainees in the state's medical schools and graduate medical education (GME) programs, often referred to as residency programs. It focuses on the five specialties for which the CalMedForce program, established pursuant to Proposition 56, provides grants for residency training: family medicine, internal medicine, pediatrics, obstetrics/gynecology, and emergency medicine. The report also addresses psychiatry, a specialty in which California faces a large shortage of physicians. Findings presented in this report indicate that California's MD workforce is not sufficient to meet the state's needs. Specifically, California does not have enough primary care physicians and its physicians are not well-distributed across the state and do not reflect the state's racially/ethnically diverse population. In addition, many of the state's physicians providing patient care are age 65 years or older. With regard to medical education, the numbers of medical students and residents have grown substantially over the past decade but medical schools and residency programs are not well-distributed across the state and, like physicians, do not reflect the racial/ethnic diversity of the state's population.

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Key Findings

California policymakers need up-to-date information about the state's physician workforce and the pipeline of trainees in the state's medical schools and graduate medical education (GME) programs, often referred to as residency programs, to make good decisions about investment of resources in physician workforce development. This report compiles relevant data from multiple sources. It focuses on the five specialties for which the CalMedForce program provides grants for residency training: family medicine, internal medicine, pediatrics, obstetrics/gynecology, and emergency medicine. CalMedForce was established pursuant to Proposition 56, which increased California's state tobacco tax and allocated a portion of revenue (\$40 million) to the University of California (UC) to "sustain, retain, and expand" California's GME programs. The report also addresses psychiatry, a specialty in which widespread shortages exist but which does not currently receive CalMedForce funding.

Findings presented in this report indicate that California's physician workforce is not sufficient to meet the state's needs. Specifically,

- California has fewer primary care MDs than specialist MDs providing patient care which may make it difficult for Californians to obtain primary care services that can prevent illness and enable them to manage chronic conditions effectively.
- California's MDs are not well-distributed across the state; the lowest supplies per capita are in the Inland Empire, Northern and Sierra, and San Joaquin Valley regions.
- A large share of MDs providing patient care in California are age 65 years or older.
- Blacks and Latinx are underrepresented among MDs relative to their shares of California's population.
- Findings regarding medical education indicate that
 - Over the past decade, the number of graduates of MD-granting medical schools in California increased by 14 percent and the number of graduates of DO-granting schools increased by 40 percent.
 - Nevertheless, during the 2018-2019 academic year, California ranked 43rd among the 46 states with medical schools in the ratio of medical students per 100,000 population
 - In 2018, California ranked 29th among the 50 states that have residency programs in the ratio of residents per 100,000 population.
 - Among specialties eligible for CalMedForce funding, the number of physicians entering residency in California has increased substantially in emergency medicine, family medicine, and internal medicine primarily due to increases in the numbers of residency programs in these specialties.
 - As with practicing MDs, the racial/ethnic diversity of medical students and residents does not reflect the racial/ethnic diversity of California's population.
 - However, University of California medical schools are making progress toward increasing racial/ethnic diversity; U.S. News and World Report ranks four University of California medical schools (UC Davis, UCLA, UC Riverside, and UCSF) among the top 10 most diverse medical schools in the nation.
 - California retains larger shares of physicians who complete medical school and/or residency than any other state in the nation.

- Even though California retains high proportions of its medical students and residents, projections of future supplies of primary care physicians and psychiatrists suggest that the state will not have sufficient numbers of physicians in these specialties to meet demand for their services.

Introduction

California has struggled to meet its physician workforce needs over the past several decades. Previous reports have found that California has fewer primary care physicians than it needs and that the state's physicians are poorly distributed relative to the state's population. In 2030, demand for primary care clinicians in California is projected to exceed supply by 12 to 17 percent.¹ The state is projected to have an even more severe shortage of psychiatrists.² Low supplies of primary care physicians and psychiatrists make it difficult for Californians to obtain medical and behavioral health services that can improve their health. In addition, California's physicians are aging and are not as racially and ethnically diverse as the state's population. The lack of racial/ethnic diversity is especially challenging in California because our state is among the most racially/ethnically diverse in the nation. Research has shown that having racially/ethnically and linguistically concordant health care providers improves patient trust and satisfaction and may improve health outcomes.^{3,4,5,6}

Proposition 56, which was approved by voters 2016, increased California's state tobacco tax and allocated a portion of revenue (\$40 million) to the University of California (UC) to "sustain, retain, and expand" California's graduate medical education (GME) programs, which are often referred to as residency training programs. UC contracted with Physicians for a Healthy California to administer a statewide GME grant program, also known as CalMedForce. Under the terms of Proposition 56, CalMedForce must provide grants to residency programs in five specialties: emergency medicine, family medicine, general internal medicine, general pediatrics, and obstetrics/gynecology. CalMedForce is also authorized to fund residency programs in other specialties in which shortages exist. Grantees are selected based on their ability to expand California's physician workforce with emphasis on ability to meet the needs of medically underserved populations.

In the state of California, physicians are required to complete three years of residency training following medical school graduation to obtain a license to practice medicine.⁷ In some specialties, physicians must complete more than three years of training to be eligible for board certification. Physicians who wish to subspecialize must complete additional years of fellowship. Most residency and fellowship positions are in programs accredited by the Accreditation Council for Graduate Medical Education (ACGME), although some fellowship programs are not ACGME-accredited.

This report presents current information about California's physician workforce and the pipeline of trainees in the state's medical schools and residency programs. It focuses on the five specialties for which CalMedForce provides funding and presents projections of future demand for physicians in these specialties. The report also provides information about psychiatry, a specialty in which widespread shortages have been reported yet that does not currently receive funding from CalMedForce. The analysis focuses on physicians with a Doctor of Medicine (MD) degree because the number of osteopathic physicians (DO) in California is much smaller. In 2020, there were 123,941 MDs with active California licenses practicing in the state compared to 8,634 DOs.

California's Physician Workforce, 2015 to 2020

Data presented in this section of the report were obtained from the Medical Board of California's core license file and responses to a mandatory survey that all allopathic physicians (MDs) are required to complete when they renew their licenses.

Supply of Active Physicians in California

The number of MDs with active California licenses who practice in the state increased by 10 percent between 2015 and 2020, from 113,039 to 123,941 physicians. (See Table 1.) The number of MDs whose responses to the Medical Board's mandatory survey indicate that they have completed residency and provided patient care at least one hour per week also increased, rising by 6 percent, from 82,994 to 88,145 physicians.

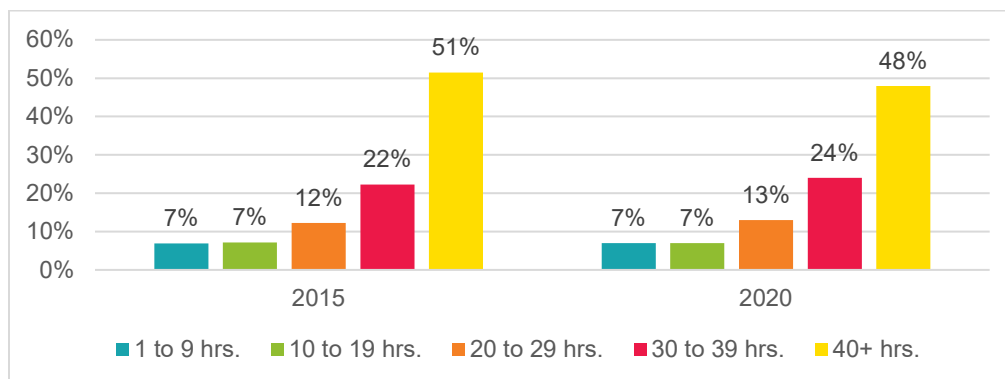
Table 1. Number of Licensed Physicians in California, 2015 and 2020

	2015	2020	% Change
Active California license and practice in California	113,039	123,941	9.6%
Completed training	100,427	106,729	6.3%
Answered mandatory survey question about providing patient care	90,314	96,362	6.7%
Provided patient care at least one hour per week	82,994	88,145	6.2%
Provided 20 or more hours of patient care per week	71,334	75,468	5.8%

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

Among physicians who provided patient care in 2015 and 2020, 85 percent provide care 20 or more hours per week. The percentage providing patient care more than 40 hours per week decreased from 51 percent to 48 percent.

Figure 1. California Patient Care Physicians by Hours of Care Provided Per Week, 2015 and 2020



Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

The analyses presented in the remainder of this chapter focus on California MDs who provided patient care at least 20 hours per week ($n = 75,468$) because 86 percent of all MDs who deliver patient care provide it at least 20 hours per week and over half care for patients 40 or more hours per week. These physicians are referred to as “active patient care MDs.”

Specialty Distribution of Active Patient Care MDs

Specialist MDs outnumber primary care MDs in California. For purposes of this report, primary care MDs are defined as those whose primary specialty is family medicine, general practice, internal medicine, pediatrics, or obstetrics/gynecology. Although obstetricians/gynecologists are not trained to provide a full scope of primary care services, they serve as primary care providers for many women of childbearing age.

According to information that MDs reported to the Medical Board, 36 percent of active patient care MDs in California in 2020 were primary care MDs. (See Table 2.) Two percent were emergency medicine physicians. The distributions of MDs by specialty were similar in 2015 and 2020 except for a growth of three percentage points in the share of MDs who are general internists and a growth of two percentage points in the share who are emergency medicine MDs. (See Appendix A for a complete list of specialties.)

Table 2. Number of Active Patient Care MDs in California by Specialty, 2015 and 2020

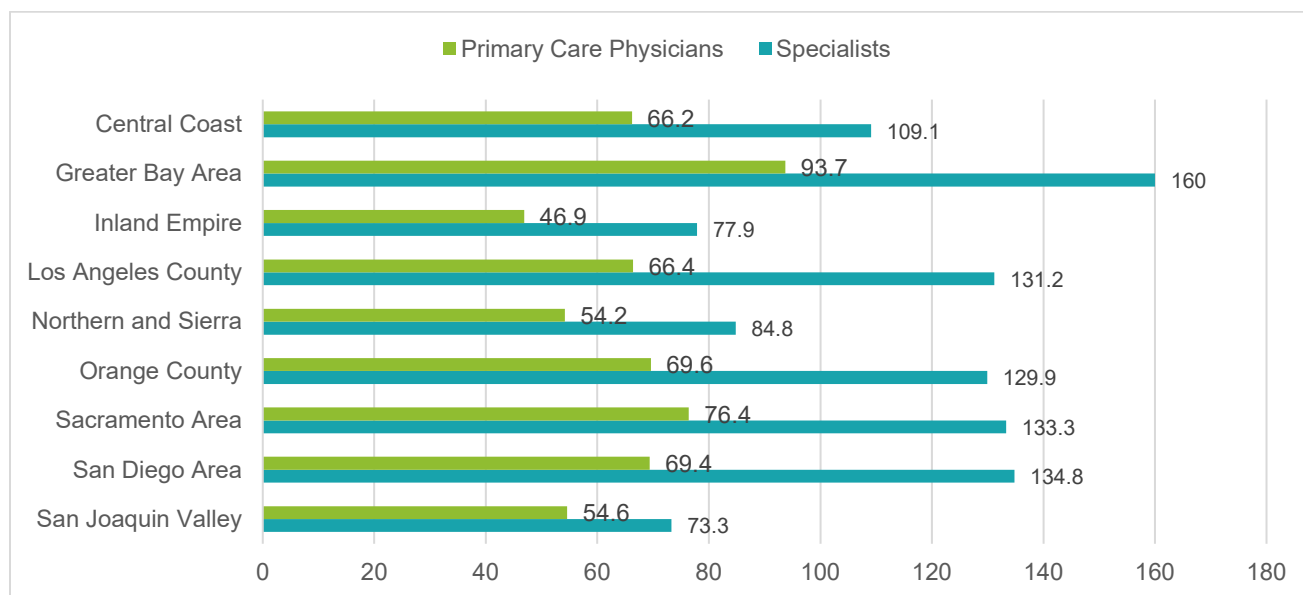
Specialty	2015	Percentage	2020	Percentage
	Number		Number	
Family Medicine	6,642	9%	6,912	9%
Internal Medicine	8,760	12%	9,663	13%
Pediatrics	5,208	7%	5,432	7%
Obstetrics/Gynecology	3,470	5%	3,598	5%
Emergency Medicine	4,067	6%	4,405	6%
General Practice*	678	1%	579	1%
General Surgery	1,760	2%	1,774	2%
Psychiatry	4,565	6%	4,666	6%
Facility-based Specialties	9,593	13%	10,168	13%
Medical Specialties	16,034	22%	17,437	23%
Surgical Specialties	8,641	12%	8,932	12%
Other Specialties	1,624	2%	1,739	2%
Not reported	292	<1%	163	<1%
Total±	71,334		75,468	

* General practice physicians are physicians who were licensed prior to enactment of the requirement that MDs complete three years of residency training following graduation from medical school. They have completed at least one year of residency training but have not completed a full residency in any specialty.

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020. See Appendix A for information about how MDs' specialties were grouped.

Geographic Distribution of Active Patient Care MDs

Supplies of MDs per population varied widely across California in 2020. Figure 2 displays ratios of primary care and specialist MDs per 100,000 people across ten regions of California. For purposes of this figure, primary care MDs are defined as MDs whose specialties are family medicine, general internal medicine, general pediatrics, and obstetrics/gynecology. The Greater Bay Area had the highest ratios of both primary care MDs and specialist MDs per 100,000 people. The Inland Empire had the lowest ratio of primary care MDs per 100,000 population and the San Joaquin Valley had the lowest ratio of specialist MDs per 100,000 population. (See Appendix B for a complete list of counties in each region.)

Figure 2. Ratios of Primary Care and Specialist MDs per 100,000 Population by Region, 2020

Note: Primary care MDs are defined as MDs whose primary specialty is family medicine, general practice, internal medicine, pediatrics, or obstetrics/gynecology.

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020. See Appendix B for information about how MDs' specialties were determined.

A closer look at the five specialties that are eligible for CalMedForce funding indicates that there were important differences in the distribution of MDs in these specialties. In 2020, the Greater Bay Area had the highest ratios of general internists, general pediatricians, and obstetrician/gynecologists per 100,000 people, but had a lower ratio of family physicians per 100,000 population than five other regions of the state. Conversely, the Central Coast as well as the Northern and Sierra regions had the highest ratios of family physicians per 100,000 people but lower ratios of general internists and general pediatricians per 100,000 people than a number of other regions. The Inland Empire had the lowest ratios of family physicians, general internists, and obstetrician/gynecologists per 100,000 people and the San Joaquin Valley had the lowest ratio of emergency physicians per 100,000 people.

Table 3. Ratios of Active Patient Care MDs to Population by Region, 2020

	Family Medicine	Internal Medicine	Pediatrics	Obstetrics/Gynecology	Emergency Medicine
Central Coast	25.7	20.0	12.0	8.4	4.8
Greater Bay Area	19.8	41.1	19.6	13.2	5.8
Inland Empire	15.3	17.5	8.8	5.4	3.2
Los Angeles County	17.0	26.8	13.8	8.8	4.1
Northern and Sierra	22.5	17.9	7.6	6.3	4.3
Orange County	20.7	24.9	15.1	8.9	4.6
Sacramento Area	22.3	30.0	13.7	10.3	4.1
San Diego Area	19.8	26.5	14.2	8.9	5.5
San Joaquin Valley	17.4	19.8	10.1	7.3	2.6

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

For the most part, regional level ratios of MDs per 100,000 population in the five specialties CalMedForce supports did not change substantially between 2015 and 2020. However, there were some notable exceptions with regard to family medicine and general internal medicine in several regions. In the Northern and Sierra region the ratio of family medicine MDs per 100,000 population decreased by 2.7 between 2015 and 2020, from 25.2 to 22.5 per 100,000 population. This decrease may reflect retirements, as this region has the oldest family physicians of any region in the state. Conversely, the ratio of family medicine MDs per 100,000 population increased in the Sacramento area from 20.2 to 22.3 per 100,000 population. Ratios of internists per 100,000 population grew in all regions of the state, with the largest increase in the Greater Bay Area, where the ratio increased from 37.1 to 41.1 per 100,000 population.

Table 4. Change in Ratios of MDs per 100,000 Population by Region, 2015 and 2020

	Family Medicine	Internal Medicine	Pediatrics	Obstetrics/ Gynecology	Emergency Medicine
Central Coast	0.6	0.7	1.3	0.2	0.8
Greater Bay Area	0.8	4.0	0.6	1.1	0.4
Inland Empire	0.9	1.1	0.5	0.0	0.4
Los Angeles County	0.2	2.6	0.4	0.0	0.3
Northern and Sierra	-2.7	1.8	-0.5	0.6	0.1
Orange County	-1.1	1.4	1.0	-0.7	0.4
Sacramento Area	2.2	2.7	0.1	0.4	-0.4
San Diego Area	0.8	2.8	1.0	0.5	0.1
San Joaquin Valley	-0.1	2.6	0.3	0.2	0.0

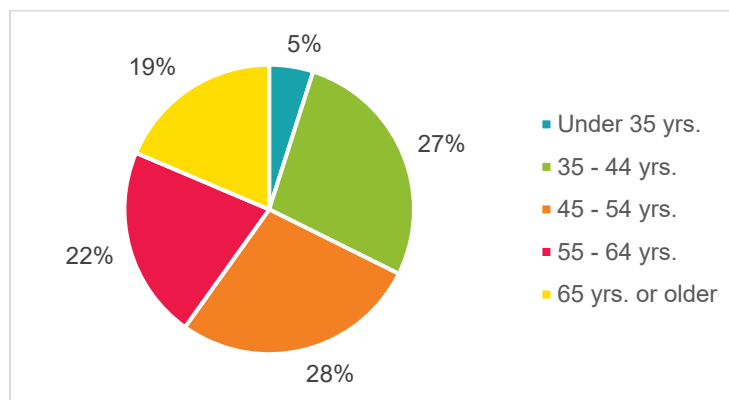
Source: Survey of Licensees (private tabulation), Medical Board of California, 2015 and 2020.

Demographic Characteristics of Active Patient Care Physicians

Age Distribution

In 2020, nearly one in five active patient care MDs in California was age 65 years or older. An additional 22 percent were age 55 to 64 years. These findings suggest that many MDs providing patient care in California are likely to retire or reduce the number of hours of patient care they provide within the next decade. The age distribution of active patient care physicians in 2015 was similar to the age distribution in 2020.

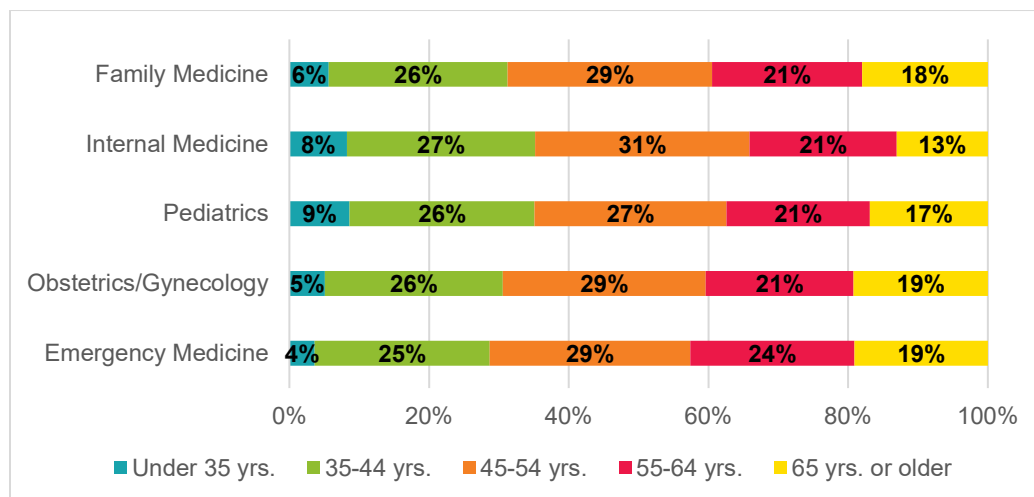
Figure 3. Age Distribution of Active Patient Care MDs, 2020



Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

Among the five specialties for which CalMedForce funds residency programs, emergency medicine and obstetrics/gynecology had the largest percentage active patient care MDs over age 65 years in 2020. Nineteen percent of active patient care MDs in these specialties were age 65 years or older in 2020. Internal medicine had the smallest percentage of MDs age 65 years or older; only 13 percent of internists were in this age group.

Figure 4. Age Distribution of Active Patient Care MDs in CalMedForce Specialties, 2020



Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

The age distribution of physicians in the five specialties for which CalMedForce funds residency programs varies substantially across California's regions. As the data in Table 5 indicate, the Northern and Sierra region has the highest percentage of active patient care family medicine, internal medicine, and emergency medicine MDs that are age 65 years or older and the second highest percentage of active patient care obstetrician/gynecologists age 65 years or older. The Central Coast had the second highest percentage age 65 years or older in all CalMedForce specialties except obstetrics/gynecology. The Sacramento region had the smallest percentage age 65 or older in all five specialties.

Table 5. Percentage of Active Patient Care MDs Age 65 Years or Older by Region, 2020

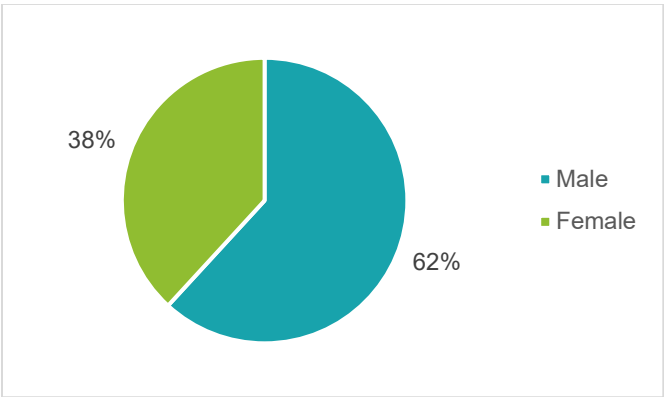
	Family Medicine	Internal Medicine	Pediatrics	Obstetrics/Gynecology	Emergency Medicine
Central Coast	23.3%	19.5%	20.6%	24.0%	29.5%
Greater Bay Area	12.3%	9.1%	11.8%	12.4%	15.3%
Inland Empire	15.2%	12.3%	20.4%	17.5%	17.5%
Los Angeles County	22.4%	16.8%	22.1%	25.7%	22.1%
Northern and Sierra	26.8%	24.5%	15.0%	25.8%	36.1%
Orange County	20.7%	14.9%	19.3%	21.3%	17.0%
Sacramento Area	12.1%	7.3%	9.9%	10.7%	9.2%
San Diego Area	14.2%	11.4%	12.8%	16.7%	16.4%
San Joaquin Valley	19.5%	14.7%	20.1%	26.9%	22.3%

Source: Survey of Licensees (private tabulation), Medical Board of California, 2020.

Gender

In 2015, 65 percent of active patient care MDs were male and 35 percent were female. By 2020, the percentage of MDs who were female had increased to 38 percent. (See Figure 5.) The Medical Board does not give physicians the option to indicate whether their gender identity is nonbinary.

Figure 5. Active Patient Care MDs by Gender, 2020

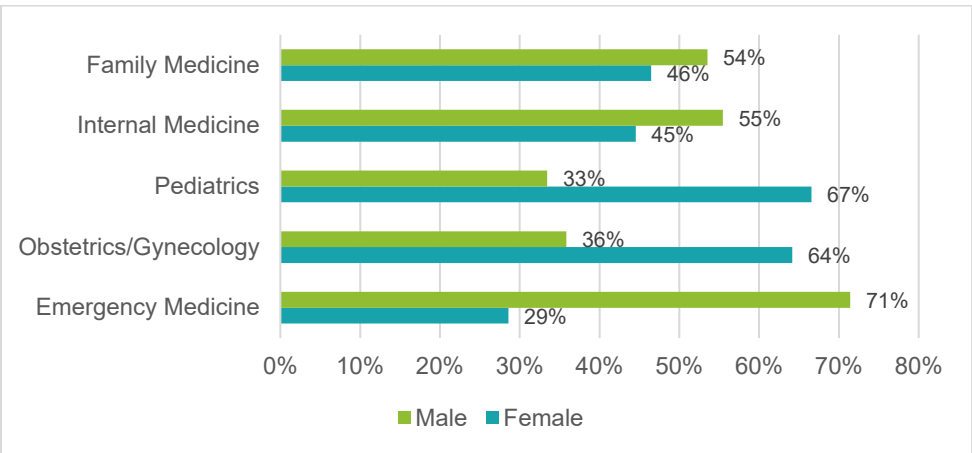


Note: Three active patient care MDs (<0.01%) did not report their sex.

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

The percentages of males and females differ substantially across the specialties for which CalMedForce funds residency programs. With the exception of emergency medicine, these specialties had higher percentages of female MDs than the percentage of females among all MDs in California. Pediatrics had the largest percentage of females (67 percent) followed closely by obstetrics/gynecology (64 percent). Emergency medicine had the smallest percentage of females (29 percent).

Figure 6. Gender of Active Patient Care MDs in CalMedForce Specialties, 2020

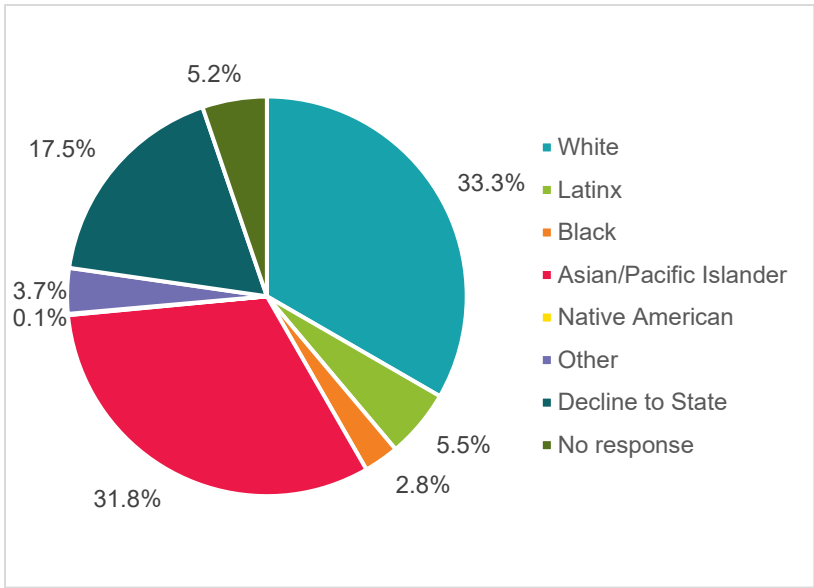


Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

Race/Ethnicity

Assessing the racial/ethnic diversity of California’s physicians is challenging because 22.7 percent of MDs did not report their race/ethnicity to the 2019 to 2020 licensure renewal cycle. Data on MDs who reported their race/ethnicity suggest that they do not reflect the racial/ethnic diversity of the state’s population. In 2018, 39.4 percent of Californians are Latinx but in 2020 only 5.5 percent of MDs were Latinx. Black MDs were also underrepresented among MDs, accounting for 2.8 percent of MDs in comparison to 5.6 percent of the state’s population.⁸ The percentages of MDs in each racial/ethnic group were similar in 2015. The largest difference was a 2 percentage point degree in the percentage of MDs who are white.

Figure 7. Active Patient Care MDs by Race/Ethnicity, 2020



Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

The race/ethnicity of MDs varied substantially across the five specialties in which CalMedForce funds residency programs (See Table 6). With the exception of internal medicine, these specialties had higher percentages of Black and Latinx MDs than the percentages among all California MDs. Obstetrics/gynecology had the highest percentage of Black MDs (5.6 percent), and family medicine had the highest percentage of Latinx MDs (12.1 percent). Internal medicine and pediatrics had higher percentages of Asian/Pacific Islanders than the percentage among all California MDs.

Table 6. Race/Ethnicity of California's Population and Active Patient Care MDs in CalMedForce Specialties, 2020

	California Population	Family Medicine	Internal Medicine	Pediatrics	Obstetrics/ Gynecology	Emergency Medicine
White	36.5%	29.9%	24.0%	30.0%	38.0%	37.8%
Latinx	39.4%	12.1%	4.9%	7.8%	7.9%	6.0%
Black	5.6%	3.5%	2.8%	3.8%	5.6%	3.2%
Asian/Pacific Islander	14.9%	32.0%	43.9%	35.7%	26.0%	26.0%
Native American/Alaska Native/Native Hawaiian	0.4%	0.3%	0.1%	0.1%	0.2%	0.5%
Middle Eastern	Not reported	2.7%	3.9%	2.3%	3.6%	3.5%
Other	3.2%	2.6%	2.7%	1.9%	1.8%	2.4%
Two or more race/ethnicities	Not reported	2.1%	2.3%	2.6%	3.1%	3.0%
Declined to state	Not applicable	14.3%	15.9%	14.9%	13.3%	17.0%
No response	Not applicable	4.2%	4.5%	4.5%	5.0%	5.2%

Source: U.S. Census Bureau, Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin for California: April 1, 2010 to July 1, 2019; Survey of Licensees (private tabulation), Medical Board of California, January 2020.

Table 7 displays data on the percentages of MDs in CalMedForce specialties by Asian/Pacific Islander ethnic group. Disaggregating data on Asian/Pacific Islander MDs is important because Asian/Pacific Islanders encompass people from a wide range of cultures who speak many different languages. The percentages of MDs among Asian/Pacific Islanders racial/ethnic groups varied across the CalMedForce specialties. The largest difference was among South Asian MDs (Indian or Pakistani), who ranged from 5 percent of obstetrician/gynecologists to 14.3 percent of internists. The second largest difference was among Filipinos who ranged from 1.9 percent of obstetrician/gynecologists to 6.8 percent of pediatricians. South Asians were the largest Asian/Pacific Islander ethnic group among MDs in all CalMedForce specialties except obstetrics/gynecology. In that specialty, Chinese MDs were the largest Asian/Pacific Islander ethnic group.

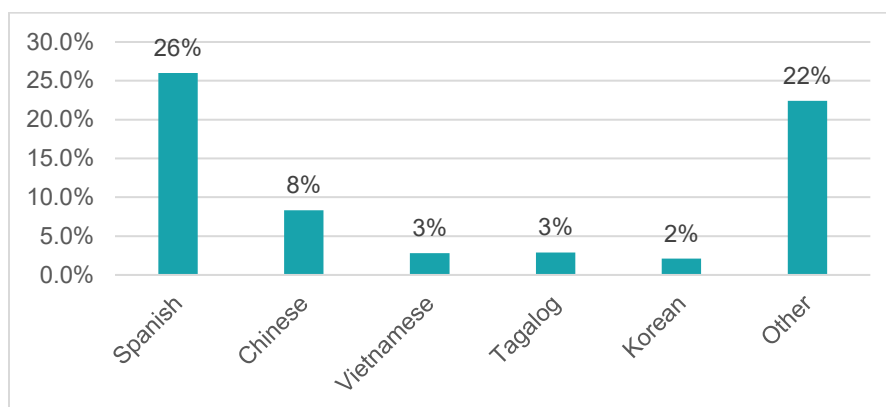
Table 7. Percentages of Asian/Pacific Islanders Among Active Patient Care MDs in CalMedForce Specialties, 2020

	Family Medicine	Internal Medicine	Pediatrics	Obstetrics/ Gynecology	Emergency Medicine
Chinese	5.1%	2.8%	3.8%	5.6%	5.6%
Filipino	5.5%	4.3%	6.8%	1.9%	2.1%
Japanese	1.1%	0.8%	1.1%	1.1%	0.8%
Korean	1.8%	2.6%	2.5%	2.5%	3.4%
South Asian	7.8%	14.3%	8.9%	5.0%	5.9%
Taiwanese	1.4%	1.9%	1.8%	1.7%	1.2%
Vietnamese	3.8%	4.1%	2.9%	2.2%	1.7%
Other Asian/Pacific Islander	1.8%	3.0%	1.8%	0.9%	0.7%
All Asian/Pacific Islander Ethnic Groups	32.0%	43.9%	35.7%	26.0%	26.0%

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

Languages Spoken

According to the American Community Survey, an ongoing survey that the U.S. Census Bureau administers, 44.2 percent of Californians age five years or older speak a language other than English at home.⁹ The five most frequently spoken of these languages in California other than English are Spanish, Chinese (including Cantonese and Mandarin), Vietnamese, Tagalog, and Korean.¹⁰ Figure 8 displays the percentages of California MDs who speak a language other than English. These percentages reflect information that MDs report to the Medical Board and do not necessarily indicate that MDs are able to provide patient care in these languages. Aside from English, Spanish was the most frequently spoken language among MDs in 2020 (26 percent). Twenty-two percent of MDs speak a language other than the five most frequently spoken non-English languages in California.

Figure 8. Percentage of Active Patient Care MDs Speaking Languages Other than English, 2020

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

The languages spoken by MDs in the five specialties in which CalMedForce funds residency programs varied. Most notably, the percentage of MDs who reported that they speak Spanish ranged from 19 percent of internists to 40 percent of obstetrician/gynecologists. Family physicians and pediatricians were substantially more likely to speak Tagalog than MDs in all specialties.

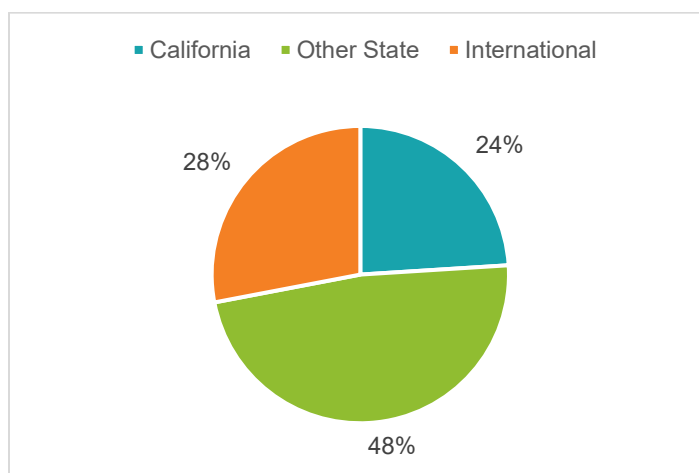
Table 8. Languages Spoken by Active Patient Care MDs in CalMedForce Specialties, 2020

	Family Medicine	Internal Medicine	Pediatrics	Obstetrics/ Gynecology	Emergency Medicine
Spanish	37%	19%	39%	40%	27%
Chinese (including Cantonese and Mandarin)	7%	10%	8%	8%	8%
Vietnamese	4%	4%	3%	3%	2%
Tagalog	6%	4%	7%	2%	2%
Korean	1%	2%	2%	2%	3%
Other	33%	44%	30%	27%	30%

Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

Medical School Location

Historically, California has imported a large share of its MDs from other states and nations. Some of these MDs complete residency in California and remain in the state to practice. Others move to California after completing both medical school and residency. In addition, a large percentage of Californians who become physicians complete medical school in other states and then return to California for residency or to practice. In 2020, one in four active patient care MDs in California graduated from a California medical school. Graduates of medical schools in other states accounted for the largest share of active patient care physicians (48%). The remainder graduated from international medical schools. These international medical graduates include both immigrants from other nations and U.S. citizens and permanent residents who completed medical school abroad. The percentages of active patient care MDs who completed medical school in California, another state, or another country in 2015 were similar to the percentages in 2020.

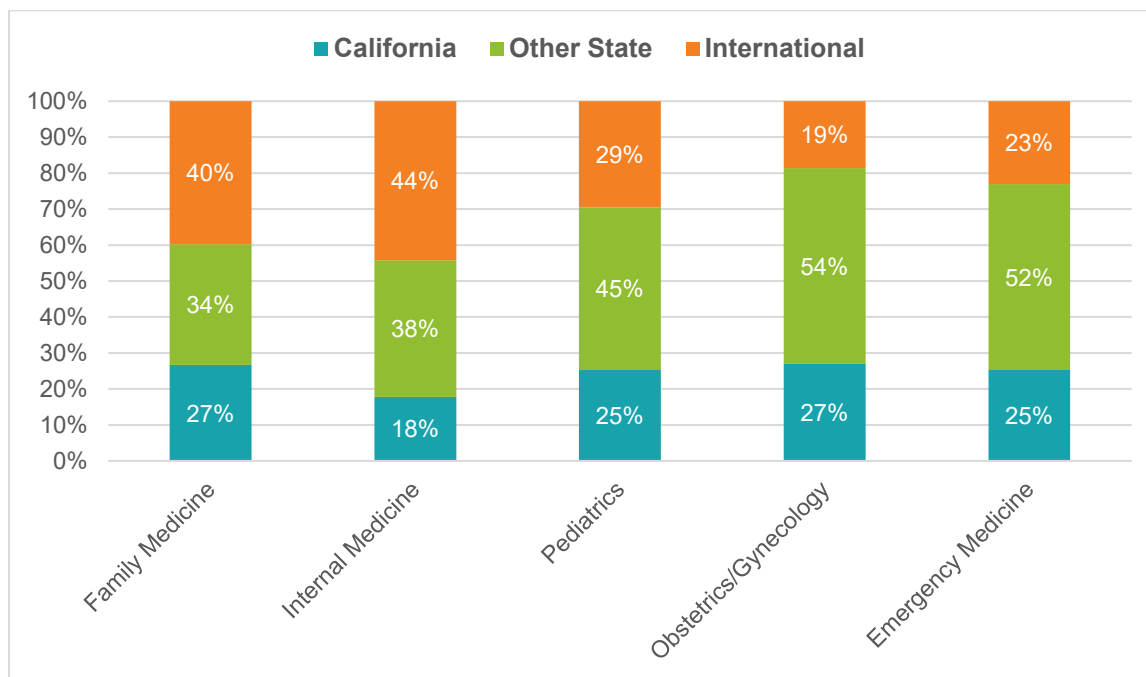
Figure 9. California Active Patient Care MDs by Medical School Location, 2020

Source: Medical Board of California, Core License File, May 2020; private tabulation.

The distribution of MDs across the three types of medical school locations varied substantially across active patient care physicians in the five specialties in which CalMedForce funds residency programs. A substantially

smaller percentage of internists graduated from a California medical school (18 percent) than the percentages of MDs in the other four specialties (25 percent to 27 percent). The percentage of international medical graduates ranged from a low of 19 percent of obstetrician/gynecologists to a high of 44 percent of internists.

Figure 10. Active Patient Care MDs in CalMedForce Specialties by Medical School Location, 2020



Source: Survey of Licensees (private tabulation), Medical Board of California, January 2020.

SPOTLIGHT ON PSYCHIATRY

Information about the supply, distribution, and characteristics of California's psychiatrists is important because they play critical roles in providing behavioral health services. Many Californians had unmet needs for these services prior to the COVID-19 pandemic and the pandemic has likely increased the amount of unmet need.

In 2020, California had 4,666 psychiatrists who provided 20 or more hours of patient care per week. Overall, the state had 11.0 such psychiatrists per 100,000 population in but supply per population varied widely across the state's regions.

The region with the most robust supply – the Greater Bay Area – had three times the number of psychiatrists per 100,000 population as the Northern and Sierra and San Joaquin Valley regions. The Greater Bay Area has 18.7 psychiatrists per 100,000 population, whereas the Northern and Sierra region has 5.8 and the San Joaquin Valley has 6.2 [Survey of Licensees (private tabulation), Medical Board of California, January 2020.]

Psychiatrists are also among the oldest physicians providing patient care in California. Twenty-six percent of psychiatrists who provided patient care 20 or more hours per week in 2020 were age 65 years or older.

California Physician Workforce Pipeline

Medical School

Ratio of Medical Students per Capita in California

California has a lower ratio of medical students (MD and DO) per capita than the United States overall. In the 2018-2019 academic year, California ranked 43rd among the 46 states with medical schools in the ratio of medical students per 100,000 population.¹¹ Due to the low number of seats in California medical schools relative to applicants, a large share of Californians who pursue careers in medicine attend medical schools in other states. Only 40.3 percent of Californians who entered an MD-granting medical school in 2018-2019 enrolled in schools in California.¹²

Graduates of California Medical Schools

California has 12 medical schools that award MD degrees, six of which are part of the University of California and six of which are private. California also has three private medical schools that award DO degrees. Seven of the private medical schools are not-for-profit (five MD-granting schools plus two DO-granting schools). One of the two private for-profit medical schools awards MD degrees; the other awards DO degrees.

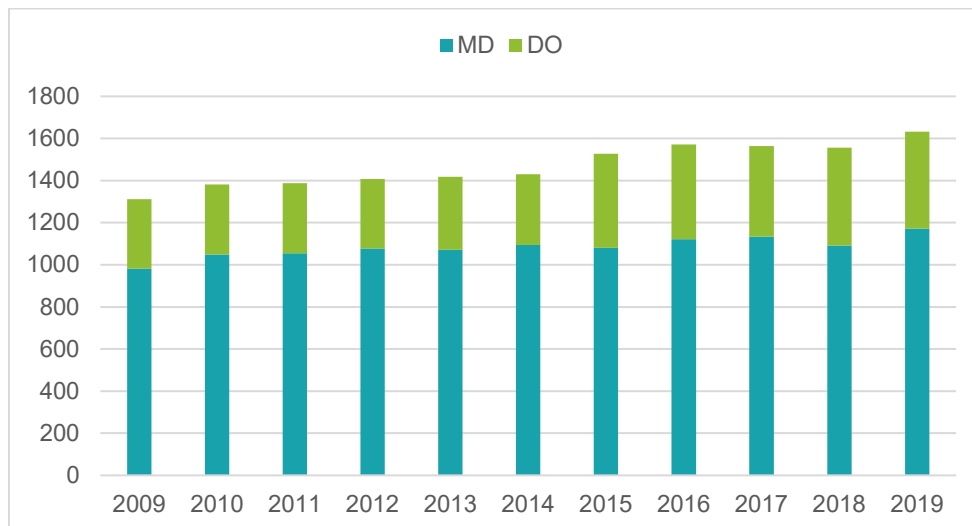
Table 9. Medical Schools in California by Ownership Type

Public	Private Not-for-Profit	Private For-Profit
MD-granting Medical Schools		
University of California, Davis	California University of Science and Medicine	California Northstate University
University of California, Irvine	Kaiser Permanente Bernard J. Tyson	
University of California, Los Angeles	Loma Linda University	
University of California, Riverside	Stanford University	
University of California, San Diego	University of Southern California	
University of California, San Francisco		
DO-granting Medical Schools		
	Touro University	California Health Sciences University
	Western University of Health Sciences	

Of these 15 medical schools, 12 had graduates during the 2018-2019 academic year, the most recent year for which data are available for both MD- and DO-granting schools. These medical schools had a total of 1,633 graduates of which 1,172 received an MD degree and 461 received a DO degree. As Figure 11 illustrates, the number of graduates of California medical schools increased by 25 percent between 2009 and 2019. This was due to the opening of two new MD-granting medical schools (California NorthState and the University of California, Riverside) and increases in enrollment at other medical schools. Overall, the number of graduates of

MD-granting schools increased by 14 percent and the number of graduates of DO-granting schools increased by 40 percent.

Figure 11. Graduates of California Medical Schools (MDs and DOs), 2009 to 2019



Sources: American Association of Colleges of Osteopathic Medicine (AACOM). Graduates by Osteopathic Medical College and Gender 2000-2019; Association of American Medical Colleges (AAMC). FACTS: Enrollment, Graduates, and MD/PHD Data, FACTS Table B-2.2: Total Graduates by U.S. Medical School, Sex, and Year, 2010-2011 through 2014-2015; AAMC. FACTS: Enrollment, Graduates, and MD/PHD Data, FACTS Table B-2.2: Total Graduates by U.S. Medical School, Sex, and Year, 2014-2015 through 2019-2020.

The number of graduates of California medical schools will continue to increase over the next several years as the three newest medical schools in the state begin to graduate their first classes. The California University of Science and Medicine will graduate its first class of 64 students in 2022.¹³ In 2024, the California Health Sciences University will graduate its first class of 79 students¹⁴ and the Kaiser Bernard J. Tyson School of Medicine will graduate its first class of 50 students.¹⁵ If all of these students complete medical school within the typical length of time (four years), the total number of graduates from California medical schools will increase by 12 percent between 2019 and 2024.

Geographic Distribution of California Medical Schools

Table 10 displays the number of medical schools in each of California's regions. Most of the state's medical schools are in the Los Angeles and San Francisco metropolitan areas. The Inland Empire and Los Angeles regions have the largest numbers of medical schools, three each. Two regions – the Central Coast and the Northern and Sierra regions – do not have any medical schools. Appendix C contains a map that displays the exact locations of the state's medical schools.

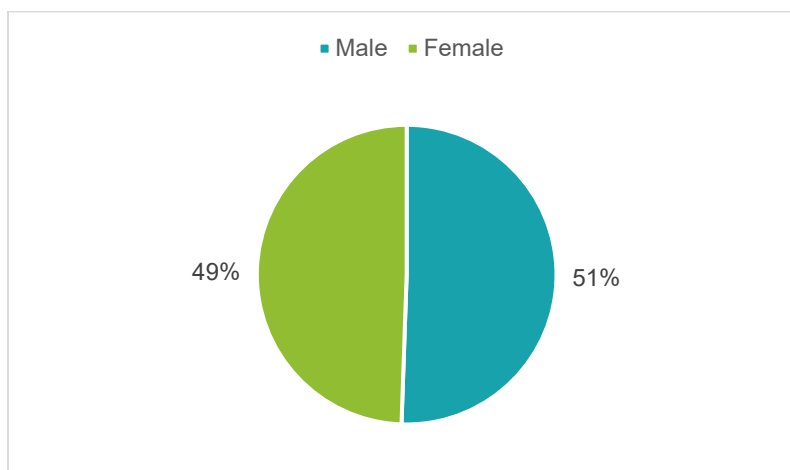
Table 10. Medical Schools in California by Region

Region	MD-granting Medical Schools	DO-granting Medical Schools
Central Coast		
Greater Bay Area	Stanford University University of California, San Francisco	Touro University
Inland Empire	California University Science and Medicine Loma Linda University University of California, Riverside	
Los Angeles County	Kaiser Permanente Bernard J. Tyson University of California, Los Angeles University of Southern California	Western University
Northern and Sierra		
Orange County	University of California, Irvine	
Sacramento Area	California Northstate University University of California, Davis	
San Diego Area	University of California, San Diego	
San Joaquin Valley		California Health Sciences University

Demographic Characteristics of Graduates of California Medical Schools

Gender

The percentage of medical school graduates who are female has increased substantially over the past 50 years. Among all physicians (MDs and DOs) graduating from California medical schools during the 2018-2019 academic year, 51 percent were male and 49 percent were female. However, the percentage of female graduates varied widely across medical schools, ranging from a low of 31 percent at California Northstate University to a high of 69 percent at the University of California, Davis.

Figure 12. California Medical School Graduates by Gender, 2018-2019 (n = 1,633)

Sources: AACOM. Graduates by Osteopathic Medical College and Gender 2000-2019; AAMC. FACTS: Enrollment, Graduates, and MD/PHD Data, FACTS Table B-2.2: Total Graduates by U.S. Medical School, Sex, and Year, 2010-2011 through 2014-2015; AAMC. FACTS: Enrollment, Graduates, and MD/PHD Data, FACTS Table B-2.2: Total Graduates by U.S. Medical School, Sex, and Year, 2014-2015 through 2019-2020.

Race/Ethnicity

Graduates of California's medical schools are somewhat more diverse than the state's physicians but not nearly as diverse as the state's population. In the 2018-19 academic year, Blacks constituted 4.7 percent of medical school graduates and Latinx constituted 7.2 percent of medical school graduates. Both private and public MD-granting medical schools had higher percentages of Black graduates than DO-granting schools. Public (i.e., University of California) MD-granting medical schools had a higher percentage of Latinx graduates than private MD-granting medical schools and DO-granting medical schools. The private for-profit MD-granting medical school had the lowest percentages of Black and Latinx graduates. Whites constituted a much larger share of DO graduates than MD graduates.

Recent incoming classes at University of California medical schools are more racially/ethnically diverse. Persons from racial/ethnic groups that are underrepresented in medicine constituted 52 percent of first-year students enrolled at UC Davis medical school during the 2020-21 academic year, 50 percent of first-year students at UC Riverside and 47 percent of first-year students at UCSF. Among racial/ethnic groups underrepresented in medicine, Latinx constituted the largest numbers of first-year students at University of California medical schools.¹⁶ U.S. News and World Report has ranked four University of California medical schools (UC Davis, UCLA, UC Riverside, and UCSF) among the top 10 most diverse medical schools in the nation.¹⁷

Table 11. California Medical School Graduates by Race/Ethnicity, 2018-2019 (n = 1,633)

	Public MD-granting medical schools	Private Not-for-Profit MD-granting medical schools	Private Not-for-Profit DO-granting medical schools	Private For-Profit MD-granting medical schools	Total
American Indian/Alaska Native, non-Hispanic	0%	0.2%	0%	0%	0.1%
Asian, non-Hispanic	33.3%	33.8%	33.6%	50.0%	34.0%
Black, non-Hispanic	6.3%	6.1%	1.1%	1.9%	4.7%
Latinx	10.9%	5.4%	4.3%	0%	7.2%
White, non-Hispanic	30.8%	37.0%	48.8%	34.6%	37.7%
Other	14.3%	11.6%	6.7%	11.5%	11.3%
Unknown	1.1%	4.3%	5.4%	0%	3.2%

Notes: Other includes Pacific Islanders and graduates who reported having two or more races. The private for-profit DO-granting medical school (California Health Sciences University) and two of the private not-for-profit MD-granting medical schools (California University of Medicine and Science and Kaiser Permanente Bernard J. Tyson) are not included because they do not have any graduates yet.

Sources: AACOM, Annual Osteopathic Medical School Questionnaires, 1999-00 through 2018-19 academic years; AAMC, Table B-6.2: Total Graduates by U.S. Medical School and Race/Ethnicity (Alone or In Combination), 2018-2019.

Graduate Medical Education

Following medical school, physicians are required to complete residency to obtain additional clinical education to prepare them to practice independently and obtain licensure. In the state of California, physicians are required to complete three years of residency training following medical school graduation to obtain a license to practice medicine. The Accreditation Council for Graduate Medical Education (ACGME) accredits training programs for physicians in approximately 182 specialties and subspecialties.¹⁸

Ratio of Medical Residents per Capita

California has a lower ratio of medical residents per capita than the United States overall. In 2018, California ranked 29th among the 50 states that have residency programs in the ratio of residents per 100,000 population.¹⁹

Number of Programs

California had 1,059 ACGME-accredited residency and fellowship programs during the 2019-2020 academic year. These programs consisted of 455 residency programs that provide physicians with an initial training experience in a specialty following completion of medical school and 604 subspecialty residency programs that provide subspecialty training to physicians who wish to subspecialize within their specialty.²⁰ For example, a physician who completes a residency in internal medicine may complete a subspecialty fellowship in cardiology, critical care, or another subspecialty of internal medicine. Of the 455 residency programs that enroll physicians immediately after medical school, the ACGME considers 424 to be “pipeline programs” because physicians who complete these programs are eligible for board certification in their specialties. Thirty-one are programs that provide physicians with one or more years of preliminary training prior to entering a residency program in a specialty.

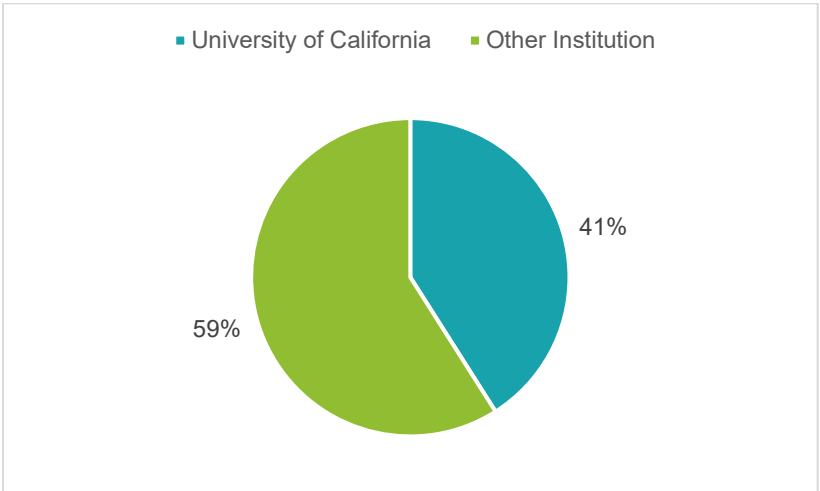
Among specialties in which CalMedForce provides funding to residency programs, data reported by the ACGME indicate that during the 2019-2020 academic year California had 69 family medicine residency programs, 44 internal medicine residency programs, 16 pediatrics residency programs, 4 medicine/pediatrics residency programs, 21 obstetrics/gynecology residency programs, and 22 emergency medicine residency programs.²¹ (Medicine/Pediatrics residency programs are four year residency programs that prepare physicians for board certification as both internists and pediatricians.ⁱ) Rates of growth in numbers of residency programs have varied substantially across these five specialties. The highest rate of growth was among emergency medicine residency programs, which increased by 47 percent from 15 to 22 programs between 2015-2016 and 2019-2020. The numbers of family medicine and internal medicine residency programs also grew substantially, rising by 44 percent and 33 percent, respectively. The number of obstetrics/gynecology residency programs grew by 11 percent. The number of pediatrics residency programs did not change.^{22,23}

Institutions Sponsoring Residency Programs

As Figure 13 illustrates, 41 percent of residency and fellowship programs in California are sponsored by the University of California. The remaining 59 percent are sponsored by a wide range of institutions, including other universities, Kaiser Permanente, private hospitals, public hospitals, and federally qualified health centers.²⁴

ⁱ The ACGME also accredits combined residency programs in emergency medicine/family medicine, emergency medicine/internal medicine, emergency medicine/pediatrics, and internal medicine/family medicine but none of these residency programs are located in California.

Figure 13. California Residency and Fellowship Programs by Type of Sponsoring Institution, 2021-2022

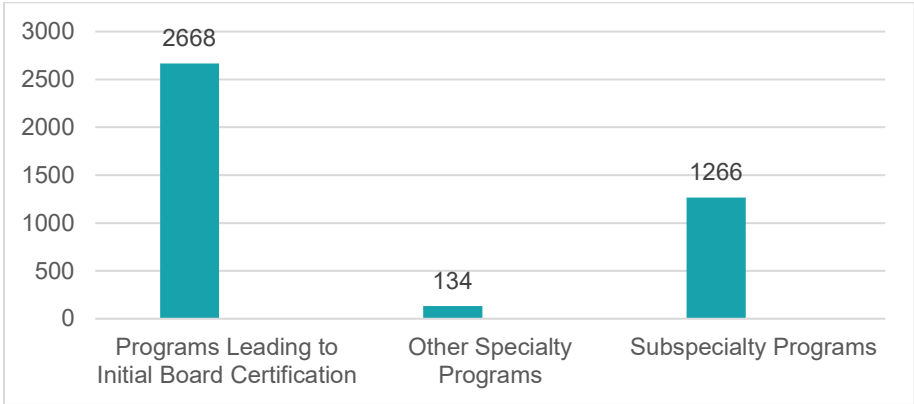


Source: Accreditation Council for Graduate Medical Education (2021). Institution and Program Finder. <https://apps.acgme.org/ads/public/>

Number of Residents and Fellows

During the 2019-2020 academic year, a total of 13,188 residents and fellows were enrolled in ACGME-accredited programs in California. Of these residents and fellows, 10,580 (80 percent) were enrolled in what the ACGME considers “pipeline programs” – i.e., programs leading to eligibility for board certification, 171 (1 percent) were enrolled in other specialty residency programs that provide preliminary training, and 2,437 (19 percent) were enrolled in subspecialty fellowship programs. During this academic year, 4,068 persons graduated from ACGME-accredited residency and fellowship programs in California, of whom 2,668 (66 percent) graduated from programs leading to initial board certification 134 (3 percent) graduated from other specialty programs, and 1,266 (31 percent) graduated from subspecialty fellowship programs. The percentage of graduates who completed subspecialty fellowship programs was greater than the percentage of residents and fellows enrolled in subspecialty programs because subspecialty programs take fewer years to complete than programs that lead to initial board certification.

Figure 14. California Residency Program Graduates by Type of Program, 2019-2020



Source: ACGME. Data Resource Book, Academic Year, 2019-2020.

Table 12 lists the numbers of first-year residents entering programs leading to initial board certification in California during the 2019-2020 academic year. The number of first-year residents in individual specialties ranged from a low of 22 in plastic surgery to a high of 747 in internal medicine. Among other specialties in which CalMedForce funds residency programs, there were 535 first-year family medicine residents, 300 first-year pediatrics residents, 117 first-year obstetrician/gynecologist residents, and 239 first-year emergency medicine residents.

Table 12. California First-Year Residents by Specialty, 2019-2020

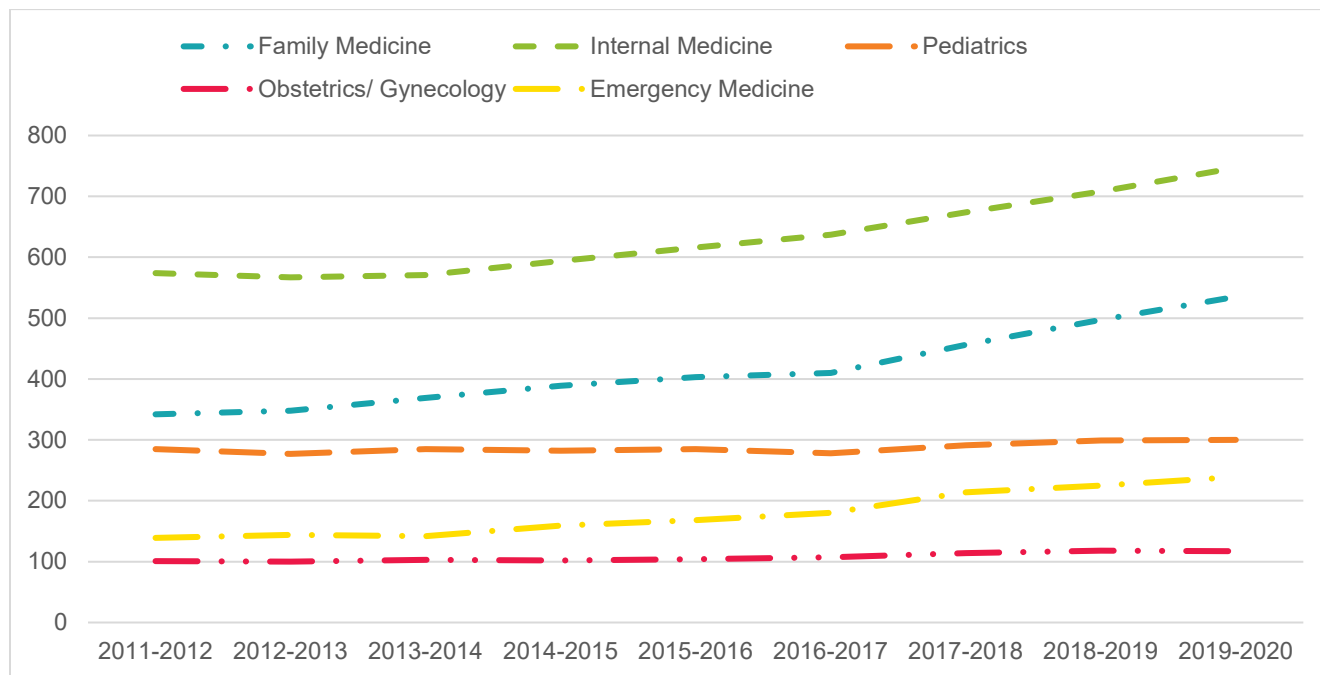
Specialty	Number of First-Year Residents
Anesthesiology	151
Child Neurology	14
Dermatology	55
Emergency Medicine	239
Family Medicine	535
General Surgery	114
Internal Medicine	747
Internal Medicine/Pediatrics	18
Interventional Radiology	17
Medical Genetics	6
Neurological Surgery	21
Neurology	73
Nuclear Medicine	3
Obstetrics/Gynecology	117
Ophthalmology	45
Orthopedic Surgery	79
Otolaryngology	36
Pathology	62
Pediatrics	300
Physical Medicine and Rehabilitation	29
Plastic Surgery	22
Preventive Medicine	24
Psychiatry	183
Radiation Oncology	22
Radiology-diagnostic	108
Thoracic Surgery-integrated	6
Urology	33
Vascular Surgery-integrated	7

Source: ACGME. Data Resource Book, Academic Year, 2019-2020, pgs. 84-86.

Figure 15 displays trends in the numbers of first-year residents entering residency programs in the five specialties eligible for CalMedForce grants from the 2011-2012 academic year to the 2018-2019 academic year (latest year for which data are available). The number of first-year residents has increased in all five specialties but the rate of increase varied substantially across them, which is consistent with trends in growth in the numbers of residency programs in these specialties. Emergency medicine had the largest increase in the number of first-year residents (72 percent), followed by family medicine (56 percent), and internal medicine (30 percent). The numbers of first-

year residents in obstetrics/gynecology and pediatrics residency programs grew more slowly, rising by 13 percent and 5 percent, respectively.

Figure 15. Residents Entering Residency Programs in CalMedForce Specialties, 2011-2012 to 2019-2020



Source: ACGME. Data Resource Book, Academic Years, 2011-2012, 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020.

Percentages of First-Year Residency Positions Filled in the National Residency Matching Program

Most residency positions in the United States are filled through the National Residency Matching Program, often referred to as the “Match.” The purpose of the “Match” is to provide a uniform process by which applicants and residency programs can select one another. “Matches” are made by comparing rank order lists of applicants and residency program directors. Each year, residency programs indicate to the “Match” the number of positions available for first-year residents (i.e., Post Graduate Year 1 positions) and for physicians who have already completed one year of residency (i.e., Post Graduate Year 2 positions). Physicians completing MD- or DO-granting medical schools in the U.S. are eligible to participate in the “Match” as are graduates of international medical schools (IMGs) who have been certified by the Educational Commission for Foreign Medical Graduates, an organization responsible for reviewing and assessing the credentials of IMGs who seek admission to U.S. residency programs. The percentage of available positions filled in the “Match” is an indicator of interest in the specialty among medical school graduates.

Table 13 displays the percentages of first-year residency positions in California that were offered in the “Match” in 2020 that were filled during the match. In the vast majority of specialties, 100 percent of positions offered were filled in the “Match.” General surgery and radiation oncology were the only specialties in which less than 96 percent of positions offered were filled in the “Match.” Among specialties in which CalMedForce provides funding, “Match rates ranged from 96 percent (family medicine) to 100 percent (emergency medicine).

Table 13. Percentages of California First-Year Residency Positions Filled in the National Residency Matching Program by Specialty, 2020

Specialty	Percentage of First-Year Positions Filled
Anesthesiology	100%
Child Neurology	100%
Emergency Medicine	100%
Family Medicine	96%
General Surgery	80%
Internal Medicine	99%
Internal Medicine/Pediatrics	100%
Interventional Radiology	100%
Medical Genetics	100%
Neurological Surgery	100%
Neurology	100%
Obstetrics/Gynecology	98%
Orthopedic Surgery	100%
Otolaryngology	100%
Pathology	98%
Pediatrics	98%
Physical Medicine and Rehabilitation	100%
Plastic Surgery	100%
Preventive Medicine	100%
Psychiatry	99%
Radiation Oncology	79%
Radiology-diagnostic	100%
Thoracic Surgery-integrated	100%
Vascular Surgery-integrated	100%

Note: Dermatology, Nuclear Medicine, Ophthalmology, and Urology are omitted from this table because the NRMP did not report data on the rate at which first-year residency positions in this specialty were filled in the “Match.”

Source: National Resident Matching Program, 2020 NRMP Main Residency Match®: Match Rates by Specialty and State.

Geographic Distribution

California's residency and fellowship programs are not distributed evenly across the state. The majority are concentrated in large metropolitan areas in Northern and Southern California. Table 14 lists the numbers of residency programs in specialties CalMedForce funds that offered positions in the National Residency Matching Program in 2019-2020 by region. Appendix D contains maps that visually illustrate the geographic distribution of these residency programs. Family medicine was the only CalMedForce specialty that had residency programs in all 10 regions of California. The Central Coast region had no residency programs in pediatrics or emergency medicine. The Northern and Sierra region had no residency programs in internal medicine, pediatrics, obstetrics/gynecology, and emergency medicine.

Table 14. Number of Residency Programs by Region in CalMedForce Specialties, 2019-2020

	Family Medicine	Internal Medicine	Pediatrics	Medicine/ Pediatrics	Obstetrics/ Gynecology	Emergency Medicine
Central Coast	4	2	0	0	1	0
Greater Bay Area	9	13	6	0	6	3
Inland Empire	12	9	2	1	3	5
Los Angeles County	15	11	5	1	6	3
Northern and Sierra	4	0	0	0	0	0
Orange County	2	2	1	0	1	1
Sacramento Area	5	1	1	1	1	2
San Diego Area	3	4	1	1	1	1
San Joaquin Valley	10	5	2	0	2	4
All Regions	64	47	18	4	21	19

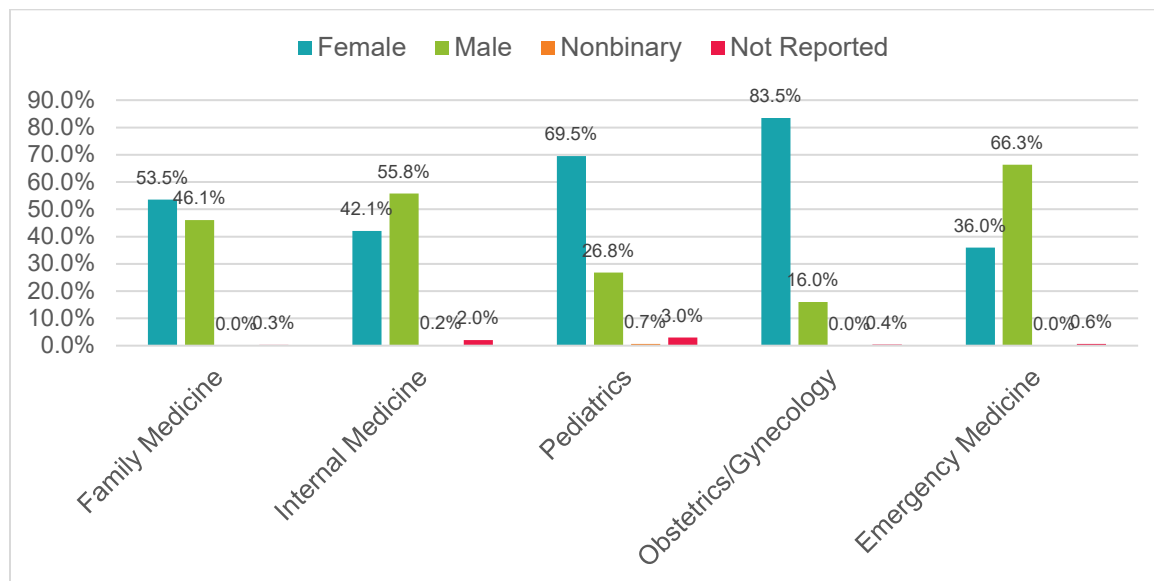
Note: Medicine/Pediatrics residency programs are four year residency programs that prepare physicians for board certification as both internists and pediatricians.

Source: National Resident Matching Program, 2020 NRMP Main Residency Match®: Match Rates by Specialty and State.

Demographic Characteristics

Gender

National data indicate that 45.1 percent of persons enrolled in ACGME-accredited residency and fellowship programs in 2019-2020 were female. (Data specific to California are not available.) Across “pipeline programs,” the percentage of residents who are female ranged from a low of 16.1 percent in orthopedic surgery to a high of 83.5 percent in obstetrics/gynecology. Figure 16 displays the percentages of male, female, and nonbinary residents in the five specialties in which CalMedForce funds residency programs.

Figure 16. Residents in CalMedForce Specialties by Gender, United States, 2019-2020

Source: ACGME. Data Resource Book, Academic Year, 2019-2020, pg. 77.

Race/Ethnicity

National data indicate that Black and Latinx trainees are underrepresented among residents and fellows enrolled in ACGME-accredited programs. (Data specific to California are not available.) During the 2019-2020 academic year, 5.1 percent of residents and fellows were Black, whereas 13.4 percent of the U.S. population was Black. Latinx accounted for 6.1 percent of residents and fellows compared to 18.5 percent of the U.S. population.²⁵ The race/ethnicity of 14 percent of residents and fellows was unknown. Table 14 displays the percentages of residents by race/ethnicity in the specialties in which CalMedForce funds residency programs. Across these specialties, nationwide the percentage of residents who were Black ranged from 4.4 percent of emergency medicine residents to 8.1 percent of obstetrics/gynecology residents. The percentage of residents who were Latinx ranged from 5.2 percent of emergency medicine residents to 8.4 percent of pediatrics residents.

Table 15. Residents in CalMedForce Specialties by Race/Ethnicity, United States, 2019-2020

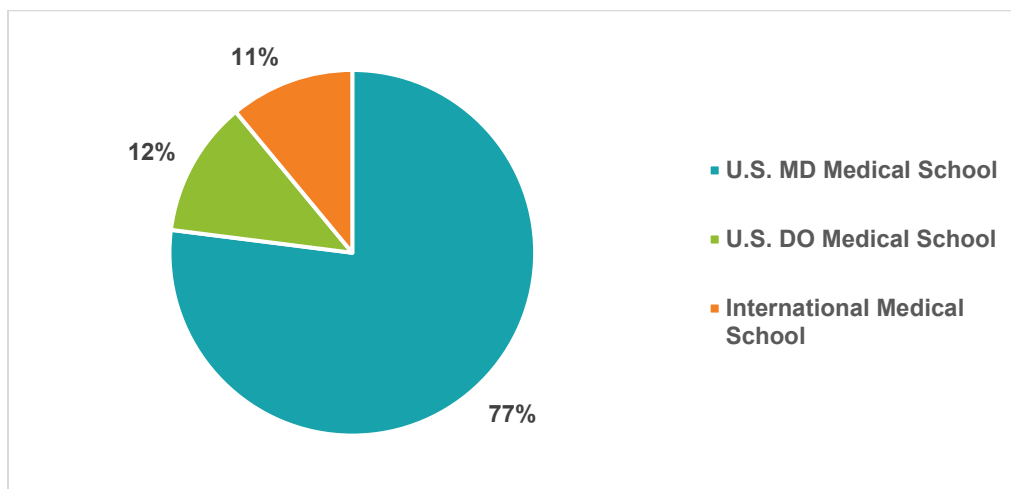
	Family Medicine	Internal Medicine	Pediatrics	Obstetrics/Gynecology	Emergency Medicine
American Indian, Alaska Native, Native Hawaiian or Pacific Islander	0.6%	0.4%	0.6%	0.4%	0.4%
Asian	19.9%	25.2%	16.4%	11.9%	12.1%
Black	7.6%	5.1%	5.4%	8.1%	4.4%
Latinx	7.5%	6.3%	8.4%	7.1%	5.2%
White	51.9%	32.8%	42.9%	55.7%	62.8%
Other	5.4%	8.4%	3.9%	3.9%	4.1%
Unknown	7.1%	21.8%	22.5%	12.8%	11.0%

Source: ACGME. Data Resource Book, Academic Year, 2019-2020, pgs. 79-81.

Type of Medical School Attended

Figure 17 displays the distribution of residents and fellows enrolled in ACGME-accredited programs in California during the 2019-2020 academic year by type of medical school attended. Most residents and fellows (77 percent) attended an MD-granting medical school located in the United States. Twelve percent attended a DO-granting medical school in the U.S. and 11 percent attended an international medical school. California had a higher percentage of residents and fellows who are graduates of U.S. MD-granting medical schools than the U.S. overall (77 percent compared to 60 percent) and lower percentages of U.S. DO graduates and international medical graduates.²⁶

Figure 17. California Residents and Fellows by Type of Medical School Attended, 2019-2020



Source: ACGME. Data Resource Book, Academic Year, 2019-2020.

SPOTLIGHT ON PSYCHIATRY

Information about psychiatry residency programs is important because California is facing a severe shortage of psychiatrists. During the 2019-2020 academic year, California had 25 psychiatry residency programs that enrolled 182 first-year residents.

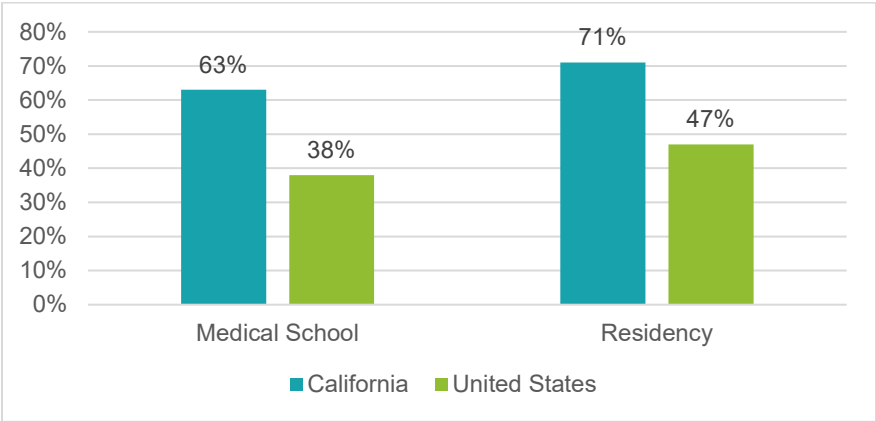
The number of first-year psychiatry residents increased substantially during the 2010s, rising from by 44 percent, from 126 in 2011-2012 to 182 in 2019-2020. However, this increase may not be adequate to meet demand.

In addition, psychiatry residency programs are not well-distributed across California. There are no psychiatry residency programs in the Central Coast or Northern and Sierra regions.

Retention of Physicians Educated in California

California retains larger shares of physicians who complete medical school and/or residency than any other state in the nation. Among physicians practicing in 2018, 63 percent of physicians who graduated from a California medical school practiced in California, whereas nationwide only 38 percent practiced in the state in which they completed medical school. The high rate of retention of medical school graduates reflects UC medical schools’ policy of prioritizing admission of California students. California retained 71 percent of physicians who completed residency in the state compared to 47 percent nationwide. Physicians who complete both medical school and residency in California are even more likely to practice in California.

Figure 18. Retention of Medical Students and Residents, California vs. United States, 2018



Source: AAMC, 2019 State Physician Workforce Data Report, Tables 4.1 and 4.3

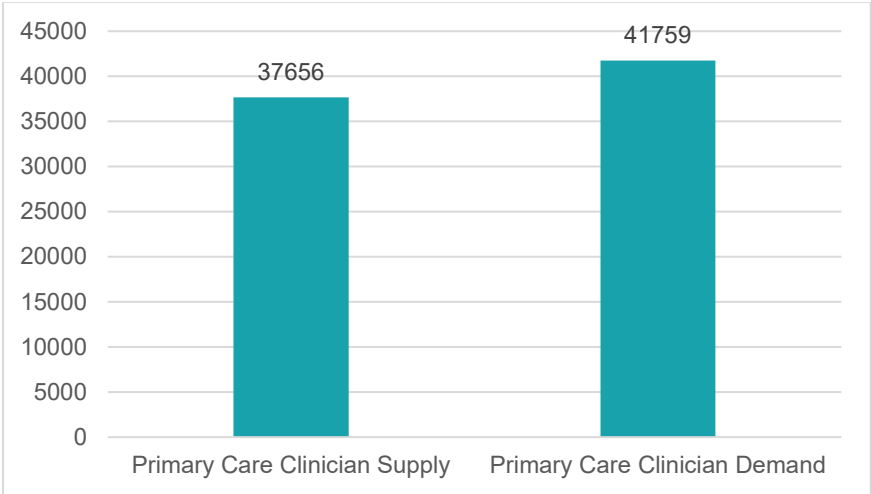
Future Supply and Demand for Physicians in California

Primary Care

Projections generated for the U.S. Health Resources and Services Administration (HRSA) suggest that in 2025 California will have a shortage of 1,550 full-time equivalent (FTE) physicians in the following primary care specialties: family medicine, general internal medicine, geriatric medicine, and general pediatrics. This estimate suggests that California will have 4.6 percent fewer physicians in these specialties than the number needed to meet demand.²⁷

An important limitation of the HRSA projections is that they are based on national sources of data that may not be as accurate as California sources of data on the supply of primary care physicians and use of primary care services. Projections published by Healthforce Center at UCSF, which are based on data from the Medical Board of California suggest that the number of primary care physicians in California will not keep pace with demand during the coming decade. A large share of physicians are age 65 years or older and the number of new licensees per year is not adequate to replace retiring physicians. While some demand for primary care can be met by nurse practitioners and physician assistants, the total supply of primary care clinicians will not be adequate to meet demand.²⁸

Figure 19. Supply and Demand for Primary Care Physicians in California, 2030



Source: Spetz, Coffman, Geyn (2017). California's Primary Care Workforce: Forecasted Supply, Demand, and Pipeline of Trainees, 2016-2030.

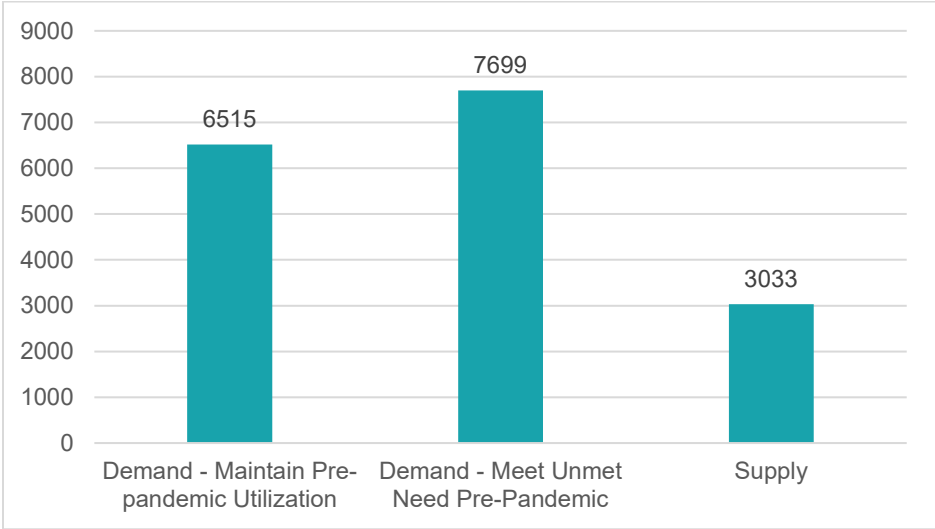
Psychiatrists

HRSA has also issued projections regarding the adequacy of the supply of psychiatrists in California and all other states. These projections suggest that in 2030 California will have 480 fewer FTE psychiatrists (7.3 percent) than the number needed to maintain utilization of psychiatrists at the level observed prior to the COVID-19 pandemic. If unmet needs observed prior to the pandemic are considered, California would need 940 more psychiatrists (13.4 percent).²⁹ Studies of the pandemic suggest that it has increased the need for behavioral health services, which would exacerbate the shortage of psychiatrists.

As noted above with regard to primary care physicians, an important limitation of the HRSA projections is their extrapolation of findings for psychiatrists to California from national sources of data. Other projections derived from California-specific data sources suggest that the shortage of psychiatrists is more severe. Projections

published by Healthforce Center at UCSF suggest that California will have a shortage of 41 percent fewer psychiatrists than needed in 2028 to maintain the pre-pandemic level of utilization of psychiatrists and 50 percent fewer than the number needed to address unmet demand.³⁰ (See Figure 20.)

Figure 20. Supply and Demand for Psychiatrists in California, 2028



Source: Coffman et al. California’s Current and Future Behavioral Health Workforce, 2018.

Emergency Medicine Physicians

A study of supply and demand for board-certified emergency medicine physicians suggests that the number of full time equivalent emergency in California grew by 11.32 percent from 2005 to 2017. The authors of this study also estimated the adequacy of the supply emergency medicine physicians in California and all other states based on the volume of emergency department visits and data from the American Board of Medical Specialties and the American Osteopathic Board of Emergency Medicine on the numbers of board-certified emergency medicine physicians in each state. The authors concluded that California had a surplus of 328 FTE board-certified emergency medicine physicians in 2017.³¹ More recent analyses of supply and demand for emergency medicine physicians in California were not identified.

Summary of Findings

Findings from the analyses presented in this report indicate that California's patient care MD workforce is not sufficient to meet the state's needs. Specifically,

- California has fewer primary care MDs than specialist MDs providing patient care which may make it difficult for Californians to obtain primary care services that can prevent illness and enable them to manage chronic conditions effectively.
- California's MDs are not well-distributed across the state with the lowest supplies per capita in the Inland Empire, Northern and Sierra, and San Joaquin Valley regions.
- A large share of California's patient care MDs are age 65 years or older.
- Blacks and Latinx physicians are underrepresented among MDs relative to their shares of California's population.

Findings regarding medical education indicate that

- The number of medical school graduates has increased substantially over the past decade as new medical schools have opened.
- Among specialties eligible for CalMedForce funding, the number of physicians entering residency in California has increased substantially in emergency medicine, family medicine, and internal medicine primarily due to increases in the numbers of residency programs in these specialties.
- As with practicing MDs, the racial/ethnic diversity of medical students and residents does not reflect the racial/ethnic diversity of California's population.
- California leads the nation in the percentages of medical students and residents who remain in California to practice.

Despite California's ability to retain large shares of medical students and residents trained in the state, projections of future supplies of primary care physicians and psychiatrists suggest that California will not have sufficient numbers of physicians in these specialties to meet demand for their services.

Strategies for Better Aligning California's Physician Workforce with its Needs

Alleviating California's physician workforce deficits will require sustained investment in initiatives that increase the number of physicians trained, incentivize practice in medically underserved areas of the state, and support persons from underserved areas and racial/ethnic groups that are underrepresented in medicine who seek to become physicians. These investments should extend across a continuum that ranges from pre-medical pipeline programs to programs for physicians who have completed residency. Programs across continuum should partner with one another so that students receive mentorship and financial support to enable them to seamlessly transition from one program to another as they move from pre-medical school to medical school and then to residency and practice. The major types of strategies for which there is evidence of effectiveness are briefly described below. Information about specific programs that are implementing these types of strategies can be found in other publications.^{32,33}

Pre Medical School

Pipeline programs provide secondary school, college, and post-baccalaureate students with multiple types of support to improve their readiness for graduate-level education in the health professions. Types of support provided include advising, academic enrichment, financial support (e.g. scholarships), internships, social support, preparation for completing admissions tests, and guidance regarding applications and interviews. These programs usually serve students who are from economically disadvantaged backgrounds or are from racial/ethnic groups that are underrepresented in medicine and other health professions.

College level programs can be especially helpful for nurturing students interested in careers in medicine and other health professions. These students sometimes have discouraging experiences in lower division basic science classes and may abandon their aspirations absent guidance and encouragement from faculty, staff, and fellow students.^{34,35,36} Multiple evaluations of college-level pipeline programs funded by Area Health Education Centers, the Health Careers Opportunity Program, and other sources have found that these programs improve academic performance and likelihood of enrolling in medical school.³⁷

Post-baccalaureate programs often serve students who are reapplying to medical school after an unsuccessful initial attempt. These programs tailor their services to the needs of individual participants. For example, some participants may need to retake classes in basic science to improve their grades, whereas others may need more intensive test preparation to increase their scores on admissions tests or guidance on how best to present themselves in personal statements or interviews. An evaluation of University of California post-baccalaureate programs for reapplicants found that participants were more likely to enroll in medical school, choose practice in primary care specialties, and practice in medically underserved areas.³⁸

Medical School

Interventions at the medical school level are also important for addressing California's physician workforce challenges. Adoption of holistic review of applications, which is endorsed by the Association of American Medical Colleges, prompts admissions committees to look beyond grades and test scores and consider other attributes of applicants that may enable them to relate more effectively to patients, such as growing up in a medically underserved area or coming from a disadvantaged background.³⁹ The experience of University of California medical schools that have adopted holistic review suggest that it is an effective strategy for increasing both the racial/ethnic and socio-economic diversity of medical students.

Evidence suggests that some of the most effective interventions focus on recruiting students who are committed to caring for underserved populations. These interventions include focused training tracks within medical schools, such as the six Programs in Medical Education (PRIME) programs offered by University of California's medical

schools. Each of the PRIME programs focuses on preparing physicians to provide care to a specific group of underserved Californians, such as Latinx Californians, rural Californians, and Californians living in underserved urban areas.⁴⁰ Among the current class of 365 students enrolled in PRIME programs, 243 (67 percent) are from racial/ethnic groups that are underrepresented in medicine.⁴¹ Other interventions include expansion of medical schools that prioritize admission of students who are committed to caring for underserved populations. Examples include the State Legislature's decision to provide the UC-Riverside School of Medicine with resources to increase the number of students it admits and the Charles R. Drew University's efforts to transition its role in undergraduate medical education from a program that partners with the University of California, Los Angeles, to a full medical school.⁴²

Training medical students in rural and urban underserved communities is an important companion strategy for nurturing students who are interested in caring for underserved Californians. Students enrolled in each of the University of California's PRIME programs complete clinical training at clinics and hospitals in underserved areas. The COMPADRE program, a collaboration between the University of California, Davis School of Medicine and Oregon Health and Sciences University, is another important example. This new partnership, funded by the American Medical Association will provide clinical training to medical students at 10 health systems, 16 hospitals and a network of Federally Qualified Health Centers (FQHCs) throughout northern California and Oregon.⁴³ Sites in northern California include Eureka, Redding, and Ukiah.

Other interventions include streamlining medical school, which enables physicians to enter the workforce more quickly. The most notable example of this type of intervention in California is the Accelerated Competency-based Education in Primary Care (ACE PC) program at the University of California, Davis School of Medicine. Instead of completing the traditional pathway to primary care practice of four years of medical school and three years of residency, students in the ACE PC program complete medical school in three years and then complete a residency program in family medicine or primary care internal medicine at an affiliated Kaiser Permanente medical center. The program prioritizes admission of students who are the first in their families to complete a bachelor's degree and speak a language other than English. Approximately 60 percent of students are from communities that are underrepresented in medicine.⁴⁴

To better meet the needs of Californians who do not speak English well, other medical schools can follow UC-Davis' lead and consider an applicant's ability to speak a language other than English when making admissions decisions. Medical schools can also help students elevate their fluency in non-English languages so that they can converse effectively with patients about their conditions and treatment options. This could be accomplished by offering rigorous courses in non-English languages and assessing students' mastery of these languages.⁴⁵

Providing scholarships to medical students from disadvantaged backgrounds is also important. In 2019, the median amount of education debt among medical school graduates was \$200,000.⁴⁶ Some persons from disadvantaged backgrounds are reluctant to take on such large amounts of debt to finance their education. Others feel pressure to pursue careers in lucrative specialties regardless of their interests so that they can repay their debts more easily. Scholarships reduce students' financial stress by reducing the amount of money they need to borrow to finance their education. They are especially helpful to students whose families rely on them for financial support. To incentivize medical students to complete residency in California, scholarships could be combined with guaranteed admission to a California residency program following graduation from medical school.

In addition to general financial aid, scholarships for visiting elective rotations can be helpful for increasing the racial/ethnic and socio-economic diversity of residents. Visiting elective rotations are short-term placements that enable students to explore a specialty of interest and assess whether particular residency programs would be good choices for them at medical schools other than their own. These rotations also enable resident recruitment committees to learn about potential applicants. Participating in visiting elective rotations can be costly because students must pay for registration, travel, meals, and lodging. Scholarships could increase the number of low-

income medical students participating in visiting electives, which could increase the number who “match” with residency programs in California.⁴⁷

Pre-Residency

International medical graduates (IMGs) are an important source of physicians who speak languages other than English and understand the cultures of recent immigrants. However, despite California's great need for Spanish-speaking physicians, physicians from Spanish-speaking countries are not well-represented among IMGs. These IMGs benefit from initiatives aimed at helping them complete requirements for admission to residency, such as UCLA's International Medical Graduate program. This program prepares Latinx physicians who have completed medical school in other countries to take the U.S. Medical Licensing Exam, orients them to the culture of medicine in the U.S., and enhances their ability to “match” with family medicine residency programs in California through the NRMP. Participants are not charged tuition and receive a small monthly stipend. In exchange, they agree to apply to family medicine residency programs and to practice in an underserved area for three years following graduation.⁴⁸

Residency

Targeted programs that fund GME constitute another important strategy for addressing California's physician workforce needs. Investment of targeted resources in residency training at the state level is necessary because Medicare, the primary source of federal funding for GME, does not allocate funds on the basis of workforce needs. Targeted funding programs can incentivize hospitals, community health centers, and other providers to expand or establish residency programs in specialties in which shortages exist. These programs can also allocate funds in a manner that gives priority to residency programs that train residents in underserved areas of the state or which have strong track records of training physicians from groups that are underrepresented in medicine or who practice in underserved areas following graduation.

Examples of such GME funding programs include CalMedForce, the Song-Brown Healthcare Workforce Training Program, and the Transitional GME Program Office. CalMedForce and Song-Brown both fund residency programs in primary care specialties and prioritize funding residency programs that train residents in underserved areas and which have high percentages of graduates who are from groups that are underrepresented in medicine, practice in underserved areas, and provide outpatient primary care services.^{49,50} The Song-Brown program encompasses separate streams of funding for existing residency positions, expansion of existing programs, and establishment of newly accredited programs. The Transitional GME Program Office provides grants to non-teaching hospitals to explore the feasibility of launching residency programs.⁵¹

Most of California's sources of funding for GME are limited to primary care specialties. The only source of funding for psychiatry residency programs is the Mental Health Workforce Education and Training program administered by the Office of Statewide Health Planning and Development. This program awarded \$11.7 million to three psychiatry residency programs during fiscal year 2020-2021.⁵² Given the large shortage of psychiatrists, California policymakers should consider providing ongoing funding for expansion of existing psychiatry residency programs and establishment of new programs.

In addition to these statewide sources of funding, the University of California, Davis has received funding from the AMA to establish the COMPADRE program, described above in the section on medical school level strategies. This partnership between UC-Davis and Oregon Health and Sciences University will support residency training in seven specialties at health systems, hospitals and FQHCs in northern California and Oregon.⁵³

Post-Residency

Loan repayment programs are important tools for recruiting physicians to care for underserved Californians following graduation. These programs repay physicians' education debt in exchange for caring for underserved persons for a specified length of time. For example, the CalHealthCares program repays up to \$300,000 of student loans for physicians who are within five years of graduation in exchange for a five-year service obligation.⁵⁴ Participants must agree to maintain a patient caseload of at least 30 percent Medi-Cal patients. Other loan repayment programs available to California physicians include the National Health Service Corps, the California State Loan Repayment Program, the County Medical Services Program Loan Repayment Program, and the Steven M. Thompson Physician Corps Loan Repayment Program.⁵⁵ These programs require participants to practice in geographic areas that have been designated as underserved. Studies of loan repayment programs have concluded that they are effective tools for recruiting physicians to practice in underserved areas and that retention rates for participants are higher than those of physicians who receive scholarships with service obligations.

Investment in recruitment and retention of physicians from groups that are underrepresented in medicine is also important for training the next generation of physicians and recruiting underrepresented students to California medical schools and residency programs. Underrepresented students and residents benefit from faculty mentors with similar racial/ethnic and socio-economic backgrounds and all students and residents benefit from learning from diverse faculty. Examples of programs that support recruitment and retention of faculty from underrepresented backgrounds include the John A. Watson Faculty Scholars program at the University of California San Francisco School of Medicine, which provides grants to retain faculty from underrepresented backgrounds and grants to residents and fellows from underrepresented backgrounds whose departments would like to hire them but which do not have any open positions.⁵⁶

Conclusion

California faces several major physician workforce challenges in the coming decades. The state has an aging physician workforce that is not well-distributed geographically across the state and does not contain sufficient numbers of primary care physicians and psychiatrists to meet Californians needs. Blacks and Latinx are also underrepresented among the state's physicians. California's medical students and residents are somewhat more diverse but not nearly as diverse as the state's population.

California is making some progress toward addressing these challenges, as evidenced by growth in the numbers of medical students and in residents in some primary care specialties. In addition, the state has a number of programs that address physician workforce needs across the continuum from pre-medical school to practice that could be expanded to position the state to increase the supply of primary care physicians and psychiatrists, improve geographic distribution, and increase the numbers of physicians from economically disadvantaged backgrounds and from racial/ethnic groups that are underrepresented in medicine. These programs are good investments for California because the state retains more of its medical students and residents than any other state in the nation.

Appendix A. Specialties of California MDs

Family Medicine

Internal Medicine

Pediatrics

Obstetrics and Gynecology

Emergency Medicine

General Practice

General Surgery

Psychiatry

Psychiatry

Psychosomatic Medicine

Facility-Based Specialties

Anesthesiology

Nuclear Medicine

Pathology

Physical Medicine and Rehabilitation

Radiation Oncology

Radiologic Physics

Radiology

Other Specialties

Aerospace Medicine

Complementary and Alternative Medicine

Pain Medicine

Public Health & General Preventive Medicine

Other Specialty

Medical Specialties

Allergy & Immunology

Cardiology

Critical Care

Dermatology

Endocrinology

Epilepsy

Gastroenterology

Geriatrics

Hematology

Hospice and Palliative Medicine

Infectious Disease

Medical Genetics

Neonatal-Perinatal Medicine

Nephrology

Neurodevelopmental Disabilities

Neurology

Neurology with Special Quals in Child Neurology

Occupational Medicine

Oncology

Pulmonology

Rheumatology

Sleep Medicine

Surgical Specialties

Colon and Rectal Surgery

Cosmetic Surgery

Facial/Plastic/Reconstructive Surgery

Neurological Surgery

Ophthalmology

Orthopedic Surgery

Otolaryngology

Pediatric Surgery

Plastic Surgery

Spine Surgery

Sports Medicine

Surgery of the Hand

Surgical Critical Care

Surgical Oncology

Thoracic Surgery

Urology

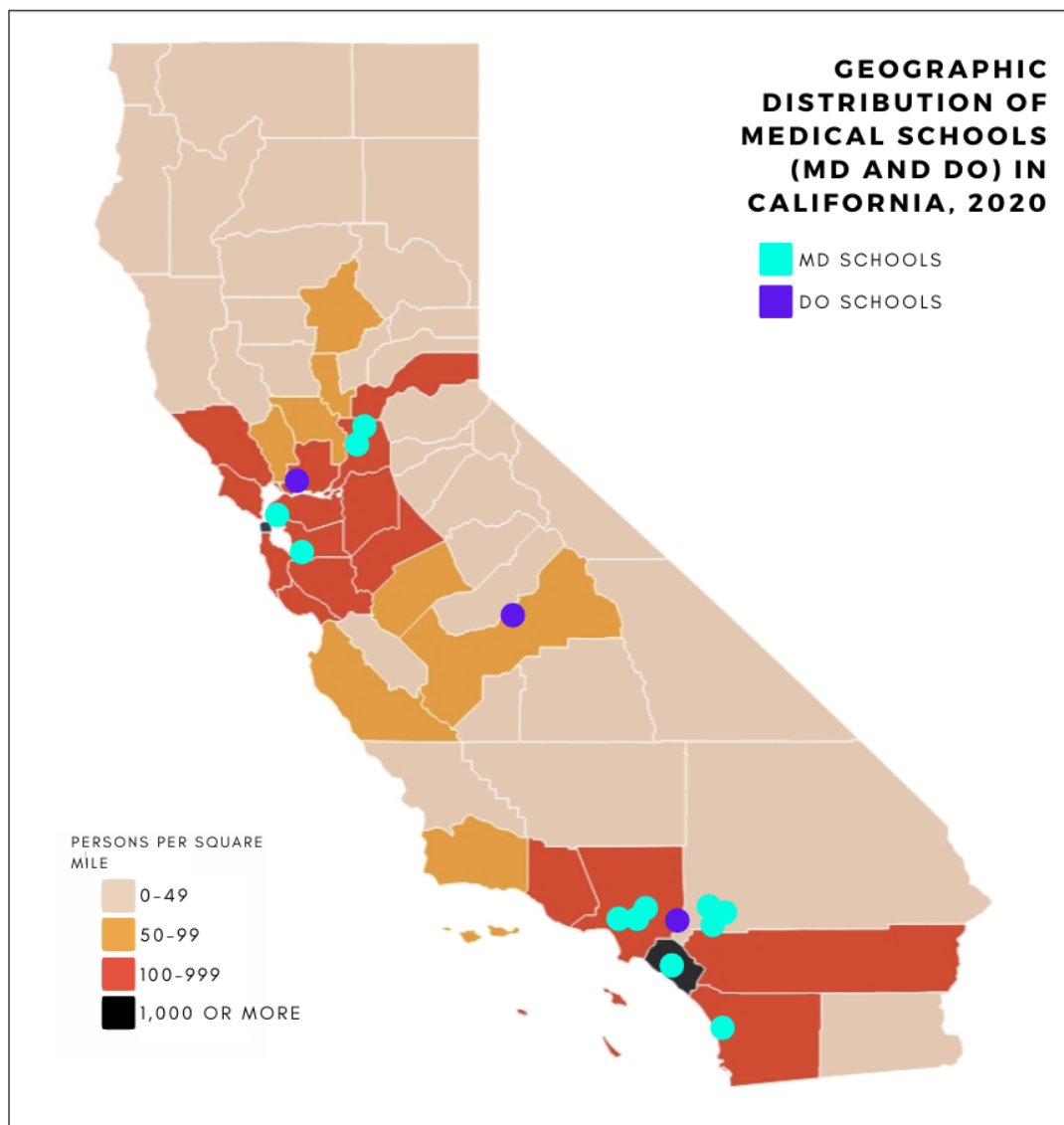
Vascular Surgery

Appendix B. California Counties Included in Regions

Region	Counties
Central Coast	Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz, Ventura
Greater Bay Area	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma
Inland Empire	Riverside, San Bernardino
Los Angeles County	Los Angeles
Northern and Sierra	Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, Glenn, Humboldt, Inyo, Lake, Lassen, Mariposa, Mendocino, Modoc, Mono, Nevada, Plumas, Shasta, Sierra, Siskiyou, Sierra, Sutter, Tehama, Trinity, Tuolumne, Yuba
Orange County	Orange
Sacramento Area	El Dorado, Placer, Sacramento, Yolo
San Diego Area	Imperial, San Diego
San Joaquin Valley	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare

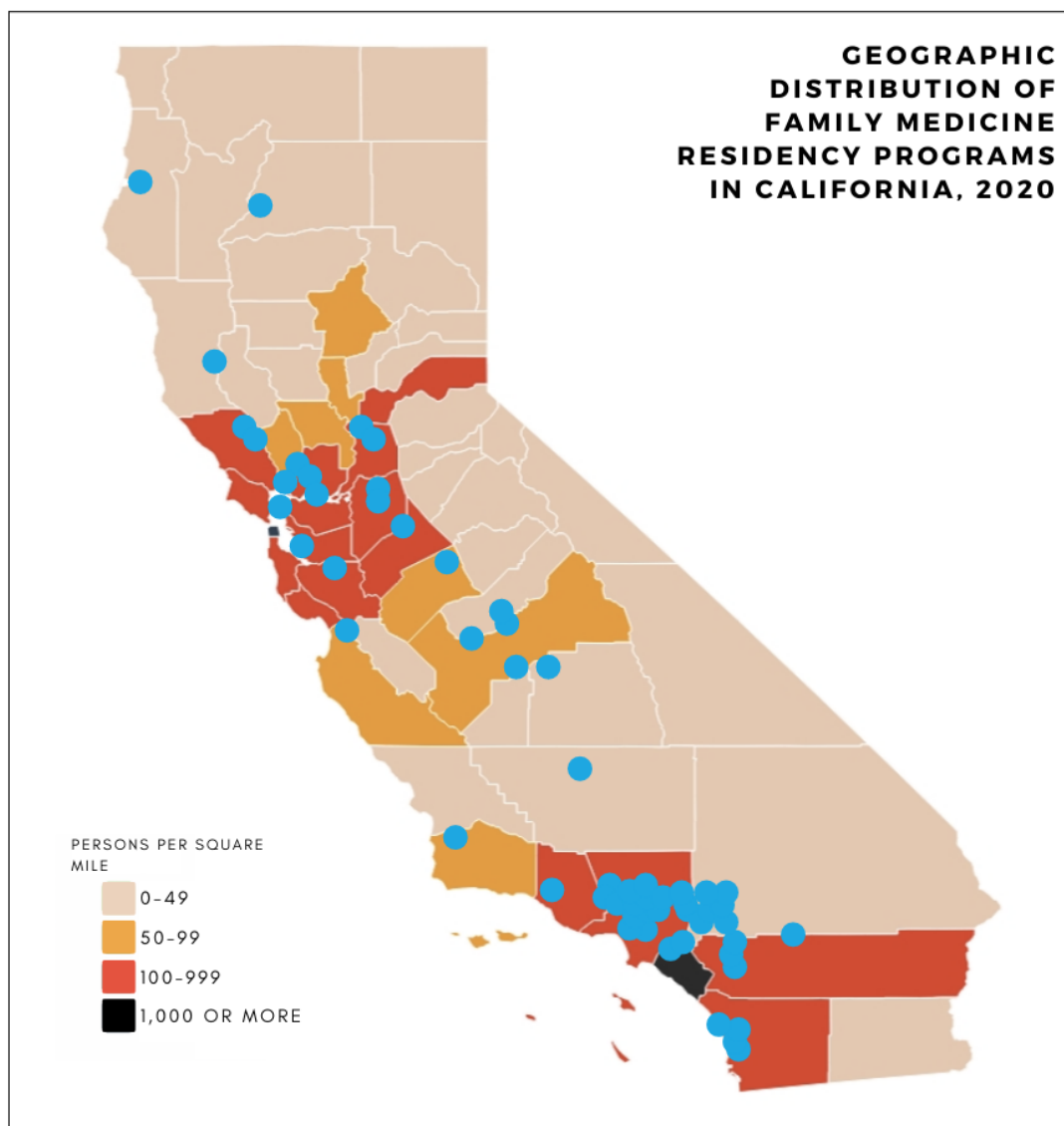
Appendix C. Geographic Distribution of Medical Schools in California, 2020

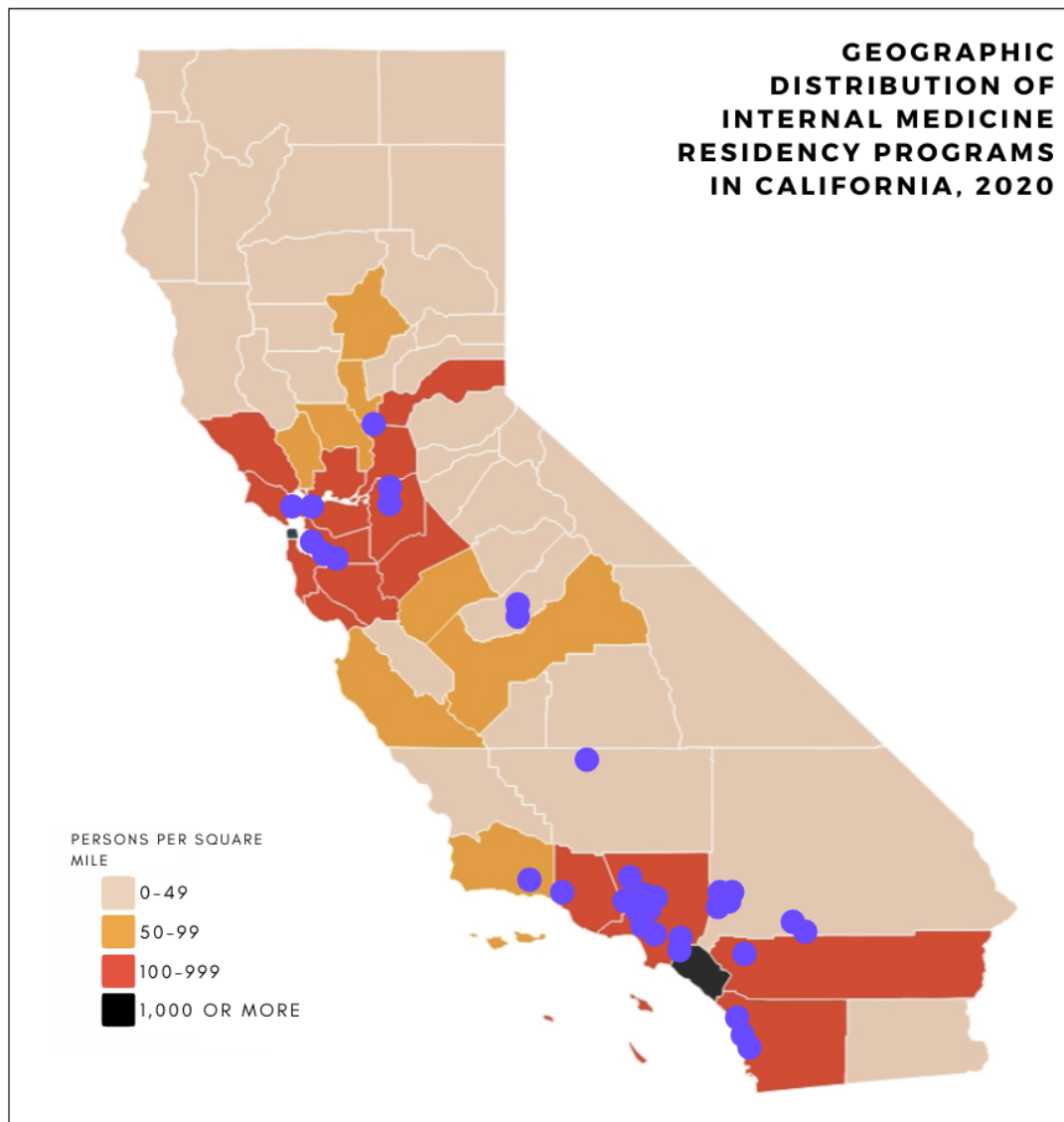
Sources: National Resident Matching Program, 2020 NRMP Main Residency Match®: Match Rates by Specialty and State; U.S. Census Bureau.

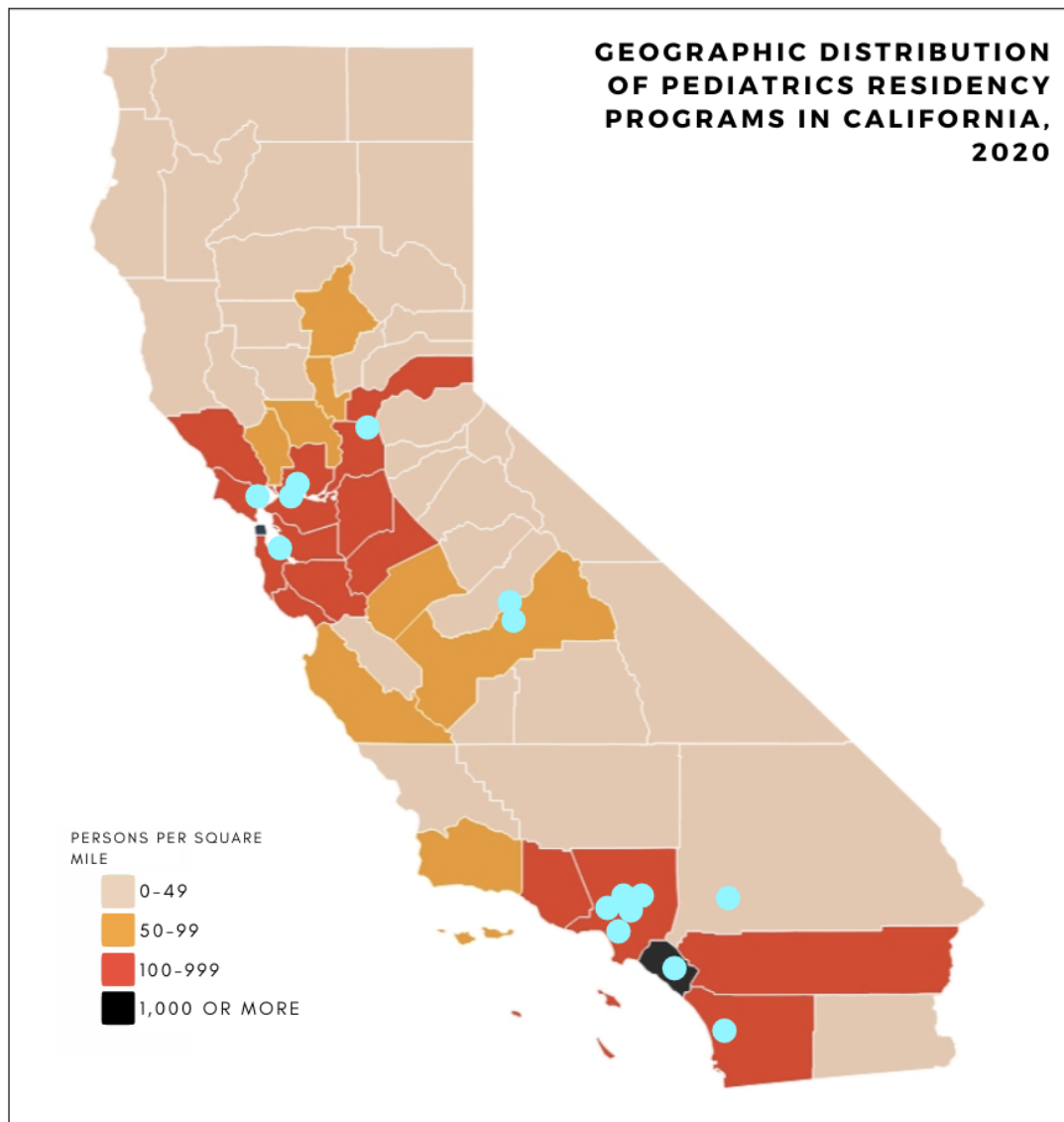


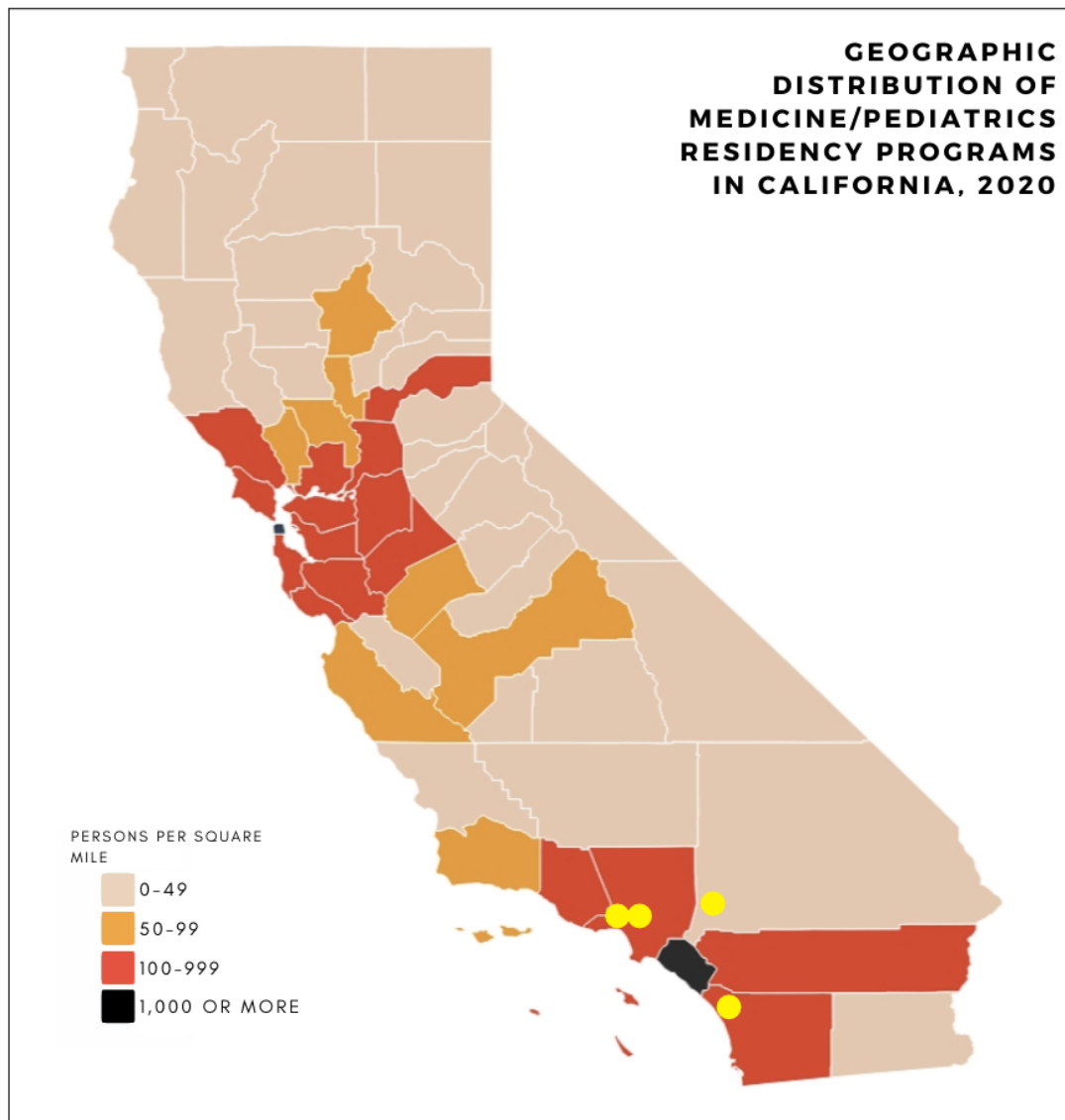
Appendix D. Geographic Distribution of Residency Programs in CalMedForce Specialties, California, 2020

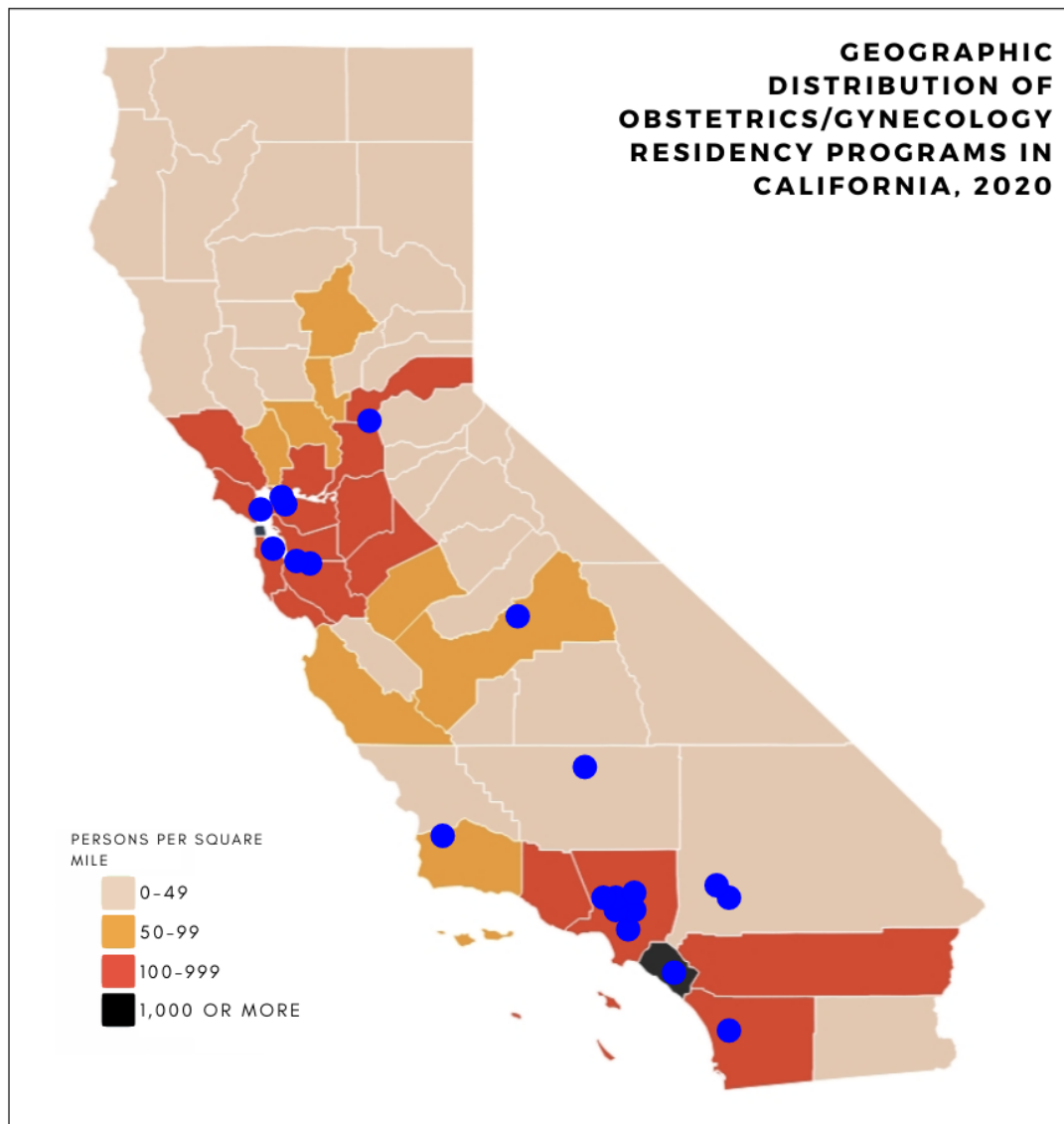
Sources: National Resident Matching Program, 2020 NRMP Main Residency Match®: Match Rates by Specialty and State; U.S. Census Bureau.

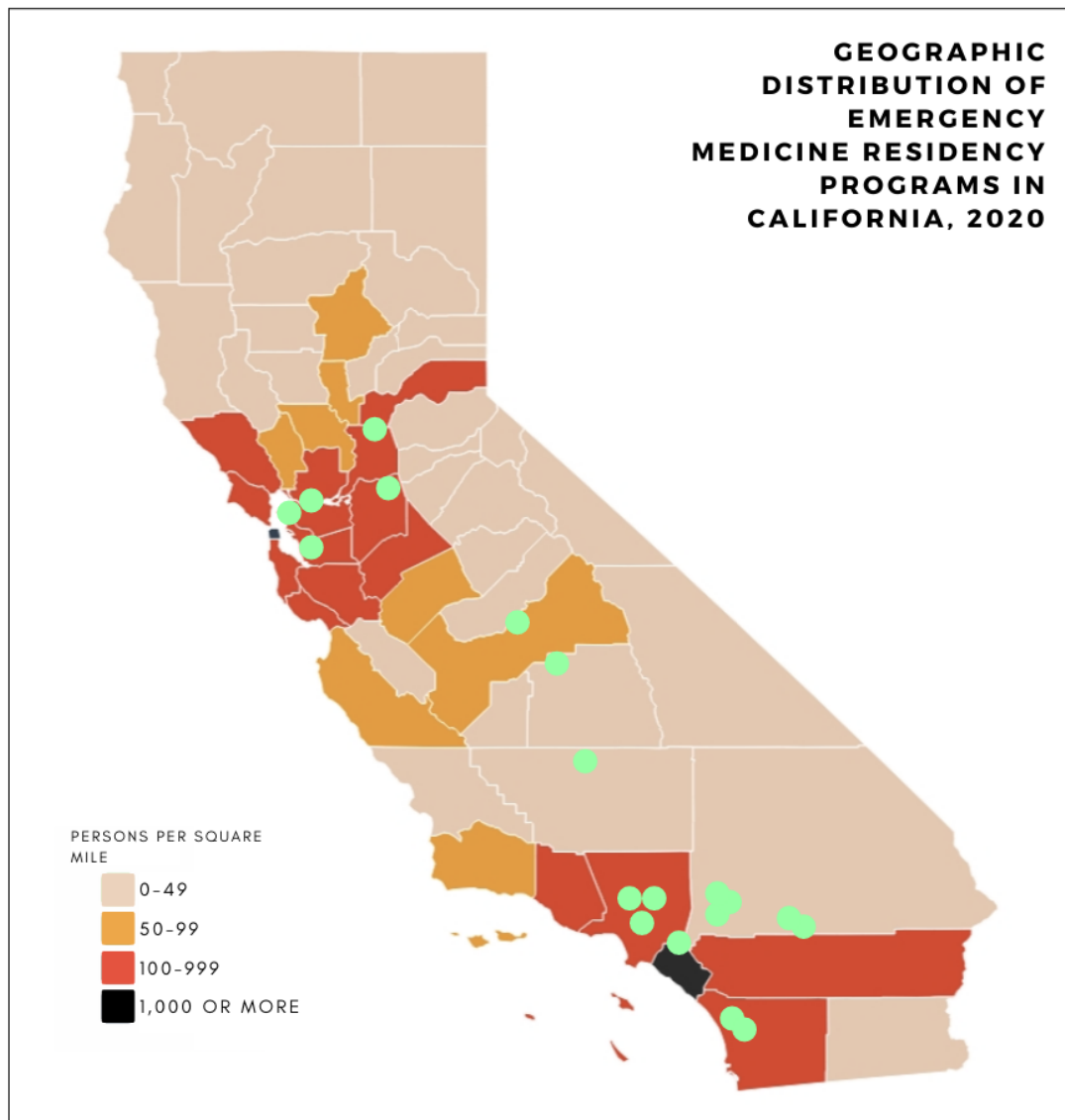












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- ¹³ Association of American Medical Colleges. Table B-1.2. Total Enrollment by U.S. Medical School and Sex, 2016-2017 through 2020-2021. Retrieved from <https://www.aamc.org/data-reports/students-residents/interactive-data/2020-facts-enrollment-graduates-and-md-phd-data>
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