

CALIFORNIA'S

PHYSICIAN SHORTAGE

White Paper

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**Latino Policy &
Politics Initiative**

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ABOUT UCLA LATINO POLICY AND POLITICS INITIATIVE

The Latino Policy & Politics Initiative is a comprehensive think tank that addresses the most critical domestic policy challenges facing communities of color in states and localities across the U.S. LPPI fosters innovative research, leverages policy-relevant expertise, drives civic engagement, and nurtures a leadership pipeline to propel viable policy reforms that expand opportunity for all Americans.

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EXECUTIVE SUMMARY

Approximately seven million Californians live in areas with a shortage of primary care physicians [1]. This shortage is expected to increase in the near future, as California's population grows older and increasingly diverse. Previous research shows a disparity between the racial/ethnic composition of physicians in California and its increasingly diverse population. Research shows that patient-provider concordance is positively associated with better interpersonal processes of care, access to care and health outcomes [2, 3]. According to research from the UCLA Latino Policy & Politics Initiative (LPPI), it could take up to five centuries to fully address the Latino physician shortage if present trends continue [4]. This report discusses how to address the physician shortage in California by: *Increasing physician admissions for Underrepresented Minority (URM) students, Increasing Primary Care Residencies, and Expanding International Medical Graduate Placements* in the near-term. This report argues that addressing existing barriers in medical school admissions, residencies, and supply of language-capable physicians is key to address the health care needs of increasing numbers of medically- and linguistically-underserved residents in California. Additional funding, policies, and slots for URM medical students are needed to address the current deficit of primary care physicians in California. Evidence-based solutions hinge on the capacity of policymakers to integrate the growing URM workforce into California's physician pool to meet the growing demand for health care amongst an aging and minority-majority population.

Introduction

California is experiencing an increasing shortage of primary care physicians. The California Healthcare Workforce commission has recently estimated that approximately seven million Californians live in a Health Professional Shortage Area (HPSA), a federal designation for counties experiencing a shortage of primary care, dental or mental health care providers [1]. Latinos, African Americans, and Native Americans are the majority of residents in areas with a physician shortage. This shortage is expected to increase with the aging population. The population aged 65 years and older is projected to grow by 48% [5]. By 2050, approximately 19.5% of the population will be 65 years or older. The older adult population in the U.S. is expected to become increasingly diverse. Latinos currently account for 7% of the older adult population, however, Latinos are projected to represent 20% by 2050 [6]. Population aging is likely to worsen the physician shortage due to increased health care demand. By 2030, California is projected to face a shortage of 4,100 primary care providers if present trends continue [1]. Demand for primary care

clinicians in California will increase by 12 -17%, above the current demand, and physician supply will concurrently decline [7]. By 2032, the demand for physicians will exceed supply by a range of 46,900 to 121,900 full-time physicians [8].

Racial/Ethnic Concordance and Health Care Delivery

Provider linguistic and cultural competency are key determinants of health inequities in patient experience and quality of care [3, 9]. Previous research shows that racial/ethnic concordance is positively associated with better interpersonal processes of care, access to care and health outcomes [10-15]. Increased mutual respect, trust, communication, and satisfaction improve in concordant patient-doctor relationships [12, 13]. California's physician shortage is particularly acute in areas in need of primary care providers that can deliver language-concordant care.

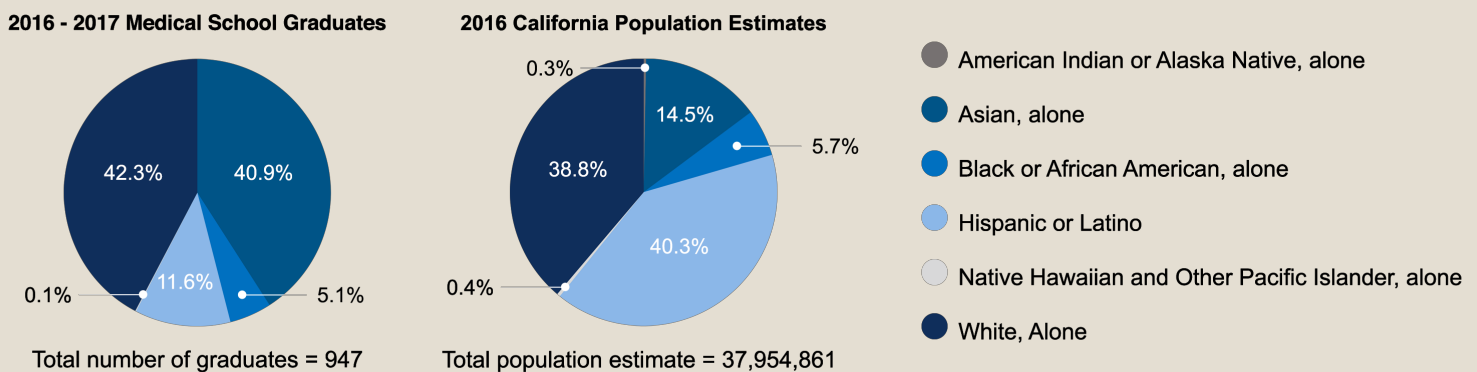
Approximately 25 million individuals in the U.S. are considered Limited English Proficient (LEP), or those who speak English “less than very well” according to the U.S. Census. Almost 28% of the U.S. LEP population lives in California [16]. According to research from the UCLA Latino Policy & Politics Initiative (LPPI), in California, nearly 44% of the population speaks a language other than English at home and Spanish-speaking physicians are the most under-represented in the physician workforce in California with only 62.1 per 100,000 Spanish-speakers [17]. More than 37 million Latinos speak Spanish at home, making it the most widely used non-English language in the U.S. [18]. Studies show that Spanish-speaking LEP patients in California, who have a Spanish-speaking primary care provider, have better glycemic control [19] and report feeling more confident to ask questions, report higher trust in their providers, and perceive lower discrimination

from them, compared to patients who lack a Spanish-speaking primary care provider [20].

California Medical School Graduates by Race and Ethnicity

The racial and ethnic composition of medical school graduates in California differs from the population demographics in California, particularly among traditionally Underrepresented Minorities (URMs) in medicine. This disparity is likely to grow if action is not taken in the near-term to close this gap. **Figure 1** shows the share of medical school graduates by race and ethnicity from California medical schools for the Graduate Medical Education (GME) year 2016 to 2017, and shows the corresponding race and ethnic composition of California’s population.

Figure 1. Share of California medical school graduates vs. California’s population by race and ethnicity for 2016-2017.



Note: The total state population estimate excludes non-Hispanic/Latino and Hispanic/Latino populations who reported “some other race alone” or “two or more races”.

Sources: AAMC Data & Facts Table B-6.1 for total graduates by U.S. Medical School and Race/Ethnicity (alone) (GME year 2016-2017). Data excludes percentage estimates for other race/ethnicity; multiple race/ethnicity; unknown race/ethnicity; and non-U.S. citizens or non-permanent residents. U.S. Census Bureau, 2016 American Community Survey (ACS) 1-Year Estimates for Total Population by Race (Table B02001) and Hispanic or Latino Origin by Race (Table B03002).

Currently, eleven allopathic medical schools accredited by the Association of American Medical

Colleges (AAMC) are located in California. **Table 1** summarizes these medical school programs.

Table 1. AAMC-accredited allopathic medical school programs offered in California in 2018-2019.

Medical School	City	Program(s) Offered
California Northstate University College of Medicine (CNUCOM)	Elk Grove	M.D. First U.S. private, for-profit medical school (est. 2015).
California University of Science and Medicine (CSUM) School of Medicine	San Bernardino	M.D. Established in 2018, CSUM is a private, not-for-profit medical school.
Loma Linda University School of Medicine	Loma Linda	M.D. Established in 1909 as the College of Medical Evangelists. Students participate in two programs: Social Action Community Health System and Students for International Mission Service.
Keck School of Medicine of the University of Southern California (KSOM)	Los Angeles	Primary Care Program (PCP) within the KSOM Introduction to Clinical Medicine Program. M.D./Ph.D. Joint Program with the California Institute of Technology (Caltech).
Stanford University School of Medicine	Palo Alto	M.D. M.D./Ph.D. (MSTP)
UC Davis School of Medicine	Davis	M.D. M.D./Ph.D. Accelerated Competency-based Education in Primary Care (ACE-PC)-with Kaiser Permanente Northern California. Rural Program in Medical Care Education (Rural-PRIME) (est. 2007). Reimagining Education to Advance Central California Health (REACH) Transforming Education and Community Health for Medical Students (TEACH-MS).
UC Irvine School of Medicine	Irvine	M.D. M.D./Ph.D. (MSTP) Health Education to Advance Leaders in Integrative Medicine (HEAL-IM). Leadership to Education to Advance Diversity-African, Black, and Caribbean (LEAD-ABC). Program in Medical Education for the Latino Community (PRIME-LC) (est. 2004).
UC Riverside School of Medicine	Riverside	M.D. M.D./Ph.D. (MSTP)
UC San Diego School of Medicine	San Diego	M.D. M.D./Ph.D. (MSTP) School of Medicine Program in Medical Education-Health Equity (PRIME-HEq) (est. 2007).
UC San Francisco School of Medicine	San Francisco	M.D. M.D./Ph.D. (MSTP) Joint M.D. program between UCSF and UC Berkeley. UCSF-UC Berkeley Joint Program focuses on the urban underserved (PRIME-US) (est. 2006). San Joaquin Valley (SJV) PRIME-Fresno (partnered with UC Merced and UC Davis as of 2011).
UC Los Angeles David Geffen School of Medicine (DGSOM)	Los Angeles	M.D. M.D./Ph.D. (MSTP) PRIME-LA (Leadership and Advocacy focus) (est. 2008) Charles R. Drew/UCLA Medical Education Program Charles R. Drew/UCLA PRIME-LA program

Note: Global health pathways, law, MS, MPH, MBA dual degrees were excluded.

Source: University websites. MSTP= Medical Scientist Training Program.

In addition to allopathic medical schools, three osteopathic medical schools accredited by the American Association of Colleges of Osteopathic Medicine (AACOM) are based in California:

- Western University of Health Sciences/College of Osteopathic Medicine of the Pacific in Pomona, CA.
- California Health Sciences University/College of Osteopathic Medicine in Clovis, CA.
- Touro University College of Osteopathic Medicine in Vallejo, CA.

In California, 38% of graduating Osteopathic medical students planned to pursue primary care specialties in 2016 [21]. According to 2019 NRMP Match results, almost 14% of first-year residency slots available in primary care specialties in California were filled by graduates from U.S. Osteopathic medical schools [22].

Currently Enrolled URM in California Medical Schools

American Indian, Alaska Natives, and Native Hawaiian/Pacific Islander students are severely underrepresented in California's graduate medical education (**Table 2**). On average, Black or African Americans comprise 6.2% of the total enrolled student population across all California's medical schools. The representation of Latino students in California's medical schools ranges from 7% to 19.7% [23, 24]. By contrast, in 2018 the Latino population in California represented 39.6% of the state's population, and is projected to increase rapidly in the upcoming decades [25]. These figures suggest that the current supply of Latino physicians is insufficient to address the needs of a growing Latino population. **Table 2** shows the racial and ethnic composition of California's medical schools.

Table 2. Share of students enrolled by race and ethnicity during the 2018-2019 academic year.

School of Medicine	American Indian or Alaska Native	Asian	Black or African American	Latino	Native Hawaiian or other Pacific Islander	White
CNUCOM	0%	49.4%	1.2%	2.1%	0%	30.5%
CSUM	0%	47.0%	3.0%	6.0%	0%	36.0%
Loma Linda	0%	30.5%	7.7%	7.0%	0%	33.7%
USC Keck (SOM)	0%	37.2%	7.0%	9.6%	0.1%	33.5%
Stanford	0.4%	36.6%	6.3%	8.3%	0.2%	29.4%
UC Davis	0.4%	33.6%	4.6%	19.1%	0.2%	26.5%
UC Irvine	0%	34.4%	3.1%	8.8%	0%	35.0%
UC Riverside	0%	33.9%	6.3%	19.7%	0.4%	19.7%
UC San Diego	0.3%	32.1%	5.8%	7.5%	0.3%	37.6%
UC San Francisco	0%	28.0%	7.9%	11.4%	0%	34.6%
UCLA-Geffen	0.1%	34.2%	12.6%	15.7%	0.2%	22.3%

Note: Enrollment includes the number of students in medical school, including students on a leave of absence, on October 31 of each year, and excludes students with graduated, dismissed, withdrawn, deceased, never enrolled, completed fifth pathway, did not complete fifth pathway, or degree revoked statuses. Latino describes students who identify as Hispanic, Latino, or of Spanish Origin.

Source: AAMC Data & Facts Table B-5.1.

CALIFORNIA'S LATINO PHYSICIAN CRISIS

Latinos became California's plurality population in 2015. By 2050, Latinos are estimated to represent 44.5% of the state's population [26]. While the Latino population continues to grow, the supply of Latino physicians has not caught up [27]. The scarcity of Latino physicians in California has led to a deficit of 54,655 Latino physicians that are required to achieve parity with Non-Latino Whites [4]. The magnitude of the Latino physician crisis is reflected by the shortage of Latino medical graduates and resident physicians actively practicing in states with growing Latino populations. In 2000, the overall supply of Latino physicians was projected to increase by approximately 30% by 2020, a growth projection that would be overshadowed by a projected 74% Latino population growth in California [24]. Over the last few decades, efforts to recruit and retain physicians to practice in California's Latino communities have been ineffective [28].

5 Centuries to Reach Parity: California's Latino Physician Shortage

Recent research from LPPI estimates the magnitude of California's Latino physician shortage by projecting the number of years it would require closing the disparity gap between Latino and Non-Latino White (NLW) physicians. This research suggests that if present trends continue, it would take 5 centuries to fully address this disparity [4]. Importantly, this estimate assumes perfect parity between Latino physicians and patients. In practice, a diversity of providers would continue to deliver care to a diversity of patients. This calculation by LPPI, however, shows the underrepresentation of Latino physicians in California compared to the supply of NLW physicians. **Table 3** summarizes California's Latino physician shortage.

Table 3. California Latino Physician Shortage (2015).

Racial/Ethnic Group	Population	# of Physicians	Physician Rate per 100,000 Population	Shortage for Parity
Non-Hispanic White	14,814,590	60,106	405.7	---
Latino	15,184,905	6,953	45.8	54,655

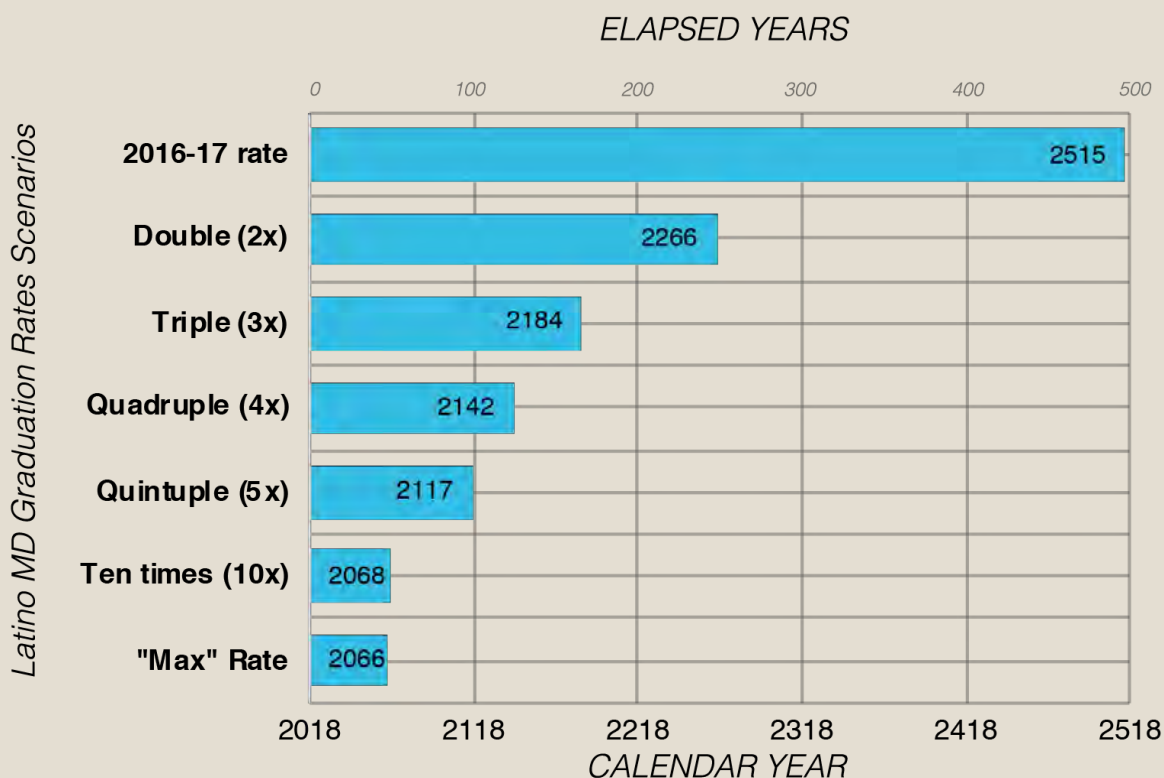
Source: Hsu, P., Anaya, Y.B., and Hayes-Bautista, D.E. (2019), "5 Centuries to Reach Parity: An Analysis of How Long it Will take to Address California's Latino Physician Shortage", UCLA LPPI, Policy Brief.

California exhibited a shortage of 54,655 Latino physicians for 2015 [4]. At 45.8, the Latino physician rate per 100,000 individuals is nearly 90% lower than

the Non-Hispanic White (NHW) rate in California. **Figure 2** shows the time needed to make up the Latino physician shortage.¹

¹ Data on California medical school graduates from the AAMC from 2016-2017 was used to determine that the total number of Latino physicians, which graduated in 2017 in California, was 110 out of a total of 1,133 medical graduates [4]. These values were used to project that, assuming that the number of Latino graduates were to stay constant, it would take about 500 years to make up the Latino physician shortage for 2015.

Figure 2. Years Needed to Fill the Latino Physician Shortage in California (2015).



Source: Hsu, P., Anaya, Y.B., and Hayes-Bautista, D.E. (2019), "5 Centuries to Reach Parity: An Analysis of How Long it Will take to Address California's Latino Physician Shortage", UCLA LPPI, Policy Brief.

INCREASING CALIFORNIA ADMISSIONS FOR URM

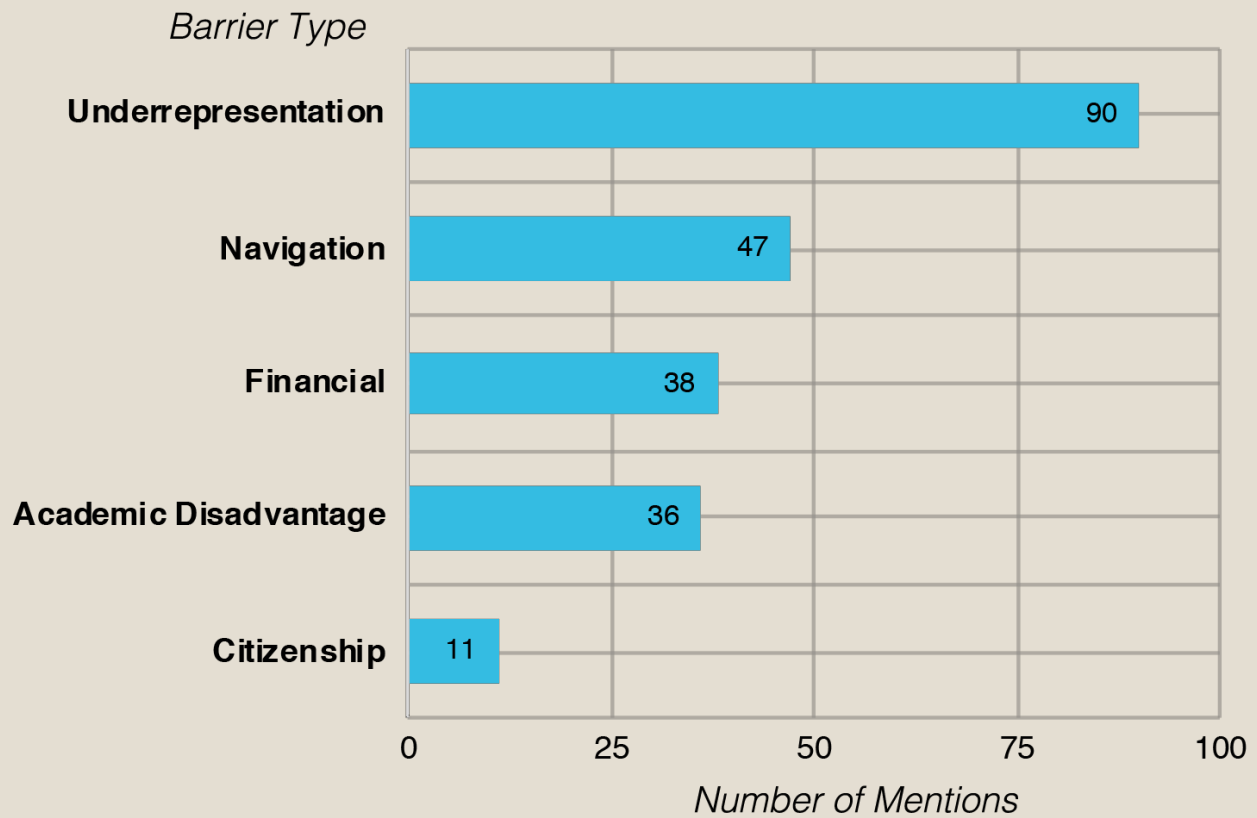
Barriers and Leaks in the Pipeline of Latino Physicians

Previous research shows that URM students face considerable barriers navigating the medical school admission process, due to lack of necessary information, guidance, and social support [29]. URM students who are interested in the medical profession encounter socio-economic and academic obstacles [30]. Research shows that these barriers contribute to a "leaky pipeline," which is worsened by perceived discrimination and lack of mentors and role models [31-33]. URM students find more obstacles in

identifying mentors that can help them navigate the medical profession [34].

A recent study by LPPI found that the Latino physician pipeline has many leaks. The physician's life cycle can be divided into three phases, K-12 to college years, medical school, and residency. Many Latino students fail to make the transition into medical school during the first phase due to barriers such as financial/opportunity cost, academic disadvantages, challenges in the navigation of higher education, underrepresentation, and citizenship issues (**Figure 3**) [34].

Figure 3. Barriers in the Latino physician pipeline in a sample of Latino medical students.



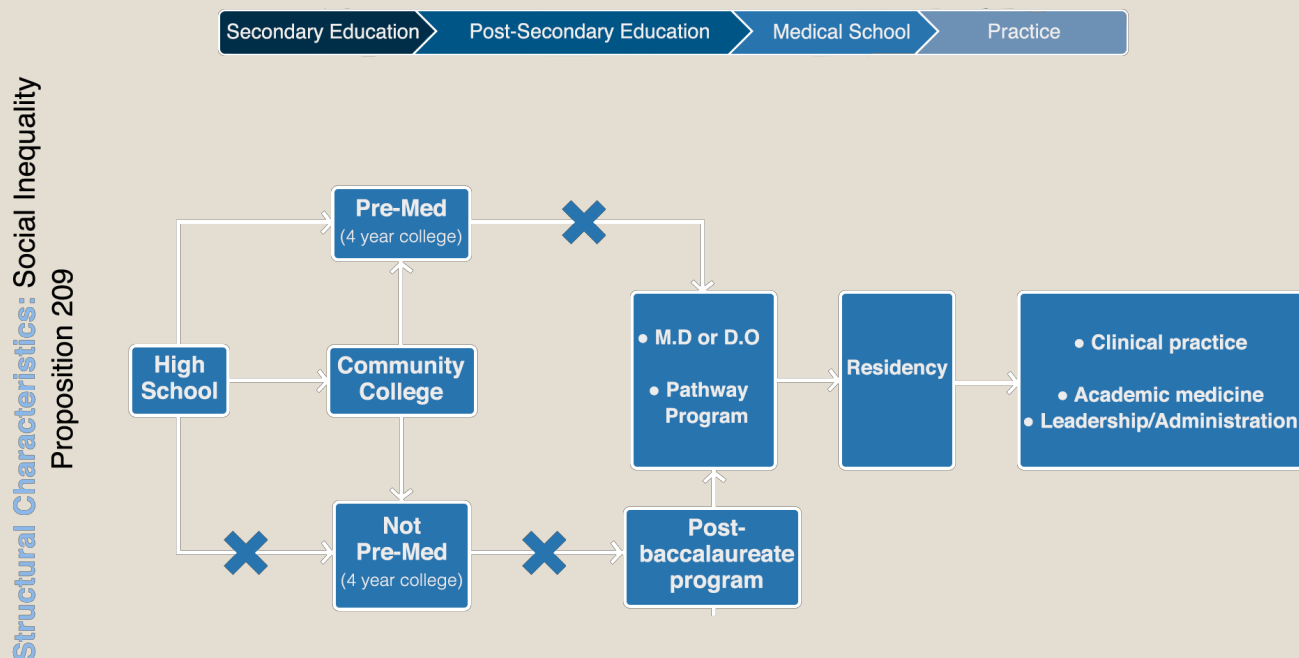
Source: Bustamante, A.V. and L.F. Beltran (2019), "Latino Physician Shortage in California: The Provider Perspective", UCLA LPPI, Policy Brief.

Social inequality is a structural problem that impacts the trajectories and outcomes of URM physicians and medical students. **Figure 4** shows the different trajectories and barriers faced by prospective Latino physicians. The arrows show the progression through different pathways [34]. Steps with X marks show "leaks" or critical junctures when financial and academic disadvantages, underrepresentation or

lack of guidance may prevent Latino students from successfully pursuing a medical career. The transition from high school to college, and from college into medical school are critical moments when potential Latino physicians choose alternative career paths due to the perceived barriers in the medical profession.



Figure 4. Pathways, barriers, and leaks in the pipeline of Latino physicians.



X = “leaks” or critical junctures where barriers such as finances and lack of guidance might hinder students progress, or discourage them from pursuing a medical career.

Barrier	Secondary Education	Post-secondary Education	Medical School	Practice
Financial conditions	X	X	⚠	✓
Academic disadvantages	X	X	⚠	
Underrepresentation	⚠	X	✓	X
Navigation	✓	X	✓	⚠
Citizenship	X	X	X	X

X = barrier or potential deterrent

✓ = barrier with available resources

⚠ = concern

Source: Focus groups and interviews with pre-medical students, medical school applicants, medical students, residents and practicing physicians in California 2018.

COMMON TRAINING PATHWAYS FOR URMS IN CALIFORNIA

Community College Graduates as a Source for the Primary Care Physician Workforce

One-third of all medical students attend a community college (CC) before they enroll in medical school. Previous studies have found that a higher share of URMs use this pathway into medical school compared to Non-Latino Whites, however, CC students report lower odds of being accepted into medical school compared to non-CC students. In addition, CC students are more likely to have parents without a college degree, and they are more likely to practice in underserved communities [35]. During medical school, former CC students have expressed more interest in practicing family medicine [36]. Another study found that among family medicine residents, 50% were Latino [15]. Given the high representation of URM students and higher likelihood of practicing in underserved areas among CC attendants, CC pre-meds are a potential source of primary care providers for underserved communities [35-38].

Post-Baccalaureate Pre-medical (PBP) Programs

Another common pathway for Latinos into medical school are post-baccalaureate pre-medical programs (PBP), which offer pre-medical school course requirements to college students and graduates. In addition to academic requirements, PBPs are also useful to build social networks. A study on PBPs in California found that a greater percentage of students who enrolled in a PBP program in the University of California (UC) system were in primary care and in high-poverty, Latino and African-American communities [33, 39]. Another study

showed that physicians who studied in a PBP were more likely to choose primary care and work in underserved areas as compared to other physicians [40]. As in the case of CC students, medical students who studied in PBPs are more inclined to work as primary care providers in underserved areas.

Physician Pipeline Programs in California

Pipeline and pathway programs provide training, mentorship, and support to URM students with the aim of gaining admission into medical school [41]. In 2004, AAMC reviewed a subset of pipeline programs aimed at increasing the representation of URM students in the health care workforce. Among the main elements of successful programs, they highlight the following characteristics.

- Academic preparation must start early and persist throughout schooling.
- Programs should include academic preparation, mentoring, admissions preparation, psychosocial support, and professional opportunities.
- Partnerships between health professional schools, public school systems, and community-based organizations play an essential role in increasing the number of URM students entering college and medical schools. Academic health centers and providers can participate in these partnerships to expose URM students to the medical profession.
- URMs in senior-level administrative and faculty positions serve as role models for students and staff [42].

Another study suggests strategies for the implementation of enrichment programs aimed at improving the academic readiness for racial and ethnic minority students, which should focus on: career information and counseling, support for individual career aspirations, and support for individual academic achievement [43]. The evidence about the effectiveness of these programs is scarce, however, in this section we provide a description of some promising pipeline programs from public and private universities in California.

UC San Francisco (UCSF): The UCSF Latino Center for Medical Education and Research (LaCMER) seeks to train a “home grown” workforce in California’s Central Valley. This pipeline program has different partnerships with academic and community organizations and targets students from grades seven to twelve who may be interested in medical school. This program also collaborates with middle schools in the area to implement the Junior Doctors Academy AVID (Advancement Via Individual Determination) class, which has a focus on science and health. Other activities of this pipeline program include study trips to universities and health institutions, a summer program, and writing and organizational workshops that provide useful skills for college admission [44].

UC Riverside (UCR): The Thomas Haider Early Assurance Program at UCR provides undergraduate students with guaranteed admission to the UCR School of Medicine. Accepted students demonstrate strong academic ability and a commitment to practice in the Inland Empire. However, students are not required to take the MCAT, which is one of the main entry barriers into medical school. Another promising UCR initiative is FastStart, a five-week program for first-year college students from disadvantaged backgrounds that provides guidance on how to use their college experience to maximize their chances to get admitted into medical school.

Another complementary program is Future Physician Leaders (FPS), a UCR summer mentorship program for prospective medical students with an interest in serving their communities. This program includes leadership workshops, community service, and physician shadowing rotations.

UC Los Angeles (UCLA): Médicos, Enfermeros, y Dentistas Para el Pueblo (MEDPEP) at UCLA is a pipeline program that provides support to community college students to complete their science course work and transition into four-year universities. The UCLA PREP is another enrichment program that targets pre-medical and pre-dental students from disadvantaged backgrounds to strengthen their ability to get admitted into medical or dental school. The Family Medicine Bridging the Gap Program partners the UCLA Family Medicine Residency Program with high schools in underserved communities that the residency serves and aims to build interest in primary care, provides skills development and admissions preparation.

Pathway Programs in Medical School

Mission-based or pathway programs are those that seek to increase enrollment of URM students in medical school. The largest initiative of pathway programs is the Programs in Medical Education (PRIME) in the UC system. Alternative pathway programs have been implanted in specific UC campuses, such as the Charles R. Drew/UCLA Medical Education Program and more recently the Accelerated Competition in Primary Care (ACE-PC) program, a partnership between UC Davis and Kaiser Permanente Northern California (see Table 1 for a broader list of the offered programs in California medical schools).

PRIME programs: UC system-wide initiative to increase the number of medical school graduates who work with medically underserved populations. Between 2007 and 2012, each UC medical school

implemented its own PRIME program with a distinct focus on each campus (see **Table 1**). PRIME programs provide a 5-year curriculum, including summer orientation, community engagement, leadership activities, and a master's degree (alternatively, some participants choose clinical research experience). Since the implementation of this program is relatively recent, evidence about its effectiveness is still scarce [45]. Students have pointed out that among the benefits, they perceived peer support, professional role models and mentorship, and curricular enrichment activities [37].

Drew/UCLA Medical Education: This program has the goal of training physicians to work in underserved areas. Since 1981, the joint effort between UCLA and Charles R. Drew University of Medicine and Science provides students with clinical experience and research opportunities in low-income areas of Los Angeles. Accepted students complete the first two years of training at UCLA alongside students enrolled in the David Geffen School of Medicine. Students undergo clinical training and complete a research project at the Martin Luther King Jr./Charles R. Drew Medical Center, with an emphasis on minority and multicultural health, and complete a health disparities research thesis. Studies have shown that compared with students in the regular M.D. program at UCLA, Drew/UCLA students were nine times more likely to be interested in practicing in underserved communities after graduation [46]; 53% of Drew/UCLA graduates were located in medically disadvantaged areas (in contrast to 26.1% of regular UCLA graduates); and those in the Drew/UCLA program were 2.5 times more likely to work in disadvantaged areas compared to the regular UCLA program [47].

ACE-PC: Since 2014, the UC Davis School of Medicine implemented the Accelerated Competition in Primary Care (ACE-PC) program, a pathway program for students committed to careers in primary

care. Rather than entering a three-year residency after medical school, participants in this program enter primary care practice one year earlier and follow a three-year medical school track. This is made possible by their partnership with Kaiser Permanente (KP) Northern California. Students who get admitted into this program receive paid tuition and are guaranteed a residency slot in primary care in KP Northern California, which they can forfeit and pay retroactively for tuition if they choose an alternative career path.

Innovating Programs with a Focus on Primary

Care: The Primary Care Program at the Keck School of Medicine is a tailored program to champion medical student choice in primary care. The Kaiser Permanente School of Medicine in Pasadena is a new medical school with a training model focused on health promotion [48] and tuition will be waived for their first five classes (entering in the fall of 2020 through 2024) [49]. Recently, the Claremont Colleges announced plans to open a new medical school (Keck Graduate Institute School of Medicine) focused on training students for careers as primary care physicians to cater to the growing Latino population in areas such as eastern Los Angeles County and the Inland Empire, and regions that encompasses Riverside and San Bernardino counties [50].

Pipeline programs and mentorship platforms partly address barriers in the medical profession encountered by URM students, by providing tutoring, mentorship, exposure to the medical profession, counseling, skill-building activities, financial support, and volunteering opportunities among other resources. While several of these programs are promising, their scope is limited. Given the current relatively small size of their operations, these programs by themselves are insufficient to substantially change the low representation of Latinos in the medical profession.

Policy Recommendations to Increase URM in Medicine

Based on our study findings, the shortage of URM pursuing a medical degree and successfully entering the physician workforce could be addressed by considering the following recommendations:

1. **Increase financial resources available** to support prospective URM physicians.
 - a. Expand loan repayment programs to ease the financial burden of medical education, particularly, for language capable primary care physicians.
 - b. Allocate resources to PBPs administered by Community Colleges, the California State University (CSU), and the University of California (UC) systems, and provide scholarships to URM students enrolled in a PBP program to cover the cost of MCAT preparation courses.
 - c. Incentivize medical schools to create a higher supply of MD/DOs entering the California workforce. Recruitment and admissions practices should prioritize the matriculation of students specifically interested in pursuing primary care in underserved areas.
2. **Address academic disadvantages** by coordinating and expanding pipeline and pathway programs that support students from middle school until medical school.
 - a. Allocate resources to support the expansion of existing pipeline programs throughout the public university system.
 - b. Create tutoring, summer programs, volunteering, and mentorship opportunities that will expose students to the health system and enable them to find mentors and role models while strengthening their academic skills.
 - c. Create incentives for medical schools to increase the number of spaces available to students from Minority Serving Institutions, such as those from the Cal State University and Community College system, by funding scholarships aimed at students from these public university systems.
3. **Improve navigation resources** for high school and college students.
 - a. Support programs that provide guidance and promote the skills needed to succeed in the medical profession [35].
 - b. Standardizing pre-med programs in California's university systems could improve navigation. In addition, supporting programs that review applications and guide students through pre-med or when pursuing a PBP, such as Future Physician Leaders (FPL) and the Medical Professionals Empowerment Program (MedPEP), could improve the dissemination of information.
 - c. Strengthening mentorship programs focused on inspiring the next generation of diverse healthcare leaders for underserved communities, such as MiMentor (mimmentor.org) and other similar matching platforms. These organizations help URM students identify support networks and role models, and provide formal and informal information needed to be successful medical school applicants, and later on how to succeed in the medical profession [51].
4. **Monitor, evaluate, and disseminate best practices** from existing pipeline and pathway programs and new models of medical education.
 - a. Evidence from effective programs that are successful at training physicians for underserved areas should be collected and disseminated. Scaling-up these programs and ensuring adequate financial support should be prioritized.
 - b. Studying new teaching models of medical education that promote team-based care and skills such as language and cultural awareness should be further explored.
 - c. Evaluating the operation of these programs and disseminating best practices could encourage efforts by other universities in California to improve medical education and increase the representation of URM in the medical profession.

INCREASING PRIMARY CARE RESIDENCIES IN CALIFORNIA

The Importance of Primary Care

Primary care is the most effective and efficient approach to enhance people's physical and mental health, as well as social well-being [52]. The American Academy of Family Physicians (AAFP) defines it as care provided by physicians trained for and skilled in comprehensive first contact and continuing care [53]. Specialties that are considered to constitute primary care are: Family Medicine, Internal Medicine, Pediatrics, and Obstetrics & Gynecology [53]. Family physicians alone account for 40% of the primary care workforce [54]. Primary care physicians manage acute and chronic conditions and administer preventive care. They ensure age-appropriate cancer screening, screening of infectious diseases, appropriate vaccinations to prevent infectious diseases and work with their patients on chronic disease prevention.

Primary Care Physicians in the Face of California's Physician Shortage

California is projected to face an increasing shortage of primary care physicians [1]. Forecasts out of the Healthforce Center at UCSF predict that California will have shortages of primary care clinicians by 2025, needing approximately 4,700 additional primary care clinicians to meet the demand [7]. Expanding the clinician training capacity in California for physicians, Nurse Practitioners (NPs), and Physician Assistants (PAs) by 3-7% could help ameliorate shortages long-term [55]. In addition, the California Future Health Workforce Commission recommends an increase in 1,872 primary care physicians by 2030 [1].

An Emphasis on Primary Care is Cost-Saving

Evidence shows that access to primary care helps people live longer and have healthier lives [56]. Patients with access to a regular primary care physician have lower overall health care costs than those without one, and health outcomes improve [56]. Within the U.S., health care areas with a larger share of primary care physicians have lower spending and higher quality of care [57]. When people have access to primary care, treatment occurs before more severe problems can develop [58]. As a result, greater use of primary care is associated with lower costs, higher patient satisfaction, fewer hospitalizations, and emergency department visits [57]. The patient-centered medical home (PCMH) is a more comprehensive model of primary care. Studies show that programs with higher numbers of PCMH primary care practices produced savings of 1.2 % as compared to 0.6% for those with no advanced primary care practices [59]. The state of Oregon reports PCMH savings of \$240 million dollars over 3 years (2012-2014) for its health care system, approximately \$13 in savings for every \$1 increase in primary care investment [60].

URMs are More Likely to Practice in Primary Care

Research conducted by the AAMC showed that between 1980 and 2007, racial and ethnic minority physicians consistently practiced in primary care specialties [61]. On average, 41.6% of Black or African American, 36.5% of Hispanic or Latino, and 44.0% of American Indian or Alaska Native physicians practiced in a primary care discipline. Comparatively, 30.3% of Asian and 32.3% of White physicians practiced primary care [61].

Resident Physicians in the Physician Workforce Pipeline

Every summer, over 32,000 medical school graduates begin their training as first-year residents throughout the United States [62]. Residency is the postgraduate clinical training of physicians. Having completed medical school, residents are supervised by senior physicians as they gain experience before obtaining licensure and board certification. Medical residencies can last up to seven years, with primary care specialties lasting between three and four years. Beginning January 1, 2020, trainees will be required to obtain a Postgraduate Training License (PTL) within 180 days of enrollment into an Accreditation Council Graduate Medical Education (ACGME) program and will need to successfully complete 36 months of accredited-postgraduate training. All trainees must obtain their Physician's and Surgeon's license within 90 days of completing postgraduate training to practice in California [63].

An Overview of Residency Positions in Primary Care in California

The number of new primary care physicians completing residency programs is insufficient to replace those physicians expected to retire [7]. Between 1997 and 2012, the number of primary care residents graduating from California declined. By 2012, only 23.3% of total residency graduates in California pursued primary care after graduation [64]. While the number of primary care physician jobs grew by approximately 8% between 2005 and 2015, the number of jobs for specialists grew approximately six times that amount during the same period [57].

Currently, 64 Family Medicine, 43 Internal Medicine, 21 Pediatrics, and 21 Obstetrics & Gynecology residency programs are available in California [22, 65]. Table 4 shows the breakdown of the 1,872 primary care positions available in the 2019 Match, National Resident Matching Program (NRMP). Out of the available 1,872 positions, only 1,815 slots were filled, leaving a slight deficit of 57 primary care positions. These patterns are also observed among some of the other most populated states in the U.S., such as Florida, New York, and Texas.

Table 4. The 2019 Match, NRMP: Primary Care Residency Positions available and filled by first-year postgraduate medical education (PGY-1) residents.

Specialty	California		Florida		New York		Texas	
	No. of Positions	No. filled	No. of Positions	No. filled	No. of Positions	No. filled	No. of Positions	No. filled
Family Medicine*	495	473	145	127	234	225	284	268
Internal Medicine	968	947	640	548	1,633	1,598	602	581
Obstetrics & Gynecology	116	113	54	54	179	176	106	105
Pediatrics	293	282	168	164	406	400	214	209

Note: No. of Positions = number of positions in the match. No. Filled = number of positions filled.

*Psychiatry/Family Medicine (PGY-1) were also included in the count for Family Medicine.

Source: 2019 Match Results by State, Specialty, and Applicant Type Report from the Match, National Resident Matching Program (NRMP, 2019) [22].

Factors Preventing Medical Student Choice for Primary Care

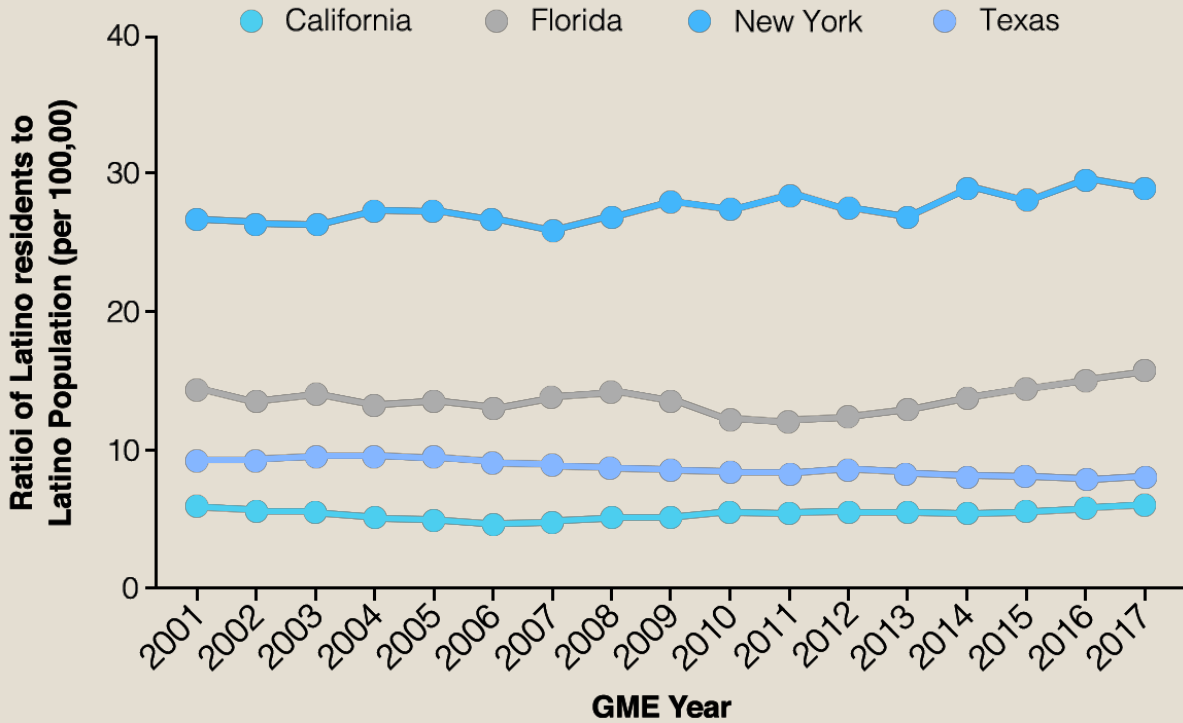
An increasing administrative burden, high patient volume, and low reimbursement rate are driving medical students away from primary care [57]. In addition, increasing student debt and financial incentives in other specialties further discourage medical students from pursuing primary care. In one study, participants reported debts up to \$400,000 by the time they finish their residency [34], yet primary care physicians (PCPs) earn only two-thirds of what a specialist earns [66]. Moreover, medical students from students from pursuing primary care. In one study, participants reported debts up to \$400,000 by the time they finished their residency [34], yet primary care physicians (PCPs) earn only two-thirds of what a specialist earns [66]. Moreover, Latino physicians face a \$30,000 income disparity compared to their White counterparts [66]. To effectively attract students to primary care, compensation and workload burden for PCP must be improved [55, 67].

Latino Resident Physicians Underrepresentation in California's Physician Workforce

LPPI examined current trends in the demographics of practicing Latino resident physicians in the physician workforce of four U.S. states with some of the largest Latino populations: California, Florida, New York, and Texas [68]. Figure 5 shows an overview of active Latino resident physicians from 2001 to 2017 for each of these states. The state of New York had the highest amount of Latino resident physicians per 100,000 Latinos at 28.4 in 2011 [68]. By contrast, California had the lowest rate of Latino resident physicians in 2011, with 5.4 per 100,000 Latinos, nearly 15% of the national average of 36.6 residents per 100,000 Latinos. These low Latino resident physician rates remained fixed during the seventeen years examined.



Figure 5. A 17-year overview of Latino resident physicians across states.



Sources: Martinez et al. (2019), California’s Latino Physician Crisis -“The Current State of the Latino Physician Workforce: California Faces a Severe Shortfall of Latino Resident Physicians”. UCLA LPPI, Policy Brief. U.S. Census Bureau ACS 5-year estimates (2011-2014 and 2013-2017) and the American Medical Association (AMA) Physician Masterfile for GME years 2001-2017.

LPPI further examined the total number of Latino residents practicing in primary care specialties among California, Florida, New York, and Texas. Between 2001 and 2017, California and Texas had

the lowest rates for Latino residents in primary care with approximately one resident per 100,000 Latinos (**Figure 6**). Florida and New York had 2 and 3 residents per 100,000 Latinos, respectively.

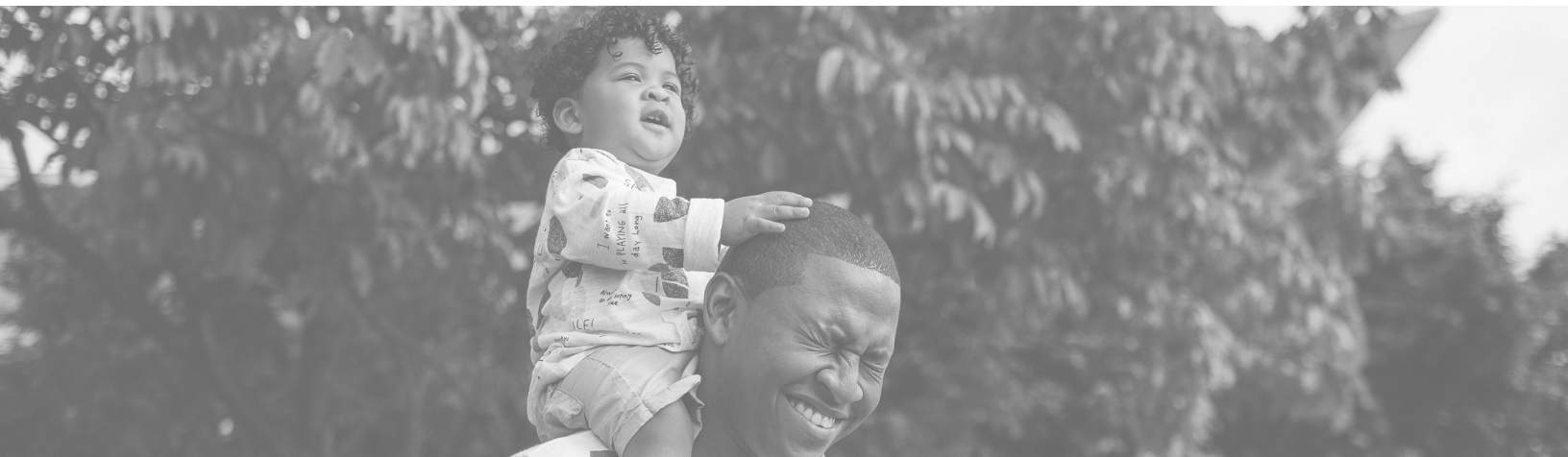
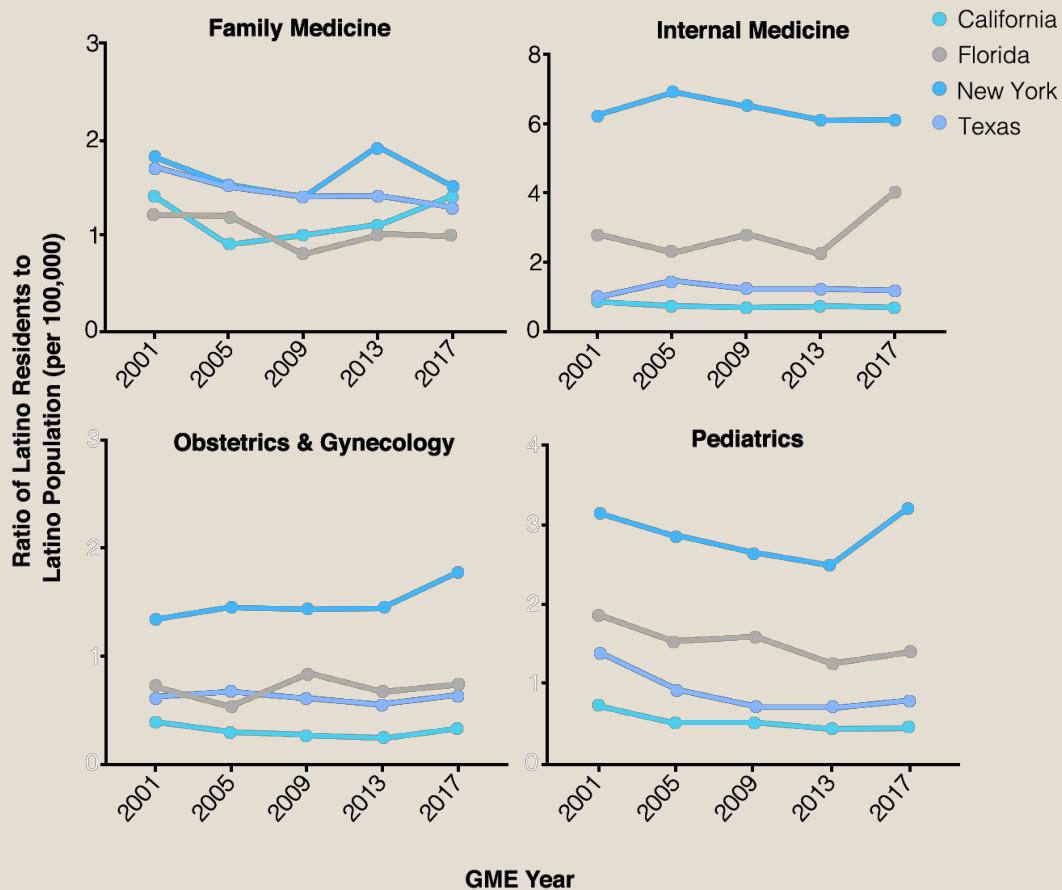


Figure 6. Latino resident physician rates per 100,000 Latinos across states.



Source: American Medical Association (AMA) Physician Masterfile for GME years 2001-2017.

Funding Sources for Residency Programs

In California, Graduate Medical Education (GME) funding comes from multiple sources.² The federal government subsidizes GME through Medicare and Medicaid GME funding as provided by the Centers for Medicare & Medicaid Services (CMS), the Veteran’s Health Administration (Department of Veterans Affairs), among others [70]. California lacks a Medicaid GME program. The Affordable Care Act of 2010 included a new model of primary care

training in community-based health settings called the Teaching Health Centers (THC) funded by the Health Resources and Services Administration (HRSA) [71]. Medicare is a primary source of public funding for GME and residency programs [70]. In 1997, Congress placed a cap on the number of federally supported residency positions (Public Law 105-33) [72]. Currently, Medicare provides financial support for GME and covers a portion (~20%) of direct costs of training residents. In 2015, Medicare programs paid teaching hospitals that train residents \$3.68 billion in Direct Graduate Medical Education

² The President’s budget for 2018-2019 eliminated health professions programs, including the Primary Care Training and Enhancement Program (Title VII Section 747 of the Public Health Service Act) [69]. However, a Congressional reauthorization act modified Title VII stipulations to direct HRSA to prioritize training using a patient-centered medical home model, and to develop the infrastructure of primary care departments. Multiple Departments of Family Medicine and Family Medicine Residency programs have recommended that Congress increase funding for 2020 to further allow training under primary care training health professions programs [69].

(DGME) funds [73].³ By comparison, Medicare pays a larger amount for Indirect Medical Education (IME) costs that includes funding for additional health services delivered by residents, as part of their educational experience. In the same year, Medicare disbursed \$7.38 billion in IME payments [73].

Medicaid is the second-largest explicit source of funding for GME and services of teaching hospitals. In 2018, California was waiting for approval of an amendment to its Medicaid state plan that would allow the state to pay Federally Qualified Health Centers (FQHCs) and Rural Health Clinics for their GME costs [76]. In that same year, California had the second largest number of teaching hospitals in the nation at 77, second to New York with 85. However, Medicaid GME payments were not made to teaching hospitals [76]. The Song-Brown Program is an innovative funding mechanism in California, which provides funding to primary care residency programs that train residents from underserved communities and those underrepresented in medicine. In 2017, the California state budget appropriated \$100 million

over a three-year period, resulting in a substantial expansion of the program [77]. According to a recent analysis by the Office of Statewide Health Planning and Development (OSHPD), graduates of residency programs sponsored by Song-Brown funds are 40% more likely to practice in federally designated Health Professional Shortage Areas than are other primary care physicians in California [77].

California has consistently shown gaps in proportion to the total U.S. population, the proportion of U.S. GME graduates, and the proportion of Medicare GME funding. Although California constituted 12.2% of the U.S. population in 2015, it trained 8.5% of total GME graduates in the nation, and only received 6.8% of total CMS Medicare GME costs [70, 78]. GME funding and spending ultimately dictate the number of practicing physicians and medical specialties in the workforce. In 2015, California had 119 teaching hospitals with accredited residency or fellowship programs. **Table 5** summarizes the amount spent at the federal and state levels.

Table 5. GME funding source and the amount spent in California in 2015.

Source of Funding	Amount Spent
Medicare	\$552,235,626
Medi-Cal	No direct contribution
Veteran’s Affairs	\$90,662,608
Children’s Hospitals GME Payment Program	\$32,061,000
Teaching Health Center GME Program	\$13,476,745
Preventive Medicine Residency Program	\$1,329,459
The Song-Brown Program	\$5,987,340
Proposition 56	\$40,000,000 proposed when it passed in 2016

Source: Table adapted from the Guide to Graduate Medical Education Funding, California Health Care Foundation (September 2018)[70].

³ In 2013, the RAND corporation reported that the average residency compensation for Family Medicine and General Internal Medicine was \$65,540 [74]. The cost for existing residency programs without Medicare Graduate Medical Education funding is \$72,126 for each resident per year [73]. This estimate is specific to expansion via collaborations with Community Health Clinics and excludes the increase in administrative and faculty infrastructure. The cost analysis of the Health Resources & Services Administration (HRSA) – Teaching Health Center Graduate Medical Education (THCGME) program predicted a median net cost of \$157,602 for training a resident in a THC in the fiscal year of 2017 [75].

24 CALIFORNIA'S PHYSICIAN SHORTAGE

In 2015, the top five teaching hospitals contributing to Medicare GME dollars in California, and indirect medical education payments were the Stanford Hospital & Clinics (\$86,292), the Ronald Reagan UCLA Medical Center (\$81,194), the UCSF Medical

Center (\$70,185), the UC Davis Medical Center (\$58,360), and the Cedars-Sinai Medical Center (\$50,867) [70]. Table 6 shows the top 5 teaching hospitals with the highest per resident amount (PRA) costs for residents in primary care [78].

Table 6. Top 5 teaching hospitals in California with the highest PRAs in primary care in 2015.

Teaching Hospital	Primary Care PRAs
UCLA Medical Center in Santa Monica	\$186,565
UCSF Children's Hospital in Oakland	\$181,169
UCLA Medical Center in Olive View	\$163,801
Good Samaritan Hospital	\$160,625
Glendale Adventist Medical Center	\$159,330

Source: Table adapted from the Graduate Medical Education Funding in California – Medicare GME Funding 101, California Health Care Foundation (February 2019) [78].

To meet the cost and demand of physicians in California's workforce, the Healthforce Center at UCSF has published a report identifying priority recommendations of the California Future Health Workforce Commission [79]. This workforce recommended that for the 2020-21 state budget, funding for residency training in primary care should increase from \$75 million to \$118.2 million using different funding sources, such as the Song-Brown Program [79].

Efforts to Sustain the Expansion of Primary Care Training and Practice in California

Previous efforts to sustain the expansion of primary care residencies in California have been hindered by a lack of funding and restrictive criteria for certain programs [55]. California has a history of health professional loan forgiveness programs that require participants to work in Health Professional Shortage Areas (HSPAs) and Primary Care Shortage Areas (PCSA). Continuing to provide funding and extending service requirements to the following programs will ensure physician placement in the most needed PCSAs:

- The Steven M. Thompson Physician Corps Loan Repayment Program works to increase health professionals in high priority areas. The current service commitment is 3 years long and requires full-time service in PCSAs [80].
- The County Medical Services Loan Repayment Program (CMSP LRP) provides repayment options for qualified educational loans taken by physicians practicing in primary care and who provide service in the approved sites [81]. These awards currently require a 2-year service commitment.
- The Cal Health Cares-LRP program allows for care provision for Medi-Cal beneficiaries (with 30% of more patient caseload) [82]. The length of service required is 5 years.

Policy Recommendations for Increasing Primary Care Residencies in California

1. **Prioritize the expansion of residency programs** that focus on primary care.
 - a. The expansion of training capacity includes the addition of slots to existing residency programs, expanding community-based graduate medical education training such as THCs, Community Health and Academic Medical Partnerships (CHAMPs) [83].
 - b. Prioritize investment in innovative models such as THCs (funded by the HRSA) and CHAMPs. Both training models partner residency programs with FQHCs or Community Health Centers (CHCs).
 - c. Academic-based residency programs can be leveraged to train additional primary care-focused residents through well-established residency programs while completing outpatient training in FQHCs or CHCs.
2. **Create and sustain funding** to foster the growth of primary care positions.
 - a. Time-limited grants are unlikely to promote sustainable growth of the primary care pipeline [84]. To ensure that the existing 1,872 primary care positions in California are maintained, established residency programs will require ongoing funding support.
 - b. Financially support programs such as the Song-Brown Program, which provides funding to primary care residency programs that train residents from underserved communities and those underrepresented in medicine.
 - c. Expand grant programs that support postgraduate placement in HPSAs.
3. **Recruit and retain trainees** to practice in underserved areas.
 - a. Consider ways to recruit residents that have trained out of state back to practice in California and incentivize physicians to practice in underserved areas. Tax credits can be used, as in other states for clinicians who practice in rural areas [55].
 - b. Recruitment and incentive programs modeled after successful programs established in other states should be considered. New York has implemented the Doctors Across New York Physician Practice Support, which provides funding to recruit new physicians, allowing participating physicians and physician practices to use funds for a variety of purposes [85].
 - c. Change physician compensation models to incentivize primary care practice in underserved areas, and reduce the income gap between primary care physicians and other specialties [86].
4. **Incentivize medical students who pursue primary care** by providing financial support.
 - a. The California Future Health Workforce Commission recommends providing scholarships for students who pursue priority health professions and provide service to underserved communities under a new Emerging California Health Leaders Scholarship Program [1].
 - b. The L.A. Care Health Plan is working to expand the primary care workforce by offering full scholarships to select medical school students and loan repayment opportunities for physicians recruited to practice in underserved areas. Scholarships would be provided through the Elevating the Safety Net Initiative, which targets the growing shortage of primary care physicians in Los Angeles County's safety net and within some of the most vulnerable populations [87].
 - c. Expand loan repayment opportunities to incentivize practice in high priority medically underserved areas.

EXPANDING INTERNATIONAL MEDICAL GRADUATE PLACEMENTS IN CALIFORNIA

International Medical Graduates (IMGs) are physicians who received their medical school education outside the U.S. and Canada. U.S. citizens who graduate from an international medical school are considered U.S. IMGs. Individuals who are non-U.S. citizens at the time of medical school graduation are considered foreign-born IMGs, even if they later become U.S. citizens. Studies show that IMGs are more likely to practice medicine in the poorest areas in the U.S., with less education and/or minority residents [88]. IMGs serve in rural underserved areas (RUAs) and increasingly fill Family Medicine residency slots [89-92].

IMGs may enter the U.S. physician workforce upon fulfilling credentialing requirements issued by the Educational Commission for Foreign Medical Graduates (ECFMG) [93]. Effective 2023, the ECFMG will require IMGs to obtain medical accreditation through a formal process utilizing criteria established for U.S. medical schools [94]. IMGs who are not ECFMG-certified can enter ACGME-accredited

training if they hold an unrestricted medical license in a U.S. jurisdiction or if they have completed a Fifth Pathway Program [95]. While IMG physicians in California can currently obtain a medical license after completing 24 months of postgraduate training, effective January 1, 2020, applicants will be required to successfully complete 36 months of accredited postgraduate training to obtain a license to practice in California [63].

Foreign-born IMGs in Residency Slots in California and Other States

About 3,000 IMGs enter residency programs in the U.S. every year, primarily filling slots in primary care [96]. The number of foreign-born IMGs training and practicing in California, however, lags behind other states.⁴ In 2019, 53 foreign-born IMGs matched into primary care residency programs in the U.S. [62].

According to **Table 7**, New York matched 691, followed by Florida (175), and Texas (137).

Table 7. The 2019 Match, NRMP: Foreign-born IMGs that matched in Primary Care Residencies and in their first year of postgraduate medical education (PGY-1).

Specialty	California			Florida			New York			Texas		
	Positions	Filled	IMG	Positions	Filled	IMG	Positions	Filled	IMG	Positions	Filled	IMG
Family Medicine*	495	473	16	145	127	14	234	225	37	284	268	20
Internal Medicine	968	947	32	640	548	123	1,633	1,598	532	602	581	89
Obstetrics & Gynecology	116	113	0	54	54	1	179	176	15	106	105	3
Pediatrics	293	282	5	168	164	37	406	400	106	214	209	24

Note: No. of Positions = number of positions in the match. No. Filled = number of positions filled. IMG = non-U.S. citizen graduates of international medical schools. *Psychiatry/Family Medicine (PGY-1) were also included in the count for Family Medicine.

Source: 2019 Match Results by State, Specialty, and Applicant Type Report, National Resident Matching Program (NRMP, 2019) [22].

⁴ Recent data for resident physicians indicates that 23.5% of trainees in residency programs were IMGs [97]. IMGs comprised 28.7% of residents in Family Medicine, 37.9% in Internal Medicine, 9.2% in Obstetrics & Gynecology, 18.0% in Pediatrics, and 25.6% in Psychiatry.

Bilingual IMGs can help meet the needs of medically underserved regions with Limited English Proficient (LEP) populations. Spanish-speaking physicians are highly underrepresented in California's IMG physician workforce. California needs Spanish-speaking physicians more than any other linguistically underrepresented language group [98]. The current supply is insufficient to address the expected demand from the LEP Spanish-speaking population.

California Programs Preparing IMGs for Entry into Primary Care Residencies

Current strategies available in California to recruit IMGs to primary care residencies include the UCLA

International Medical Graduate Program, which aims to increase the number of bilingual Family Medicine physicians practicing in underserved communities [99]. This program recruits and prepares bilingual Spanish-speaking physicians for entry into California Family Medicine residency programs. A critical component is the contractual commitment to practice Family Medicine and to continue working in an underserved area in California for at least 2 years beyond completion of residency. The UCLA IMG Program, supported by private funding, is free of tuition or fees, covers all educational expenses, and provides a small stipend [99, 100].



Policy Recommendations to Increase IMG Placements in California

1. **Expand the existing pool of IMGs in California.**
 - a. Recruit bilingual physicians trained in Spanish-speaking countries, and incentivize their practice in medically underserved areas with high Latino populations (e.g. Central Valley and Inland Empire).
2. **Support IMG training programs** that bolster match competitiveness.
 - a. Programs that help prepare IMGs for admission to a residency program in a primary care specialty, in exchange for practicing in an underserved area upon completion of residency, should be supported and expanded. Funding should be allocated to support existing programs such as the UCLA IMG program to encourage matriculation and increase graduation rates of IMGs.
 - b. Develop new IMG training programs modeled after successful IMG training pathways throughout the state. Allocate resources to support the expansion of existing IMG training programs to other UCs with existing medical schools and Family Medicine residency programs.
3. **Encourage IMGs to practice in linguistically underserved communities** by reforming visa rules to allow foreign-born IMGs to practice in medically underserved areas in California and other U.S. states.
 - a. Expand the terms of service to priority areas to 5-year terms for physicians to retain IMGs in underserved areas for extended times.
 - b. A service contract should be added for those who enter the U.S. via H1B visas as these physicians do not currently have any service requirements and are a potential source
 - c. of bilingual primary care physicians.

CONCLUSION

California can be the leading model to address the national physician shortage by building and supporting a diverse physician workforce reflective of its population demographics. To effectively attract primary care physicians to medically underserved areas in California, we must address and offer solutions to remediate academic disadvantage conditions and challenges for URM students, which could substantially increase their acceptance and enrollment in California's medical schools. As primary care providers earn a fraction of what a specialist earns, and income disparities exist for certain racial/ethnic groups, such as Latinos, improved compensation, loan repayment policies, and additional incentives should be considered to encourage primary care physicians to work in underserved areas of California. Building a strong, financially secure health system infrastructure that minimizes administrative burden and advances health promotion will retain residents in medically underserved communities once their residency training is completed. Bilingual IMGs can help meet the needs of medically underserved regions with underrepresented LEP populations in California. Policymakers, health systems, and particularly those in underserved communities, must support their trainees and physicians in providing high-quality care.

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