

Oral Health Workforce and Education in California

INTRODUCTION

Dentists are healthcare professionals who diagnose and treat problems related to oral health. Common tasks include repairing or removing damaged teeth, filling cavities, performing root canals, placing sealants or whitening agents on teeth and making models and measurements for dental appliances (e.g., dentures and implants). This report presents an overview of California's practicing dentists and its pipeline of dental students.

SUMMARY

- California has a higher ratio of dentists per capita than the United States overall.
- Over 80% of dentists in California practice general dentistry, but the number of dental school graduates pursuing advanced dental education is increasing.
- While the overall supply of dentists in California is adequate, an estimated 2.2 million Californians live in areas designated by the Health Resources and Services Administration as Dental Health Professional Shortage Areas.
- California's share of female dentists is growing.
- California dentists are more racially and ethnically diverse than dentists nationwide, yet blacks and Hispanics remain underrepresented relative to the state's population.
- The numbers of dental students and graduates has increased over the last ten years, both in California and nationwide. Although the racial and ethnic makeup of recent dental students and graduates is more diverse than that of practicing dentists overall, the share of dental students from underrepresented backgrounds is still lower than that of the general population.

CURRENT SUPPLY

California has more dentists than any other state in the United States, accounting for 15% (30,772) of the nation's 199,486 dentists in 2018. This translates to a ratio of 77.79 dentists per 100,000 persons, greater than the national ratio of 60.98 dentists per 100,000 persons.¹ The most recent measure of full-time equivalent (FTE) dentists estimates that in 2015, California had 69.6 FTE dentists per 100,000 persons, based on hours worked per year.²

Specialties

As of March 2019, the majority of dentists practicing in California practice general dentistry (81.2%). The rest practiced in endodontics (2.2%), oral surgery (2.3%), orthodontics (3.8%), pedodontics (2.4%), periodontics (2.1%) and other specialties (6.1%).³ This is consistent with nationwide estimates; approximately one-fifth of U.S. dentists practice in specialties.⁴

Practice Settings

Historically, most dentists worked in solo practice but the percentage has decreased substantially over time. Sixty-five percent of dentists in the United States were in solo practice in 1999. By 2017, the percentage in solo practice had fallen to 50.6%. The percentage of California dentists in solo practice in 2017 was similar to the percentage nationwide.⁵

According to the California Employment Development Department (EDD), most dentists in California who are not self-employed work in dentists' offices (64.6%). Other settings in which dentists are employed include physicians' offices (2.8%) and outpatient care centers (2.2%).⁶ (These percentages do not sum to 100% because EDD only publicly reports the top three settings in which people in an occupation are employed.)

Access to Dentists for Vulnerable Populations

Estimates of the total supply of dentists in California do not reflect the supply of dentists available to care for medically underserved communities and individuals covered by Medi-Cal, California's Medicaid program or by the Healthy Families Program, California's Children's Health Insurance Plan (CHIP). Medi-Cal covers 26% of the state's population and nearly half (43%) of the state's children.^{7,8} However, in 2016, only 15.7% (4,836) of California dentists participated in Medi-Cal or the Healthy Families Program, the second-lowest rate in the nation. Among all dentists in the United States, the median rate of participation in Medicaid and CHIP programs is 41.3%.⁹

Data are not available to assess whether California has shortages of dentists who serve populations such as the elderly and individuals with special needs. However, many older adults, who make up 13.6% of California's population, do not have dental insurance.¹⁰

Nationwide, 62.7% of seniors lack dental benefits.¹¹ Traditional Medicare fee-for-service does not cover dental benefits, although an unknown percentage of Medicare Advantage plans may provide coverage. Private dental insurance is available, but seniors on fixed incomes often cannot afford to purchase it. Low-income older adults who qualify for Medi-Cal may be able to access dental benefits through the program, but as noted above, few California dentists participate in Medi-Cal.

Lack of insurance coverage contributes to low use of dental care among senior citizens. In 2016, almost half (49%) of all Medicare beneficiaries nationwide did not have a dental visit. Black and Hispanic Medicare beneficiaries were even less likely to have dental care, with nearly three-fourths (71%) of black beneficiaries and two-thirds (65%) of Hispanic beneficiaries going without a dental visit in 2016, compared to 43% of white beneficiaries.¹²

Affordability is often a particularly significant barrier to accessing dental care. In 2016, for example, nearly one in five Medicare

beneficiaries who received dental care spent more than \$1,000 out of pocket.¹³

Previous research has found that many dentists do not feel qualified or prefer not to treat older adult and other special needs patients.^{14,15} This reluctance to treat older adults decreases access to dental care even for those who have insurance.

Geographic Distribution

As of 2017, California had 65 Dental Health Professional Shortage Areas (HPSAs). Dental HPSAs are areas that have been designated by the Health Resources and Services Administration as facing shortages of dentists; such shortages could be geographic-, population-, or facility-based. California's Dental HPSAs are largely concentrated in the Northern and Sierra counties, Central Valley, Central Coast and Inland Empire.¹⁶

In 2017, approximately 2.2 million Californians lived in a Dental HPSA, or approximately 5.6% of the state's population.^{17,18} Over two-thirds of these Dental HPSAs were population-based designations, meaning that the area faced a shortage (defined as a population to provider ratio of at least 4,000 people to 1 dentist, equivalent to 25 dentists per 100,000 persons) of providers for a specific population such as low-income, homeless, or migrant farmworker populations.¹⁹ The remaining Dental HPSAs are geographic-based designations, meaning the area faces a shortage of providers for the entire population in the area (defined as a population to provider ratio of at least 5,000 to 1, equivalent to 20 dentists per 100,000 persons).^{20,21}

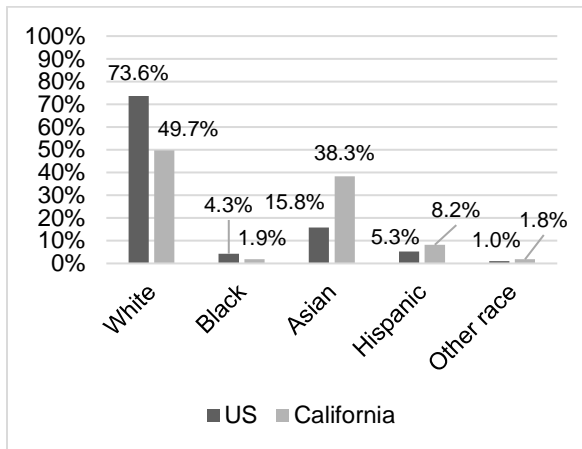
Demographic Characteristics

In 2015, one-third (33.9%) of California dentists were female; this was higher than the share of female dentists nationwide (28.9%).^{22,23} By 2035, female dentists are expected to make up 46% of all California dentists.²⁴

California's dentists are more racially and ethnically diverse than dentists in the United States overall. In 2016, 73.6% of dentists in the United States were white. Although the largest

share of California dentists (49.7%) were white, half were non-white. As seen in **Figure 1**, nearly 40% of the state's dentists were Asian, 8.2% were Hispanic, 1.9% were black, and 1.8% were of other races. The percentages of blacks and Hispanics among California's dentists were lower than the percentages of blacks (6.5%) and Hispanics (39.3%) in the state's population.²⁵

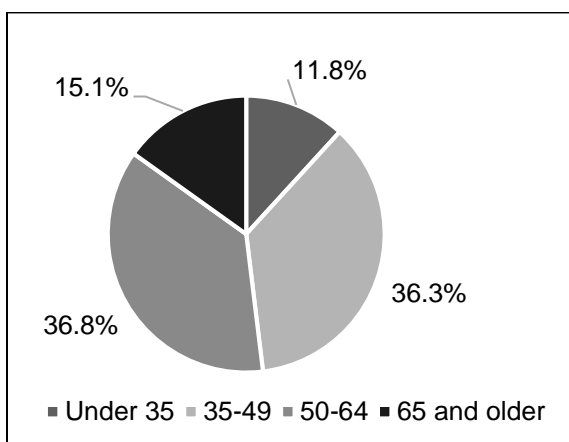
Figure 1. Racial/Ethnic Distribution of Dentists, United States and California



Source: American Dental Association master file, 2016

Consistent with the United States overall, over half (51.9%) of California's dentists were age 50 or older in 2016 (**Figure 2**). The average age of California dentists was 50.6 years.²⁶

Figure 2. Age Distribution of California Dentists



Source: American Dental Association Master File, 2016

EDUCATION

Dental Schools

To become a dentist, an individual must complete a bachelor's degree and enroll in a graduate professional degree program, typically spanning four years. Dental school graduates receive either a DDS (Doctor of Dental Surgery) or a DMD (Doctor of Medicine in Dentistry or Doctor of Dental Medicine) degree. For purposes of licensure, the two degrees are equivalent and have similar curriculum requirements; programs vary in what they choose to call their degree. Additionally, a number of dental schools in the United States have added accelerated two-year international dentist pathway programs. These programs typically accept 20 to 30 students per year and prepare dentists trained overseas to receive their U.S. DDS/DMD degree.

There are 66 dental schools in the United States; 39 are public and 27 are private. Between 2008 and 2018, the number of dental schools nationwide increased from 57 to 66 schools, and the total number of students enrolled in dental school grew by 28.6%, from 19,742 to 25,381. The number of dental school graduates increased by 30.9% over the same time period, from 4,815 in Spring 2008 to 6,305 in Spring 2018.²⁷ As seen in **Table 1**, however, the total number of dental school applicants trended downwards by almost 1,000 applicants over the same period (from 12,178 to 11,298, a 7.2 % decrease). The ratio of applicants to first-year students thus decreased from a high of 2.5 for the 2008-2009 school year to a low of 1.9 for 2017-2018.²⁸

For the 2018-2019 school year, 51.1% of dental students in the United States were white, 24% Asian, 9% Hispanic/Latino, 5.3% black, 3% multiracial, 0.4% American Indian/Alaska Native and 0.2% Native Hawaiian/Other Pacific Islander.²⁹ Although U.S. dental students are more racially and ethnically diverse than U.S. dentists, underrepresented minority (URM) groups (black, Hispanic/Latino, American Indian/Alaska Native, and Native Hawaiian/Other Pacific Islander) are still underrepresented among dental students;

persons from URM groups account for approximately 33.2% of the general population but only 14.9% of dental students.³⁰ To address this, there have been efforts to improve the pipeline of URM dental school students through outreach and recruitment initiatives such as summer enrichment programs, postbaccalaureate programs and other predoctoral programs.^{31,32}

Table 1. Ratio of Applicants to First-Year Enrollments, United States Dental Schools

Year	Applicants	Enrollments	Ratio of applicants to first-year enrollments
2008-09	12,178	4,918	2.5
2009-10	12,210	5,089	2.4
2010-11	12,001	5,170	2.3
2011-12	12,039	5,493	2.2
2012-13	12,077	5,697	2.1
2013-14	12,162	5,904	2.1
2014-15	11,745	5,967	2.0
2015-16	11,789	6,000	2.0
2016-17	12,058	6,165	2.0
2017-18	11,298	6,184	1.9

Source: ADA Survey of Dental Education 2018-2019

California currently has six dental schools. Two are public (both operated by the University of California system) and four are private, not-for-profit. In the last ten years, one new dental school has opened at the Western University of Health Sciences, which enrolled its first class in Fall 2009. Additionally, California Northstate University has announced plans to open a dental school that will enroll its first class in Fall 2021; this would be the state's first private, for-profit dental school.^{33,34}

In 2018-2019, California dental schools accounted for 10.4% of enrollment across all dental schools in the United States. Applications to California dental programs fluctuated over the previous ten years, but trended upward, from 5,329 in 2008-2009 to a peak of 8,771 in 2017-2018, before falling to 6,790 in 2018-2019. (The number of individuals represented by these applications is unknown because prospective students typically apply to multiple dental schools.) During this time, total enrollment in California dental schools grew 15.8%, from 2,287 to 2,650. From Spring 2008 to Spring

2018, the total number of California graduates grew by 13.5%, from 658 to 747.

During the 2018-2019 school year, over half of students in California dental schools were female (51.5%). The same year, California dental students were 40.7% Asian, 31.6% white, 9.4% Hispanic/Latino, 5% multiracial, 3.2% black, 1.1% Native Hawaiian/Other Pacific Islander and 0.3% American Indian/Alaska Native; 5.5% were nonresident aliens. The race or ethnicity of the remaining 3.2% is unknown. Three-fourths of all first-year dental students in California dental schools in 2018-2019 were California residents.³⁵

Advanced Dental Education

Following graduation and obtaining licensure, new graduates can begin practicing general dentistry. However, a growing number of graduates are choosing to complete advanced dental education programs following graduation, such as advanced training programs, residencies and clinical fellowships. These programs include training in specialties such as advanced general dentistry, orthodontics, endodontics, oral and maxillofacial surgery, periodontics and pediatric dentistry.

From 2008 to 2018, the number of graduates enrolled in advanced dental education programs nationwide grew by approximately 25%, from 5,864 to 7,318.³⁶ (The number of enrollments exceeds the number of dental school graduates because many programs take multiple years to complete.)

In the 2018-2019 school year, there were 773 American Dental Association-accredited advanced dental education programs in the United States; 67 programs were in California. Nationally, there were 3,751 first-year enrollments in such programs. There were 277 first-year enrollments in California programs, the most common of which were general practice residency/advanced education in general dentistry (44%), orthodontics (13%), and oral and maxillofacial surgery (9%).³⁷

FUTURE SUPPLY AND DEMAND

In theory, California's supply of practicing dentists could face future constraints due to an aging workforce.³⁸ However, current evidence suggests that the challenges faced by the dental labor market are driven not by a statewide shortage of dentists, but by a maldistribution of dentists across the state which has created shortages of dental care providers in underserved communities.

For instance, many of the state's Dental HPSAs are in the Northern and Sierra counties, Central Valley, Central Coast, and Inland Empire. Compared to the Bay Area, the Sacramento area and Los Angeles and other Southern California counties, these areas are more rural and contain a higher percentage of low-income residents who lack dental insurance or are covered by Medi-Cal.³⁹ Dentists in these areas are also more likely to be older and nearing retirement.⁴⁰

As previously noted, blacks and Hispanics are substantially underrepresented in California's dentist workforce. Previous research has found that URM dentists are more likely to serve minority communities, be located in counties with a partial Dental HPSA, work in safety-net or public-sector settings, and enroll a proportionately larger share of URM patients than the racial and ethnic composition of the county in which they practice.⁴¹

However, given that financial affordability is the greatest barrier to dental care access, efforts to ensure that there are more minority dentists in the workforce alone will not improve access to dental care unless such efforts are combined with efforts to eliminate structural barriers that prevent URM dentists from practicing in underserved communities.⁴² On average, URM dentists graduate with more debt than their non-URM peers.⁴³ Despite reporting a greater interest in serving underserved communities, most URM dentists work in traditional, private, fee-for-service practices where low-income persons have difficulty obtaining care because they do not have private dental insurance and cannot afford to pay for dental care out-of-pocket.⁴⁴ Medi-Cal reimbursement rates for

dental care are lower than rates paid by private dental insurers, leading many private dental practices to decline to treat Medi-Cal beneficiaries or to limit the number of Medi-Cal patients in their practices. Moreover, Medi-Cal fee-for-service reimbursement rates rank among the lowest state Medicaid rates for both adult and child dental care services.⁴⁵

At the same time, California has historically pioneered new workforce models that have expanded access to dental care by utilizing dental assistants, dental hygienists, and other non-dentist providers in expanded roles. Common models include the "extended function" and "alternative practice" models, which broaden a given profession's scope of practice. For example, dental assistants in extended function may conduct preliminary oral health evaluations and perform oral health assessments in school-based or community health project settings under the direction of a dentist or registered dental hygienist.⁴⁶ Registered dental hygienists in alternative practice (RDHAP) may practice independently in underserved settings such as Dental HPSAs, nursing homes, hospitals, residential care facilities and other public health settings, providing dental hygiene services to patients for 18 months without dentist or physician involvement.^{47,48}

Other professions, such as dental sedation assistants and orthodontic assistants, have emerged as important members of the oral healthcare workforce by taking on administrative duties and assisting with clinical tasks such as oral exams, dental procedures, preparing patients for treatment and patient education.⁴⁹ Several states license dental therapists who are trained to provide "primary dental care" and preventive services, giving dentists greater capacity to tend to more complicated patient cases.^{50,51}

It should also be noted that the integration of oral health services into primary care can help expand the oral health workforce by utilizing qualified non-dental health providers such as physicians, nurse practitioners and physician assistants. These providers can conduct basic screening for oral health conditions (e.g., abscesses), refer patients to dental providers or

even provide limited oral care services. For instance, there is a consensus among pediatricians that they should examine patients' mouths, discuss oral hygiene with families and know how to refer high-risk children to a dental home.^{52,53,54} Similarly, research has found that pregnant women receiving prenatal care from medical providers who promote oral health during pregnancy are more likely to receive dental care during pregnancy.⁵⁵ Previous research has shown that primary care providers are as effective as dental providers in applying fluoride varnish to reduce dental cavities, and that reimbursing primary care providers for this

service has increased uptake of this treatment.^{56,57,58}

Ultimately, California's ability to meet future demand for dental care will depend on cultivating the right mix of oral health care providers with the ability to deliver care to all individuals who need it. Achieving this goal will require attention to both the supply of oral health care providers and reducing barriers for them to care for underserved populations, including strategies and resources for reducing high levels of educational debt and low reimbursement rates.

¹ American Dental Association. (2019). Supply of Dentists in the U.S.: 2001-2018 [Data file]. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIdata_SOD_2018.xlsx?la=en

² American Dental Association. (2015). Projected Supply of Dentists: California. American Dental Association. Retrieved from <https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/ProjectedSupplyofDentists/California-Projected-Supply-of-Dentists.pdf?la=en>

³ Kaiser Family Foundation. (2019). Special data request for Dental Data, American Dental Association, March 2019, from Redi-Data, Inc.

⁴ American Dental Association. (2019). Supply of Dentists in the U.S.: 2001-2018 [Data file]. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIdata_SOD_2018.xlsx?la=en

⁵ American Dental Association. (2018). How Many Dentists are in Solo Practice? American Dental Association. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIgraphic_1018_1.pdf?la=en

⁶ California Employment Development Department. (n.d.). Occupational Profile: Dentists, General. Retrieved from <https://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?menuChoice=occExplorer&socCode=291021&occByTraProg=true&location=0601000000>

⁷ Kaiser Family Foundation estimates based on the Census Bureau's American Community Survey, 2009-2018.

⁸ Kaiser Family Foundation estimates based on the Census Bureau's American Community Survey, 2008-2017.

⁹ American Dental Association. (2018). Dentist Profile Snapshot by State 2016 [Data file]. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIData_Profile_2016.xlsx?la=en

¹⁰ U.S. Census Bureau. (2018). American Community Survey Demographic and Housing Estimates. Retrieved from <https://data.census.gov/cedsci/table?d=ACS%205-Year%20Estimates%20Data%20Profiles&table=D05&tid=ACSDP5Y2018.DP05&g=0400000US06&vintage=2018>

¹¹ Yarbrough, C., & Vujicic, M. (2019). Oral health trends for older Americans. *The Journal of the American Dental Association*, 150(8), 714-716. doi: 10.1016/j.adaj.2019.05.026

¹² Freed, M., Neuman, T., & Jacobson, G. (2019). Drilling Down on Dental Coverage and Costs for Medicare Beneficiaries. Retrieved from <https://www.kff.org/medicare/issue-brief/drilling-down-on-dental-coverage-and-costs-for-medicare-beneficiaries/>

¹³ Freed, M., Neuman, T., & Jacobson, G. (2019). Drilling Down on Dental Coverage and Costs for Medicare Beneficiaries. Retrieved from <https://www.kff.org/medicare/issue-brief/drilling-down-on-dental-coverage-and-costs-for-medicare-beneficiaries/>

[brief/drilling-down-on-dental-coverage-and-costs-for-medicare-beneficiaries/ /](#)

¹⁴ Schwenk, D. M., Stoeckel, D. C., & Rieken, S. E. (2007). Survey of Special Patient Care Programs at U.S. and Canadian Dental Schools. *Journal of Dental Education*, 71(9), 1153–1159. Retrieved from

¹⁵ Baumeister, S. E., Davidson, P. L., Carreon, D. C., Nakazono, T. T., Gutierrez, J. J., & Andersen, R. M. (2007). What influences dental students to serve special care patients? *Special Care in Dentistry*, 27(1), 15–22. doi: 10.1111/j.1754-4505.2007.tb00322.x

¹⁶ California Health and Human Services. (2017). Health Professional Shortage Area Dental [Data file]. Retrieved from

<https://data.chhs.ca.gov/dataset/health-professional-shortage-area-dental>

¹⁷ California Health and Human Services. (2017). Health Professional Shortage Area Dental [Data file]. Retrieved from

<https://data.chhs.ca.gov/dataset/health-professional-shortage-area-dental>

¹⁸ Annual Estimates of the Resident Population for Selected Age Groups by Sex for the United States, States, Counties and Puerto Rico Commonwealth and Municipios: April 1, 2010 to July 1, 2017.

¹⁹ Bureau of Health Workforce, Health Resources and Services Administration (HRSA), U.S. Department of Health & Human Services, Designated Health Professional Shortage Areas Statistics: Designated HPSA Quarterly Summary, as of September 30, 2019.

²⁰ Health Resources and Service Administration. (2019). Health Professional Shortage Areas (HPSAs). Retrieved from <https://bhw.hrsa.gov/shortage-designation/hpsas>.

²¹ Bureau of Health Workforce, Health Resources and Services Administration (HRSA), U.S. Department of Health & Human Services, Designated Health Professional Shortage Areas Statistics: Designated HPSA Quarterly Summary, as of September 30, 2019.

²² American Dental Association. (2019). Supply of Dentists in the U.S.: 2001-2018 [Data file]. Retrieved from

https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIdata_SOD_2018.xlsx?la=en

²³ American Dental Association. (2015). *Projected Supply of Dentists: California*. American Dental

Association. Retrieved from

<https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/ProjectedSupplyofDentists/California-Projected-Supply-of-Dentists.pdf?la=en>

²⁴ American Dental Association. (2015). *Projected Supply of Dentists: California*. American Dental Association. Retrieved from

<https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/ProjectedSupplyofDentists/California-Projected-Supply-of-Dentists.pdf?la=en>

²⁵ United States Census Bureau. (2018).

QuickFacts: California. Retrieved from

<https://www.census.gov/quickfacts/fact/table/CA#>

²⁶ American Dental Association. (2018). Dentist Profile Snapshot by State 2016 [Data file]. Retrieved from

https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIData_Profile_2016.xlsx?la=en

²⁷ American Dental Association. (2019). ADA Survey of Dental Education 2018-2019 Report 1: Academic Programs, Enrollment, and Graduates [Data file]. Retrieved from

https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/SDE1_2018-19.xlsx?la=en

²⁸ American Dental Association. (2019). ADA Survey of Dental Education 2018-2019 Report 1: Academic Programs, Enrollment, and Graduates [Data file]. Retrieved from

https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/SDE1_2018-19.xlsx?la=en

²⁹ American Dental Association. (2019). ADA Survey of Dental Education 2018-2019 Report 1: Academic Programs, Enrollment, and Graduates [Data file]. Retrieved from

https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/SDE1_2018-19.xlsx?la=en

³⁰ U.S. Census Bureau. (2019, July). U.S. Census Bureau QuickFacts: United States. Retrieved March 11, 2020, from

<https://www.census.gov/quickfacts/fact/table/US/PST045219>

³¹ Brunson, W. D., Jackson, D. L., Sinkford, J. C., & Valachovic, R. W. (2010). Components of Effective Outreach and Recruitment Programs for

Underrepresented Minority and Low-Income Dental Students. *Journal of Dental Education*, 74(10 suppl), S74–S86. Retrieved from

³² Wides, C. D., Brody, H. A., Alexander, C. J., Gansky, S. A., & Mertz, E. A. (2013). Long-Term Outcomes of a Dental Postbaccalaureate Program: Increasing Dental Student Diversity and Oral Health Care Access. *Journal of Dental Education*, 77(5), 537–547. 7

³³ American Dental Education Association. (2018, November 14). California Northstate University Launches School of Dental Medicine, Dr. Leon Assael Selected as Founding Dean. Retrieved from <https://www.adea.org/BDEBlog.aspx?id=40537&blogid=27619>

³⁴ College of Dental Medicine at California Northstate University. Retrieved June 4, 2020, from <http://dentalmedicine.cnsu.edu/>

³⁵ American Dental Association. (2019). ADA Survey of Dental Education 2018-2019 Report 1: Academic Programs, Enrollment, and Graduates [Data file]. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/SDE1_2018-19.xlsx?la=en

³⁶ American Dental Association. (2019). ADA 2018-19 Survey of Advanced Dental Education report [Data file]. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/SADV_2018-19.xlsx?la=en

³⁷ American Dental Association. (2019). ADA 2018-19 Survey of Advanced Dental Education report [Data file]. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/SADV_2018-19.xlsx?la=en

³⁸ American Dental Association. (2015). *The Dental Care System in California: An Analysis for the California Dental Association*. Retrieved from https://www.cda.org/Portals/0/pdfs/ada_hpi_analysis_for_cda.pdf

³⁹ UCLA Center for Health Policy Research. (2018). 2018 California Health Interview Survey.

⁴⁰ Pourat, N. & Choi, M.K. (2014). *Trends in the Supply of Dentists in California*. Retrieved from <http://healthpolicy.ucla.edu/publications/Documents/PDF/2014/dentistspb-mar2014.pdf>

⁴¹ Mertz, E. A., Wides, C. D., Kottek, A. M., Calvo, J. M., & Gates, P. E. (2016). Underrepresented Minority Dentists: Quantifying Their Numbers

And Characterizing The Communities They Serve. *Health Affairs*, 35(12), 2190–2199. doi: 10.1377/hlthaff.2016.1122

⁴² Gupta, N., & Vujicic, M. (2019). *Main Barriers to Getting Needed Dental Care All Relate to Affordability. Main Barriers to Getting Needed Dental Care All Relate to Affordability*. American Dental Association. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0419_1.pdf?la=en

⁴³ Toretsky, C., Mutha, S., & Coffman, J. (2019). Reducing Educational Debt Among Underrepresented Physicians and Dentists. Healthforce Center at UCSF. Retrieved from <https://healthforce.ucsf.edu/sites/healthforce.ucsf.edu/files/publication-pdf/Reducing%20Educational%20Debt%20Among%20Underrepresented%20Physicians%20and%20Dentists.pdf>

⁴⁴ Mertz, E. A., Wides, C. D., Kottek, A. M., Calvo, J. M., & Gates, P. E. (2016). Underrepresented Minority Dentists: Quantifying Their Numbers And Characterizing The Communities They Serve. *Health Affairs*, 35(12), 2190–2199. doi: 10.1377/hlthaff.2016.1122

⁴⁵ Gupta N, Yarbrough C, Vujicic M, Blatz A, Harrison B. (2017). Medicaid fee-for-service reimbursement rates for child and adult dental care services for all states, 2016. Health Policy Institute Research Brief. American Dental Association. Retrieved from https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0417_1.pdf

⁴⁶ California BPC Sections 1750-1768. Retrieved from http://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=BPC&division=2.&title=&part=&chapter=4.&article=7

⁴⁷ Mertz, E., & Glassman, P. (2012). Alternative Practice Dental Hygiene in California: Past, Present, and Future. *Journal of the California Dental Association*, 39(1).

⁴⁸ California BPC Sections 1900 - 1966.6. Retrieved from http://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=BPC&division=2.&chapter=4.&article=9.

⁴⁹ Mertz, E., Spetz, J., & Moore, J. (2017). Pediatric Workforce Issues. *Dental Clinics of North*

America, 61(3), 577–588. doi:
10.1016/j.cden.2017.02.004

⁵⁰ Nash, D. A., & Nagel, R. J. (2005). A Brief History and Current Status of a Dental Therapy Initiative in the United States. *Journal of Dental Education*, 69(8), 857–859. g

⁵¹ Mertz, E., & Mouradian, W. E. (2009). Addressing Children’s Oral Health in the New Millennium: Trends in the Dental Workforce. *Academic Pediatrics*, 9(6), 433–439. doi: 10.1016/j.acap.2009.09.003

⁵² American Academy of Pediatrics. Oral health risk assessment timing and establishment of the dental home. 2003, 2009. Policy statement. Retrieved from

<https://pediatrics.aappublications.org/content/111/5/1113>

⁵³ R.B. Quinonez, A.M. Kranz, C.W. Lewis, et al. Oral health opinions and practices of pediatricians: updated results from a national survey. *Academic Pediatrics*, 14 (6) (2014), pp. 616-623

⁵⁴ American Academy of Pediatric Dentistry. (2018). Definition of Dental Home. Retrieved from https://www.aapd.org/media/Policies_Guidelines/D_DentalHome.pdf

⁵⁵ Marchi, K. S., Rinki, C., Shah, M., Dove, M., Terpak, C., Curtis, M. P., & Braveman, P. (2019). Medical Provider Promotion of Oral Health and Women’s Receipt of Dental Care During Pregnancy. *Maternal and Child Health Journal*, 23(7), 890–902. doi: 10.1007/s10995-018-02714-z

⁵⁶ Herndon, J. B., Tomar, S. L., Catalanotto, F. A., Vogel, W. B., & Shenkman, E. A. (2014). The Effect of Medicaid Primary Care Provider Reimbursement on Access to Early Childhood Caries Preventive Services. *Health Services Research*, 50(1), 136–160. doi: 10.1111/1475-6773.12200

⁵⁷ Kranz, A. M., Pressier, J. S., & Rozier, R. G. (2015). Effects of Physician-Based Preventive Oral Health Services on Dental Caries. *Pediatrics*, 136(1). doi: 10.1542/peds.2014-2775d

⁵⁸ Kranz, A. M., Rozier, R. G., Preisser, J. S., Stearns, S. C., Weinberger, M., & Lee, J. Y. (2014). Comparing Medical and Dental Providers of Oral Health Services on Early Dental Caries Experience. *American Journal of Public Health*, 104(7). doi: 10.2105/ajph.2014.301972