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Projecting Future Supply and Demand for Primary Care Team Members in California

Technical Appendix to Strengthening California's Primary Care Team Workforce: Data and Recommendations for Action

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About the Foundation

The California Health Care Foundation is an independent, nonprofit philanthropy that works to improve the health care system so that all Californians have the care they need. We focus especially on making sure the system works for Californians with low incomes and for communities who have traditionally faced the greatest barriers to care. We partner with leaders across the health care safety net to ensure they have the data and resources to make care more just and to drive improvement in a complex system.

CHCF informs policymakers and industry leaders, invests in ideas and innovations, and connects with changemakers to create a more responsive, patient-centered health care system.

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About This Report

This document is a companion to *Strengthening California's Primary Care Team Workforce: Data and Recommendations for Action*, a report that draws on the published literature, interviews with primary care practices, an original supply-and-demand analysis, and expert input to present policy recommendations to strengthen and sustain an interprofessional primary care team workforce in California. This technical appendix describes the data sources and methods used to complete the supply-and-demand analysis.

Introduction

Primary care is the foundation of the health care system and the only component in which increased supply is consistently linked to better population health and more equitable outcomes.[1] Ideally, primary care clinicians are the first point of contact and a source of continuous, comprehensive, and coordinated care that addresses a wide range of health needs. Yet access to primary care remains elusive for millions. Over 11.4 million Californians — more than one-quarter of the state's population — live in federally designated Primary Care Health Professional Shortage Areas.[2] This access gap stems from a workforce both unevenly distributed across California and underresourced. As a result, our current workforce struggles to provide all recommended primary care services to a population that, while younger than that of the United States overall, is aging rapidly as birthrates and in-migration from other states and countries decrease.

The path forward lies in interdisciplinary primary care teams, which are better equipped to respond to the complex and evolving needs of patients and communities.[3] Although California is home to some exceptional interdisciplinary primary care practices, many primary care practices are not able to provide comprehensive team-based care. To achieve the promise of interdisciplinary primary care teams, California will need to make strategic investments in primary care workforce development. Identifying appropriate targets for investment requires estimation of future supply and demand for primary care team members.

This document presents projections of supply and demand through 2035 for four key members of interdisciplinary primary care teams:

- Allopathic physicians (MDs)
- Osteopathic physicians (DOs)
- Physician assistants (PAs)
- Nurse practitioners (NPs)

Although nurses, behavioral health clinicians, pharmacists, and unlicensed personnel, such as medical assistants (MAs) and community health workers (CHWs), play critical roles on interdisciplinary primary care teams, insufficient data are available to estimate the numbers who will practice in primary care settings. The California Department of Consumer Affairs and the California Department of Health Care Access and Information (HCAI) collect data regarding nurses, behavioral health clinicians, and pharmacists through surveys administered to licensees when they renew their licenses every two years,[4] but the response options do not allow distinguishing between licensees who practice in primary care settings versus in other types of ambulatory care settings. There are no statewide registries of MAs, CHWs, or other types of unlicensed personnel, and surveys that include samples of people who work in these occupations (e.g., the American Community Survey and the Bureau of Labor Statistics' Occupational Employment and Wage Statistics program) do not disaggregate those who work in primary care practices from those who work in non–primary care settings.

The main report for this project, *Strengthening California's Primary Care Team Workforce: Data and Recommendations for Action*, presents recommendations to increase the availability of comprehensive workforce data for all members of the primary care team, including data on key demographic characteristics, time spent providing patient care, and rates at which new graduates work in primary care practices.

Data Sources

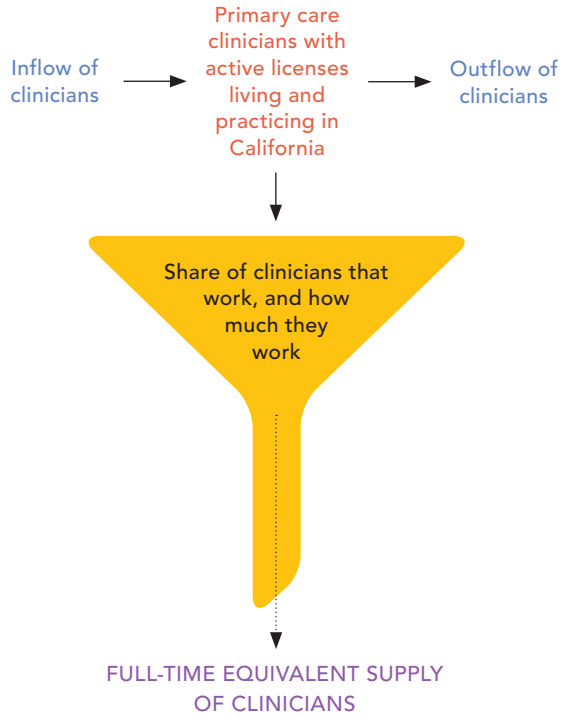
Estimates presented in this appendix were drawn from multiple data sources. Data regarding supplies of primary care physicians (MDs and DOs), PAs, and NPs were obtained from California licensing board records and a survey administered to licensed health professionals in California when they renew their licenses every two years. The survey data were weighted to reflect the total populations of licensees in each profession. Data regarding the pipeline of new graduates of training programs for primary care physicians, PAs, and NPs were obtained from the Accreditation Council on Graduate Medical Education, the Integrated Postsecondary Education Data System, and the California Board of Registered Nursing.

Methods Used to Forecast Future Supplies of Primary Care Physicians, Physician Assistants, and Nurse Practitioners

Supply Model Approach

A "stock and flow" model was used to estimate future supplies of primary care physicians (MDs and DOs), PAs, and NPs. This type of model accounts for both the inflow of newly licensed professionals and the outflow of professionals who exit the workforce due to retirement, death, or other reasons.[5] The model adds inflows of primary care clinicians to the stock of clinicians and subtracts the outflows to show the number available for clinical care in California. (See Figure 1.) To account for differences in the hours that full- and part-time clinicians devote to patient care, the model expresses estimates of the labor supply of primary care clinicians as full-time equivalent (FTE) employment in patient care. 2024 was used as the base year for the forecasts because it is the most recent year for which data are available on the number of licenses issued by California licensing boards.

Figure 1. Stock and Flow Model of Primary Care Clinician Supply



Source: Joanne Spetz et al., *California's Primary Care Workforce: Forecasted Supply, Demand, and Pipeline of Trainees, 2016–2030* (PDF), Healthforce Center at UCSF, August 15, 2017.

Current Stock of Primary Care Physicians, PAs, and NPs

The stock of primary care physicians, PAs, and NPs in California consists of clinicians who:

- Are licensed in California
- Have a practice address in California
- Indicate that their primary specialty is a primary care specialty (defined below)
- Practice primarily in a setting other than a hospital inpatient department, emergency department, or urgent care center
- Provide at least one hour of patient care per week

Physicians and PAs were classified as specializing in primary care if their responses to the California licensure renewal survey indicated that their primary specialty was family medicine, geriatric medicine, internal medicine, or pediatrics. NPs were classified as primary care clinicians if their primary specialty was adult health, family health, or pediatrics.[6]

For clinicians in these specialties, analyses were further limited to respondents who indicated that their primary practice setting was not a hospital inpatient unit, emergency department, or urgent care center to remove hospitalists and other clinicians whose primary professional activity is not providing outpatient primary care services.

Table 1 illustrates the implications of these analytic choices for estimating the stock of primary care physicians, PAs, and NPs in California. In 2024, California had 67,329 actively licensed physicians, PAs, and NPs in primary care specialties, but only two-thirds of them (45,934) practiced outside a hospital inpatient unit, emergency department, or urgent care center and provided patient care 20 or more hours per week. The data indicate that most clinicians in primary care specialties practice primarily in outpatient settings, but the percentage varies by profession and specialty. Internal medicine physicians were the least likely to provide primary care. Only 70% of general internist MDs and 49% of general internist DOs practice in a primary care (PC) setting. This finding is not surprising because many internists practice as hospitalists.[7]

Table 1. Estimated Number of Primary Care Clinicians, by Specialty and Patient Care Hours, California, Current State: 2024

		# OF ACTIVE LICENSES			
PROFESSION	SPECIALTY	# PRACTICING IN ANY SETTING, ANY # OF HOURS OF PATIENT CARE PER WEEK	# PRACTICING IN SETTING NOT IN INPATIENT, ED, OR URGENT CARE SETTING (% ACTIVE LICENSES)	# PROVIDING PATIENT CARE 1+ HOUR PER WEEK, NOT IN INPATIENT, ED, OR URGENT CARE SETTING (% ACTIVE LICENSES)	# PROVIDING PATIENT CARE ≥20 HOURS PER WEEK, NOT IN INPATIENT, ED, OR URGENT CARE SETTING (% ACTIVE LICENSES)
MD physicians	Family Medicine	13,351	12,149 (91%)	11,846 (89%)	9,919 (74%)
	Geriatrics	646	628 (97%)	613 (95%)	470 (73%)
	Internal Medicine	18,556	12,953 (70%)	12,502 (67%)	10,198 (55%)
	Pediatrics	10,849	9,324 (86%)	9,048 (83%)	7,535 (69%)
	Total PC MDs	**43,402**	**35,054 (81%)**	**34,009 (78%)**	**28,122 (65%)**

PROFESSION	SPECIALTY	# OF ACTIVE LICENSES			
		# PRACTICING IN ANY SETTING, ANY # OF HOURS OF PATIENT CARE PER WEEK	# PRACTICING IN SETTING NOT IN INPATIENT, ED, OR URGENT CARE SETTING (% ACTIVE LICENSES)	# PROVIDING PATIENT CARE 1+ HOUR PER WEEK, NOT IN INPATIENT, ED, OR URGENT CARE SETTING (% ACTIVE LICENSES)	# PROVIDING PATIENT CARE ≥20 HOURS PER WEEK, NOT IN INPATIENT, ED, OR URGENT CARE SETTING (% ACTIVE LICENSES)
DO physicians	Family Medicine	3,335	2,974 (89%)	2,944 (88%)	2,708 (81%)
	Geriatrics	85	82 (96%)	82 (96%)	78 (92%)
	Internal Medicine	1,782	871 (49%)	858 (48%)	789 (44%)
	Pediatrics	690	561 (81%)	558 (81%)	503 (73%)
	Total PC DOs	**5,892**	**4,488 (76%)**	**4,442 (75%)**	**4,078 (69%)**
PAs	Family Medicine	3,566	3,351 (94%)	3,310 (93%)	3,005 (84%)
	Geriatrics	125	124 (99%)	124 (99%)	109 (87%)
	Internal Medicine	732	669 (91%)	661 (90%)	603 (82%)
	Pediatrics	187	184 (98%)	181 (97%)	163 (87%)
	Total PC PAs	**4,610**	**4,328 (94%)**	**4,276 (93%)**	**3,880 (84%)**
NPs	Adult Health	2,995	2,687 (90%)	2,619 (87%)	2,214 (74%)
	Family Health	8,307	7,550 (91%)	7,395 (89%)	6,411 (77%)
	Geriatrics	n/a	n/a	n/a	n/a
	Pediatrics	2,125	1,624 (76%)	1,555 (73%)	1,229 (58%)
	Total PC NPs	**13,427**	**11,861 (88%)**	**11,569 (86%)**	**9,854 (73%)**
Grand total		**67,331**	**55,731 (82%)**	**54,296 (81%)**	**45,934 (68%)**

Source: Authors' analysis of California Department of Health Care Access and Information licensure and survey data (custom data request received November 8, 2024).

Responses to a question on the licensure renewal surveys regarding numbers of hours of patient care provided per week were used to estimate FTE supplies of primary care physicians, PAs, and NPs in 2024. Respondents are asked to indicate the number of hours per week they spend providing direct patient care (including telehealth). The response options are no hours, 1 to 9 hours, 10 to 19 hours, 20 to 29 hours, 30 to 39 hours, or 40 or more hours per week. To calculate FTE supplies, the midpoints of the ranges were used. For example, it was assumed that all primary care clinicians who reported that they provide direct patient care 30 to 39 hours per week provided direct patient care 34.5 hours per

week. The data were then weighed as indicated in the formula below to estimate the FTE numbers of primary care MDs, DOs, PAs, and NPs.

(0 × # providing no patient care hours per week)
+ (0.2 × # providing 1–9 patient care hours per week)
+ (0.4 × # providing 10–19 patient care hours per week)
+ (0.6 × # providing 20–29 patient care hours per week)
+ (0.8 × # providing 30–39 patient care hours per week)
+ (1 × # providing 40+ patient care hours per week)
= # FTE clinicians

Table 2 displays the estimates of FTE primary care MDs, DOs, PAs, and NPs generated by these calculations.

Table 2. Estimated FTE Primary Care Clinicians, California, Current State: 2024

PROFESSION	FTE PRIMARY CARE CLINICIANS
MDs in primary care specialties	25,614
DOs in primary care specialties	3,651
PAs in primary care specialties	3,429
NPs in primary care specialties	8,935

Source: Authors' analysis of California Department of Health Care Access and Information licensure and survey data (custom data request received November 8, 2024).

Another important dimension of the current stock of primary care physicians, PAs, and NPs is the age distribution of clinicians. As Table 3 illustrates, the percentage of DOs age 65 and older (5.3%) was substantially smaller than the percentage of MDs (16.8%), which reflects growth in the number of osteopathic medical schools nationwide and in California over the past 20 years. PAs and NPs in primary care specialties are also younger than MDs and, thus, less likely to retire between now and 2035.

Table 3. Estimated Age Distribution of Primary Care Clinicians, California, Current State: 2024

	AGE GROUP		
PROFESSION	<35	35–64	65+
MDs in primary care specialties	12.3%	70.9%	16.8%
DOs in primary care specialties	24.7%	70.0%	5.3%
PAs in primary care specialties	28.2%	60.7%	11.1%
NPs in primary care specialties	14.4%	77.1%	8.5%

Source: Authors' analysis of California Department of Health Care Access and Information licensure and survey data (custom data request received November 8, 2024).

Inflow of Newly Licensed Primary Care Physicians, PAs, and NPs: Base Case

The inflow consists of primary care physicians, PAs, and NPs newly licensed in California, which encompass those who:

- Graduated from training programs in California
- Relocated from other states or countries

Numbers of Newly Licensed Physicians Providing Primary Care

To estimate the number of new licenses issued to primary care physicians in 2024, the base year for the forecasts, data were obtained on numbers of new licensees from the California Department of Consumer Affairs' website and from surveys that licensed health professionals in California are required to complete when they renew their licenses every two years.[8] Table 4 displays the average number of new licenses issued from 2018 to 2023. The five-year average was used instead of the most recent year to reduce sensitivity to annual fluctuations. Because the Department of Consumer

Affairs data on new licensees do not indicate a clinician's specialty, it was assumed that the percentage of new licensees in primary care specialties would be similar to the percentage of all licensed MDs and DOs who were in primary care specialties in 2024 (34% of MDs and 51% of DOs).[9]

It was further assumed that the distribution of new licensees across primary care specialties is the same as the distribution of graduates of primary care residency and fellowship programs in California across these specialties over the five-year period from 2018–19 to 2022–23 (33% family medicine, 2% geriatrics, 46% internal medicine, 19% pediatrics).[10] The percentage of all licensed physicians in primary care specialties (34% for MDs, 51% for DOs) was multiplied by the percentage of graduates of primary care residency programs to estimate the percentage of new licensees in each primary care specialty (e.g., 34% × 33% = 11% for family medicine MDs, 51% × 33% = 17% for family medicine DOs). The average number of new licenses was then multiplied by these percentages to generate estimates of the number of new licensees in each of the primary care specialties.

Table 4. Estimated Number of New Licensees in Primary Care Specialties, Current State: 2024

	AVERAGE # OF NEW LICENSEES PER YEAR, 2018–23	% OF NEW LICENSEES IN PRIMARY CARE SPECIALTIES, 2024	ESTIMATED # OF NEW LICENSEES IN PRIMARY CARE SPECIALTIES
All MDs	**6,811**		
Family medicine		11%	749
Geriatrics		1%	68
Internal medicine		16%	1,090
Pediatrics		6%	409
All MDs in primary care specialties		***34%***	***2,316***
All DOs	**922**		
Family medicine		17%	157
Geriatrics		1%	9
Internal medicine		23%	212
Pediatrics		10%	92
All DOs in primary care specialties		***51%***	***470***
Total MDs & DOs in primary care specialties	**7,733**	**36%**	**2,786**

Source: Authors' analysis of data from the California Department of Consumer Affairs, the California Department of Health Care Access and Information, and ACGME (see endnotes).

Estimates of the numbers of newly licensed primary care physicians were further refined because some newly licensed physicians in primary care specialties do not provide primary care. These physicians include those who work in hospital inpatient units (i.e., hospitalists), emergency departments, and urgent care centers. To exclude these newly licensed physicians from our estimates, the estimates of the numbers of newly licensed family physicians, internists, and pediatricians were multiplied by percentages reported in the most recent literature identified regarding the career plans and trajectories of family physicians, internists, and pediatricians. No adjustments were made to the numbers of geriatricians because no literature was identified regarding the career plans and trajectories of new graduates of geriatrics fellowship programs.

For family physicians, 97% were estimated to provide primary care because a recent analysis of national data from the American Medical Association's Masterfile concluded that only 3% of physicians who complete family medicine residency programs complete subspecialty fellowship programs.[11] For internal medicine, 9.4% were estimated to plan to become general internists based on an analysis of responses to an American College of Physicians' Internal Medicine In-Training Examination survey regarding the career plans of new graduates of internal medicine residency programs.[12] For pediatricians, 34% of graduates of pediatric residency programs were estimated to plan to practice as general pediatricians because 34% of respondents to the American Academy of Pediatrics Annual Survey of Graduating Residents plan to practice as general pediatricians.[13]

Table 5 illustrates that applying these percentages from the literature to our estimates of the number of new licensees by primary care specialty reduces our estimate of the number of newly licensed MDs and DOs in California who provide primary care by 55%, from 2,786 to 1,248.

Table 5. Estimated Number of Newly Licensed Physicians in Primary Care Specialties Whose Primary Professional Activity Is Providing Primary Care, Current State: 2024

PROFESSION/SPECIALTY	ESTIMATED # OF NEW LICENSEES IN PRIMARY CARE SPECIALTIES	ESTIMATED % PROVIDING PRIMARY CARE	ESTIMATED # PROVIDING PRIMARY CARE
MDs in primary care specialties			
Family medicine	749	97.0%	727
Geriatrics	68	100.0%	68
Internal medicine	1,090	9.4%	102
Pediatrics	409	34.0%	139
All MDs providing primary care	***2,316***		***1,036***
DOs in primary care specialties			
Family medicine	157	97.0%	152
Geriatrics	9	100.0%	9

PROFESSION/SPECIALTY	ESTIMATED # OF NEW LICENSEES IN PRIMARY CARE SPECIALTIES	ESTIMATED % PROVIDING PRIMARY CARE	ESTIMATED # PROVIDING PRIMARY CARE
Internal medicine	212	9.4%	20
Pediatrics	92	34.0%	31
All DOs providing primary care	***470***		***212***
Total MDs & DOs	**2,786**		**1,248**

Sources: Custom data request, California Department of Health Care Access and Information, received November 8, 2024; JoAnna K. Leyenaar and Mary Pat Frintner, "Graduating Pediatric Residents Entering the Hospital Medicine Workforce, 2006–2015," *Academic Pediatrics* 18, no. 2. (2018): 200–7; Neha Paralkar et al., "Career Plans of Internal Medicine Residents from 2019 to 2021," *JAMA Internal Medicine* 183, no. 10 (2023): 1166–67; and William R. Phillips et al., "Pathways to Primary Care: Charting Trajectories from Medical School Graduation Through Specialty Training," *Health Affairs* 44, no. 5 (2025): 580–88.

Numbers of Newly Licensed PAs and NPs Providing Primary Care

To estimate the number of new licenses issued to PAs and NPs in 2024, the base year for the forecasts, data on numbers of new licensees were obtained from the California Department of Consumer Affairs' website and from surveys that licensed health professionals in California are required to complete when they renew their licenses.[14] Table 6 displays the average number of new licenses issued from 2018 to 2023. As with MDs and DOs, the five-year average was used instead of the most recent year's figure to reduce sensitivity to annual fluctuations.

For newly licensed PAs, the number of new licensees was multiplied by the National Commission on Certification of Physician Assistants estimate of the percentage of newly certified PAs working in a primary care specialty (22.7%). The commission's estimate was obtained from responses to a questionnaire administered to PAs who were board-certified for the first time in 2023.[15]

To estimate the number of newly licensed NPs who provide primary care, the average number of new licensees was multiplied by an estimate of the percentage of NPs who provide primary care from a recent sample survey of California NPs.[16] Responses to a survey question that asked NPs to describe the type of care they provide indicate that 32.8% of NPs in California provide primary care. This percentage was used instead of the number of licensed NPs in primary care specialties (40%), because some NPs in primary care specialties work in specialty outpatient practices or acute care settings.

Table 6. Estimated Number of Newly Licensed PAs and NPs Providing Primary Care, Current State: 2024

PROFESSION/ SPECIALTY	ESTIMATED # OF NEW LICENSEES	ESTIMATED % PROVIDING PRIMARY CARE	ESTIMATED # PROVIDING PRIMARY CARE
PAs	1,452	22.7%	330
NPs	3,287	32.8%	1,078
Total	**4,739**		**1,408**

Sources: Authors' analysis of California Department of Consumer Affairs license data; Jen Joynt et al., *California's Nurse Practitioner Workforce: Understanding Demographics, Education, and Scope of Practice*, California Health Care Foundation, 2024; and *2023 Statistical Profile of Recently Board Certified PAs: An Annual Report of the National Commission on Certification of Physician Assistants*, National Commission on Certification of Physician Assistants, 2024.

Rates of Growth in Inflows of Primary Care Physicians, PAs, and NPs

In addition to estimating the number of newly licensed physicians (MDs and DOs), PAs, and NPs providing primary care in the base year (2024), assumptions were made about the rate of growth in the inflows of newly licensed clinicians. These assumptions were derived from analyses of trends

in rates of growth of newly licensed physicians, PAs, and NPs in California and growth in the numbers of graduates of training programs for primary care physicians, PAs, and NPs in California. For each profession, the authors selected what they consider to be the most plausible scenario. (See Table 7.)

Table 7. Projected Average Annual Rates of Growth in New Licensees, 2024 to 2035: Base Case

	AVERAGE ANNUAL GROWTH RATE
MDs and DOs	5%
PAs	7%
NPs	4%

Sources: Authors' analysis of California Department of Consumer Affairs. Annual Statistics: New Licenses, 2025; Data Resource Book (2018/19–2022/23), Accreditation Council for Graduate Medical Education; and Marcy Ainslie et al., "*Nurse Practitioner Program Enrollment Trends and Predictions*," *Journal of Professional Nursing* 55 (November–December 2024): 97–104.

Primary Care Physicians. For primary care physicians, the authors assume that the inflow of newly licensed physicians will increase at the average annual rate at which the numbers of graduates of family medicine, internal medicine, and pediatrics residency programs in California grew from 2018–19 to 2022–23. To estimate trends in the numbers of MD and DO graduates of California medical residency programs in primary care specialties, data was lagged from the Accreditation Council on Graduate Medical Education on numbers of first-year residents enrolled in these residency programs (ACGME, 2018, 2019, 2020, 2021, 2022, 2023).[17] (Data on graduates were not available.) All residents were assumed to have completed their residency within the typical three-year span.[18] The authors' analyses of the ACGME data suggest that the number of graduates grew by 5% over this period.

PAs. For PAs providing primary care, the authors assumed that the inflow of newly licensed PAs would increase at the average annual rate observed in California from 2018–19 to 2022–23 (7%). This assumption is consistent with data on graduates of PA education programs in California from the Integrated Postsecondary Education Data System during this time period, which indicate that graduates of PA education programs grew at an average annual rate of 7%.[19]

NPs. For NPs providing primary care, the authors assumed that the inflow of newly licensed NPs will increase at an annual rate consistent with projections of growth in numbers of NP graduates nationally from 2023 to 2026.[20] Ainslie and colleagues used data from the American Association of Colleges of Nursing's Enrollment and Graduations reports to construct an autoregressive integrated moving average projection model to forecast national enrollment of full-time and part-time NP students for the four-year period from 2023 through 2026. National data they reported on the numbers of full-time and part-time students who graduated in 2022 was used to estimate a weighted average of the projected rates of growth in full-time and part-time students, which was calculated as follows:

(0.48% projected annual growth rate for full-time students × 47.5% of graduates who are full-time) + (7.51% projected annual growth rate for part-time students × 52.5% of graduates who are part-time) = 0.002 + 0.039 = 0.041 = 4%.[21]

Outflow of Primary Care Clinicians: Base Case

The outflow consists of primary care physicians, PAs, and NPs with California licenses who:

- Allow their California license to lapse due to death, retirement, relocation, or other reasons
- Transition from practicing in a primary care setting to practicing in a specialty care setting

Outflow of Physicians Providing Primary Care

Estimates of the rate at which licenses lapse among primary care MDs and DOs were derived from an analysis of data obtained from the Medical Board of California. An MD's license was determined to have lapsed if the MD had an active California license in January 2020 but did not have an active California license in January 2024. Annual license lapse rates were calculated separately for male and female MDs and DOs in three age groups: under 40, 40 to 60, over 60. (See Table 8.) Estimates for nonbinary clinicians are not presented because data are not available. These data on MDs were used to generate estimates for both MDs and DOs because the team did not have access to data on lapsed licenses among DOs.

Table 8. Estimated License Lapse Rates Among Primary Care Clinicians, by Age Group

	MALES			FEMALES		
	<40	40–60	60+	<40	40–60	60+
MDs and DOs	4%	2%	43%	13%	3%	9%
PAs and NPs	1.4%	0.7%	5.3%	1.4%	0.7%	5.3%

Sources: Authors' tabulation of Medical Board of California data; and Joanne Spetz et al., *California's Primary Care Workforce: Forecasted Supply, Demand, and Pipeline of Trainees, 2016–2030* (PDF), Healthforce Center at UCSF, August 15, 2017.

Outflow of PAs and NPs Providing Primary Care

Estimates of the rate at which licenses lapse among primary care NPs and PAs were based on findings from an analysis of annual lapse rates among NPs conducted for previously published projections of the supply of primary care NPs and PAs.[22] License lapse rates were calculated for PAs and NPs in three age groups: under 40, 40 to 60, over 60. Rates for males and females were not calculated separately because 87% of NPs in California are female.[23] Data for NPs were used to generate estimates for PAs in addition to NPs because the team did not have access to data on lapsed licenses among PAs.

For PAs and NPs, the numbers of males and females who move from the under-40 age group to the 40-to-60 age group were adjusted to account for PAs and NPs who transition from primary care to specialty practice. The numbers of PAs and NPs moving to the 40-to-60 age group were reduced by 28%, based on findings from Quella and colleagues' analysis of data from the American Academy of Physician Assistants (AAPA) student survey and its census survey, which tracked the specialties of PAs early in their careers.[24] Although findings from other studies indicate that PAs and NPs switch specialties throughout their careers,[25] Quella and colleagues' study is the only one that reports an estimate of the percentage of PAs who switch from primary care to specialty care as opposed to reporting estimates of the percentage switching regardless of specialty. The number of NPs who moved from the under-40 group to the 40-to-60 group was reduced by the percentage Quella and colleagues reported for PAs because the authors of this report were unable to identify a similar estimate for NPs.

Sensitivity Analyses

Sensitivity analyses were conducted to assess how sensitive our projections of supply are to estimates about rates of inflow and outflow of primary care clinicians.

For inflow, we generated estimates of supplies of MDs, DOs, PAs, and NPs providing primary care in which the rate of growth in supply was:

- 50% lower than our base case scenario (2.5% for MDs and DOs, 3.5% for PAs, 2% for NPs)

- 50% higher than our base case scenario (7.5% for MDs and DOs, 10.5% for PAs, 6% for NPs)

These sensitivity analyses are intended to capture a range of possible futures. The rate at which the supply of primary care clinicians grows could be lower than our base case estimate if the influx of clinicians from other states and countries decreases, potentially due to the high cost of living, changes in immigration policies, or other factors. While in recent years, there has been a significant emphasis and concerted effort to expand primary care residency programs across the state, supply could also grow more slowly if the federal government cuts funding for primary care training or if state budget shortfalls lead to a reduction in funding for CalMedForce grants for primary care residency programs and Song-Brown grants for primary care residency programs and primary care PA and NP education programs. In addition, younger PAs and NPs are less likely to practice in primary care specialties than older PAs and NPs; if this trend continues the number of newly licensees providing primary care could decrease.[26] Conversely, if California's economy improves, the supply of primary care clinicians could grow more rapidly than our base case estimate due to an increase in in-migration of clinicians from other states and an increase in state funding for primary care training.

For outflow, we generated estimates of supplies of MDs, DOs, PAs, and NPs providing primary care in which the rate of growth in supply was:

- 50% lower than our base case scenario for each age and sex group
- 50% higher than our base case scenario for each age and sex group

As with the inflow scenarios, the sensitivity analyses are intended to capture a range of possible futures. The rate at which primary care clinicians let their licenses lapse could be higher than our base case estimate if high levels of burnout persist and lead primary care clinicians to retire early. The rate of primary care clinicians' license lapses could also be higher if more of them leave California to practice elsewhere. In addition, some primary care physicians, PAs, and NPs may maintain their licenses but stop providing patient care (e.g., transition to an administrative or research position). Conversely, the rate at which primary care clinicians let their licenses lapse could be lower than our base case estimate if primary care practices across the state implement team-based primary care, which could reduce administrative burden and burnout.

Projected Supplies of Primary Care Physicians, PAs, and NPs in California

The following formula was used to calculate annual changes in supplies of full-time equivalent (FTE) primary care physicians, PAs, and NPs in California from 2024 to 2035:

# of FTE clinicians in previous year
+ (((inflow of newly licensed clinicians × annual rate of growth in new licensees)
– age/gender-specific annual outflows of clinicians)
× FTE adjustment)
= # FTE clinicians in the following year

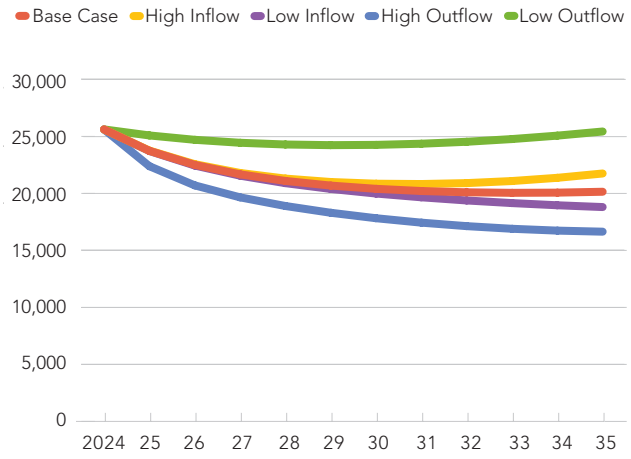
Findings regarding changes in supplies of primary care clinicians are discussed below.

MDs

Figure 2 displays projections of the numbers of FTE primary care MDs from 2024 to 2035. If the base case estimate is correct, the number of FTE primary care MDs is projected to decrease by 21%, because the outflow of primary care MDs whose California licenses lapse is projected to exceed the inflow of newly licensed primary care MDs. The four sensitivity analyses also project that

the number of FTE primary care MDs in California will decrease, with the rate of decrease ranging from 1% (low outflow) to 35% (high outflow). The estimates are more sensitive to outflow than inflow due to the high rate of outflow of male primary care MDs over age 60 (43%).

Figure 2. Projected Supply of FTE Primary Care MDs, 2024 to 2035



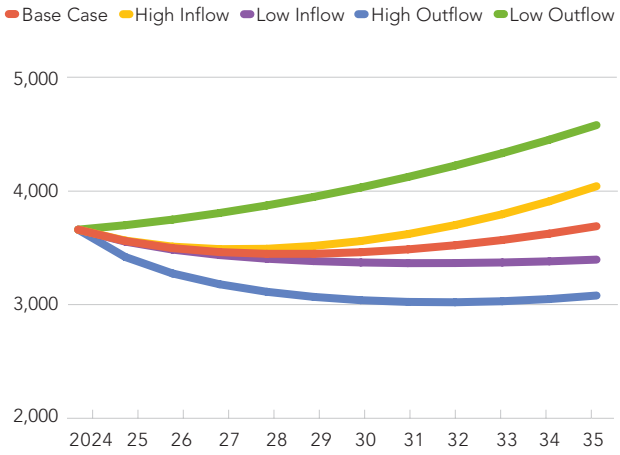
Source: Authors' tabulation of data from ACGME, the California Department of Health Care Access and Information the Medical Board of California.

DOs

Figure 3 displays projections for FTE primary care DOs from 2024 to 2035. If the base case estimate is correct, the number of FTE primary care DOs is projected to increase by 1%, because inflow of newly licensed primary care DOs would be slightly larger than the outflow of primary care DOs whose California licenses lapse. Two of the sensitivity analyses projects that the number of FTE primary care DOs will increase (high inflow, low outflow), and two project that the number of FTE DOs will decrease (low inflow, high outflow). The rate of change ranges from a decrease of 16% to an increase of 25%.

The main reason for the difference in projected supplies of FTE primary care MDs and DOs is the difference in their age distributions. DOs are younger than MDs, in large part because DO-granting medical schools have expanded more rapidly in recent years compared to MD-granting medical schools. As a consequence, the percentage of DOs whose California licenses are projected to lapse in the coming decade is smaller than the percentage of MDs.

Figure 3. Projected Supply of FTE Primary Care DOs, 2024 to 2035

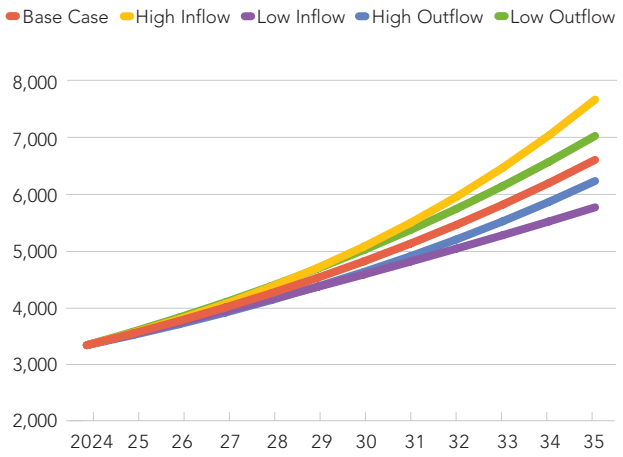


Source: Authors' tabulation of data from ACGME, the California Department of Health Care Access and Information, and the Osteopathic Medical Board of California.

PAs

Figure 4 displays projections for FTE primary care PAs in California from 2024 to 2035. The base case projection indicates that the number of FTE primary care PAs will grow by 95%, because the rate of growth in the number of newly licensed PAs is projected to exceed the rates at which PAs let their California licenses lapse or transition from primary care to specialty practice. All four sensitivity analyses also project that the number of FTE primary care PAs will increase substantially, with estimates ranging from 71% (low inflow) to 126% (high inflow).

Figure 4. Projected Supply of FTE Primary Care PAs, 2024 to 2035



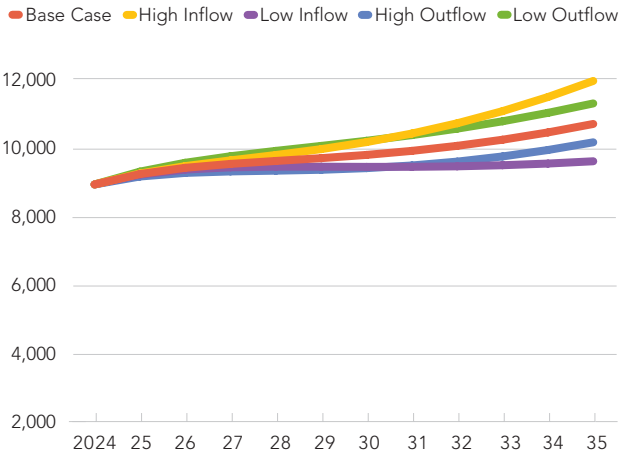
Source: Authors' tabulation of data from the California Department of Health Care Access and Information, the California Physician Assistant Board, and the Integrated Postsecondary Education Data System.

The projected rates of growth in FTE primary care PAs are higher than projected rates of growth among primary care MDs and DOs for three reasons. First, the base case scenario assumed a higher rate of growth (7% vs. 5%) due to higher rates of growth in the number of new licensees and the number of graduates of training programs in California in recent years. Second, the base case scenario assumed that PAs over age 60 will let their licenses lapse at a lower rate than MDs in the same age group. Third, PAs are younger than MDs, which means that a smaller share of them are projected to leave the workforce over the coming decade. In 2024, 17% of primary care MDs in California were age 65 and older versus 11% of primary care PAs.

NPs

Figure 5 displays projections for FTE primary care NPs in California from 2024 to 2035. In the base case scenario, the number of FTE primary care NPs is projected to grow by 20%. All four sensitivity analyses project that the number of FTE primary care NPs will grow, with rates ranging from 8% (low inflow) to 34% (high inflow). The projected rates of growth in FTE primary care NPs are higher than rates of growth among primary care MDs because NPs over age 60 let their California licenses lapse at a lower rate than MDs in this age group and because the share of NPs in this age group is smaller than the share of MDs. The projected rates of growth in primary care NPs are lower than the projected rates of growth in primary care PAs because the number of graduates of PA education programs in California has grown more rapidly in recent years than the number of graduates of NP education programs in primary care specialties.

Figure 5. Projected Supply of FTE Primary Care NPs, 2024 to 2035



Source: Authors' tabulation of data from Marcy Ainslie et al., "Nurse Practitioner Program Enrollment Trends and Predictions," *Journal of Professional Nursing* 55 (November–December 2024): 97–104, Lisel Blash and Joanne Spetz, *California Board of Registered Nursing 2022–2023 Annual School Report: Data Summary and Historical Trend Analysis* (PDF), California Board of Registered Nursing, July 3, 2024, and the California Department of Health Care Access and Information.

Methods Used to Forecast Future Demand for Primary Care Physicians, Physician Assistants, and Nurse Practitioners

Demand for clinicians can be measured and forecast in many ways, reflecting disparate ideas about what demand is or should be. One method relies on benchmarks, which are typically expressed as ratios of clinicians to population. In some cases, forecasters assume that the current ratio of clinicians to population is sufficient to meet demand (i.e., that supply and demand are in equilibrium) and estimate the number of clinicians needed to maintain a stable ratio of clinicians per population. In other cases, forecasters establish a target ratio of clinicians to population and estimate the number of clinicians needed to achieve the target ratio.

Another method uses data on utilization of health care services to estimate demand. Under this approach, forecasters equate utilization with demand and project the number of clinicians needed to achieve an observed level of utilization. The level of utilization is adjusted upward or downward as the size and demographic characteristics of the population are projected to change.

The projections presented in this report are derived from estimates of utilization from the 2023 California Health Interview Survey (CHIS). CHIS is a survey of a representative sample of Californians that includes questions on a wide range of health and health care topics, including utilization of health care services. The sampling frame includes Californians with all types of health insurance along with those who are uninsured. The 2023 CHIS survey was used because it is the most recent for which data are available.

Use of 2023 CHIS data functions as a proxy for demand for primary care under conditions approaching universal coverage. Since the mid-2010s, California has made substantial progress toward reducing the number of uninsured people by expanding eligibility for Medicaid and actively promoting enrollment of eligible people in Covered California. In 2023, Californians who enrolled in Covered California received more generous subsidies than they did when the Affordable Care Act was originally signed into law due to the increase in the size of premium tax credits and expansion of eligibility for premium tax credits enacted by the American Rescue Plan Act in 2021 and extended by the Inflation Reduction Act in 2022.

Responses were used to a question on the CHIS survey that asked respondents to recall the number of visits they or their minor children had made to a doctor's office during the past year. All these visits were assumed to be to primary care clinicians. They were also assumed to include visits with either a physician or a PA or NP. CHIS reports data separately for children and adolescents age 0 to 17, adults age 18 to 64, and adults age 65 and older.

Table 9 displays the percentages of people in each age group who made a certain number of visits to a doctor's office in the past year, and the weighted average number of visits per person. For children and adolescents, the weighted average number of visits per year was 2.3. The weighted average number of visits per year for adults age 18 to 64 was similar (2.5). Adults age 65 and older had a higher weighted average number of visits per year (4), consistent with the higher burden of disease in this population. Many adults age 65 and older have one or more chronic conditions that warrant additional visits to a primary care clinician.

Table 9. Self-Reported Visits to a Doctor's Office, by Age Group, 2023

VISITS TO A DOCTOR'S OFFICE	0–17	18–64	65+
0 visits	9.3%	22.6%	6.8%
1 visit	28.6%	18.7%	13.2%
2 visits	26.4%	17.7%	16.7%
3 visits	12.7%	11.3%	13.9%
4 visits	8.6%	8.1%	12.7%
5 visits	5.1%	5.6%	8.2%
6 visits	4.0%	4.0%	7.3%
7–8 visits	2.2%	3.0%	5.8%
9–12 visits	2.1%	5.0%	8.6%
13–24 visits	0.8%	2.9%	4.7%
25+ visits	0.2%	1.0%	2.1%
Weighted average # of visits	**2.3**	**2.5**	**4.0**

Source: Authors' analysis of AskCHIS (2023), UCLA Center for Health Policy Research.

To estimate the total number of visits demanded in 2024, the weighted average number of visits per age group were assumed to be the same as the weighted averages calculated from the 2023 CHIS data. Those weighted averages were multiplied by the California Department of Finance's estimate of the number of Californians in three similar age groups: 0 to 19, 20 to 64, and 65 and older. (2024 CHIS data were not available at the time these analyses were conducted.)

Table 10 displays the results of these calculations.

Table 10. Total Primary Care Visits Demanded in 2024

AGE GROUP	POPULATION	WEIGHTED AVERAGE # OF PRIMARY CARE VISITS	TOTAL PRIMARY CARE VISITS
0–19	9,855,597	2.3	22,667,873
20–64	22,842,719	2.5	57,106,798
65 and older	6,421,418	4.0	25,685,672
All age groups	**39,119,734**	**—**	**105,460,343**

Sources: Authors' analysis of California Department of Finance Population Estimates; and AskCHIS (2023), UCLA Center for Health Policy Research.

Assuming that the authors' estimate of the supply of FTE primary care clinicians in California in 2024 is correct, there were 2,533 visits per FTE primary care clinician in that year.[27]

105,460,343 visits
÷ (29,270 FTE primary care physicians
+ 12,364 FTE primary care NPs and PAs)
= 2,533 visits per FTE primary care clinician

For the base case projections of demand, it was assumed that California's population would grow between 2024 and 2035 at the rate estimated by the California Department of Finance (DoF).[28] Table 11 presents DoF's projections for overall growth in California's population and the change in population by age group. DoF projects that California's population will grow at the modest rate of 3.1% during this time period. People age 65 and older will account for the largest share of growth because rates of in-migration of younger people to California from other states and nations are projected to be small. The population age 0 to 19 is projected to decrease due to a long-term decrease in the number of births in the state.[29]

Table 11. California Department of Finance Projections of Population Growth, 2024 to 2035

AGE GROUP	POPULATION IN 2024	POPULATION IN 2035	PERCENTAGE CHANGE
0–19	9,855,597	8,423,227	-14.5%
20–64	22,842,719	23,440,937	2.6%
65+	6,421,418	8,487,429	32.2%
All age groups	**39,119,734**	**40,351,593**	**3.1%**

Sources: California Department of Finance Population Estimates; and AskCHIS (2023), UCLA Center for Health Policy Research.

To estimate the number of visits demanded in 2035, the estimated number of visits by age group in 2024 was multiplied by the DoF's projection of the population in each age group in 2035:

(8,423,227 people age 0–19 × 2.3 visits)
+ (23,440,937 people age 20–64 × 2.5 visits)
+ (8,487,429 people age 65 and older × 4.0 visits)
= 111,925,481 visits

Then percentage change in the number of visits was calculated:

(111,925,481 visits in 2035
– 105,460,343 visits in 2024)
÷ 105,460,343 visits in 2024
= 6.1%

Next, the numbers of FTE primary care physicians and PAs/NPs in 2024 were multiplied by 6.1% to estimate the numbers of FTE primary care physicians and PAs/NPs demanded in 2035. Table 12 displays the change in demand for primary care clinicians over the entire time period from 2024 to 2035.

Table 12. Projected Changes in Primary Care Visits and Demand for Primary Care Clinicians

	# DEMANDED IN 2024	% CHANGE IN VISITS	# DEMANDED IN 2035
FTE primary care physicians	29,270	6.1%	31,055
FTE primary care PAs and NPs	12,364	6.1%	13,118

Sources: Authors' projections based on analysis of 2023 California Health Interview Survey (CHIS) data and California Department of Finance population projections.

Sensitivity Analyses

Two sensitivity analyses were conducted to assess the sensitivity of the projections of demand to the model's parameters. The two analyses reflect different assumptions about population growth and change in the age distribution of California's population.

- A higher population growth model, in which California's economy improves relative to the economy of other states and nations, leading to an increase in migration of adults of working age from other states and nations and a smaller decrease in the number of children and adolescents in the state. It was assumed that the decrease in children and adolescents age 0 to 19 would be 25% lower and that the increase in the number of adults age 20 to 64 would be 50% higher than DoF's projections. In addition, it was assumed that the increase in the number of people age 65 and older would be 10% larger than DoF's projections due to an increase in life expectancy.
- A lower population growth model, in which California's economy falters relative to other states and changes in immigration policy constrain immigration from other nations, leading to a reduction in the number of working-age adults and children. It was assumed that the decrease

in the number of children and adolescents age 0 to 19 would be 25% larger than DoF projects and that the increase in the number of adults age 20 to 64 would be 75% lower than DoF projects. It was further assumed that the increase in the number of people age 65 and older would be consistent with DoF's projection (i.e., no increase in life expectancy beyond what DoF projects).

Under the higher population growth scenario, the number of working-age adults in California would increase by 3.9% versus 2.6% in the base case scenario, and the number of children and adolescents would decrease more slowly (by 10.9% vs. 14.5%). The number of adults age 65 and older would increase by 35.4% versus 32.2% under the base case scenario.

Under the lower population growth scenario, the number of working-age adults in California would increase by 0.7% versus 2.6% in the base case scenario, and the number of children and adolescents would decrease more rapidly (by 18.2% vs. 14.5%).

Findings Regarding Demand

Primary Care Physicians

Figure 6 displays the base case projection of growth in demand for FTE primary care physicians (MDs and DOs) from 2024 to 2035 plus the projections derived from the sensitivity analyses. Under the base case scenario, California would demand 31,055 FTE physicians providing primary care in 2035. Under the lower population growth scenario, California would demand 30,733 FTE primary care physicians, and under the higher population growth scenario, California would demand 31,963 FTE primary care physicians.

PAs and NPs in Primary Care Specialties

Figure 7 displays these two projections of growth in demand for FTE PAs and NPs in primary care specialties from 2024 to 2035. The projections suggest that primary care practices in California will demand 13,118 FTE primary care PAs and NPs in 2035 as members of the primary care team. Under the lower population growth scenario, California would demand 12,982 FTE primary care PAs and NPs in 2035, and under the higher population growth scenario, it would demand 13,502 FTE primary care PAs and NPs in 2035.

Figure 6. Projected Demand for FTE MDs and DOs Providing Primary Care Services, 2024 to 2035

Source: Authors' projections based on analysis of 2023 California Health Interview Survey data and California Department of Finance population projections.

Figure 7. Projected Demand for FTE PAs and NPs Providing Primary Care Services, 2024 to 2035

Source: Authors' projections based on analysis of 2023 California Health Interview Survey data and California Department of Finance population projections.

Comparison of Supply and Demand for Primary Care Physicians, Physician Assistants, and Nurse Practitioners

Forecasts of supply and demand for primary care clinicians were compared to assess whether the projected future supplies of clinicians will be adequate to meet demand.

Primary Care Physicians

Figure 8 compares projections of supply and demand for primary care physicians (MDs and DOs) in 2035. If any of the five supply scenarios is correct, in 2035 California will have an insufficient supply of physicians providing primary care. Under DoF's projection of population growth and the base case scenario for growth in supply, California will have a shortage of 7,229 physicians providing primary care. The shortage would be least severe under the low population growth scenario and the low supply outflow scenario. The shortage would be most severe under the high population growth scenario and high outflow supply scenario.

Figure 8. Forecast Comparison of Shortages of Primary Care Physicians (MDs and DOs), 2035

Shortage of <5,000 primary care physicians
Shortage of 5,000 to 10,000 primary care physicians
Shortage of >10,000 primary care physicians

	NUMBER OF PRIMARY CARE PHYSICIANS		
	LOW POPULATION GROWTH	CALIFORNIA DOF PROJECTION	HIGH POPULATION GROWTH
Low Inflow of PCPs	-8,543	-8,865	-9,772
Low Outflow of PCPs	-735	-1,057	-1,964
Base Case of PCPs	-6,907	-7,229	-8,136
High Inflow of PCPs	-4,954	-5,276	-6,183
High Outflow of PCPs	-11,018	-11,340	-12,247

Source: Authors' projections based on supply and demand models described in this appendix.

PAs and NPs in Primary Care Specialties

Figure 9 compares projections of supply and demand for PAs and NPs providing primary care in 2035. If any of the five supply scenarios is correct, in 2035 California will have an ample supply of PAs and NPs providing primary care. Under DoF's projection of population growth and the base case

Figure 9. Forecast Comparison of Oversupply of Primary Care PAs and NPs, 2035

Oversupply of <3,500 primary care PAs and NPs
Oversupply of 3,500 to 5,500 primary care PAs and NPs
Oversupply of >5,500 primary care PAs and NPs

	NUMBER OF PRIMARY CARE PAS AND NPS		
	LOW POPULATION GROWTH	CALIFORNIA DOF PROJECTION	HIGH POPULATION GROWTH
Low Inflow of NPs/PAs	2,478	2,342	1,958
Low Outflow of NPs/PAs	5,421	5,285	4,902
Base Case of NPs/PAs	4,401	4,265	3,882
High Inflow of NPs/PAs	6,717	6,581	6,197
High Outflow of NPs/PAs	3,494	3,358	2,975

Source: Authors' projections based on supply and demand models described in this appendix.

scenario for growth in supply, California will have a surplus of 4,265 PAs and NPs providing primary care. The surplus would be smallest under the high population growth scenario and the low supply inflow scenario. The surplus would be largest under the low population growth scenario and high supply inflow scenario.

Limitations

These projections of supply and demand for primary care physicians, PAs, and NPs in California have a number of important limitations.

Supply

The method for estimating supply overstates the actual number of FTE physicians, PAs, and NPs in primary care specialties who work in primary care practices. Excluded were those whose primary practice location is a hospital inpatient unit, emergency department, or urgent care center but not those who work in specialty outpatient practices, because the response options for the practice-setting question on California's licensure renewal survey do not distinguish outpatient settings in which providers deliver primary care from those in which providers deliver specialty care. Thus, the estimates of the supplies of FTE primary care physicians, PAs, and NPs may overstate the actual number of clinicians delivering primary care services. This is especially true of PAs and NPs in primary care specialties because they increasingly work in outpatient specialty care practices.[30] In addition, some physicians in primary care specialties practice in specialized outpatient settings, such as vasectomy clinics and weight management clinics, and may not provide comprehensive primary care services, including preventive, acute, and chronic care management.

As illustrated above, the projections of supplies of FTE members of the primary care team in California are sensitive to the data available and the assumptions used. If the actual rate of inflow in new licensees is higher than the base case scenario, the projected supply of FTE primary care clinicians will be higher. If the actual rate of inflow is lower than the base case scenario, the projected supply will be lower. The forecasts are also sensitive to assumptions about outflows of primary care clinicians. The projections are especially sensitive to changes in the rate at which primary care physicians' licenses' lapse, because the lapse rate in the base case scenario, which is based on recent data from the Medical Board of California, is high.

Finally, the forecasts present projections of total numbers of FTE primary care clinicians in California. Actual rates of growth in supply may vary across regions. For example, growth in the supply of primary care physicians is likely to be lower in the Northern and Sierra region than in California overall because the region's primary care physician workforce is older than the primary care physician workforce in the state as a whole.

Demand

These projections of demand should be interpreted with caution for several reasons. First, the projections are sensitive to forecasts of California's population growth. The California Department of Finance forecasts that California's population will grow slowly over the next decade. Demand will increase more rapidly if DoF's projections underestimate general population growth or growth in the share of the population age 65 and older. Conversely, demand will increase less rapidly if DoF's projections overestimate general population growth or growth in the share of the population age 65 and older.

The demand projections are also sensitive to assumptions about utilization of primary care services. It was assumed that all visits to doctor's offices that CHIS respondents reported were to primary

care clinicians' offices. Some of these visits were to specialists' offices, especially among people with acute or chronic conditions, but the numbers of visits to specialists could not be discerned because CHIS does not ask respondents whether visits were to primary care or specialist clinicians. Thus, this report's projections overstate demand for primary care clinicians by an unknown magnitude.

In addition, the demand projections assume that the configuration of primary care clinicians observed in 2024 will remain constant until 2035. Licensure renewal survey responses suggest that 70% of primary care clinicians in California in 2024 were physicians and 30% were NPs or PAs. Demand may differ in 2035 for several reasons. As California's population ages, more people will be living with multiple chronic conditions and may be managed by a primary care physician instead of by an NP or PA. On the other hand, the Office of Health Care Affordability's efforts to contain health care costs and changes in Medicaid policy may lead primary care practices to rely more heavily on NPs and PAs to provide care because their compensation is lower. Primary care practices may also respond to these changes by shifting more tasks to unlicensed personnel where feasible and appropriate. In addition, virtual assistants and other types of AI will affect primary care practices, but these technologies are so new that their impact on demand for primary care clinicians is unknown.

Key Takeaways

Current Primary Care Physician, PA, and NP Workforce

- In 2024, California's primary care workforce consisted of 38,451 physicians (MDs and DOs), 4,276 PAs, and 11,569 NPs who practiced in primary care settings and provided patient care at least one hour per week.
- The percentage of physicians, PAs, and NPs in primary care specialties who practice in primary care settings and provide patient care at least one hour per week varies across professions, ranging from 66% of general internists to 99% of PAs who specialize in geriatrics.
- On average, each FTE primary care clinician (MD, DO, NP, PA) provided 2,533 visits.
- The age distribution of primary care clinicians varies substantially across professions. Most notably, DOs, PAs, and NPs in primary care specialties are younger than MDs.
- In 2024, 1,248 newly licensed physicians and 1,408 newly licensed PAs and NPs provided primary care in California.

Future Supply of Primary Care Physicians, NPs, and PAs

- Our base case estimate of the future supply of primary care MDs suggests that the number of FTE primary care MDs in California will decrease by 21% between 2024 and 2035. Sensitivity analyses suggest that the decrease could range from 1% to 35%.
- Our base case estimate of the future supply of primary care DOs suggests that the number of FTE primary care DOs in California will increase by 1% between 2024 and 2035. Sensitivity analyses suggest that the change in the number of FTE primary care DOs could range from a decrease of 16% to an increase of 25%.
- Our base case estimate of the future supply of primary care PAs suggests that the number of FTE primary care PAs in California will increase by 95% between 2024 and 2035. Sensitivity analyses suggest that the decrease could range from 71% to 126%.
- Our base case estimate of the future supply of primary care NPs suggests that the number of

FTE primary care NPs in California will increase by 20% between 2024 and 2035. Sensitivity analyses suggest that the change in the number of FTE primary care NPs could range from a decrease of 8% to an increase of 34%.

Future Demand for Primary Care Physicians, PAs, and NPs

- Under the base case scenario, California will demand 31,055 FTE physicians providing primary care in 2035. Sensitivity analyses suggest that demand in 2035 could range from 30,733 to 31,963 FTE primary care physicians.
- Under the base case scenario, California will demand 13,118 FTE primary care PAs and NPs in 2035 as members of the primary care team. Sensitivity analyses suggest that demand in 2035 could range from 12,982 to 13,502 FTE primary care PAs and NPs.

Adequacy of the Future Supply of Primary Care Physicians, PAs, and NPs

- Estimates of future supplies of physicians, PAs, and NPs providing primary care in California are sensitive to assumptions about the numbers of clinicians providing primary care at baseline and about rates of inflow of new licensees and rates of outflow of clinicians whose licenses lapse due to death, retirement, relocation to another state, or another reason, or who transition from primary care to specialty practice.
- Under the base case supply-and-demand scenarios, California will have a shortage of 7,229 physicians providing primary care in 2035.
    - A shortage would occur under all five supply scenarios and all three demand scenarios.
    - The least severe shortage would occur if the outflow of primary care physicians is lower than in the base case supply scenario and the rate of population growth is lower than in the base case population growth scenario.
    - The most severe shortage would occur if the outflow of primary care physicians is higher than the base case scenario and the rate of population growth is higher than in the base case population growth scenario.
- Under the base case supply-and-demand scenarios, California will have a surplus of 4,265 PAs and NPs providing primary care in 2035.
    - A surplus would occur under all five supply scenarios and all three demand scenarios.
    - The smallest surplus would occur if the inflow of primary care NPs and PAs is lower than in the base case scenario and the rate of population growth is higher than in the base case population growth scenario.
    - The largest surplus would occur if the inflow of primary care NPs and PAs is higher than in the base case scenario and the rate of population growth is lower than in the base case population growth scenario.

Limitations of Data Available to Estimate Supply and Demand for Primary Care Team Members in California

Despite recent strides to improve and expand the collection of health workforce data in California, important gaps remain in the availability of data on California's primary care workforce that limit the ability to estimate supply and demand and develop evidence-based policy recommendations.

- The state government's collection of data on the primary care workforce is limited to licensed clinicians.

- Newly licensed clinicians who initially train in primary care specialties are not tracked over time to determine the percentage who continue to provide primary care (as opposed to completing additional training to become a specialist).
- Response options for surveys of licensed clinicians in primary care specialties cannot be used to distinguish those who provide primary care from those who work in outpatient specialty practices.
- Response options for other licensed clinicians (e.g., behavioral health clinicians, nurses, pharmacists) do not distinguish those who practice as part of primary care teams from those who work in specialty outpatient care practices.
- State government does not collect data on community health workers / *promotores,* medical assistants, or other unlicensed members of primary care teams.

The main report for this project, Policy Recommendations to *Strengthening California's Primary Care Team Workforce: Data and Recommendations for Action*, presents recommendations to address these gaps in the availability of comprehensive workforce data for all members of the primary care team.

Endnotes

1. Linda McCauley et al., *Implementing High-Quality Primary Care: Rebuilding the Foundation of Health Care*, National Academies Press, 2021.
2. Jill Yegian, *The Case for Investing in Primary Care in California* (PDF), California Health Care Foundation, April 2022.
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11. William R. Phillips et al., "Pathways to Primary Care: Charting Trajectories from Medical School Graduation Through Specialty Training," *Health Affairs* 44, no. 5 (2025): 580–88.
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15. *2023 Statistical Profile of Recently Board Certified PAs: Annual Report* (PDF), National Commission on Certification of Physician Assistants, 2024.
16. Jen Joynt et al., *California's Nurse Practitioner Workforce: Understanding Demographics, Education, and Scope of Practice*, CHCF, 2024.
17. *Data Resource Book* (2018/19–2022/23), ACGME.
18. Some residents take longer than three years to complete a family medicine, internal medicine, or pediatrics residency program due to medical, parental, or other forms of leave, but the authors do not have data to enable estimation of the percentage who take longer than three years to graduate.
19. Author tabulation of data from the Integrated Postsecondary Education Data System, "Awards/degrees conferred by program (6-digit CIP code), award level, race/ethnicity, and gender, academic years 2018-2019 to 2022-2023," US Department of Education.
20. Marcy Ainslie et al., "Nurse Practitioner Program Enrollment Trends and Predictions," *Journal of Professional Nursing* 55 (November–December 2024): 97–104.
21. The authors considered using the average annual rate of growth in the number of newly licensed NPs from 2017/18 to 2022/23 but decided against this because the average annual rate of growth in newly licensed NPs (12%) does not seem sustainable.
22. Spetz et al., California's Primary Care Workforce.
23. Joynt et al., California's Nurse Practitioner Workforce.
24. Alicia K. Quella et al., "Retention and Change in PAs' First Years of Employment," *Journal of the American Academy of Physician Assistants* 34, no. 6. (2021): 40–43.
25. Andrzej Kozikowski et al., "Physician Assistant/Associate Career Flexibility: Factors Associated with Specialty Transitions," *BMC Health Services Research* 24 (2024): 1660.
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27. Visits per individual FTE may vary substantially across primary care practices, especially in practices in which the roles of primary care NPs and PAs differ from those of primary care physicians.
28. *Report P-1C: Total Population by 5-Year Age Group and Sex, 2020–2070*, California Department of Finance, 2025.
29. Hans Johnson et al., *California's Population*, Public Policy Institute of California, 2025.
30. *2024 Statistical Profile of Board Certified Physician Assistants: Annual Report* (PDF), National Commission on Certification of Physician Assistants, 2025; and Parth K. Modi et al., "Employment of Independently Billing Advanced Practice Clinicians," *JAMA Health Forum* 6, no. 9 (2025): e253903.