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California's Nurse Practitioners: How Scope of Practice Laws Impact Care

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About Healthforce Center at UCSF

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ABOUT THIS SERIES

This paper is one of a series that examines the scope of practice of selected California health professions. The series looks at professions discussed by the California Future Health Workforce Commission and its subcommittees and workgroups during spring and summer of 2018. Each brief begins by describing the profession, including its legally permissible scope of work, and educational requirements. The brief then outlines how California's permissible scope of practice compares with that of other states and provides a summary of research studies on the impact of the profession's scope of practice on access to care, care quality, and costs. Finally, it summarizes demographic characteristics, practice settings, and geographic distribution.

Visit www.futurehealthworkforce.org to learn more.

California is 1 of 28 states that restricts nurse practitioners (NPs) by requiring that they practice and prescribe with physician oversight, and it is the only western state with this requirement. A large body of research has linked such restrictions to lower supply of NPs, poorer access to care for state residents, lower use of primary care services, and greater rates of hospitalizations and emergency department visits. Although proponents of scope of practice restrictions argue that physician oversight is necessary to ensure quality of care, dozens of studies demonstrate both that the quality of NP care is comparable to that of physician care, and that there is no difference in the quality of care when there are no physician oversight requirements. Finally, several studies have found that full practice authority for NPs is associated with lower costs of care.

This paper describes the regulations that govern the scope of practice for NPs in California and in other states, and summarizes recent research on how these laws impact care.

Overview of the Profession

Nurse practitioners (NPs) are registered nurses (RNs) who have completed additional education to prepare them to deliver a broad range of services including the diagnosis and treatment of acute and chronic illnesses.¹ Nurse practitioners trace their history to the late 1950s, when RNs with clinical experience began to collaborate with physicians in the delivery of primary care, particularly in rural areas. Nurse practitioners are one of four categories of advanced practice registered nurses (APRNs): NPs, certified nurse-midwives (CNMs), nurse anesthetists, and clinical nurse specialists.

NPs provide a broad array of health services, including taking health histories and performing physical exams, diagnosing and treating acute and chronic illnesses, providing immunizations, performing procedures, ordering and interpreting lab tests and x-rays, coordinating patient care across multiple providers, providing health

A large body of research has linked restrictions on scope of practice to lower supply of NPs, poorer access to care for state residents, lower use of primary care services, and greater rates of hospitalizations and emergency department visits.

How Scope of Practice Is Modified in California

Scope of practice laws establish the legal framework that controls the delivery of medical services. The reach of these laws encompasses the full range of licensed health professionals — ranging from physicians and physical therapists to podiatrists and dental hygienists. Scope of practice laws govern which services each category of licensed health professional is allowed to provide and the settings in which they may do so.

With few exceptions, scope of practice statutes are set by state governments. State legislatures consider and pass the statutes that govern health care practices. Regulatory agencies, such as medical and other health professions boards, implement the statutes through the writing and enforcement of rules and regulations.

Such laws and regulations vary widely from state to state. Some states allow individual professions broad latitude in the services they may provide, while others employ strict limits. The nature of the limitations can either facilitate or hinder patients' ability to see a particular type of provider, which in turn influences health care costs, access, and quality.

education and counseling, and prescribing and managing medications and other therapies. The Veterans Health Administration reports that the roles of NPs are similar to those of physicians in their system,² and NPs are a key source of care in community health centers and nurse-managed health centers nationwide.³ For a detailed look at NP demographics and practice patterns in California, see Appendix A.

Nurse Practitioner Education

The first formal education program for nurse practitioners was established at the University of Colorado in 1965 with a focus on the delivery of primary care in rural communities.⁴ The program was codesigned by a physician and a nurse. This and other early NP education programs conferred certificates, and many of the initial graduates of these programs had received their RN education in hospital-based diploma programs. The California Board of Registered Nursing (BRN) began certifying NPs in 1985, and all states now certify or license NPs.

Forty-five states and the District of Columbia require completion of a master's, postgraduate, or doctorate degree from an accredited NP program, and then certification from a nationally recognized certifying body such as the American Academy of Nurse Practitioners or the American Nurses Credentialing Center.⁵ NP certification in California can be obtained by successful completion of an NP education program that meets BRN standards, or by certification through a national organization whose standards are equivalent to those of the BRN. There are 23 approved NP programs in California. Since January 2008, California requires that new NP applicants who have not been qualified or certified as an NP in California or any other state possess a master's degree in nursing, a master's degree in a clinical field related to nursing, or a graduate degree in nursing, and complete an NP program approved by the board. A nurse practitioner must have BRN certification to practice in California, but certification from a national professional association is not required.

Nurse practitioners can be prepared and certified in many clinical areas, including family practice, pediatrics, women's health, psychiatry, acute care, and community/public health. NP education covers a common range of topics including physiology, various body systems, and diagnosis and treatment of illnesses and conditions. A

recent development in NP education is the establishment of the Doctor of Nursing Practice (DNP) degree, which is offered by an increasing number of nursing schools. However, the number of NPs educated in these programs is small thus far.

Practice Oversight of Nurse Practitioners in California

In California, NP practice is governed by the state nurse practice act.⁶ The Board of Registered Nursing has promulgated regulations that require the NP to work under standardized procedures for authorization to perform overlapping medical functions (CCR § 1485).⁷ This regulation requires that NPs work under collaboration with a physician and adhere to standardized procedures developed through collaboration among administrators and health professionals, including physicians and surgeons. California NPs must obtain additional certification from the BRN to "furnish" (prescribe or order) drugs or devices under standardized procedures developed with the supervising physician and surgeon.⁸

As collaborators, physicians take legal responsibility for the NP's practice and are expected to determine the appropriate level of supervision, communicate regularly with the NP, and oversee the NP's practice and quality of care. More than half of NPs in jobs with an NP title in California report that they are "always" (39.7%) or "almost always" (16.4%) involved in the development or revision of standardized procedures. Nearly 8% of NPs report never having a voice in the development of standardized procedures.⁹

There are no rules regarding proximity of the physician to the NP, and thus a physician can provide supervision remotely — even from hundreds of miles away. In 2017, 72.6% of California NPs reported that their collaborating physician practiced in the same location they did, while 9.8% of NPs indicated that their collaborating physician was at another practice or system.¹⁰ There are no data regarding the share of California physicians who formally collaborate with one or more NPs or the share who are willing to collaborate with NPs.

One specific area of regulation concerns the prescribing of buprenorphine for the treatment of opioid use disorder in office settings. Since 2002, buprenorphine can be prescribed in office-based care settings by a provider who

has a waiver under the Drug Addiction Treatment Act of 2000.¹¹ This prescribing was limited to physicians until passage of the Comprehensive Addiction and Recovery Act (CARA) in 2016, which allows NPs and physician assistants (PAs) to obtain waivers.^{12,13} CARA stipulates that if a state requires physician oversight of NP/PA prescribing, the physician must be board certified in addiction psychiatry or addiction medicine, have completed training in medication-assisted therapy, or meet other specific qualifications. These restrictions may impact the potential for NPs to support treatment for opioid use disorder.

Overview of Regulations in Other States

State regulations regarding NP scope of practice vary widely. In an effort to encourage greater consistency across states, the National Council of State Boards of Nursing has developed a Model Act, which provides consensus-based recommendations regarding how an ideal nurse practice act should be written.¹⁴ The Model Act explicitly defines the scope of practice of APRNs

to include conducting assessments; ordering and interpreting diagnostic procedures; establishing diagnoses; prescribing, ordering, administering, dispensing, and furnishing therapeutic measures; delegating to assistive personnel; and consulting with other disciplines and providing referrals. The Model Act recommends that APRNs be licensed independent practitioners.

In 22 states and the District of Columbia, NPs can practice and prescribe without physician collaboration or supervision.¹⁵ States that require physician collaboration or supervision of NPs have a variety of specific regulations related to this supervision, described below and summarized in Table 1.^{16,17}

Formal agreements and chart review. Twenty-six states allow NPs to practice independently, but four of these require a collaborative agreement with a physician to prescribe or furnish pharmaceuticals. In some states, a physician must review a specific share of patient records, and other states specify that chart review must occur but do not specify what share.

Table 1. Selected Features of State Nurse Practitioner Scope of Practice

	NUMBER OF STATES / DETAILS
Full authority to practice and prescribe without physician collaboration	22 Alaska, Arizona, Colorado, Connecticut, District of Columbia, Hawaii, Idaho, + Iowa, Maine, Maryland, Minnesota, Montana, Nebraska, Nevada, New DC Hampshire, New Mexico, North Dakota, Oregon, Rhode Island, South Dakota, Vermont, Washington, Wyoming
Can practice without collaboration but physician involvement for prescribing	4 Arkansas, Michigan, Oklahoma, Wisconsin
Transitional supervision period	12 Colorado: 1,000 hours in mentorship with physician or APRN Connecticut: 3 years and 2,000 hours of physician oversight Delaware: 2 years and 4,000 hours of physician oversight Illinois: 4,000 hours of physician oversight, plus 250 hours of continuing education Maine: 24 months of collaboration with physician or NP Maryland: 18 months of collaboration with physician Minnesota: 2,080 hours of physician oversight Nebraska: 2,000 hours of collaboration with physician or NP Nevada: 2 years or 2,000 hours of physician oversight to prescribe New York: 3,600 hours to become exempt from requirement of written practice agreement, but collaboration still required South Dakota: 1,040 hours of collaboration with physician or APRN Vermont: 24 months and 2,400 hours of collaboration with physician or NP

Table 1. Selected Features of State Nurse Practitioner Scope of Practice, *continued*

	NUMBER OF STATES / DETAILS
Maximum number of NPs that can be supervised by a physician	8 Alabama: 3 FTEs per week Florida: no more than 4 satellite offices for primary care, stricter limits for specialty Georgia: 8 total but only 4 “at any given time” New York: 4 if not at same physical location Ohio: 5 prescribing NPs Oklahoma: 2 FTE NPs or 4 NPs total Texas: 7 FTEs Virginia: 6 NPs
Maximum distance between physician and NP	4 Alabama: physician on-site 10% of NP hours Mississippi: 75 miles Missouri: 30 miles; 50 miles in shortage area; same site for first month South Carolina: “near proximity”
Physician review of charts required	7 Alabama, Georgia, Mississippi: 10% of charts per year Missouri: every 2 weeks New York, Virginia: frequency not specified Tennessee: 20% of chart notes within 30 days
Frequency of consultation with MD specified in law	8 Alabama: 4 times per year Georgia: quarterly Illinois: monthly Mississippi: quarterly North Carolina: every 6 months but monthly for first 6 months of collaboration Ohio: annually with a chart review Tennessee: on-site visit by physician every 30 days Texas: monthly for first 3 years, then 4 times per year with monthly telecommunication

Note: Additional states may have similar regulations that were not identified.

Sources: *State Law Chart: Nurse Practitioner Practice Authority*, American Medical Association, 2017, www.ama-assn.org (PDF); and *State-by-State Guide to Laws Regarding Nurse Practitioner Prescriptive Authority and Physician Practice*, National Nurse-Led Care Consortium, September 2017, nurseledcare.org (PDF).

Physician proximity. Some states specify the maximum distance permitted between the NP and physician; some states specify the number of miles, such as Mississippi (75 miles), and some states require a certain proximity for a specified amount of time. For example, in Alabama, the physician must be on-site for at least 10% of the NP’s hours.

Consultation frequency. Some states specify the frequency of consultation between an NP and physician, which can range from every 30 days (Tennessee) to annually (Ohio). Other states require an agreement regarding

frequency of collaboration but do not specify that frequency. The frequency with which collaborative practice agreements must be reviewed is specified by some states.

Supervision rules. In many states there are limits to the number of NPs a physician can supervise. Several states permit NPs to practice without supervision after a transitional period. These states can specify the number of supervised hours required, number of months required, or both. Six of these states allow the supervision to be provided by another NP.

Recent Changes in Other States

Since 2010, 20 states have enacted regulatory changes that have provided NPs with a greater degree of practice authority, including 9 states that now allow NPs to practice without physician oversight. These changes are consistent with recommendations from leading authorities, including the National Academy of Medicine and the National Governors Association, which have stated that NPs be allowed to practice without physician oversight.^{18,19} In addition, the US Federal Trade Commission (FTC) issued a policy paper in 2014, *Competition and the Regulation of Advanced Practice Nurses*, which advised policymakers that “APRN scope of practice limitations should be narrowly tailored to address well-founded health and safety concerns, and should not be more restrictive than patient protection requires.” The FTC policy paper also noted that the FTC has “consistently urged state legislators to avoid imposing restrictions on APRN scope of practice unless those restrictions are necessary to address well-founded patient safety concerns.”²⁰

States have gradually granted NPs authority to practice autonomously. Between 2011 and 2017, NPs were granted full authority to practice and prescribe without physician oversight in nine states: North Dakota (2011), Vermont (2011), Nevada (2013), Rhode Island (2013), Connecticut (2014), Minnesota (2014), Maryland (2015), Nebraska (2015), and South Dakota (2016). In addition, incremental changes were made to provide NPs with greater practice authority in Alabama, Delaware, Florida, Illinois, Kentucky, Michigan, New York, Ohio, Texas, Utah, and West Virginia.²¹ Seven of the states that have recently established full practice authority for NPs require a transitional period of oversight by a physician or NP; the exceptions are North Dakota and Rhode Island.

Prescribing authority, one major element of NP scope of practice, has changed over the years. In 2006, Georgia became the last state to grant NPs prescriptive authority,²² and in 2016, Florida became the last state to authorize NPs to prescribe controlled substances.²³ Today, NPs hold prescription privileges in all 50 states and the District of Columbia. NPs may prescribe controlled substances, including Schedule III substances in every state and Schedule II substances, such as oxycodone, methadone, and fentanyl, in all but 7 states.²⁴

A similar trend toward expanded practice authority is visible at the federal level. In 2016, the US Department of

Veterans Affairs announced new regulations permitting full practice authority for the nearly 6,000 APRNs in its workforce, allowing them “to practice to the full extent of their education, training, and certification, regardless of State restrictions that limit such full practice authority.”²⁵

Examining the Evidence for Practice Expansion: A Summary of Research

NPs and physicians both agree that it’s valuable for NPs to have some association with physicians.²⁶ However, daily autonomy of NPs and their ability to fully use their skills is diminished when state regulations require physician oversight.²⁷ In a 2017 survey, 60.2% of California NPs reported “always fully using their NP skills,” and an additional 21% were almost always doing so. California’s relatively restrictive scope of practice regulations may be a factor for the 19% of NPs who are not at least “almost always” fully using their skills.²⁸ A large body of research has examined the relationship between scope of practice regulations for NPs and access to care, quality of care, and health care costs (see Tables 2, 3, and 4).

Access to Care

Physician supply will meet less than half of demand for primary care in 2030, but this gap can be filled by projected growth in nurse practitioner and physician assistant supply.²⁹ Many policy leaders point to the elimination of unnecessary barriers to nurse practitioners’ practice as a means to address primary care shortfalls, particularly in rural and underserved areas.^{30,31}

Rural and vulnerable populations. Numerous studies have found that state regulations requiring physician oversight of NPs and other restrictions on NP practice are associated with decreased access to care for patients, particularly in rural regions and for Medicaid enrollees. In 2016, a systematic review of the impact of state NP scope of practice regulations on health care delivery determined that “[s]tates granting NPs greater SOP authority tend to exhibit (a) an increase in the number and growth of NPs through higher APRN educational enrollment and migration and (b) greater provision of primary care by NPs and expanded health care utilization, especially among rural and vulnerable populations.”³²

Removing barriers to mental health care. The large projected shortfall of psychiatrists in California can be lessened by the use of psychiatric/mental health NPs because both can prescribe medications.^{33,34} Two papers have reported that scope of practice regulations create barriers to the use of psychiatric/mental health NPs in public health systems in California, in part because public

health directors find the regulations confusing and have difficulty finding psychiatrists who are willing to supervise NPs.^{35,36}

See Table 2 for a compilation of recent research findings on access to care.

Table 2. Access-to-Care Research Findings

Full practice authority	SOURCE
▶ States in which NPs have full practice authority have a larger supply of NPs.	P. B. Reagan and P. J. Salsberry, "The Effects of State-Level Scope-of-Practice Regulations on the Number and Growth of Nurse Practitioners," <i>Nursing Outlook</i> 6, no. 1 (2013), 392–99.
▶ NPs in states with full practice and prescribing authority are more likely to practice in primary care, in rural regions, and with Medicaid patients. They also are more likely to practice in areas with lower socioeconomic and health status.	P. I. Buerhaus et al., "Practice Characteristics of Primary Care Nurse Practitioners and Physicians," <i>Nursing Outlook</i> 63, no. 2 (Mar./Apr. 2015): 144–53, doi:10.1016/j.outlook.2014.08.008; and M. A. Davis et al., "Supply of Healthcare Providers in Relation to County Socioeconomic and Health Status," <i>Journal of General Internal Medicine</i> 33, no. 4 (2018): 412–14.
▶ NPs are more likely to work in primary care in states with full scope of practice, and also are more likely to provide primary care if the state also reimburses NPs at 100% of the physician Medicaid fee-for-service rate.	H. Barnes et al., "Effects of Regulation and Payment Policies on Nurse Practitioners' Clinical Practices," <i>Medical Care Research and Review</i> 74, no. 4 (2016): 431–51, doi:10.1177/1077558716649109.
▶ Removing scope of practice restrictions could modestly expand the capacity of the primary care workforce in the short run.	J. A. Graves et al., "Role of Geography and Nurse Practitioner Scope-of-Practice in Efforts to Expand Primary Care System Capacity: Health Reform and the Primary Care Workforce," <i>Medical Care</i> 54, no. 1 (Jan. 2016): 81–89, doi:10.1097/MLR.0000000000000454.
▶ The share of patients for whom NPs billed Medicare independently grew more rapidly when NPs had full practice authority.	Y.-F. Kuo et al., "States with the Least Restrictive Regulations Experienced the Largest Increase in Patients Seen by Nurse Practitioners," <i>Health Affairs</i> 32, no. 7 (2013): 1236–43, doi:10.1377/hlthaff.2013.0072.
▶ There are fewer avoidable hospitalizations and hospital readmissions in states in which NPs have full practice authority.	G. Oliver et al., "Impact of Nurse Practitioners on Health Outcomes of Medicare and Medicaid Patients," <i>Nursing Outlook</i> 62, no. 6 (2014): 440–47.
▶ The NP supply to health professional shortage areas rose more rapidly between 2009 and 2013 in states that did not require physician oversight.	Y. Xue et al., "Full Scope-of-Practice Regulation Is Associated with Higher Supply of Nurse Practitioners in Rural and Primary Care Health Professional Shortage Counties," <i>Journal of Nursing Regulation</i> 8, no. 4 (2018): 5–13.
▶ Access to primary care is greater in states in which physician oversight is not required.	K. Stange, "How Does Provider Supply and Regulation Influence Health Care Markets? Evidence from Nurse Practitioners and Physician Assistants," <i>Journal of Health Economics</i> 33 (2014): 1–27.
▶ Patients have shorter travel times to their closest primary care provider in states that do not require physician oversight of NPs.	D. F. Neff et al., "The Impact of Nurse Practitioner Regulations on Population Access to Care," <i>Nursing Outlook</i> (2018), online ahead of print.
▶ The frequency of routine checkups increases and emergency room use for patients with ambulatory care-sensitive conditions declines when states eliminate regulations requiring physician oversight of NPs.	J. Traczynski and V. Udalova, "Nurse Practitioner Independence, Health Care Utilization, and Health Outcomes," <i>Journal of Health Economics</i> 58 (2018): 90–109.

Table 2. Access-to-Care Research Findings, continued

Relaxing restrictions on SOP	SOURCE
<ul style="list-style-type: none"> States that relaxed restrictions on SOP experienced growth in the number of routine checkups, improvements in quality-of-care measures, and decreases in emergency room use by patients with ambulatory care-sensitive conditions. 	<p><i>Impact of State Scope of Practice Laws and Other Factors on the Practice and Supply of Primary Care Nurse Practitioners</i>, US Department of Health and Human Services, November 2015.</p>
<ul style="list-style-type: none"> Relaxation of NP scope of practice regulations is associated with retail clinic growth, which offers patients a convenient, low-cost source of care for common acute conditions such as urinary tract infection and bronchitis. 	<p>J. M. B. Carthon et al., "Growth in Retail-Based Clinics Following Nurse Practitioner Scope of Practice Reform," <i>Nursing Outlook</i> 65, no. 2 (Mar.–Apr. 2016): 195–201, doi:10.1016/j.outlook.2016.11.001.</p>
SOP regulations create barriers to care	
<ul style="list-style-type: none"> Scope of practice regulations create barriers to the use of psychiatric/mental health NPs in public health systems in California, in part because public health directors find the regulations confusing and have difficulty finding psychiatrists who are willing to supervise NPs. 	<p>S. A. Chapman et al., "Utilization and Economic Contribution of Psychiatric Mental Health Nurse Practitioners in Public Behavioral Health Services," <i>American Journal of Preventive Medicine</i> 54, no. 6, suppl. 3 (June 2018): S243–49; and B. Phoenix, M. Hurt, and S. A. Chapman, "Experience of Psychiatric Mental Health Nurse Practitioners in Public Mental Health," <i>Nursing Administration Quarterly</i> 40, no. 3 (July–Sept. 2016): 212–24, doi:10.1097/NAQ.0000000000000171.</p>

Quality of Care

Some proponents of restrictive scope of practice regulations for NPs cite concerns about the quality of care that might be provided by NPs relative to physicians, since NP education is shorter and more narrowly focused on primary care and a subset of specialty fields. However, multiple systematic reviews of the literature conclude that NPs provide care of comparable quality as physicians, even when NPs practice without physician oversight.³⁷ Findings were similar for studies that looked at primary care in general and for studies that looked at specific aspects of patient care, such as prescribing, chronic disease management, and ordering diagnostic tests. Researchers looking at long-term care settings and at rural and community health centers came up with similar findings.

More tests? Two studies, published in 1999 and 2015, report that NPs order more tests and generate more specialty referrals than physicians. Both studies, however, have significant shortcomings including small sample size, possibly misattribution of who ordered

tests, insignificant differences, and subanalyses with contradictory findings.^{38–40} As mentioned, other studies have found that NPs do not order more tests or produce more specialty referrals than physicians.

Surveys of nurse practitioners. Nurse practitioners report that restrictive scope of practice laws negatively impact the quality of care they are able to provide. In the BRN survey of California NPs, 11.3% of those employed in NP positions say scope of practice restrictions are a major barrier to their ability to provide high-quality care, and 29.1% say scope of practice restrictions are a minor barrier. Similarly, an exploratory survey found that NPs perceived that requirements for physician oversight impacted their practice and may jeopardize patient safety.⁴¹

See Table 3 on page 10 for a detailed list of research findings on quality of care.

Table 3. Quality-of-Care Research Findings

General	SOURCE
<ul style="list-style-type: none"> ▶ NPs provide primary care of similar quality as physicians and, in some aspects, NP quality of care may be higher. 	<p>R. P. Newhouse et al., "Advanced Practice Nurse Outcomes 1990-2008: A Systematic Review," <i>Nursing Economics</i> 29, no. 5 (Sept.–Oct. 2011): 230–50.</p>
<ul style="list-style-type: none"> ▶ Eleven quality and patient outcomes measures for NPs are comparable to or better than those achieved by physicians. 	<p>J. Stanik-Hutt et al., "The Quality and Effectiveness of Care Provided by Nurse Practitioners," <i>Journal for Nurse Practitioners</i> 9, no. 8 (2013): 492–500.</p>
<ul style="list-style-type: none"> ▶ Patients with NPs as usual and supplemental providers had more primary care visits than patients with physician-only care. No differences were seen for hospitalizations or unmet need. 	<p>C. M. Everett, P. Morgan, and G. L. Jackson, "Primary Care Physician Assistant and Advance Practice Nurses Roles: Patient Healthcare Utilization, Unmet Need, and Satisfaction," <i>Healthcare (Amsterdam)</i> 4, no. 4 (Dec. 2016): 327–33, doi:10.1016/j.hjdsi.2016.03.005.</p>
Long-term care	
<ul style="list-style-type: none"> ▶ Long-term care settings that rely upon APRNs have lower rates of numerous adverse outcomes and greater satisfaction among family members with the long-term services and supports provided by APRNs. 	<p>F. Donald et al., "A Systematic Review of the Effectiveness of Advanced Practice Nurses in Long-Term Care," <i>Journal of Advanced Nursing</i> 69, no. 10 (2013), 2148–61.</p>
<ul style="list-style-type: none"> ▶ An NP-led pain management team in a nursing home produced significant improvements in resident pain and functional status. 	<p>S. Kaasalainen et al., "The Effectiveness of a Nurse Practitioner-Led Pain Management Team in Long-Term Care: A Mixed Methods Study," <i>Intl. Journal of Nursing Studies</i> 62 (Oct. 2016): 156–67, doi:10.1016/j.ijnurstu.2016.07.022.</p>
<ul style="list-style-type: none"> ▶ Closing an NP-led program of all-inclusive care for the elderly (PACE) led to increases in emergency department visits, hospitalizations, and nursing home placements. 	<p>M. J. Meunier et al., "Life After PACE (Program of All-Inclusive Care for the Elderly): A Retrospective/Prospective, Qualitative Analysis of the Impact of Closing a Nurse Practitioner Centered PACE Site," <i>Journal of the Amer. Assn. of Nurse Practitioners</i> 28, no. 11 (Nov. 2016): 596–603.</p>
Chronic disease management	
<ul style="list-style-type: none"> ▶ For VA patients with diabetes and cardiovascular disease, there were comparable outcomes for NPs, PAs, and physicians for glycemic and blood pressure control, statin use, number of specialty care visits, lipid panels, use of beta blockers, and other quality measures. 	<p>N. N. Faza et al., "Effectiveness of NPs and PAs in Managing Diabetes and Cardiovascular Disease," <i>JAAPA: official journal of the Amer. Academy of Physician Assistants</i> 31, no. 7 (2018): 39–45.</p>
<ul style="list-style-type: none"> ▶ Diabetes management by NPs and PAs was comparable to management by physicians among VA patients. 	<p>Y. Yang et al., "Nurse Practitioners, Physician Assistants, and Physicians Are Comparable in Managing the First Five Years of Diabetes," <i>Amer. Journal of Medicine</i> 131, no. 3 (2018): 276–83, doi:10.1016/j.amjmed.2017.08.026.</p>
Medicare patients	
<ul style="list-style-type: none"> ▶ Among Medicare patients, there are no significant differences in chronic disease management, cancer screening, preventable hospitalizations, and adverse outcomes of care provided by primary care NPs as compared with physicians. 	<p>P. Buerhaus et al., "Quality of Primary Care Provided to Medicare Beneficiaries by Nurse Practitioners and Physicians," <i>Medical Care</i> 56, no. 6 (2018): 484–90, doi:10.1097/MLR.0000000000000908.</p>
<ul style="list-style-type: none"> ▶ The finding of no differences persists when comparing NP versus physician practice in states with and without physician oversight. 	<p>J. Perloff et al., "Association of State-Level Restrictions in Nurse Practitioner Scope of Practice with the Quality of Primary Care Provided to Medicare Beneficiaries," <i>Medical Care Research and Review</i>, published ahead of print, Sept. 1, 2017, doi:10.1177/1077558717732402.</p>

Table 3. Quality-of-Care Research Findings, continued

Community health and rural health centers	SOURCE
<ul style="list-style-type: none"> ▶ Within community health centers, there is no statistically significant difference between NP and physician care for eight of nine primary care outcomes, and NPs were more likely to provide smoking cessation counseling. 	<p>E. T. Kurtzman and B. S. Barnow, "A Comparison of Nurse Practitioners, Physician Assistants, and Primary Care Physicians' Patterns of Practice and Quality of Care in Health Centers," <i>Medical Care</i> 55, no. 6 (2017): 615–22.</p>
<ul style="list-style-type: none"> ▶ There are no statistically significant differences in the same quality measures between states in which NPs have full practice authority versus physician oversight. NP visits in states with prescriptive independence received more educational services and medications; it could not be determined whether receiving more medications was good or bad. 	<p>E. T. Kurtzman et al., "Does the Regulatory Environment Affect Nurse Practitioners' Patterns of Practice or Quality of Care in Health Centers?," <i>Health Services Research</i> 52, suppl. 1 (2017): 437–58, doi:10.1111/1475-6773.12643.</p>
<ul style="list-style-type: none"> ▶ There is no statistically significant difference in quality of care for rural health centers in states with full NP practice authority compared to centers in states with restricted NP practice. 	<p>J. Ortiz et al., "Impact of Nurse Practitioner Practice Regulations on Rural Population Health Outcomes," <i>Healthcare</i> 6, no. 65 (2018).</p>
Prescribing and ordering of tests	
<ul style="list-style-type: none"> ▶ Statewide rates of prescribing of opioid and benzodiazepine medications are not different between states with restricted practice versus full practice authority for NPs. 	<p>L. Schirle and B. E. McCabe, "State Variation in Opioid and Benzodiazepine Prescriptions Between Independent and Nonindependent Advanced Practice Registered Nurse Prescribing States," <i>Nursing Outlook</i> 64, no. 1 (2016): 86–93.</p>
<ul style="list-style-type: none"> ▶ The quality of prescribing by NPs and PAs is similar to the care delivered by physicians for 10 of 13 prescribing quality indicators, and there is no consistent directional association for the remaining three measures. 	<p>S. Jiao et al., "Quality of Prescribing by Physicians, Nurse Practitioners, and Physician Assistants in the United States," <i>Pharmacotherapy</i> 38, no. 4 (2018): 417–27.</p>
<ul style="list-style-type: none"> ▶ For patients with neck or back pain, NPs and PAs were less likely than primary care physicians to order a computed tomography (CT) or magnetic resonance image (MRI), or narcotic analgesic, and NPs/PAs were more likely to order a non-narcotic analgesic or muscle relaxant. For acute respiratory infection patients, NPs/PAs were more likely to order any antibiotic but less likely to order an x-ray, broad-spectrum antibiotic, or rapid strep test. 	<p>D. W. Roblin et al., "Provider Type and Management of Common Visit in Primary Care," <i>Amer. Journal of Managed Care</i> 23, no. 4 (2017): 225–31.</p>
<ul style="list-style-type: none"> ▶ The use of NPs/PAs in patient care was not associated with higher use of specialty referrals, advanced diagnostic imaging, emergency department visits, or hospitalizations. 	<p>H. Liu et al., "The Impact of Using Mid-Level Providers in Fact-to-Face Primary Care on Health Care Utilization," <i>Medical Care</i> 55, no. 1 (2017): 12–18.</p>
<ul style="list-style-type: none"> ▶ NPs/PAs are slower to adopt new pharmaceuticals in the care of new chronic disease patients; this may be due to NPs/PAs being more focused on evidence-based practice, receiving less intense marketing from drug companies, or being more attentive to costs. 	<p>Z. A. Marcum et al., "New Chronic Disease Medication Prescribing by Nurse Practitioners, Physician Assistants, and Primary Care Physicians: A Cohort Study," <i>BMC Health Services Research</i> 16 (2016): 312, doi:10.1186/s12913-016-1569-1.</p>
<ul style="list-style-type: none"> ▶ NPs had higher rates of antibiotic prescribing compared to physicians for pediatric patients for upper respiratory tract infections, although it is not clear if this was an indicator of good or bad care. 	<p>E. H. Ference et al., "Antibiotic Prescribing by Physicians Versus Nurse Practitioners for Pediatric Upper Respiratory Infections," <i>Annals of Otolaryngology & Laryngology</i> 125, no. 12 (2016): 982–91, doi:10.1177/0003489416668193.</p>
<ul style="list-style-type: none"> ▶ NP performance of screening colonoscopy results in similar safety, accuracy, and satisfaction as physicians. 	<p>M. Limoges-Gonzalez et al., "Comparisons of Screening Colonoscopy Performed by a Nurse Practitioner and Gastroenterologists: A Single-Center Randomized Controlled Trial," <i>Gastroenterology Nursing</i> 34, no. 3 (May–June 2011): 210–16, doi:10.1097/SGA.0b013e31821ab5e6.</p>

Productivity and Cost of Care

Restrictive NP scope of practice regulations could affect the cost of care in two key ways. First, by limiting the supply of NPs and access to care, patients may be more likely to use expensive services including emergency departments. Second, employed physicians' salaries and bonuses are often based on personal productivity, and the time required to supervise an NP reduces the number of patients the physician can see. Physicians thus often expect payment to compensate for their supervisory work; market data find that practices offer physicians stipends for NP supervision ranging between \$5,000 and \$15,000 per year.⁴² This cost is passed to the payers of health care services.

Cost-effective. Several research teams have examined the cost-effectiveness of NP practice, including in team-based care, and found that NP care is linked to better patient outcomes in ambulatory care, and is potentially cost saving.

Lower cost of care. Other researchers focused specifically on whether health care costs are lower when NPs do not have to be overseen by physicians, and found that eliminating physician oversight is associated with lower costs for ambulatory care and well-child visits, as well as in retail clinics. Removal of scope of practice restrictions also decreases the number of malpractice payments made by physicians by as much as 31%.

See Table 4 for a detailed list of research findings on productivity and cost of care.

Table 4. Productivity and Cost-of-Care Research Findings

NP practice in general	SOURCE
<ul style="list-style-type: none"> ▶ NPs in ambulatory care roles contribute positively to patient outcomes at a reasonable cost and are potentially cost saving. 	<p>R. Martin-Misener et al., "Cost-Effectiveness of Nurse Practitioners in Primary and Specialized Ambulatory Care: Systematic Review," <i>BMJ Open</i> 5 (2015), doi:10.1136/bmjopen-2014-007167.</p>
<ul style="list-style-type: none"> ▶ Teams made up of NPs and community health workers in a program to reduce cardiovascular risk led to better patient outcomes at minimal additional cost. 	<p>J. K. Allen et al., "Cost-Effectiveness of Nurse Practitioner/Community Health Worker Care to Reduce Cardiovascular Health Disparities," <i>Journal of Cardiovascular Nursing</i> 29, no. 4 (2014): 308–14.</p>
<ul style="list-style-type: none"> ▶ A simulation model found that a rural NP/PA can generate 4.4 local jobs if the community does not have a hospital, and 18.5 jobs if it does. 	<p>F. C. Eilrich, "The Economic Effect of a Physician Assistant or Nurse Practitioner in Rural America," <i>JAPPA: official journal of the Amer. Academy of Physician Assistants</i> 29, no. 10 (2016): 44–48, doi:10.1097/01.JAA.0000496956.02958.dd.</p>
NP practice without required oversight by physicians	
<ul style="list-style-type: none"> ▶ Eliminating physician oversight could reduce health care costs, particularly for state governments, since they are important payers for health services through Medicaid. 	<p>M. A. Fraser and C. Melillo, "Expanding the Scope of Practice of APRNs: A Systematic Review of the Cost Analyses Used," <i>Nursing Economics</i> 36, no. 1 (2018): 23–28.</p>
<ul style="list-style-type: none"> ▶ Full practice authority for NPs is associated with lower ambulatory care costs. Evaluation and management payments for beneficiaries assigned to an NP were 29% less than payment for beneficiaries assigned to primary care physicians. There also were lower payments for inpatient and office visit payments. 	<p>J. Perloff, C. M. DesRoches, and P. Buerhaus, "Comparing the Cost of Care Provided to Medicare Beneficiaries Assigned to Primary Care Nurse Practitioners and Physicians," <i>Health Services Research</i> 51, no. 4 (2016): 1407–23.</p>
<ul style="list-style-type: none"> ▶ The cost savings associated with retail clinics are greater when NPs have full practice authority. 	<p>J. Spetz et al., "Scope-of-Practice Laws for Nurse Practitioners Limit Cost Savings That Can Be Achieved in Retail Clinics," <i>Health Affairs</i> 32, no. 11 (2013): 1977–84.</p>
<ul style="list-style-type: none"> ▶ NP scope of practice restrictions increase the price of a well-child visit by 3% to 16%, with no difference in quality outcomes. 	<p>M. M. Kleiner et al., "Relaxing Occupational Licensing Requirements: Analyzing Wages and Prices for a Medical Service," <i>Journal of Law & Economics</i> 59, no. 2 (2016): 261–91.</p>
<ul style="list-style-type: none"> ▶ Removal of scope of practice restrictions between 1999 and 2012 decreased the number of malpractice payments made by physicians by as much as 31%. 	<p>B. J. McMichael, "The Extraregulatory Effect of Nurse Practitioner Scope-of-Practice Laws on Physician Malpractice Rates," <i>Medical Care Research and Review</i> 75, no. 3 (2018): 312–26.</p>

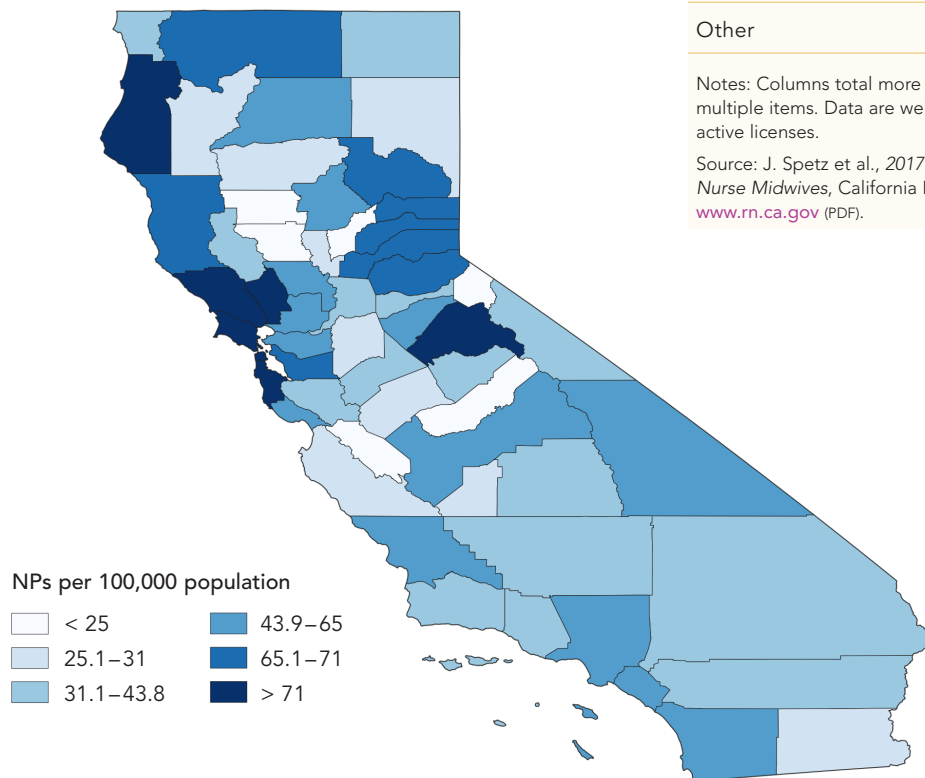
Appendix A. The Landscape of Nurse Practitioners

In 2017, 20,337 certified NPs lived in California; the number increased 39% from 2010, when there were 14,636 certified NPs,^{43,44} compared to approximately 120,000 in 2007 to more than 234,000 in 2017 nationally.⁴⁵

The distribution of NPs varies across California (Figure A1). Higher NP-to-population ratios are generally found in the San Francisco Bay Area, northern coast (Humboldt and Mendocino Counties), and Sierra region east of Sacramento. Lower ratios are observed in the northern Sacramento Valley and northern San Joaquin Valley.

NPs can specialize in one or more fields; most focus on primary care–related fields such as family care, adult gerontological care, or pediatric care (Table A1). Psychiatric/mental health care is the focus of 7.8% of those who have NP certification and 5.5% of dual NP-CNMs, indicating that about 1,573 NPs have education in this field.

Figure A1. Distribution of Nurse Practitioners in California



Source: Author's calculations based on data from the California Board of Registered Nursing, 2017, and the California Department of Finance.

Table A1. Field of Educational Specialization for NPs and NP-CNMs Residing in California

FIELD OF SPECIALIZATION	NP ONLY	DUAL CERTIFIED
Family/individual	62.8%	22.8%
Adult primary care	24.6%	13.0%
Pediatric primary care	16.2%	5.4%
Women's health / gender-related	15.8%	92.7%
Geriatric primary care	13.6%	2.0%
Acute care — adult/geriatric	9.7%	4.2%
Psychiatric/mental health	7.8%	5.5%
Occupational health	3.0%	0.0%
Acute care — pediatric	2.9%	1.9%
Palliative care / hospice	2.2%	0.5%
Oncology	2.1%	0.0%
Perinatal	1.8%	30.3%
Neonatology	1.0%	4.1%
Midwifery	0.3%	95.6%
Other	5.1%	1.0%

Notes: Columns total more than 100% because respondents could select multiple items. Data are weighted to represent all NPs and CNMs with active licenses.

Source: J. Spetz et al., 2017 Survey of Nurse Practitioners and Certified Nurse Midwives, California Board of Registered Nursing, April 11, 2018, www.rn.ca.gov (PDF).

Demographic Characteristics

The California BRN commissioned a survey of NPs and certified nurse-midwives (CNMs) in 2017.⁴⁶ At the time the survey was conducted, 20,337 certified NPs were living in California, 569 of whom were dually certified as an NP and a CNM. Some of the information provided in the survey report separates those with NP-only certification from those with dual certification.

The majority (53.4%) of NPs is over 45, and almost two-thirds of dual-certified NP-CNMs are over 45. The largest age group for NPs in 2017 was 35 to 44 years, accounting for 32.3% of the population (Figure A2).

NPs are predominantly female, with only 10.1% of NPs and 1.5% of NP-CNMs being male in 2017. As seen in Figure A3, more than 60% of NPs are non-Hispanic white, while more than 80% of NP-CNMs are non-Hispanic white. The largest non-white ethnicities for NPs are Hispanic, (8.4%), Filipino (8.3%), and other Asian/Pacific Islander (10.9%).

Practice Settings of California NPs

Nurse practitioners are key providers of primary care, particularly for underserved populations and rural communities.^{47,48} About half of nurse practitioners practice mainly in primary care, while others provide some primary care services along with specialty care, public health service, and patient education.⁴⁹ Primary care physician practices are increasingly using NPs in the delivery of care in both rural and urban areas, as found in an analysis of data from 2008 to 2016.⁵⁰ Rural NPs generally have more autonomy in their practice than urban NPs.⁵¹

More than three-quarters of NPs were employed in advanced practice positions in 2017 (Table A2, page 15). Employment rates of NPs vary somewhat between urban and rural areas. NPs with only NP certification have higher employment rates in rural areas, while those with dual NP-CNM certification have a higher employment rate in urban areas.

Among those certified solely as NPs and employed in advanced practice, 94.8% reported that their job title was “nurse practitioner” in 2017. Among those dual certified, 20.1% had the job title of NP and 74.1% had the job title of CNM.

Figure A2. Age Distribution of NPs and NP-CNMs, 2017

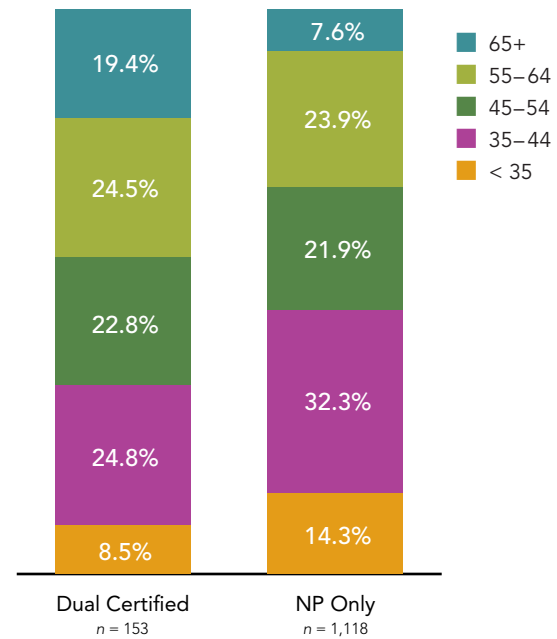
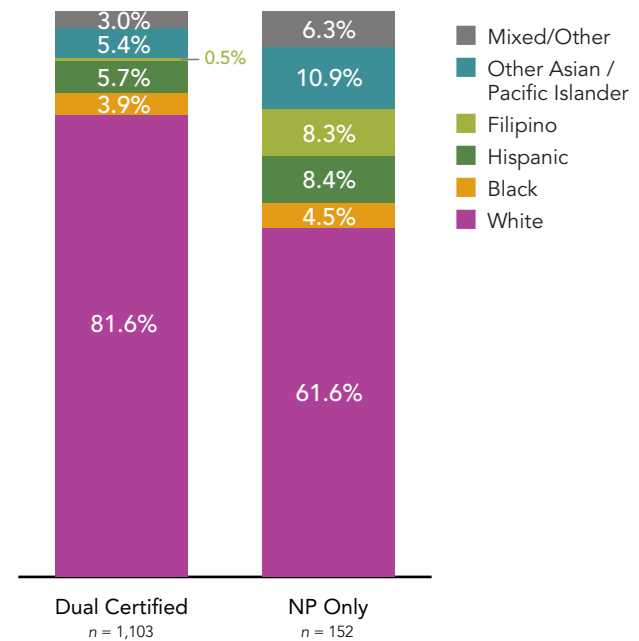


Figure A3. Race/Ethnic Distribution of NPs and NP-CNMs Residing in California, 2017



FIGURES A2 AND A3:

Note: Data are weighted to represent all NPs and CNMs with active licenses.

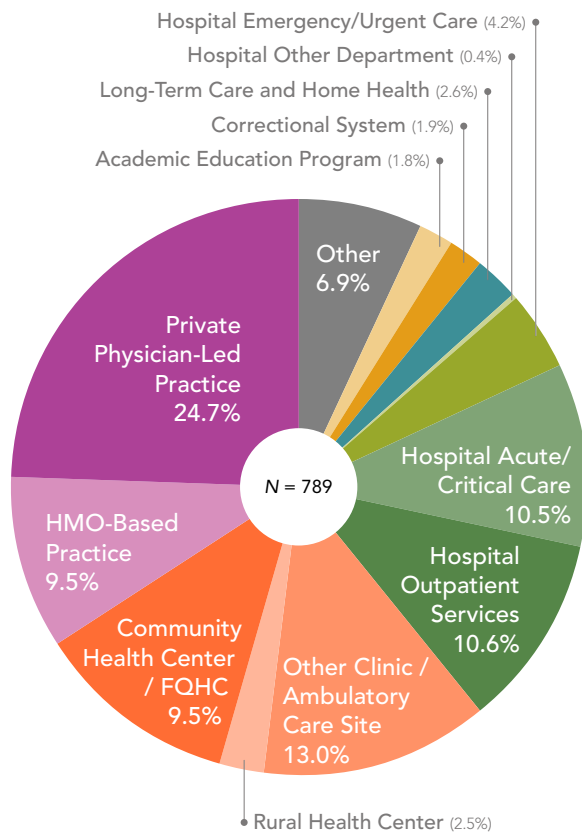
Source: J. Spetz et al., 2017 Survey of Nurse Practitioners and Certified Nurse Midwives, California Board of Registered Nursing, April 11, 2018, www.rn.ca.gov (PDF).

Table A2. Employment Rates in Advanced Practice Positions for California-Residing NPs and NP-CNMs, 2017

GEOGRAPHIC REGION	NP ONLY	DUAL CERTIFIED
Overall	77.2%	83.7%
Large urban areas	77.4%	
Commuting region for large urban areas	71.2%	84.3%*
Large rural areas	72.9%	
Small rural areas	79.0%	66.4%*
Isolated small rural areas	74.7%	
Number of cases	1,113	151

*Urban and rural categories were combined for dual-certified NP-CNMs due to small sample sizes.

Figure A4. Work Settings of California Employed NPs, 2017



About two-thirds of NPs work in ambulatory settings (66.1%) (Figure A4). The most common employment setting is private physician-led practices (24.7%), and large numbers of NPs work in community health centers and Federally Qualified Health Centers (FQHCs) (11.4%), hospital-based ambulatory services (10.6%), and HMO-based practices (9.5%). Over 10% provide acute or critical care within a hospital, 2.6% work in long-term care, 1.9% work in correctional facilities, and 1.8% work in academic education programs.

Among those employed with the job title of NP, 58.8% reported that they provide primary care and, among those, 53.6% reported that they spend 100% of their time delivering primary care, and 7.3% provide primary care 91% to 99% of the time.

Earnings from primary positions with NP job titles are summarized in Table A3. NPs who provide primary care at least half of their time earn less than other NPs. Among all NP positions, those residing in urban areas average about \$15,000 more per year than those living in rural areas.

Table A3. Earnings from Current Primary NP Job, All and Primary Care-Focused Positions, by Region, 2017

	ALL POSITIONS		50% OR MORE TIME IN PRIMARY CARE	
	EARNINGS	NUMBER OF CASES	EARNINGS	NUMBER OF CASES
Statewide	\$111,890	730	\$99,988	374
Urban	\$112,261	575	\$100,151	271
Rural	\$97,267	155	\$96,757	103

TABLES A2 AND A3, FIGURE A4:

Note: Data are weighted to represent all NPs (and CNMs) with active licenses.

Source: J. Spetz et al., 2017 Survey of Nurse Practitioners and Certified Nurse Midwives, California Board of Registered Nursing, April 11, 2018, www.rn.ca.gov (PDF).

Those in NP jobs were asked about the insurance coverage of their patients (Table A4); 23.4% of NPs think more than half of their patients are insured by Medicare, 28.1% report more than half of their patients are insured by Medicaid, and 14.1% believe more than half of their patients are uninsured. NPs who live in rural regions are more likely to report that more than half of their patients are uninsured, at 19.3%. NPs who provide primary care at least half of their time are more likely to report that more than half their patients are insured by Medicaid (35.2%) or Medicare (26.6%), or be uninsured (19.3%). More than three-quarters of NPs reported that their practices are currently accepting Medicare fee-for-service patients, 69.4% are currently accepting Medicaid patients, and 53.8% are currently accepting uninsured patients.

Nurse practitioners can be recognized by private insurance companies as primary care providers. Only 31.3% of those with an NP position report they are recognized as a primary care provider. However, more than half of rural NPs (51.2%) are primary care providers in their primary NP position. Additionally, 41.6% of those who report they spend at least half their time providing primary care are recognized as primary care providers by private insurance companies.

Research teams from several institutes have examined the caseloads and roles of NPs as compared with physicians. One study reported that NP and PA visits in community health centers are more often for chronic disease management and preventive care,⁵² and another reported that NPs are more likely to provide patient education within community health centers.⁵³

Table A4. Estimated Insurance Coverage of Patients at Current Primary NP Job, 2017

SHARE OF PATIENTS WITH COVERAGE	MEDICARE FEE-FOR-SERVICE	MEDICAID FEE-FOR-SERVICE	PRIVATE INSURANCE	OTHER GOVERNMENT PROGRAM	UNINSURED
None	10.1%	10.4%	27.9%	23.6%	14.0%
1%–25%	37.2%	40.3%	38.2%	55.3%	44.7%
26%–50%	29.3%	21.2%	17.8%	12.4%	27.2%
51%–75%	11.3%	12.2%	7.1%	2.7%	3.7%
76%–99%	8.7%	11.8%	7.5%	1.5%	5.8%
100%	3.4%	4.1%	1.5%	4.5%	4.6%

Notes: Number of cases = 569. Data are weighted to represent all NPs with active licenses.

Source: J. Spetz et al., *2017 Survey of Nurse Practitioners and Certified Nurse Midwives*, California Board of Registered Nursing, April 11, 2018, www.rn.ca.gov (PDF).

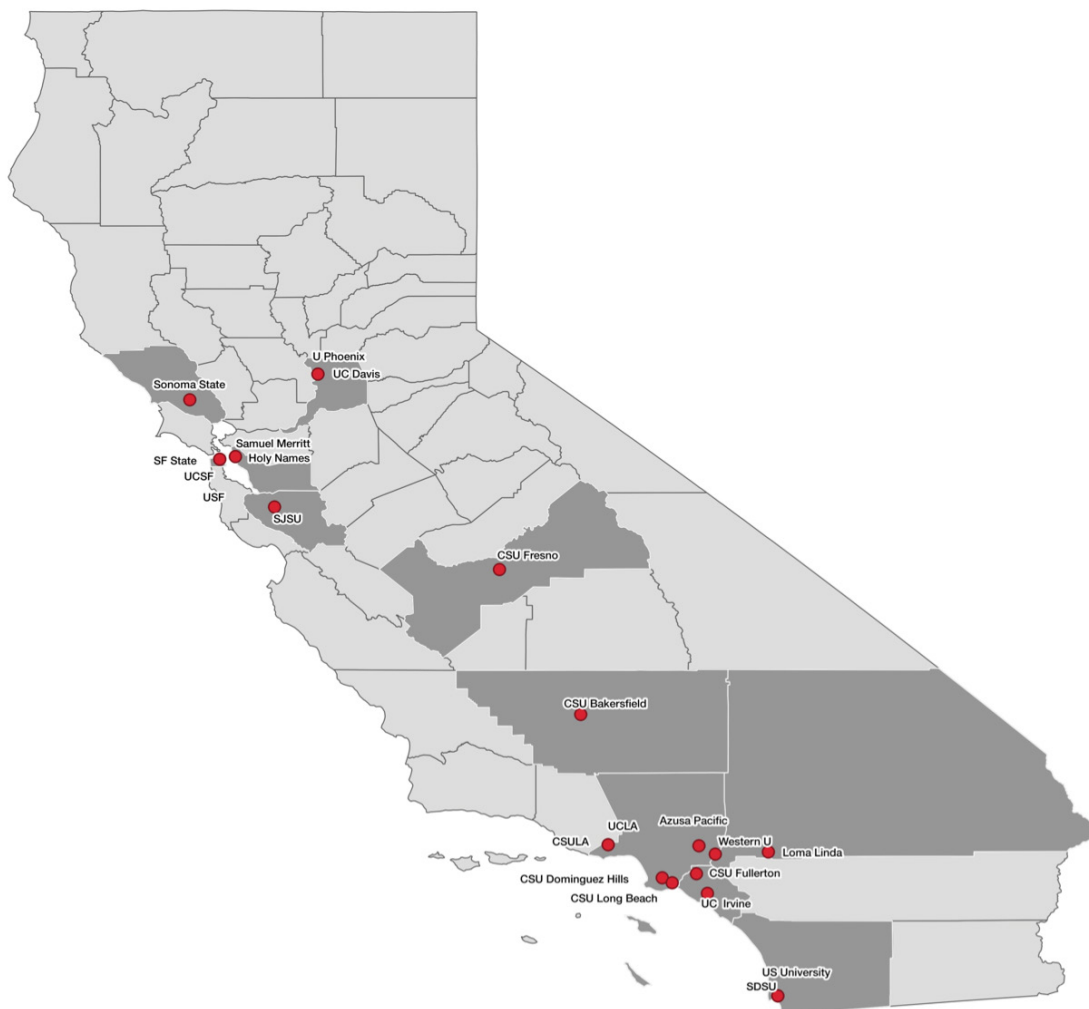
Pipeline of NPs into the Workforce

California has 23 NP education programs, most of which are in the Los Angeles and San Francisco Bay areas (Figure A5). There are only 2 programs in the San Joaquin Valley and none north of Sacramento or in the Central Coast region.

In 2017, there were 1,744 new California certificates issued to NPs in the state. The number of graduates has nearly tripled since 2007, when there were 597 graduates. Similar growth has been reported nationally; approximately 23,000 people completed NP education programs in the US in the 2015–16 year,⁵⁴ which is more than three times the 6,611 graduates in 2003.⁵⁵

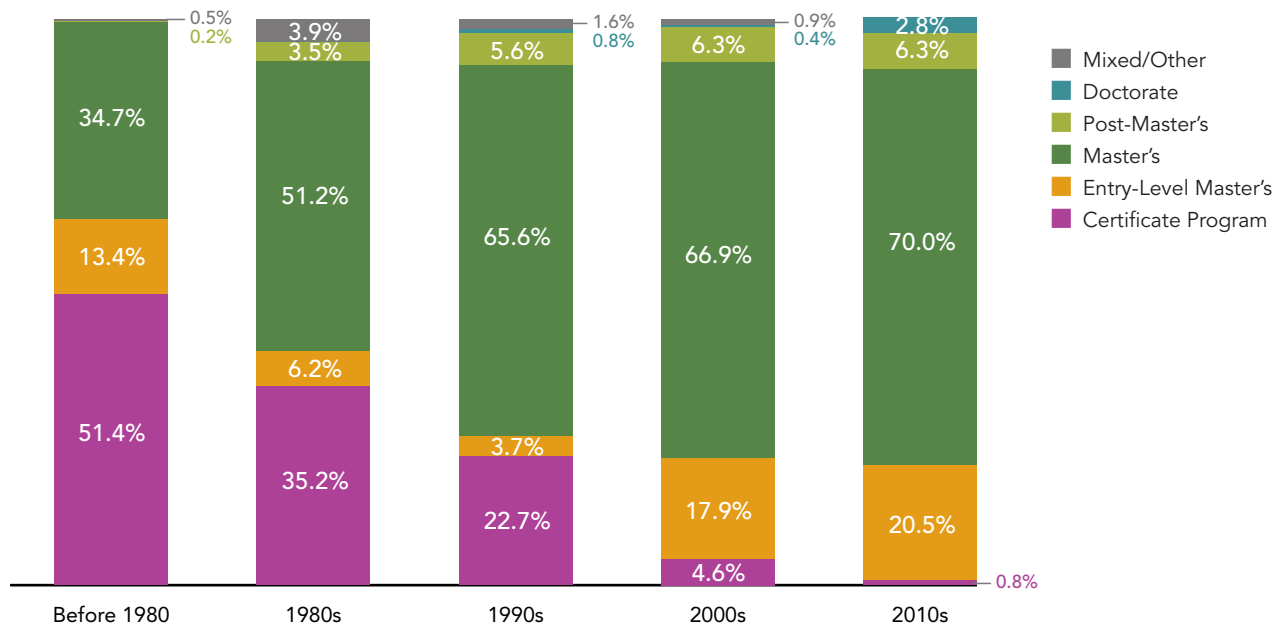
There has been a shift in the types of initial education completed by NPs and CNMs over time (Figure A6, page 18). Prior to 1980, most NPs received their initial education from nondegree certificate-granting programs. These programs have declined to a negligible share of programs, while master's degree programs have become the dominant initial education, with more than 90% of initial NP education at this level. There also has been growth in the share of initial NP education from doctoral programs, almost entirely due to the emergence and growth of doctor of nursing practice (DNP) programs since 2004, when the American Association of Colleges of Nursing recommended that the DNP become the standard for initial APRN education.

Figure A5. Location of NP Education Programs in California



Source: California Board of Registered Nursing Advanced Practice Programs, www.rn.ca.gov.

Figure A6. Initial NP Education by Decade, for NPs and NP-CNMs



Notes: Number of cases = 1,151. Data are weighted to represent all NPs and CNMs with active licenses.

Source: J. Spetz et al., 2017 Survey of Nurse Practitioners and Certified Nurse Midwives, California Board of Registered Nursing, April 11, 2018, www.rn.ca.gov (PDF).

Appendix B. State Regulations Requiring a Transitional Supervised Period of Practice

	TRANSITIONAL PERIOD	DETAILS
Colorado	1,000 hours	Mentorship with a physician or advanced practice nurse who has prescriptive authority and experience in prescribing medications.
Connecticut	3 years and at least 2,000 hours	Supervision by a physician.
Delaware	2 years and 4,000 hours	Collaborative practice with a physician.
Illinois	4,000 hours of clinical experience and 250 hours of continuing education	Collaboration with a physician.
Maine	24 months	Collaboration with a physician or another NP who has practiced as an NP for at least 5 years and has at least 10 years of total clinical experience.
Maryland	18 months	Collaboration with a physician.
Minnesota	2,080 hours	Collaboration with a physician.
Nebraska	2,000 hours	Collaboration with a physician or NP.
Nevada	2 years or 2,000 hours	Clinical experience with physician oversight.
New York	3,600 hours	After 3,600 hours the NP is exempt from requirements for written practice agreement and written protocols. However, the NP must have a collaborative relationship with one or more licensed physicians.
South Dakota	1,040 hours	Collaboration with a physician, NP, or nurse-midwife.
Vermont	24 months and 2,400 hours	Collaboration with a physician or NP. NPs who obtain a subsequent certification in an additional role and population focus must have a formal collaborative agreement in that new practice area for at least 12 months and 1,600 hours.

Sources: *State Law Chart: Nurse Practitioner Practice Authority*, American Medical Association, 2017, www.ama-assn.org (PDF); and *State-by-State Guide to Laws Regarding Nurse Practitioner Prescriptive Authority and Physician Practice*, National Nurse-Led Care Consortium, September 2017, nurseledcare.org (PDF).

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