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California's Physician Assistants: How Scope of Practice Laws Impact Care

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The California Health Care Foundation is dedicated to advancing meaningful, measurable improvements in the way the health care delivery system provides care to the people of California, particularly those with low incomes and those whose needs are not well served by the status quo. We work to ensure that people have access to the care they need, when they need it, at a price they can afford.

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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.

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Numerous studies find that physician assistants (PAs) provide high-quality care and are more likely to practice in rural regions and with underserved populations. California's restrictions on physician assistant practice create a barrier to growth of team-based care and to improvements in the efficiency of health care services.

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

Overview of the Profession

Physician assistants are state-licensed health professionals who practice medicine in collaboration with physicians and other providers, including diagnosing illness, creating treatment plans, and prescribing medications.¹ The education and training that PAs receive allows them to occupy a wide range of clinical practice areas, including family medicine / general practice, emergency medicine, surgical subspecialties, and internal medicine subspecialties,² and it significantly overlaps with medical education.³

Physician Assistant Education

Duke University founded the nation's first PA program in 1965. It was a two-year program that was based on traditional medical education, and it provided training for individuals without prior health care experience. This approach was expanded upon by the MEDEX program at the University of Washington in 1968, which focused on training those who already had considerable health experience — in particular, returning veterans who had been trained as medics. By 1974 there were MEDEX programs across the nation, and today all states have at least one physician assistant education program.⁴

PA education programs are offered at the master's degree level, and the vast majority now require prior health care experience and possession of a bachelor's degree for admission, although some programs offer a combined, accelerated bachelor's and master's degree. The curriculum includes instruction in basic medical sciences along with clinical rotations in medical and surgical disciplines, and students must complete at least 2,000 hours of supervised clinical practice.⁵ PAs in California are licensed by the California Physician Assistant Board and must obtain a qualifying score on the Physician Assistant National Certifying Exam, administered by the National Commission on Certification of Physician Assistants

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.

(NCCPA). Although PAs must take the certifying exam as part of the initial licensure process, California does not require PAs to maintain NCCPA certification to practice in the state, but most choose to renew their certifications; the share of licensed PAs in California who are not NCCPA-certified is estimated to be less than 10%.⁶

Practice Oversight of Physician Assistants in California

In California, PA practice is regulated by the Physician Assistant Practice Act (Bus. & Prof. Code §§ 3500 et seq.), which establishes the Physician Assistant Board within the jurisdiction of the California Medical Board, and sections 1399.500 et seq. of the California Code of Regulations.⁷ These statutes define the requirements of PA education and training, stipulate the authority of PAs to provide medical services (including the prescribing of medications), and define the structure of the collaborative relationship between physicians and PAs regarding supervision and oversight.

The American Academy of Physician Assistants (AAPA) outlined six key elements of a modern physician assistant practice act.⁸ These elements, which are meant to encourage practitioner accountability, allow PAs to practice to the fullest extent of their education and training, promote flexibility and efficiency at the practice level, improve health care access and quality, and reduce costs. States meet these six criteria to varying degrees; eight states have a practice act that includes all of the elements. California's PA practice act reflects four of the six elements; the following two gaps represent opportunities for statutory reform.

Collaboration Limits

The first concerns limits on the number of PAs with whom a single physician may collaborate. The current ratio is a maximum of four PAs per physician and was defined in the California Physician Team Practice Improvement Act of 2007 (AB 3, ch. 376); the previous ratio had been two PAs per physician. The American Academy of Physician Assistants⁹ and both the American College of Physicians¹⁰ and the American Osteopathic Association¹¹ have adopted a formal policy position stating that physician-to-PA ratios should not be standardized, but rather determined at the practice level and be reflective of practice and community needs.

Cosignatory Requirements

The second area for potential statutory reform concerns cosignatory requirements, which function as the process by which physicians review PA medical decisionmaking. California defines cosignatory requirements for PAs and physicians by statute, rather than allowing such requirements to be determined at the organization or practice level. However, the state enacted legislation recently (SB 337, ch. 536 of 2015) that provides an alternative mechanism for demonstrating physician oversight. The legislation was intended to reduce the administrative burden of the review process and was supported by the California Physician Assistant Committee (CPAC).

Prior to the passage of SB 337, physicians were required to review, countersign, and date a sample of at least 5% of a PA's caseload within 30 days of treatment; this is still an accepted mechanism for physician oversight of PAs. As an alternative, SB 337 allows a PA and collaborating physician to conduct a monthly review (either in person or electronically) of at least 10 medical records of patients who were treated by the PA, for at least 10 months of each year. It is also allowable for a PA and collaborating physician to use some combination of the new monthly review process and the preexisting "sample caseload" review mechanism. The new law also reduced the review requirement for cases where a PA has prescribed a Schedule II drug from 100% to a sample of 20%, provided the PA is prescribing per protocol and has successfully completed an approved education course on controlled substances.¹²

Comparison to Other States

A taxonomy of restrictiveness developed at George Washington University categorizes California among the middle group of states: In terms of scope of practice restrictiveness, there are 22 states less restrictive and 15 states more restrictive.¹³ (See Appendix B for a schematic illustrating state-level differences in the adoption of each practice element.)

Key Elements of a Modern Physician Assistant Practice Act

- ▶ **Licensure as the regulatory term.** Licensure, in contrast to “certified” or “registered,” denotes a higher level of scrutiny regarding professional qualifications, in addition to vesting regulatory authority with the state.
- ▶ **Full prescriptive authority.** The ability of PAs to prescribe all legal medications including Schedule II–V controlled substances.
- ▶ **Scope of practice determined at the practice level.** The ability of PAs and the care teams of which they are part to determine what medical services the PA provides within the legal scope of practice, rather than having to use a defined list of services determined by statutory language or a state agency.
- ▶ **Adaptable collaboration requirements.** The ability of PAs and physicians to determine how they work together to provide medical care, without regulations such as requirements that a physician be on-site.
- ▶ **Cosignatory requirements determined at the practice level.** The ability of PAs and the care teams they collaborate with to determine when, and the extent to which, a physician signs off on a PA’s medical orders or otherwise reviews a PA’s medical decisionmaking.
- ▶ **Number of PAs a single physician may collaborate with determined at the practice level.** The ability of PAs and their health care teams to determine how many PAs can collaborate with a single physician, as opposed to having a limit imposed by statutory language.

Source: American Academy of Physician Assistants.

Examining the Evidence for Practice Expansion: A Summary of Research

Physician assistants are trained to provide medical services across a range of settings. Allowing them to practice to the fullest extent of their education and training is widely seen as an effective way to address issues of health care access, quality, and cost. This section summarizes recent research on this interrelated set of issues.

Access to Care

The statutory limit on the number of PAs a single physician may collaborate with can negatively affect access to care. Such a cap limits the ability of health care organizations to expand to meet demand for services, particularly as community health centers are increasingly reliant on PAs to provide care within tight budget constraints.¹⁴ In addition, PAs are more likely than physicians to provide care in rural areas and to low-income and underserved populations; supervision regulations can impede PA workforce growth in these settings.¹⁵ Similarly, the chief nurse practitioner officer for MinuteClinic has cited PA-to-physician ratios as one of the biggest issues limiting the use of PAs to provide care in the retail clinic setting.¹⁶

Quality of Care

A body of research dating from the early 2000s indicates that PAs are providing care that achieves similar clinical outcomes to those produced by physicians. In addition, there is evidence that patients are increasingly comfortable and satisfied with the care provided by PAs.¹⁷ PAs play important roles alongside nurse practitioners (NPs) in many outpatient and primary care settings, and thus researchers often consider both in studies of quality of care. These studies have reported similar quality of care, service utilization, and referral patterns for physicians, PAs, and NPs in community health centers, and PAs and NPs were more likely to provide health education.¹⁸ Research in the VA health care system has reported similar quality of care in the treatment of diabetes and cardiovascular disease.¹⁹ House calls conducted by PAs for cardiac surgery patients have been shown to reduce 30-day readmission rates by 25%.²⁰

A number of studies have examined the quality of care provided by PAs in hospital settings. One reported that increasing the number of PAs on hospitalist care teams had no effect on clinical outcomes and resulted in a lower cost of care;²¹ similarly, pediatric patients treated by PAs in emergency departments had similar rates of returning to the emergency department and readmissions as physicians did.²² A study of a PA consultation service for patients with acute myelogenous leukemia reported shorter lengths of stay, lower readmission rates, and fewer additional consultations, with equivalent mortality rates.²³ PA leadership of a preoperative venous thromboembolism risk-assessment process resulted in improvements in patient safety.²⁴ One study of patients in an intensive care unit staffed with both PAs and NPs reported similar outcomes as other intensive care units.²⁵

Cost of Care

The cost-effectiveness of PA-provided care is largely the result of two interrelated factors. The first is that PAs are paid less than physicians. The second factor is productivity; as part of a team-based practice, PAs can significantly increase team productivity by assuming responsibility for portions of the care that might otherwise be provided by physicians.²⁶ Researchers have found that health care organizations that employ more PAs and NPs and/or allow them to provide a full range of primary care services have lower costs, lower use of services and advanced diagnostic imaging, fewer ED visits, and fewer inpatient hospital stays.²⁷ PAs and NPs are no more likely than physicians to provide care that deviates from well-established guidelines or to offer low-value health care services.²⁸

A key challenge associated with measuring the cost-effectiveness of care provided by PAs is the phenomenon of “incident to billing,” whereby care provided by a PA is billed under a collaborating physician’s National Provider Identifier number. There are specific guidelines that govern how collaborating PAs and physicians bill for the services they provide,²⁹ but there remain concerns that a lack of transparency in the process continues to obscure the direct care provided by PAs, which in turn contributes to the challenge of measuring the full impact of PAs on both cost and quality of care.

Appendix A. The Landscape of Physician Assistants

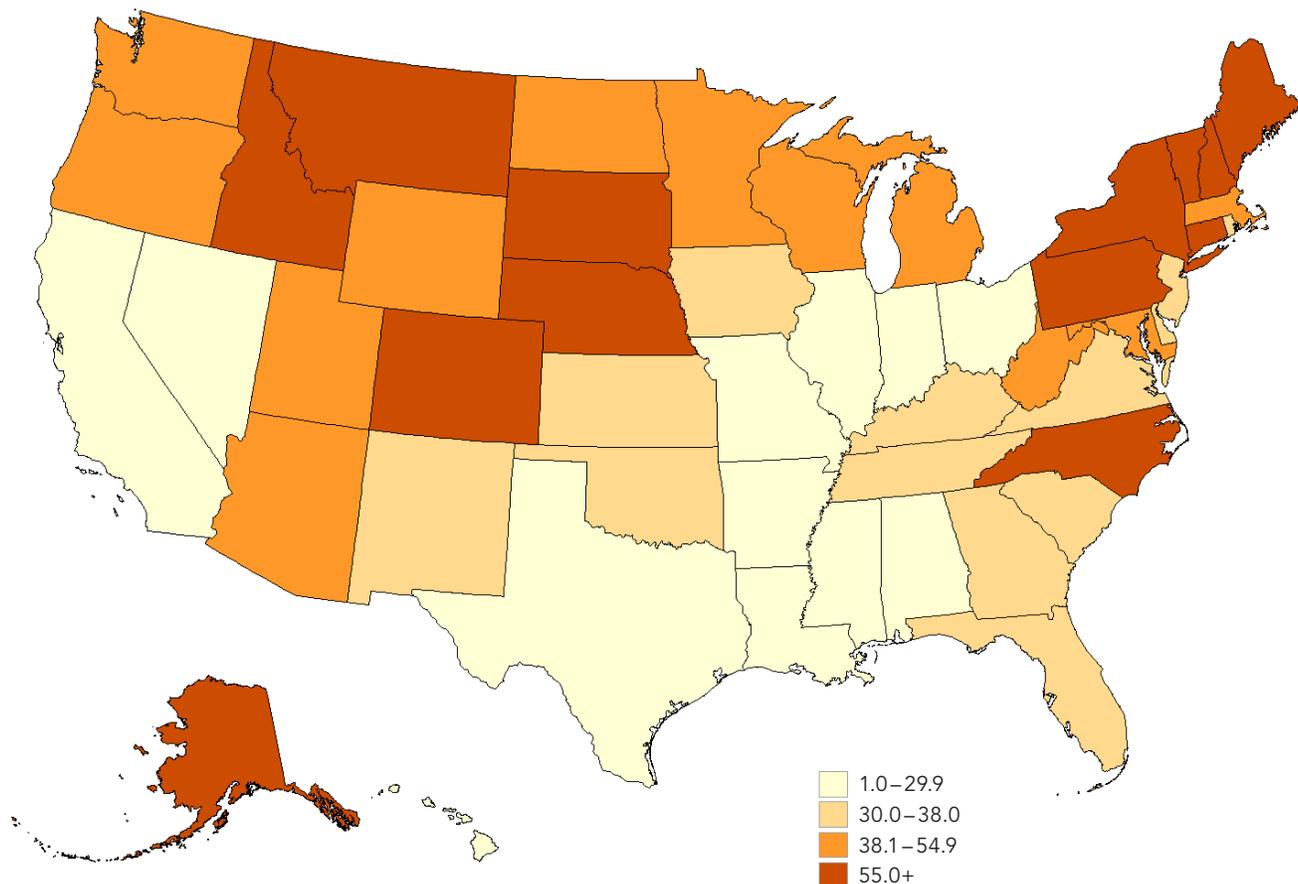
Current Number of PAs and Their Geographic Distribution

As of December 31, 2017, California had a total of 9,499 certified PAs (only New York has more). However, Figure A1 shows that California had one of the lowest rates of PAs per capita, at 24 per 100,000 residents.³⁰

The per capita distribution of PAs across California varies widely by region. Figure A2 shows that California's most rural region (the Northern and Sierra region) had the

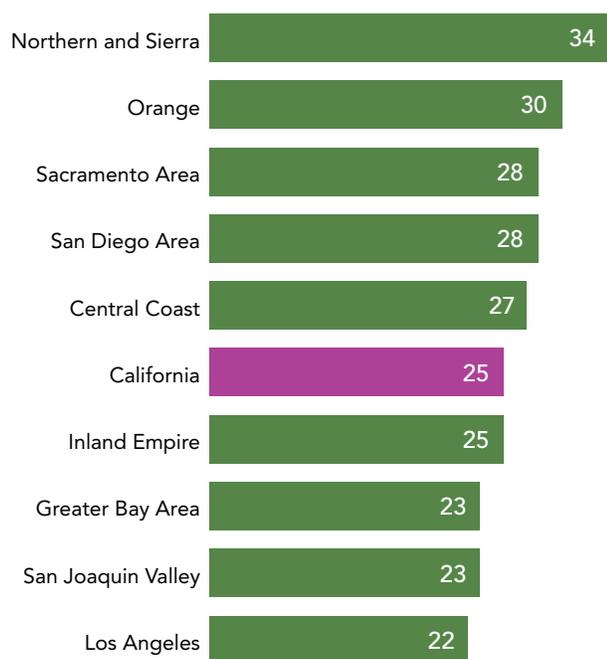
highest 2016 per capita ratio (34 per 100,000 population) (see page 8). The Los Angeles, Greater Bay Area, and San Joaquin regions had considerably lower per capita ratios. Prior research has found higher concentrations of PAs (along with NPs) in geographic areas with low ratios of physicians per capita,³¹ such as the Northern and Sierra region of California, and these data underscore that finding. PAs are an effective means of addressing access-to-care issues for underserved areas.

Figure A1. Certified Physician Assistants per 100,000 Population, by State, 2017



Source: 2016 Statistical Profile of Certified Physician Assistants by State, National Commission on Certification of Physician Assistants, www.nccpa.net.

Figure A2. Actively Licensed PAs per 100,000 Population, by California Region, 2016



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

Sources: Custom tabulation, California Department of Consumer Affairs, 2016; and *Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015*, US Census Bureau.

Demographic Characteristics

Table A1 compares the 2016 demographic profile of certified PAs in California with the United States. There is only a small difference in the gender composition of PAs in California compared to the US overall. The age distribution of certified PAs in California skews toward older providers compared with the US, as the share of PAs in California under the age of 30 is approximately half what it is nationally. The racial composition of certified PAs in California is considerably more diverse compared to the US. Although Table A1 does not distinguish Latino or Hispanic ethnicity from race, data reported separately (from the same source) indicate that in 2016 approximately 17% of certified PAs in California identified as Latino or Hispanic, compared to just 6% nationally. In addition, over 50% of certified PAs in California reported the ability to communicate with a patient in a language other than English, compared to just 23% of the US PA workforce overall.³²

Table A1. Demographic Characteristics of Certified PAs, California vs. United States, 2016

	CA	US
Gender		
▶ Male	34.9%	32.3%
▶ Female	65.1%	67.7%
Age Group		
▶ Under 30	9.2%	17.2%
▶ 30–39	37.5%	37.6%
▶ 40–49	27.7%	23.2%
▶ 50–59	15.7%	13.7%
▶ 60 and over	10.0%	8.3%
Racial Group*		
▶ White	67.0%	86.7%
▶ Asian	16.3%	5.4%
▶ Black / African American	4.6%	3.9%
▶ Native Hawaiian / Pacific Islander	1.7%	0.4%
▶ American Indian / Native Alaskan	0.4%	0.4%
▶ Other	10.0%	3.2%

*Does not distinguish Latino or Hispanic ethnicity from race.

Source: *2016 Statistical Profile of Certified Physician Assistants by State*, National Commission on Certification of Physician Assistants, www.nccpa.net.

Practice Settings

Physician assistants in California predominantly work in an office-based private practice (46%) or in a general acute care hospital (30%). Other common employment settings include community health centers (9%) and rural health clinics (3%).³³ Table A2 shows the clinical practice areas most frequently reported by certified PAs and demonstrates that PAs in California are more likely to be working in the area of family medicine / general practice compared to the US overall. In addition, in 2016, 34% of PAs in California were practicing in a primary care setting compared to 28% of PAs nationally.

Table A2. Common Clinical Practice Areas for Certified PAs, California vs. United States, 2016

	CA	US
Primary Care*	34.1%	27.8%
Family Medicine / General Practice	27.4%	20.6%
Surgical Subspecialties	17.5%	18.5%
Emergency Medicine	14.6%	13.2%
Internal Medicine Subspecialties	6.6%	9.2%

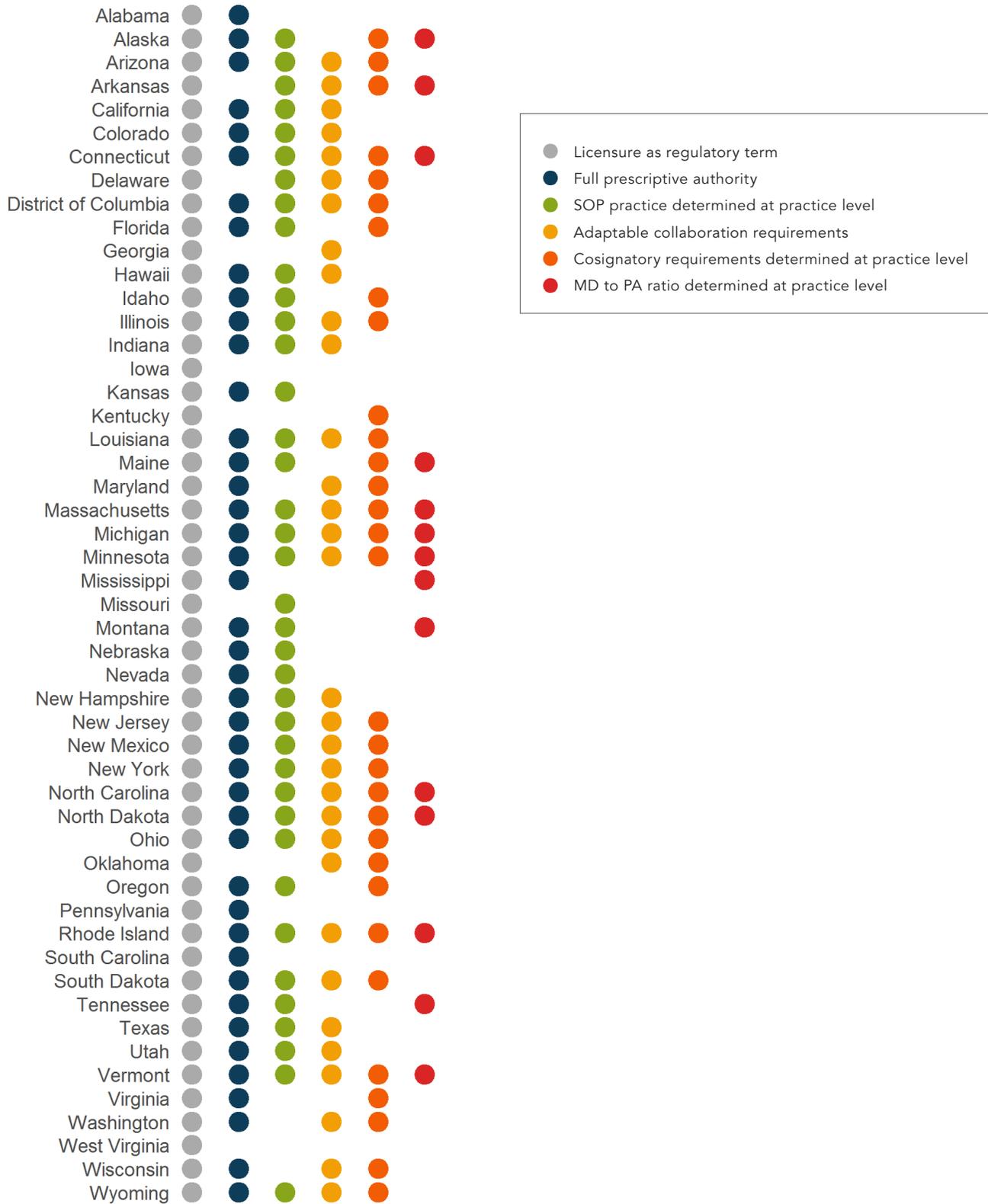
*Includes family medicine / general practice, general internal medicine, and general pediatrics.

Source: 2016 Statistical Profile of Certified Physician Assistants by State, National Commission on Certification of Physician Assistants, www.nccpa.net.

Educational Pipeline in California

There are currently 15 PA education programs in California. All but three are located in the Greater Bay Area or the Los Angeles area (LA/Orange/Riverside Counties). In combination, these 15 programs produce approximately 350 to 400 new graduates per year, which is less than half the annual number of new PA licenses issued by the state in recent years³⁴ and indicates that California has more PAs moving to California from other states than moving from California to other states. In 2015, graduates of PA training programs in California were 70% female and predominantly white (44%) or Asian (30%).³⁵

Appendix B. Physician Assistant Scope of Practice Elements, by State, 2018



Source: American Academy of Physician Assistants.

Endnotes

1. "Become a PA," American Association of Physician Assistants (AAPA), www.aapa.org; "What Is a PA," AAPA, www.aapa.org.
2. *2017 Statistical Profile of Certified Physician Assistants*, National Commission on Certification of Physician Assistants, www.nccpa.net.
3. A. J. van Vught et al., "Analysis of the Level of General Clinical Skills of Physician Assistant Students Using an Objective Structured Clinical Examination," *Journal of Evaluation in Clinical Practice* 21, no. 5 (Oct. 2015): 971–75, doi:10.1111/jep.12418.
4. J. F. Cawley, E. A. Cawthon, and R. S. Hooker, "Origins of the Physician Assistant Movement in the United States," *JAAPA: Official Journal of American Academy of Physician Assistants* 25, no. 12 (Dec. 2012): 36–42.
5. *PA Scope of Practice*, American Assn. of Physician Assistants, January 2017, www.aapa.org (PDF).
6. J. Coffman, I. Geyn, and K. Himmerick, *California's Primary Care Workforce: Current Supply, Characteristics, and Pipeline of Trainees*, Healthforce Center at UCSF, February 16, 2017, healthforce.ucsf.edu (PDF).
7. *Laws and Regulations Relating to the Practice of Physician Assistants*, Physician Assistant Board, www.pac.ca.gov (PDF).
8. *The Six Key Elements of a Modern PA Practice Act*, American Assn. of Physician Assistants, July 2016, www.aapa.org (PDF).
9. Amer. Assn. of Physician Assistants, *Six Key Elements*.
10. M. R. Zerehi and E. Rathfon, *Internists and Physician Assistants: Team-Based Primary Care*, American College of Physicians, 2010, www.acponline.org (PDF).
11. E. Rathfon and N. A. Schilligo, *Osteopathic Physicians and Physician Assistants: Excellence in Team-Based Medicine*, American Osteopathic Assn. and American Academy of Physician Assistants, July 2013, www.aapa.org (PDF).
12. For a summary of the bill's contents, see "California Improves Chart Co-Signature Requirements for PAs," press release, American Assn. of Physician Assistants, October 6, 2015, www.aapa.org and "New Law Addresses Supervision, Documentation Requirements for Physician Assistants," press release, California Hospital Assn., October 20, 2015, www.calhospital.org.
13. P. Pittman et al., "NP and PA Privileging in Acute Care Settings: Do Scope of Practice Laws Matter?," *Medical Care Research and Review* (February 27, 2018): online ahead of print, doi:10.1177/1077558718760333.
14. P. Shin, "The Health Care Safety Net: Community Health Centers' Vital Role," National Institute for Healthcare Management Foundation, July 2016, www.nihcm.org; and M. Proser et al., "Community Health Centers at the Crossroads: Growth and Staffing Needs," *JAAPA: Official Journal of the American Academy of Physician Assistants* 28, no. 4 (Apr. 2015): 49–53, doi:10.1097/01JAA.0000460929.99918.e6.
15. K. Grumbach et al., "Who Is Caring for the Underserved? A Comparison of Primary Care Physicians and Nonphysician Clinicians in California and Washington," *Annals of Family Medicine* 1, no. 2 (July 2003): 97–104, doi:10.1370/afm.49; C. M. Everett et al., "Physician Assistants and Nurse Practitioners as a Usual Source of Care," *Journal of Rural Health* 25, no. 4 (Fall 2009): 407–14, doi:10.1111/j.1748-0361.2009.00252.x; R. Wells et al., *Physician Assistants: Modernize Laws to Improve Rural Access*, National Rural Health Association, April 2018, www.ruralhealthweb.org (PDF); and Y. Xue et al., "Trends in Primary Care Provision to Medicare Beneficiaries by Physicians, Nurse Practitioners, or Physician Assistants: 2008–2014," *Journal of Primary Care and Community Health* 8, no. 4 (Oct. 2017): 256–63, doi:10.1177/2150131917736634.
16. M. Rudberg, "Retail Clinics: An Opportunity for PAs and NPs to Work Together," Amer. Assn. of Physician Assistants, www.aapa.org.
17. M. G. H. Laurant et al., "The Impact of Nonphysician Clinicians: Do They Improve the Quality and Cost-Effectiveness of Health Care Services?," *Medical Care Research and Review* 66, 6 suppl. (Dec. 2009): 36S–89S, doi:10.1177/1077558709346277; I. B. Wilson et al., "Quality of HIV Care Provided by Nurse Practitioners, Physician Assistants, and Physicians," *Annals of Internal Medicine* 143, no. 10 (Nov. 2005): 729–36, doi:10.7326/0003-4819-143-10-200511150-00010; P. A. Ohman-Strickland et al., "Quality of Diabetes Care in Family Medicine Practices: Influence of Nurse-Practitioners and Physician's Assistants," *Annals of Family Medicine* 6, no. 1 (Jan. 1, 2008): 14–22, doi:10.1370/afm.758; D. W. Roblin et al., "Patient Satisfaction with Primary Care: Does Type of Practitioner Matter?," *Medical Care* 42, no. 6 (June 2004): 579–90, doi:10.1097/01.mlr.0000128005.27364.72; and Usha Subramanian et al., "Treatment Decisions for Complex Patients: Differences Between Primary Care Physicians and Mid-Level Providers," *American Journal of Managed Care* 15, no. 6 (June 2009): 373–80, www.ncbi.nlm.nih.gov.
18. E. T. Kurtzman and B. S. Barnow, "Comparison of Nurse Practitioners, Physician Assistants, and Primary Care Physicians' Patterns of Practice and Quality of Care in Health Centers," *Medical Care* 55, no. 6 (June 2017): 615–22, doi:10.1097/MLR.0000000000000689.
19. S. S. Virani et al., "Comparative Effectiveness of Outpatient Cardiovascular Disease and Diabetes Care Delivery Between Advanced Practice Providers and Physician Providers in Primary Care: Implications for Care Under the Affordable Care Act," *American Heart Journal* 181 (Nov. 2016): 74–82, doi:10.1016/j.ahj.2016.07.020.
20. J. P. Nabagiez et al., "Physician Assistant Home Visit Program to Reduce Hospital Readmissions," *Journal of Thoracic and Cardiovascular Surgery* 145, no. 1 (Jan. 2013): 225–33, doi:10.1016/j.jtcvs.2012.09.047.

21. T. M. Capstack et al., "A Comparison of Conventional and Expanded Physician Assistant Hospitalist Staffing Models at a Community Hospital," *Journal of Clinical Outcomes Management* 23, no. 10 (Oct. 2016): 455–61, www.turner-white.com (PDF).
22. D. Pavlik et al., "Physician Assistant Management of Pediatric Patients in a General Community Emergency Department: A Real World Analysis," *Pediatric Emergency Care* 33, no. 1 (Jan. 2017): 26–30, doi:10.1097/PEC.0000000000000949.
23. B. E. Glotzbecker et al., "Impact of Physician Assistants on the Outcomes of Patients with Acute Myelogenous Leukemia Receiving Chemotherapy in an Academic Medical Center," *Journal of Oncology Practice* 9, no. 5 (Sep. 1, 2013): e228–33, doi:10.1200/JOP.2012.000841.
24. M. Moote et al., "PA-Driven VTE Risk Assessment Improves Compliance with Recommended Prophylaxis," *JAAPA: Official Journal of American Academy of Physician Assistants* 23, no. 6 (June 2010): 27–35, www.ncbi.nlm.nih.gov.
25. D. K. Costa et al., "Nurse Practitioner/Physician Assistant Staffing and Critical Care Mortality," *Chest* 146, no. 6 (Dec. 2014): 1566–73, doi:10.1378/chest.14-0566.
26. J. Altschuler et al., "Estimating a Reasonable Patient Panel Size for Primary Care Physicians with Team-Based Task Delegation," *Annals of Family Medicine* 10, no. 5 (Sep./Oct. 2012): 396–400, doi:10.1370/afm.1400.
27. D. W. Roblin et al., "Use of Midlevel Practitioners to Achieve Labor Cost Savings in the Primary Care Practice of an MCO," *Health Services Research* 39, no. 3 (June 2004): 607–26, doi:10.1111/j.1475-6773.2004.00247.x; C. Eibner et al., *Controlling Health Care Spending in Massachusetts: An Analysis of Options*, RAND Corporation, August 2009, www.rand.org (PDF); and H. Liu, "The Impact of Using Mid-Level Providers in Face-to-Face Primary Care on Health Care Utilization," *Medical Care* 55, no. 1 (Jan. 2017): 12–18, doi:10.1097/MLR.0000000000000590.
28. J. N. Mafi et al., "Comparing Use of Low-Value Health Care Services Among Us Advanced Practice Clinicians and Physicians," *Annals of Internal Medicine* 165, no. 4 (2016): 237–44, doi:10.7326/M15-2152.
29. See *Third-Party Reimbursement for PAs*, American Assn. of Physician Assistants, April 2018, www.aapa.org (PDF).
30. NCCPA, *2017 Statistical Profile*.
31. Coffman, *California's Primary Care Workforce*.
32. *2016 Statistical Profile of Certified Physician Assistants*, National Commission on Certification of Physician Assistants (NCCPA), www.nccpa.net.
33. NCCPA, *2016 Statistical Profile*.
34. *2016 Sunset Review Report*, Physician Assistant Board, www.pac.ca.gov (PDF).
35. *2017 Statistical Profile of Certified Physician Assistants*, National Commission on Certification of Physician Assistants, 2018, www.nccpa.net (PDF).