

California's Health Care Workforce: Readiness for the ACA Era

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The mission of the Center for the Health Professions is to transform health care through workforce research and leadership development.

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I. EXECUTIVE SUMMARY

Driven by a growing and aging population, changing disease burdens, market forces and the Patient Protection and Affordable Care Act (ACA), health care is changing. In particular, the ACA provides an unprecedented opportunity to address structural issues in the US health care system that lead it to underperform while remaining very expensive. Most health regulation resides at the state level, but most states now confront major budget shortfalls, largely due to their Medicaid obligations, that will challenge their ability to implement the ACA. The Act does not detail how each state should respond; it only provides general expectations and direction. Much of the attention on the legislation to date has been on finance – the expansion of the insurance pool through exchanges and regulation of private insurers – or organization – the creation of Accountable Care Organizations and encouragement of Patient Centered Medical Homes. California has taken a lead on positioning itself to implement key components of the ACA. But the broad challenges of expanded insurance coverage and new financing models will be possible only with an adequate health care workforce that has the requisite skills and expectations to create new practice models for care delivery. Without such redesigns to create more effective and efficient models, the movement to reform will increasingly be characterized by reduction in payments to providers or rationing for consumers. Neither of these options will be attractive and perhaps not politically sustainable.

Meaningful decisions about expanding coverage and moving to new practice models need solid workforce data and analysis. This report pulls together much of this work. In addition to raising awareness about the links between ACA implementation and workforce, this compilation highlights the challenges of securing current data sets; comparing data across professions; and identifying and analyzing the options – through the training pipeline, practice acts and technology,

for example – for meeting workforce needs in the context of expanded insurance coverage.

As a way of organizing the issues, several critical questions are posed:

What are the drivers that affect the quantity and quality of California's health care work force?

Several forces are exerting pressure on the state's health workforce to expand and evolve. These include changing disease burdens and demographic shifts such as a growing and aging population that is increasingly racially and ethnically diverse. California is also linguistically diverse—40 percent of the state's residents speak a language other than English, and 20 percent do not speak English “very well”.¹ The state's large immigrant population includes many individuals who are not documented—a factor that will offer particular challenges to California's safety net providers in future years.

Market forces are also bringing about change. Advances in health information technology both facilitate and demand workflow redesign, providing unprecedented opportunity and challenge. New models of care such as retail clinics and school- and work-based clinics are emerging to offer enhanced access to health care. Perhaps most dramatically, the state is poised to implement the Patient Protection and Affordable Care Act, which will in part expand coverage to four to six million more Californians. We need not only sufficient numbers of providers but also providers who can meet the needs of a diverse and changing public.

These changes and shifts are being monitored by various researchers and institutions but the information is often scattered across various websites and publications. Several groups in California are focusing on the health workforce across professions, sharing the information available and exploring promising directions. These efforts

1 2000 US Census, Summary File 3.

(see sidebar) are applauded and need to continue. This document is intended to complement that work and bring together into one place much of the data, information, and thinking on California's health workforce. As indicated in the specific policy recommendations that follow, additional research and convening should be undertaken to track and share this knowledge to inform the actions of leaders and institutions. The recommendations also include ways to encourage positive change and mitigate negative change through state policy.

Some of the California health workforce efforts include:

California Health Jobs
<http://calhealthjobs.org/>

California Health Professions Consortium
<http://www.calhpc.org/>

California Health Workforce Alliance
<http://calhealthworkforce.org/>

California Health Workforce Development Council (under California Workforce Investment Board)
http://www.cwib.ca.gov/sc_hwdc.htm

California Office of Statewide Health Planning and Development (OSHPD)
<http://www.oshpd.ca.gov/>

Center for the Health Professions, UCSF
<http://futurehealth.ucsf.edu/>

Health Workforce Initiative of the California Community Colleges
http://www.ccewd.net/initiative_hwi.cfm

Can the current health care workforce meet the changes in demand?

Health care makes up a significant proportion of the state's labor sector. The economic recession

dampened demand in some fields, such as nursing, but the number of workers in all health care professions has continued to grow. In many groups, ratios of professionals to population have increased. However, it is difficult to say whether we have 'enough' of any given profession when new graduates cannot find jobs in one region while in another area, vacancies go unfilled. Although shortages clearly exist in some regions for some occupations, distribution poses a bigger challenge than absolute numbers. California's health care workers are not distributed throughout the state in appropriate proportions to the population, leading to access problems in many places, particularly rural and low-income areas. For example, counties in the Bay Area, Los Angeles, Orange County and the Sacramento region generally have a greater supply of health care professionals than other areas.

Economic incentives and other factors may result in an oversupply of professionals in certain fields and geographic areas, and shortages in others. For example, only three out of nine regions in the state have a 'sufficient' supply of primary care physicians as defined by existing national estimates, though eight regions far exceeded the number of specialists estimated to be needed. While workforce planning is complicated by incomplete or insufficient data, and changing practice models, it is clear that primary care will be the area most immediately affected by demographic and policy changes as preventive care and chronic disease management become increasingly important.

In less populous areas, some professions appear to have grown, possibly to extend or complement low numbers of key providers such as physicians and dentists. So, for example, there appears to be an inverse relationship between the number of dentists per population and the number of registered dental assistants and licensed registered dental hygienists per population. Similar relationship appears to exist between physicians and physician assistants (PAs), and registered nurses (RNs) and licensed vocational nurses (LVNs).

Lack of cultural and linguistic concordance between patients and health care workers may limit access, even in areas without apparent shortages. For example, only five percent of California's MDs and eight percent of its nurses are Latino (compared to 37 percent of the population). Many of the allied health professions more closely reflect the state's general population than do medicine, nursing, pharmacy or dentistry. Many health care organizations rely on support staff for language interpretation without knowing whether staff have sufficient bilingual skills to serve in this role.²

Finally, some professions in California's health care workforce are aging faster than its population. Looming waves of retirement without corresponding influxes of new practitioners could further impact the state's ability to provide care. For example, 29 percent of the state's physicians are nearing retirement age³, as are 19 percent of the state's dentists,⁴ and more than 30 percent of clinical laboratory scientists.⁵ However, the economic recession has encouraged some clinicians to delay, or return from, retirement, confounding supply predictions in some categories such as nursing.

Do we educate enough providers to meet the state's growing needs and are those providers' skills aligned with emerging needs?

While California has many health careers training programs, from community college certificate programs to advanced residencies at academic health centers, many are full to capacity, and the question remains whether the skills and backgrounds of graduates are well-matched

2 Moreno, M.R., Otero-Sabogal, R., and Newman, J. (2007). "Assessing Dual-Role Staff-Interpreter Linguistic Competency in an Integrated Healthcare System". *Journal of General Internal Medicine*. 2007 November; 22(Suppl 2): 331-335.

3 Paxton, C. (2010). *California Physicians: Facts and Figures*. Oakland: California Health Care Foundation. 10.

4 Pourat, N., and Nicholson, G. (2009). *Distribution and Characteristics of Dentists Licensed to Practice in California*. Los Angeles: UCLA Health Policy Research Center. 2.

5 California HealthCare Foundation (2011). *California's Clinical Laboratory Scientists and Technicians*. Oakland, CA. 1.

to address the state's changing needs. Some professions have programs throughout the state but many require significant travel for individuals from various locations to attend.

California needs more primary care providers, and yet the state has fewer family medicine residency slots available today than it had ten years ago. At least some of this decrease has been offset by growth in NP, PA and DO programs and graduates of those programs choosing primary care. Recent efforts to expand nursing education in the state have helped meet the demand for registered nurses and diversify the nursing workforce.

Health information technology has the potential to enhance educational opportunity, improve patient care, and redesign workflow to alleviate the burden on primary care providers. Additional investment could be made in programs training technicians and clinical staff in the implementation and use of this technology.

Racial and cultural disparities between patients and the health care workforce continue. Low high school and college graduation rates for underrepresented minority youth make it difficult to increase diversity at medical and nursing schools in particular. The allied health professions continue to be more reflective of the state's population. The community colleges that offer allied health programs attract a diverse student population, but attrition rates are high and programs have difficulty finding the resources to expand to meet growing numbers of applicants.

Are there other sources of health professionals?

While researchers have documented that California retains a number of its residents upon completion of training, others move out of state. One of the key data points missing is exactly how many leave, for what reason, and whether there is a chance to encourage the repatriation of Californians that move to other states for training. Some states

collect data at relicensure on where their health care workers went to high school to track migration patterns. California might consider such research to better understand patterns and options. It is also clear that California relies quite heavily on foreign trained professionals – particularly in nursing and primary care medicine – in meeting the state's health care needs. For example, approximately 31 percent of California's primary care physicians, and 24 percent of the state's nurses, were trained outside the country. The practice patterns of such individuals and the success of programs such as San Francisco's Welcome Back Center could be further explored.

What policy solutions can help California meet changing demands?

Efforts to offset the anticipated increase in demand for care can be found throughout the ACA in the form of investments in:

- a) Workforce development (including support for primary care training, loans and scholarships for education support, and changes in the National Health Services Corps program);
- b) Primary care payment rates; particularly the change in Medi-Cal rates to equal Medicare;
- c) Existing models of care – such as community clinics, school-based health centers, nurse managed health centers and public hospitals – that are likely to see higher proportions of the newly insured than other delivery settings; and
- d) New financing and delivery models, such as accountable care organizations and patient-centered medical homes, which show potential for improvements in access, cost and quality of care.

Starting with the workforce development opportunities offered in the ACA,⁶ the state can begin building California-specific strategies to improve supply, distribution and workforce practice models; strengthen the education pipeline; and

⁶ Morgan, Rachel. (2010). Summary of the Health Workforce Provisions in the Patient Protection and Affordable Care Act: H.R. 3590. Washington, D.C.: National Conference of the State Legislatures.

increase diversity. The policy issues raised and addressed in the recommendations below come from the compilation and analysis of the data, literature and key informant perspectives included in this report. Future action on most of these issues will require concerted efforts to identify and partner with appropriate stakeholders to design targeted strategies and task-oriented action plans. To facilitate this process, additional background material and resources can be found in the charts, maps, interview summaries and bibliographies that follow.

Improving Supply, Distribution and Workforce Practice Models

Because maldistribution is such a critical issue in California, adopting and expanding successful policies that address geographic practice choices will be key. It is also appropriate to question whether telehealth modalities could make better use of limited resources and whether California could make better use of its workforce by expanding practice acts for selected professions, notably those providing primary care, oral health care, and vision care.

An underlying theme for policy making in the future is the potential to rethink *how* we question our supply of practitioners. Perhaps it is time to focus on the type of care – such as primary, oral, or vision – that needs to be provided rather than the type of provider in calculating supply. New practice and financing models, including patient-centered medical homes and accountable care organizations, look to teams of providers where doctors, nurses and medical assistants might all play key roles in providing care. These models alleviate some of the demand for physicians, but require changes in financing and reimbursement, as well as better implementation of health information technology and practice culture changes, to succeed. Policies to address supply and distribution and to facilitate the development of new practice models include the following.

- Because professionals tend to practice in the areas where they train, increasing **training and residency opportunities in underrepresented fields and communities** is a good investment. The ACA provides for the establishment of Teaching Health Centers, which provide medical residency opportunities in community health centers. California is developing such a center in Modesto. Although individually insufficient to meet upcoming demand, it is a step in the right direction.
- Expand **loan repayment programs** for practicing in underserved areas and expanding these programs to encompass high-need professions/roles such as registered nurses working in expanded roles (care manager) in primary care, and to professional counselors, social workers and psychologists working in community clinics.
- Enhance integration and implementation of **telehealth** to reach more patients more effectively, and allow connections between clinicians, and between clinical sites, particularly in remote areas.
- Strengthen the capacity of **safety net providers** who serve underrepresented patient populations.
- Improve, standardize and streamline **workforce data collection** and availability in order to enhance regional and statewide planning and coordination.
- Promote ongoing statewide and regional **partnerships for health workforce planning**. Adequate responses to changes in demand can only be met through coordinated planning efforts beyond the level of individual organizations or communities.
- Expand the **scope of practice** for select professions such as nurse practitioners and physician assistants to serve as providers. Research suggests that these professionals are already serving key roles in rural areas where physicians are scarce.
- Invest in training and **health information technology** that would allow the safe delegation

of tasks to clinical support staff in team-based models.

- Develop **financing models** that mitigate income differences between primary and specialist providers and that reward outcomes-based services by teams of providers focused on the patient.

Improving the Education Pipeline

Recent state-level programs intended to increase the supply of registered nurses suggest that focused educational investments *can* make a difference, but these investments must be carefully targeted. This experience highlights the need for good educational and employment data for tailoring these efforts. California's Office of Statewide Health Planning and Development (OSHPD) has recently set up a website that offers maps of the educational programs offered in the state, which holds great promise for future students and policy makers alike. Many of the educational issues are profession-specific and can be explored in more depth through the literature cited in the bibliographies at the end of this report. Specific policy considerations that can be gleaned from the work done to date on this topic include:

- **Increasing the number of primary care physicians** is an important, but long-term goal that cannot be achieved fast enough to meet the upcoming increase in demand. However, investing in strategies to encourage medical students to practice in primary care is an important goal.
- In the short term, the ACA offers some opportunities for **refocusing education resources on** professions such as **nurse practitioner and physician assistant**. These professions require less training time than medical school and could help meet some of the more immediate demand for primary care providers.
- Promoting and supporting innovations in California's **community colleges to increase completion** of health professions programs and **enhance retention** of underrepresented

students would also help increase diversity and meet workforce demands. This will require creative and tailored solutions and partnering between community college administrators, faculty, workforce investment boards, and local communities. In addition, some allied health programs could explore partnering with private sector technology manufacturers, for example, to help support clinical training options, which are often in short supply. Such a move would require legislative action to help protect from misuse and conflict of interest.

- **Investing more equitably in primary and secondary education programs** would help prepare a diverse group of students to enter the health professions in the first place.

Increasing Diversity

According to the California Pan-Ethnic Health Network, more than half those eligible for subsidies or Medi-Cal under the ACA are people of color, and 32-51% of adults in these groups speak English less than well.⁷ While research suggests that linguistic, racial and ethnic concordance between physicians and patients improves the quality of care, California's physician workforce does not reflect its patient population. Neither do the nursing, dentistry or pharmacy professions. Long-term strategies for addressing these disparities include developing the education pipeline, as noted above, particularly to encourage Latinos to pursue more educationally-intense occupations. In the short-run, the mismatch between providers and patients calls for other strategies to build bridges between the health care system and patients from various cultures. Possible solutions include:

- **Investing in interpretation**, including training existing providers to work better with interpreters and interpretation services; training existing bi-lingual clinical support staff such as medical assistants to serve as dual-role interpreters; and improving reimbursement and reward for practices utilizing interpretation services.

- Training for positions such as **community health worker, promotorá, and health educator** that can 1) facilitate links between clinical care delivery and population health and 2) reach out to California's diverse communities to assist them in navigating the system, inform them of opportunities under the ACA and support interest in health careers.
- **Building career ladders** that allow members of California's diverse allied health professions to move up will improve their careers, help their communities, and help diversify the health care workforce.
- **Evaluating and replicating models that work** to recruit and enroll members from underrepresented communities into health professions programs.
- **Including communities of color in the policy and planning** processes for implementing health care reform.

How are things changing and where are the good ideas on education and practice?

As described in detail in the data sections below (see both the description of data that introduces the chart and figure section as well as the analysis of available data sets), the data systems for California's health workforce are good but could be much better. There are many basic questions that cannot be answered by the current data. These include practice locations (not just address of record, which could be a mailing address) and comparisons across professions (for example, to see how many NPs, PAs, MDs and DOs are providing primary care services). Some of the shortcomings of the current data sets are likely to be improved upon launch of OSHPD's Health Workforce Clearinghouse but this effort is still in development. Additional improvements to the collection and availability of data could be encouraged through policy changes that would significantly help those who are trying to determine whether and where to build new educational programs and how to administer incentive programs for practitioners serving traditionally hard-to-reach populations.

⁷ CPEHN. (2010). Equity Through Implementation. November 2010. Policy brief based on data from the California Health Interview Survey (CHIS).

Perhaps more importantly, the state would be well served by enhancing efforts to collect best practice ideas on education and health care services so training programs and delivery institutions throughout the state could benefit from innovators and early adapters of good ideas. Such efforts would be most helpful if they also formed bridges between employer needs and schools, would-be employees and communities seeking to prepare youth for job opportunities.

Going forward

The health care workforce is vital: it constitutes a significant portion of the state's labor market and is the source of care for Californians. The state makes major investments each year in the health care workforce through support for the University of California health professional schools and health systems, the State University and community college training programs, Medi-Cal, grants to local health departments and community-based direct training and loan programs. To plan for the optimal outcome of workforce investments, the state needs to:

- 1) Measure the investments and adequacy of supply;
- 2) Evaluate their effectiveness;
- 3) Develop ways to improve their effectiveness; and
- 4) Monitor the improvements.

The following information helps frame ways to understand the issues surrounding the health care workforce and how California can best realize a good return on its investment while helping ensure that the state's population has access to high quality providers. As California moves toward implementing the ACA and to meeting the evolving needs of the population, the role of the health care workforce is critical. This report provides an overview of much of the information, data and perspectives on California's health care workforce and offers recommendations for policy makers to consider.

Following this executive summary, the report includes the following sections:

- II. *Summary of interviews of key informants*
In June 2011, fifteen individuals with health care workforce expertise were interviewed. A summary of these thought leaders' responses to questions is included here along with their specific solutions and recommendations.
- III. *Workforce data charts and figures*
Section III of this report includes graphic presentation of data from the state's Department of Consumer Affairs for the professions it oversees, which includes the vast majority of health professions in California. Specific data presented include new licenses over time by profession and maps that show distribution by profession by county.
- IV. *Health Professions Workforce Data*
Section IV provides an overview and analysis of California health professions workforce data. It lists licensing, professional and education data, describing the various data sets and workforce surveys available, and offering commentary on both the strengths of these data as well as opportunities for improvement. This section also describes OSHPD's new Health Workforce Clearinghouse.
- V. *Summaries of published California workforce literature by profession*
Section V offers summaries of the literature included in the bibliographies that are in Section VI.
- VI. *Annotated Bibliographies*
Section VI provides annotated bibliographies of select, non-exclusive published literature on the health workforce. The focus is on California but we include some seminal national reports and literature.

II. SUMMARY OF INTERVIEWS: PERSPECTIVES FROM THOUGHT LEADERS

The following section is based on interviews of fifteen key informants with expertise in the health care field. Respondents were interviewed during the month of June 2011. All interviews were conducted using methodology approved by the Committee on Human Research at the University of California, San Francisco. A list of those interviewed is included at the end of the section.

ACA Programs and Policies

Leaders were asked to identify which ACA programs and policies aimed at mitigating the impact of significant increased demand for services had the most potential and promise for California, and whether these programs would be sufficient to meet the demand.

Workforce Development

While many of those interviewed thought that there is a shortage of primary care physicians, and that the ACA would result in increased demand on primary care clinicians, increasing the *number* of primary care physicians was seen as a long-term solution incapable of meeting the increase in demand projected by 2014.

Other types of providers could be developed to address these demands. While about 32 percent of physicians and one-third of physician's assistants enter into primary care (pediatrics, family medicine and internal medicine), 65 percent of nurse practitioners do so.⁸ Interest in primary care among current medical school students has been on the wane for years, ranging between 14-20 percent, although by 2010, interest in this field

8 American College of Physicians. Nurse Practitioners in Primary Care. Philadelphia: American College of Physicians; 2009: Policy Monograph. (Available from American College of Physicians, 190 N. Independence Mall West, Philadelphia, PA 19106.); Bodenheimer, T.; Chen, E. and Bennet, H.D. (2009) "Confronting The Growing Burden Of Chronic Disease: Can The U.S. Health Care Workforce Do The Job? The answer is "no"—not as currently constituted." *Health Affairs*, 2009 January/February (28)1: 64-74.

had increased back to 30.5 percent.⁹ However, very few medical students (6%) were interested in family medicine.¹⁰

Even if the number of primary care providers could be increased fast enough, additional measures would be required to ensure that these new providers were a) culturally and linguistically competent, and b) targeted to the geographic areas (medically underserved) and institutions (community health clinics) likely to experience the greatest demand.

Because the number of providers, including culturally and linguistically competent providers, is unlikely to increase fast enough to meet demand, redesigning practice models so that providers can delegate tasks to other health care professionals—such as nurses, community health workers, and medical assistants—holds promise. Research suggests that 50 percent of the time spent by primary care physicians is spent on preventive care and screenings, much of which could conceivably be done by others.¹¹ Allied health professionals are more likely to reflect the demographic cultural and linguistic makeup of the communities in which they are employed, which is an additional asset. However, there have also been shortages in some of the allied health fields, so investment in these programs would likely be worthwhile. While there was considerable success in expanding training programs for nurses at the community colleges, approximately one-quarter of this funding is grant-based and likely non-sustainable in the long run.

The ability to delegate tasks is reliant not only upon changing practice models, but on enhancing

9 Kruse, J. (2011) COGME 20th Report: Advancing Primary Care. Accessed June 27, 2011. <http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/index.html>.

10 Association of American Medical Colleges. (2010). 2010 GQ Medical School Graduation Questionnaire: All Schools Summary Report. Accessed June 27, 2011. <https://www.aamc.org/data/gq/allschoolsreports/>.

11 Yarnall, K.S.H; Pollak, K.I.; Ostbye, T.; Krause, K.M.; and Michener, L.J. (2002). "Primary Care: Is There Enough Time for Prevention?" *American Journal of Public Health*, 2003 April; (93)4: 635-641.

health information technology, and restructuring reimbursement. One “hidden workforce” that needs to be developed to address increasing demand is the health information technology workforce. This workforce includes those tasked with implementing and maintaining telemedicine and electronic health records systems, and clinical and administrative support staff who must work with these systems. Current training programs reportedly do not adequately prepare technicians for the workforce due to lack of resources and applied training opportunities.

Proposed new models of care such as the patient-centered medical home call for a whole-person orientation and coordinated care across the health care system. Access to behavioral and mental health services, and integration of behavioral health into primary care, require more coordinated training of behavioral health providers and the supporting workforce. The state has only two pathway programs at the secondary school level in human services, and an inchoate set of certificate programs at the graduate level to develop this workforce.

Finally, as California's population ages, the demand for home health workers and personal care attendants is increasing. This workforce is among the fastest growing job categories in the state--projected to increase by 44-46 percent by 2018.¹² Because nearly a third of this workforce is currently uninsured, the Affordable Care Act would benefit these low-wage workers by expanding access to health care coverage.

Strengthening Existing Models of Care

Many informants agreed that community health centers (CHCs) and public hospitals would bear the brunt of the increase in demand. Capacity building for these institutions will be vital to the successful implementation of health care reform. While both school-based health centers and nurse managed health centers show promise, their

numbers and capacity may be currently insufficient to meet growing demand. One person noted that these latter, primarily nurse-managed centers had potential to address primary care physician shortages, especially in physician-shortage areas, while another felt that nurse practitioners and other nurses would be better deployed in community health clinics.

Better coordination between public hospitals, non-profit hospitals, including academic medical centers, and community health centers, could help to strengthen capacity and improve quality of care. This should include electronic integration. One individual noted that hospitals needed to re-assess the way they look at their provision of community benefit and include investment in prevention rather than just emergency room services for Medicaid and uninsured populations. Since these institutions are using public resources in the form of tax breaks to provide care, they should be encouraged to practice better stewardship of these resources.

Another issue that impacts the capacity of community health centers has to do with a disparity in designation between CHCs and rural health centers. While the CHC cannot turn away uninsured patients, rural health centers have more flexibility in this respect. This may result in cost shifting opportunities for rural health centers, which can turn away the undocumented while CHCs cannot. This could increase the strain on CHCs already experiencing greater patient flow, especially if federal funding to cover the uninsured is decreased under the assumption that most citizens will be insured as a result of the Affordable Care Act.

Reforming Primary Care Reimbursement Rates

Reforming primary care payment rates will have some positive impact. In California, payment rates for primary care under Medi-Cal (Medicaid) are scheduled to be increased to 100 percent of Medicare rates, and 80 percent of Medicare for other

12 Paraprofessional Healthcare Institute. (2010). State Facts: California's Direct Care Workforce. 2010 December. Bronx, NY.

outpatient care. One respondent noted that while this would help, Medicare rates are not that high and reforming primary care payment rates is “not a game-changer” that will encourage physicians to rush to become Medi-Cal providers. It is also unclear whether this is a good *long term* solution since the increased federal dollars to support this strategy may only last for a couple of years.

New Financing and Delivery Models

According to several key informants, new financing and delivery models have greater potential for addressing the increase in demand. These include the patient-centered medical home model of care (PCMH) and accountable care organizations (ACOs).

While both of these models are projected to cut costs and improve access and quality of care, the shift to the PCMH model may actually require *more* primary care physicians. Researchers evaluating Seattle-based GroupHealth Cooperative’s medical home pilot concluded that the medical home model required more primary care physicians, smaller patient panels, enhanced staffing ratios, and improved staff training to effectively implement this team based model of care. Nonetheless, downstream cost savings for the GroupHealth pilot included decreases in emergency room use and hospitalization.¹³

Developing means of capturing and redirecting these cost-savings, and covering the costs of employing the allied health professionals and health information technology required to implement these models, requires fundamental reimbursement reform away from a volume-based to a value-based system.

While many of the individuals interviewed thought ACOs a good idea, others were skeptical, noting

that ACOs would not bring about significant change unless more fundamental changes were made to practice models. One noted that the current models are not properly structured around rewards and consequences. Current models for ACOs in California reportedly reward organizations for reducing unnecessary hospitalizations, but do not punish them for failing to reduce costs or hospitalizations.

The Affordable Care Act also contains additional provisions for improving and transforming long term care and support services. The Community Living Assistance Services and Supports (CLASS) Act within the ACA establishes a public / private long-term care insurance program. It is privately funded by individual payroll contributions, but the federal government will administer it. This cash benefit is anticipated to slow the rate of the elderly and infirm relying on Medicaid as they exhaust their resources. This cash benefit could be paid directly to home health workers or family members to provide care in the home. As one person noted, an integrated health care system has to work across the full spectrum and support sufficient home health capacity to allow people to age at home rather than in hospitals. The latter is more costly and less desirable for quality of life. The workforce implication is for more home care and in-home health care services and for integrating these direct care workers into the broader PCMH model.

Key Informants’ Specific Solutions and Recommendations

Key informants made a number of recommendations for strengthening California’s capacity to meet the demands of health care reform. They also identified a number of strategies already in the planning or implementation phases that will help to contain costs and maintain or improve quality of care.

¹³ Soman, M.P., Trescot, C.E., Erikson, M., Larson, E., B. Reid, R.J., Coleman, K., Johnson, E.A., Fishman, P.A., and Hsu, C. (2010). “The Group Health Medical Home At Year Two: Cost Savings, Higher Patient Satisfaction, And Less Burnout For Providers” *Health Affairs*, 2010; (29)5:835-843.

Improve Telehealth and HIT Capacity to Implement Meaningful Use

- 1) Find ways to use HIT to stretch the health care workforce--Address the need for a **workforce competent in health information technology** that is capable of implementing, using, and maintaining electronic health records (EHRs) and telemedicine.
 - a. Enhance the preparation of HIT specialists by **developing internships and apprenticeships** to provide on-the-job training to enrollees in community college HIT programs.
 - b. Develop and disseminate an **HIT curriculum** for medical assistant training programs and other **health professional training programs**. Training providers in HIT will allow them to develop protocols to delegate tasks, and training medical assistants and other clinical support staff in computer skills and HIT will allow them to better assist providers in patient care and documentation.
- 2) **Improve data integration** across systems so that information can be shared safely and efficiently between labs, hospitals, community health centers, and medical office practices.
- 3) **Enhance telehealth** so that primary care physicians in remote sites can access specialists and non-physician providers can provide care in remote sites and access primary care physicians. Telemedicine can also relieve the pressure on providers and other clinic staff by allowing nurse case managers and other clinic staff to receive and monitor physiological data sent electronically from patients at home. Changing the laws around telehealth could go a long way towards creating better access, coordination of care, and cost containment.

- 4) **Utilize teleconferencing for interpretation services** to increase accessibility and cut the time required for interpreters to travel from place to place.

Target Workforce Development

- 1) Invest in training to **develop multi-disciplinary teams**. Place more emphasis on teambuilding and communication in health professions training.
- 2) **Promote and support innovations in community colleges** to increase the successful completion of health professions programs, with a focus on underrepresented racial and ethnic groups. This requires creative solutions and partnering between community college administrators, faculty, workforce investment boards (WIBs), and the community.
- 3) **Invest in nurse practitioner and physician assistant training programs**, and increase the number of slots available for training NPs and PAs. Both of these professions are easier to scale up and require less time in training than primary care physicians.
- 4) **Maintain**, rather than increase, **capacity in RN training programs** for the time being. Support community college nursing program capacity so that it can be scaled up when necessary to meet demand. Continue to support collaborative programs between the community colleges and the CSU and UC system for the seamless transition between associates and baccalaureate degrees.
- 5) **Reform nurse training** away from a hospital-based focus towards a community health-based focus. Create more roles for RN care managers and chronic disease managers to support the 10 percent of patients that incur 70 percent of health care costs.¹⁴ Increase clinical training for RNs

14 Bodenheimer, T. and Berry-Millett, R. (2009). "Follow the Money — Controlling Expenditures by Improving Care for Patients Needing Costly Services". *New England Journal of Medicine*. 2009; 361:1521-1523.

- and allied health workers in community clinics and home settings.
- 6) Train for positions like **community health worker, promotorás and health educator** that can facilitate a link between clinical care delivery and population health.
 - 7) **Invest in primary education:** Strengthen pathway programs for the health careers and provide students with more information early on about the types of careers available beyond doctors and nurses. Work on enhancing math and science skills in the early grades so that students are eligible to participate in pathway programs in the first place. Invest more equitably in primary education to obtain a more diverse healthcare workforce.
 - 8) **Scholarships and loans:** forgivable loans are an important component of building the health care workforce in geographically remote and underserved areas. Expanding loan repayment programs like the National Health Service Corps to registered nurses working in expanded roles (care manager) in primary care, and to professional counselors, social workers and psychologists working in community clinics might help meet growing demand and implementation of patient centered medical homes. Investigate models like those utilized in Europe where loan repayment for college education is based on a proportion of post-graduation salary. This strategy might remove some of the disincentive to enter primary care.
 - 9) **Develop data sources:** Better data sources are needed to allow training organizations and others to determine employer demand and assess educational outcomes post-graduation.
 - 10) **Grow-your-own strategies:** Health professions training programs need to adopt recruitment and outreach strategies that benefit the region in which they are situated. These benefits might take the

form of developing health care practitioners who are culturally and linguistically concordant with local patient populations, developing practitioners who are likely to stay in underserved areas, providing jobs and economic opportunities to local communities, and providing educational support to K-12 educators in the local community.

- a. Use performance criteria to fund residency programs that have shown the ability to address local health care needs and train professionals that will stay in the community, not just programs that recruit the best and brightest from around the world. While this might mean recruiting from the local area, in one case an interviewee noted that recruiting from Mexico produced candidates that best met these criteria.
- b. Use distance learning and collaborative arrangements between community colleges and CSUs to train and retain local trainees in rural areas.
- c. Teaching Health Centers established through the ACA were noted as promising, although unlikely to be able to provide anywhere near enough graduates to meet growing demand for primary care physicians.
- d. Develop and strengthen regional partnerships and develop pathways for high-need professions in underserved areas.

Promote Regional and Statewide Planning and Coordination

- 1) Encourage ongoing statewide and regional partnerships for health workforce planning. This can provide a statewide perspective while respecting conditions unique to each region. The work of the Health Workforce Planning Council has been valuable, but is only funded through the planning stages for the ACA, and not into implementation.

- Workforce investment boards, colleges, community-based organizations, employers, and foundations are key players.
- 2) Changes underway at the Department of Mental Health Services include a statewide behavioral health services assessment and plan over the next year to look at integrating behavioral health services into primary care. This will make it imperative to integrate behavioral and mental health into statewide workforce planning.
 - 3) Strengthen the relationship of the AHECs (Area Health Education Centers) and the community health centers so that they can better coordinate educational opportunities to train providers and other health professionals to serve in community-based health care.

Strengthen the Capacity of Safety Net Providers

- 1) Develop better **partnerships between Community Health Centers (CHCs) and hospitals**. Encourage or require hospitals to invest in community clinics and prevention as part of their community benefit. Begin a process to place CHCs at risk of losing money if they do not reduce hospitalization, and share the savings if they do. Provide both types of organizations with support for innovation during the transition.
- 2) **Enhance Community Health Center electronic health record (EHR) capacity** so that CHCs can document and publicize their role in decreasing preventable emergency department utilization.
- 3) **Level the playing field between Rural Health Centers (RHCs) and FQHCs** by requiring that both provide care to the uninsured.
- 4) **Community Health Centers will need a sustainable business model** beyond '330 funding', a grant program under the Public Health Service Act, which is not guaranteed past 2013. This might include increasing the number of privately insured patients and patients with Medicare. CHCs can capitalize upon the fact that they are the ideal medical home, providing a comprehensive range of services including primary care, urgent care and often oral health, laboratory services, and mental and behavioral health.

Redesign Practice Models and Financing Structures

- 1) **Develop practice models** that include an **interdisciplinary team** working together to provide patient care. Require all clinical staff to work at the top of their license. In a clinic or other primary care setting, staff such as care managers, promotorás, health coaches, nurses, medical assistants, community health workers, and others can be trained to take on much of the planning, screening, health education, panel management, community linkages and follow-up to lighten the burden on the primary care providers.
- 2) **Changes to reimbursement structures** that pay for value, rather than volume, and emphasize prevention, are expected to improve health outcomes and contain costs in the long run by decreasing emergency room visits and hospitalization. Reimbursement structures that cover preventive services provided by nurses, medical assistants, patient navigators, care coordinators, and other clinical support staff are vital to implementing new practice models.
- 3) Encourage **patient engagement and self-management** through renewed emphasis on prevention. Utilize telehealth, patient portals and other HIT resources to provide greater access to health information, and new staffing models to encourage patient participation.

- 4) The state of California has used its section 1115 Medicaid waiver to **restructure the state's public hospital financing system** and prepare for the Affordable Care Act. This waiver is intended to ensure better coordination of care through the establishment and strengthening of organized delivery systems.¹⁵ The State is providing incentives to public hospitals for quality improvement and better integration with primary care.

Enhance Diversity

Key informants discussed a number of issues surrounding work to **diversify California's health workforce**. Several people noted that physician-to-patient cultural and linguistic concordance was ideal and resulted in better health outcomes. Visits can also be shorter if no interpretation is needed. However, because of the lack of racial and ethnic diversity among physicians in particular, other members of the health care team who may be more reflective of local communities are often called upon to serve as a bridge between the patient and the provider. Finally, employment in the health careers, especially if career ladders are in place, can serve as an engine for upward mobility in underserved communities.

Several leaders noted that the allied health professions were more likely to reflect the demographics of the state. Even in nursing, younger nurses in training are more diverse than the group of currently practicing nurses, possibly due to a number of initiatives bolstering diversity in the nursing workforce. Individuals noted that the diversity programs funded through grants from The California Wellness Foundation and The California Endowment have made a big difference, but their future remains uncertain.

- 1) Ensure that communities of color are represented on the new **Health Benefit Exchange Board**, which will broker coverage for expanded insurance for the ACA.

- 2) **Fund interpreter training** for programs for medical assistants at Community Health Centers and other practice sites. Some feel that MAs are key staff who have sufficient language background and have the potential to become interpreters in the exam rooms.
- 3) **Reimburse and reward practices** for the extra costs of using **interpreting services**. Longer visit times and the increased costs of interpretation may serve as a disincentive to take on non-English speaking patients. The number of non- and limited-English speaking patients will increase as a result of health care reform.
- 4) Train and utilize more **promotorás** in health care settings and determine how **promotorás** can be further utilized in both Latino and non-Latino communities that need a bridge to the health care system.
- 5) **Fund primary education programs:** Disproportionate numbers of Latino and African American youth drop out of high school before they even get a chance to enter health careers programs, so supporting primary education is important. Support programs in the high schools like Health Academies and career and technical education so that youth connect with the subject matter early.
- 6) **Build career ladders:** Because the allied health professions are more diverse, building career ladders to move allied health workers up is an important strategy to diversifying the health care workforce.
- 7) **Develop better data:** Use data from the medical board to track race, language, ethnicity, and practice type for physicians. Implement data collection and tracking similar to this in other health professions in the state.
- 8) Medical schools need to need to invest in **recruiting diverse students** and in requiring **cultural competency training** of all students.

¹⁵ State of California – Health and Human Services Agency. (2010). "California Section 1115 Comprehensive Demonstration Project Waiver—A Bridge to Reform: A Section 1115 Waiver Proposal."

- 9) Work with private sector employers to encourage investment in **training a diverse workforce**. Make the business case that if you invest money in this community, you will develop the sort of workforce you need to do business in this community.
- 10) Hold California's medical schools responsible for **recruiting local underrepresented students** and not just fulfilling their diversity requirement by recruiting from abroad.
- 11) Further examine the issue of **private allied health training programs**. These programs market heavily to low-income communities of color. They offer financial aid with very high tuition, but for fields that tend to offer very low wages. They are often the only health care training institutions in some communities. What are the pros and cons of these organizations for workforce diversity?

Key Informants Interviewed June 2011

- Brian Hansen, Special Assistant to the Director, Medical Director, California Department of Health Care Services
- Brian Keefer, MA, California Mental Health Planning Council
- Deloras Jones, RN, MS, President, California Institute for Nursing and Health Care (CINHC)
- Dorian Seamster, MPH, Chief of Health Information Services, California Health Information Partnership and Services Organization (CalHIPSO)
- Erin Westphal, MS, Program Officer, SCAN Foundation (Senior Care Action Network Foundation)
- Ignatius Bau, JD, Health Policy Consultant
- John Blossom, MD, Professor of Clinical Family and Community Medicine with the UCSF Fresno Family Medicine Residency Program, Director of the California Area Health Education Program
- Jose Millan, Vice Chancellor, California Community Colleges
- Kevin Barnett DrPH, MCP, Senior Investigator, Public Health Institute
- Marc A. Nivet, EdD, Chief Diversity Officer at the Association of American Medical Colleges
- Neal Kohatsu, MD, MPH, Medical Director, California Department of Health Care Services
- Rosa Maria Martinez, Program Manger, Health, Greenlining Institute
- Sarah Steenhausen, MS, Senior Policy Advisor, SCAN Foundation (Senior Care Action Network Foundation)
- Thomas Bodenheimer, MD, Adjunct Professor, UCSF Department of Family and Community Medicine
- Thomas S. Nesbitt, MD, MPH, Associate Vice Chancellor for Strategic Technologies and Alliances, UC Davis School of Medicine

III. ANALYSIS OF CALIFORNIA HEALTH PROFESSIONS LICENSING DATA

Description of Data

The data used to create the figures in this section (both graphs and maps) come from two sources. The licensing data are from the California Department of Consumer Affairs (DCA), Professional License Masterfile. The population estimates are from the 2010 Census Summary File 1. The DCA Masterfile includes licensing data for nearly all of the licensed, certified, or registered health care occupations in the state. State licensing boards report these data to the DCA monthly, and every month a new, updated masterfile is created. The file used for this report was current as of February, 2011.

The DCA Masterfile includes nearly, but not all, of the licensed, certified, or registered health care occupations in the state. The health care occupations not included in the file are those regulated by the California Emergency Services Authority (EMSA), and the California Department of Public Health (CDPH) through its Licensing and Certification Division (L&C), Radiologic Health Branch (RHB), and Laboratory Field Services (LFS).

The EMSA regulates paramedic and EMT personnel;

The CDPH Licensing & Certification Division regulates hemodialysis technicians, home health aides, and certified nursing assistants;

Radiologic Health Branch regulates radiologic technologists, radiation therapists (including those certified to perform fluoroscopy), nuclear medicine technologists, limited x-ray technicians (including those certified to perform bone densitometry);

Laboratory Field Services regulates clinical laboratory scientists (generalists), clinical chemists,

clinical cytogeneticist scientists, clinical genetic molecular biologists, clinical hematologist scientists, clinical histocompatibility scientists, clinical immunohematologist scientists, clinical microbiologist scientists, cytotechnologists, public health microbiologists, medical laboratory technicians, and certified phlebotomists.

We were not able to obtain licensing and certification data from these agencies. They are not included in the following figures.

The DCA Masterfile has two critical limitations. First, it does not tell us whether or not the holder of the license is actually working in the profession in which he or she is licensed to practice. In any given field, there may be individuals who hold a current license to practice but are not employed in that field (for example, a physician who conducts academic research but does not treat patients, or a dentist who is retired but prefers to keep her license current). Second, the DCA Masterfile only provides an address of record, which may or may not correlate with practice or employment location. There are individuals holding a current license to practice in California whose address of record is outside of California, and who may or may not be working in California. There are individuals with a California address of record that does not correspond with where in California they actually practice or are employed.

For a small number of health care professions, accessible alternatives to the DCA Masterfile exist, which provide information that has been used to better estimate the size of the active workforce and its geographic distribution. These include the California Medical Board survey (physicians), the Board of Registered Nursing Survey of Registered Nurses, and recent surveys conducted on the registered dental hygienist workforce (2005-2006), and respiratory care practitioners (2006). For most licensed health care professions in California, however, available data that can be used to estimate

the size of the active workforce and its geographic distribution is limited, and the DCA Masterfile is a useful source.¹⁶

As noted, the Masterfile includes limited information--only a few basic variables for each licensed occupation. These include: the type of license issued (e.g. physical therapist versus physical therapy assistant); license number; whether the license was issued to a business or a person; name of individual or business; an address including zip code and county; date the license was issued; date the license expires; and a code indicating the status of the license.

The primary status code is a key variable because the masterfile contains every license that was ever issued by the reporting licensing board. This means that the status of a license can have a number of conditions, including “deceased”, “cancelled”, “delinquent”, “revoked”, “suspended”, “denied”, “inactive”, or it can be “clear”, “valid”, or “renewed/current”.

In order to create the maps illustrating the geographic distribution of each licensed profession, we selected only licenses with a California address of record that were in good standing to practice (primary status code = 1000)¹⁷ at the time we obtained the license file. The figures that graph the number of new licenses issued each year include

¹⁶ Other possible alternative databases include: The California Dental Board survey, which is modeled after the Medical Board survey. To date, it has not been used in any published studies or analyses; therefore the quality of the data it contains is unknown. In addition, although the regulatory boards and agencies that report licensing data to be included in the DCA Masterfile only provide a limited set of data elements, these boards may be collecting other elements that would provide more detail about the active workforce; obtaining any additional data (if it exists) would require direct negotiation with the individual board or agency. Finally, professional associations in California that maintain a membership database may be able to provide the kinds of data elements needed for workforce analysis (like the California Dental Association); again, obtaining these data (if they exist) would require direct inquiry with the individual professional association.

¹⁷ A primary status code of 1000 is used to designate a license that is considered either “clear”, “valid”, or “renewed/current” by the board which issued the license.

all licenses, regardless of address of record or the current status of the license.

In the figures that follow below, our assumption is that (in the absence of alternative information) any individual with current license in good standing is active in the workforce, and that the licensee address of record is a reasonably good proxy for where an individual practices or is employed. In cases where there is alternative information that provides a more accurate description of workforce size and distribution, it has been included. We note that references on maps to per-populations ratios of “0” in a given county are not mathematical estimates; in these cases, zero practitioners have an address of record in that county.

Summary of Data Findings

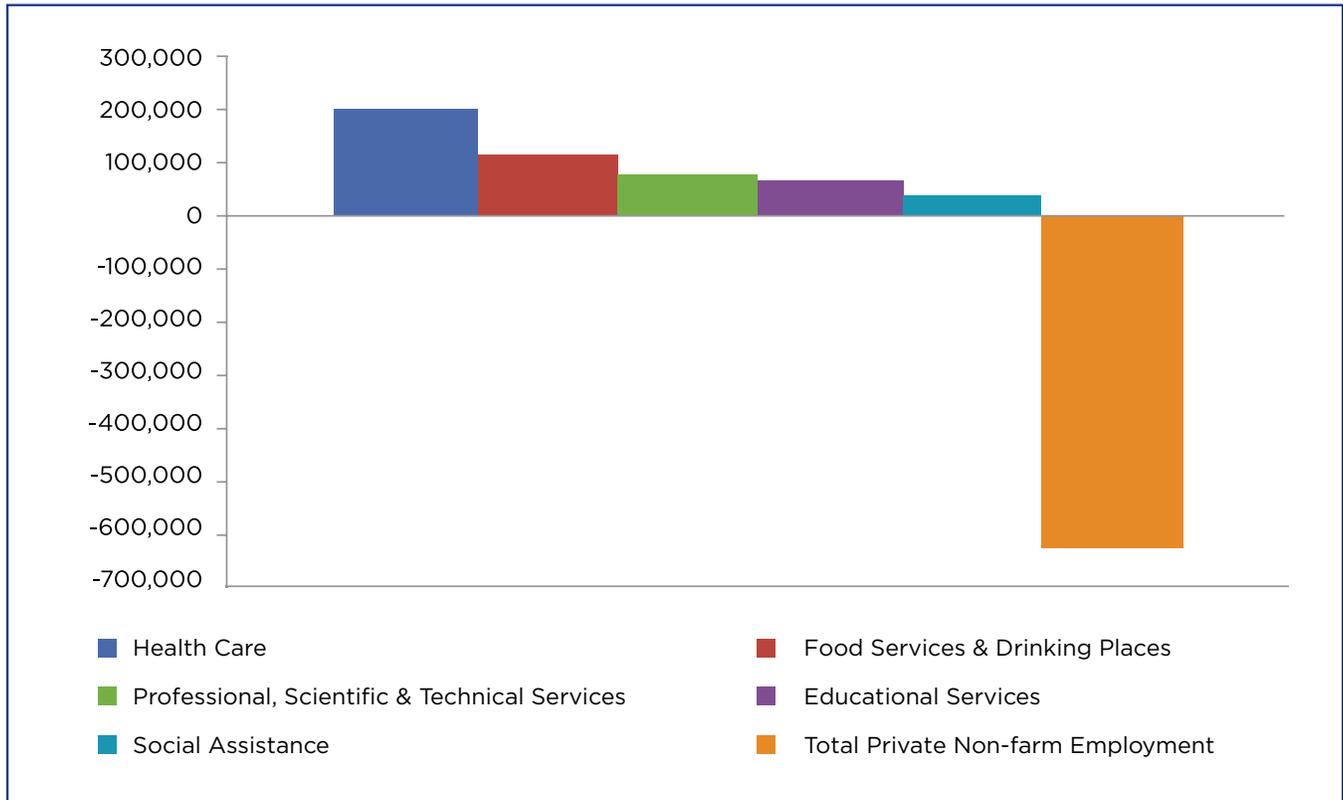
The occupational licensing data analyzed for this section of the report illustrate two important trends in California's recent economic history. Beginning in 1993, California's economy grew significantly, adding approximately 2.4 million jobs.¹⁸ For nearly all licensed health care occupations, the number of new licenses issued annually increased during this period. When general economic conditions in the state began declining in 2001 (as they did across the country) and employment levels in California started dropping, however, the health care sector became an exception.¹⁹

¹⁸ Analysis of California EDD Industry Employment – Official Estimates (not shown here).

¹⁹ Health care employment is defined by the North American Industry Classification System (NAICS) and includes Ambulatory Health Care Services (65-621000), Hospitals (65-622000), and Nursing & Residential Care Facilities (65-623000).

Figure 1 below shows that between 2001 and 2009, total non-farm private employment in California declined by approximately 638,000 jobs. In contrast, industries in the state's health care sector produced more than 193,000 jobs, making it the single largest source of non-farm private employment since 2001. The occupational licensing data corroborate this trend, showing that the number of new licenses issued each year continued to increase through this period of general economic decline.

Figure 1. Non-Farm Private Sector Job Creation in California: 2001 - 2009



Source: California EDD, Industry Employment – Official Estimates (Current Employment Statistics Program), Historical Annual Averages, 1990 – 2009²⁰

Growth occurred at different rates for different occupations, but overall, the licensing data indicate an expanding health care workforce in California over the past fifteen years. For some occupations the increase in supply is clearly driven by imported labor, in the sense that we know the state's educational capacity remained unchanged, and yet the number of new licenses being issued every year was growing; physicians (MD) and dentists are two prime examples of this phenomenon. For many other occupations, the growth in supply is comparatively steady, and corresponds with what has been a generally measured expansion in California's capacity to train new entrants to the workforce; pharmacists, physical therapists, and physician assistants are examples. In other cases, the growth in supply has been dramatic and corresponds to rapidly expanding educational training capacity driven by private for-profit education companies. Respiratory therapists, licensed vocational nurses, registered dental assistants, and pharmacy technicians are examples of this trend.

²⁰ Health care employment is defined by the North American Industry Classification System (NAICS) and includes Ambulatory Health Care Services (65-621000), Hospitals (65-622000), and Nursing & Residential Care Facilities (65-623000). These data do not include the public sector, establishments (including hospitals and other health care facilities) operated by a government entity are not represented here.

Despite the expansion of California's health care workforce, its geographic distribution remains uneven. The licensing data suggest that for most occupations the workforce is concentrated in counties along the coast, including those in the Bay Area, Los Angeles and Orange counties; or in and around Sacramento. There are differences in the extent to which a lack of access to providers may be an issue, depending on the occupation, but there are parts of the state where the data suggest this issue may be widespread. These include parts of the Central Valley, the southern border region, and counties in the north-central and north-eastern part of the state.

Mental health providers are a particular concern in terms of access to services. The occupational licensing data identify certified psychiatric/mental registered nurses, licensed psychiatric technicians, licensed psychologists, licensed marriage and family therapists, licensed clinical social workers, licensed educational psychologists, and the post-graduate assistants and interns in psychology, marriage and family therapy, and clinical social work, who are registered to complete their supervised professional training in order to qualify for a licensing examination. Counties in those regions of the state noted above have a limited supply of all of these professionals. License-per-population ratios are almost uniformly less than half the state-wide ratio.

Exceptions to the general pattern of counties in the Bay Area, along the coast, or in the Sacramento region having a much greater supply of health care professionals include licensed vocational nurses, licensed respiratory therapists, registered dental assistants, registered pharmacy technicians, and to some extent certified nurse practitioners, licensed osteopathic physicians, and licensed physician assistants. Distribution patterns for these professions can be seen in the maps below.

Other key findings concern the relationship between the primary provider of services and supporting personnel. The licensing data indicate

that in counties where the supply of occupational therapists (OTs) is large, licensed occupational therapy assistants are less frequently utilized. It may be that OTs in these counties rely on unlicensed aides for support staff. In contrast, the data indicate that counties which have a large supply of licensed physical therapists also have a comparatively large supply of licensed physical therapy assistants. Counties where the dentistry license per population ratio is low have comparatively large numbers of registered dental assistants and licensed registered dental hygienists.

We also found that counties where the physician (MD) license per population is low have comparatively large numbers of licensed osteopathic physicians (DO) and licensed physician assistants (PA); that the relationship between the county-level supply of licensed RNs and licensed LVNs appears to be inverse (meaning those counties where the RN license per population ratio is lowest are the counties which have the highest LVN license per population ratios); and that counties in Northern California generally have a greater supply of licensed RNs, certified public health RNs, certified nurse practitioners, and certified nurse anesthetists by comparison with counties in Southern California.

On the following pages, immediately after a map of California's counties on which all the subsequent maps are based, are figures and maps that visually present data from the Department of Consumer Affairs for the professions it oversees.

Figures and Maps

Map 1. California's Counties

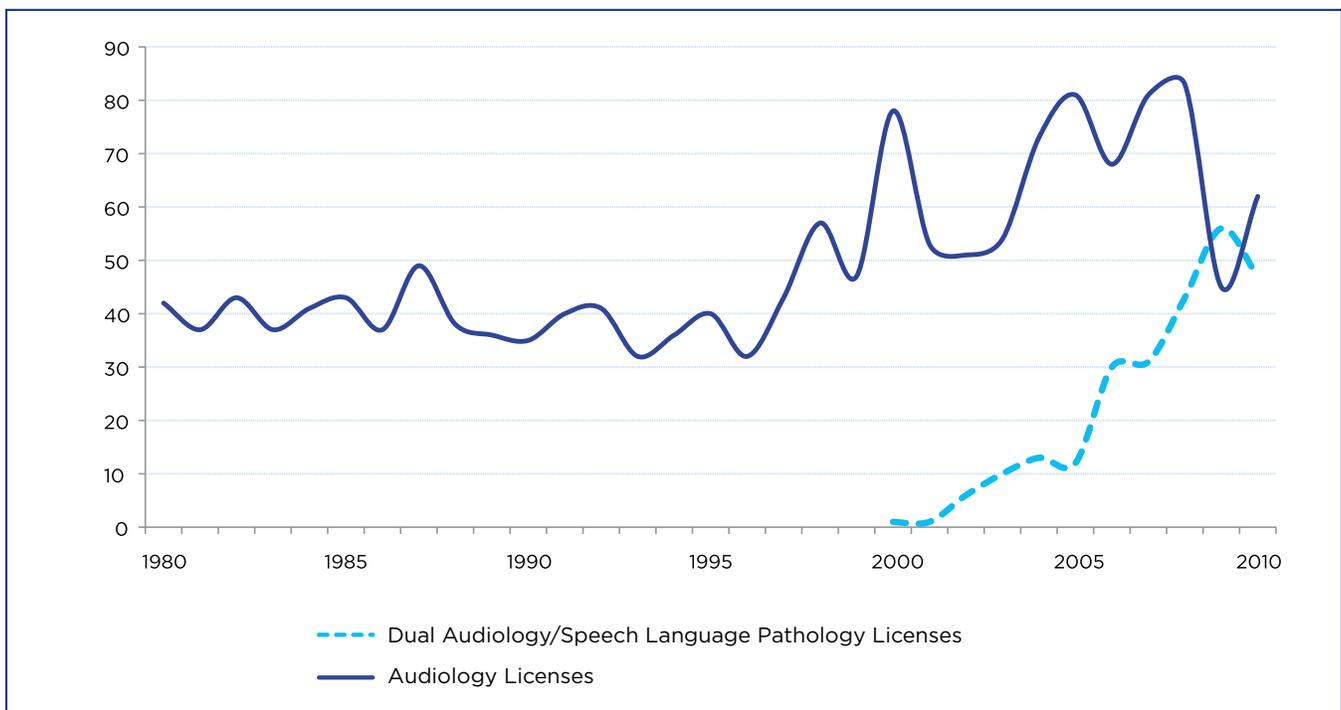


Allied Health

California Licensed Audiologists

Between 1980 and 1995 the number of new licenses issued annually to practice as an audiologist in California was consistent. Since 1995, annual licenses issued have generally increased, but with very large fluctuations; the reasons for this are unknown but may be related to training program capacity. Applicants for licensure after 2008 were required to have a doctoral degree (as opposed to a master's degree), which could explain the drop in new licenses issued per year at that point. However, Figure 2 also shows an increasing number of dual audiology/speech-language pathology licenses issued annually (a recently established license type), which mirrors the recent decline in new audiology-alone licenses.

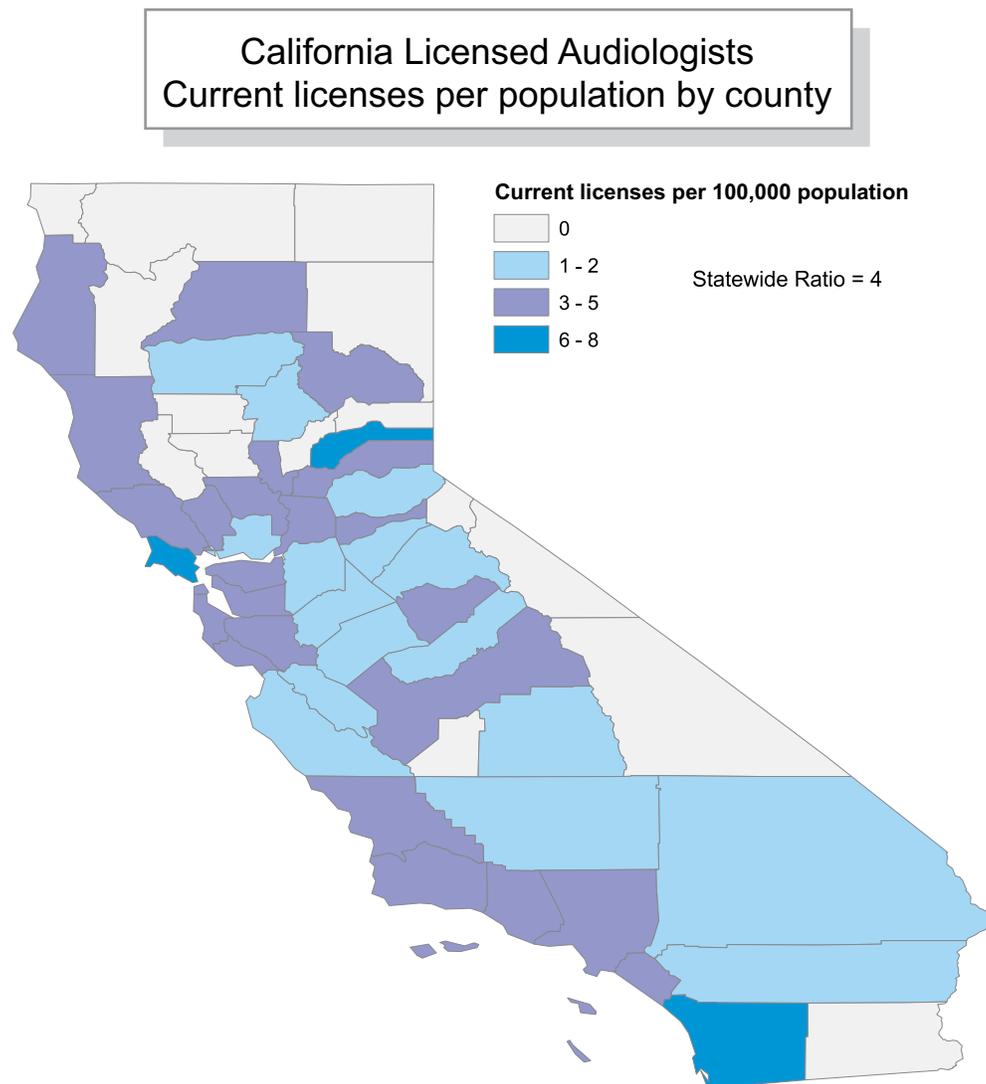
Figure 2. California licensed audiologists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 1,323 individuals with a California address in possession of a current and valid license to practice as an audiologist in the state. Audiology is a small workforce and these data show that approximately one-quarter of the counties in the state do not have any currently practicing audiologists, and another 25 percent have audiologist per population ratios less than one-half the state-wide ratio. This raises the question of whether California's supply of audiologists is adequate to meet the demand for services.

Map 2. Current California audiologist licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)

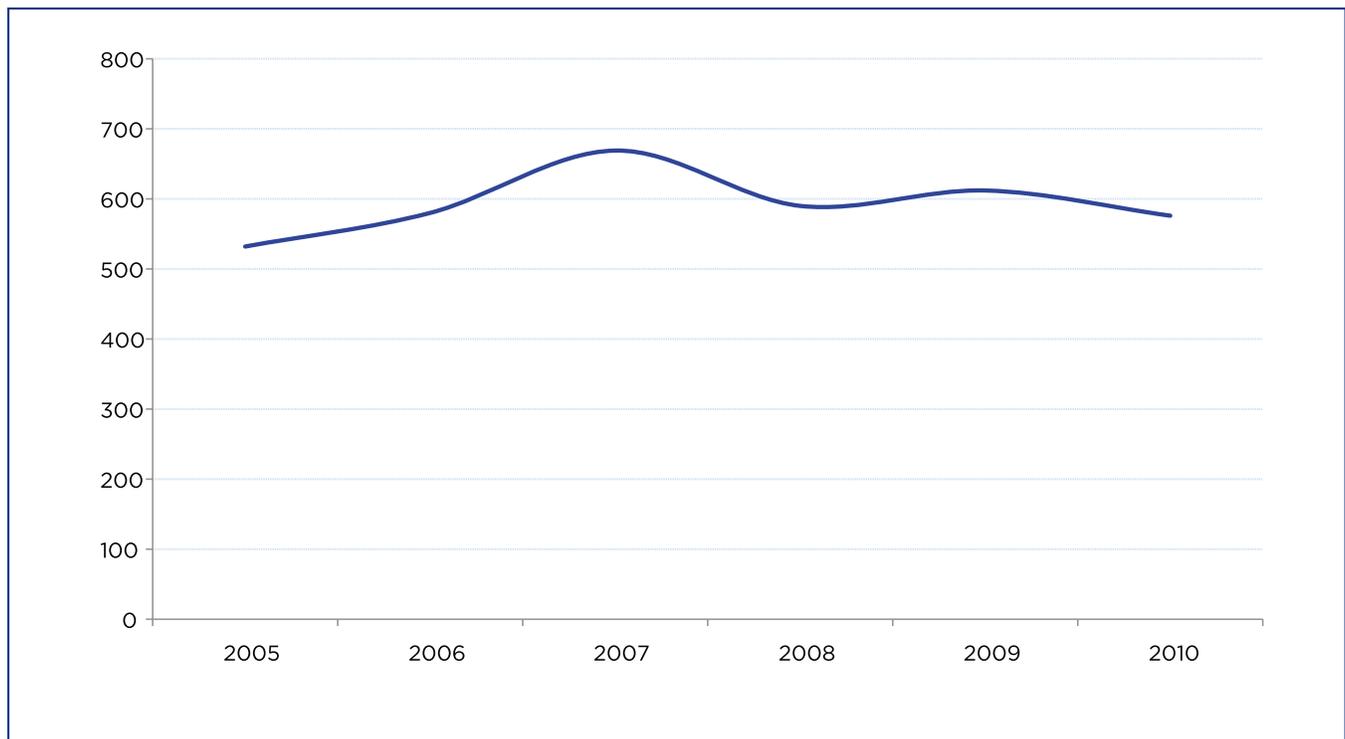
County distribution is based on individual's address of record

Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
2010 Census Summary File 1

California Licensed Occupational Therapists (OT) and Licensed Occupational Therapy Assistants (OTA)

Occupational therapist and occupational therapy assistant licensing categories are relatively recently established.²¹ The figures below begin in 2005 and do not include the initial wave of licenses issued to therapists and therapy assistants who were already in practice before the new licensing requirements were established.²² The figures below show that the number of new licenses issued each year, for both OTs and OTAs, is very consistent. They also show that, each year, there are approximately five new OT licenses issued for every new OTA license.

Figure 3. California licensed occupational therapists - new licenses issued per year: 2005 - 2010

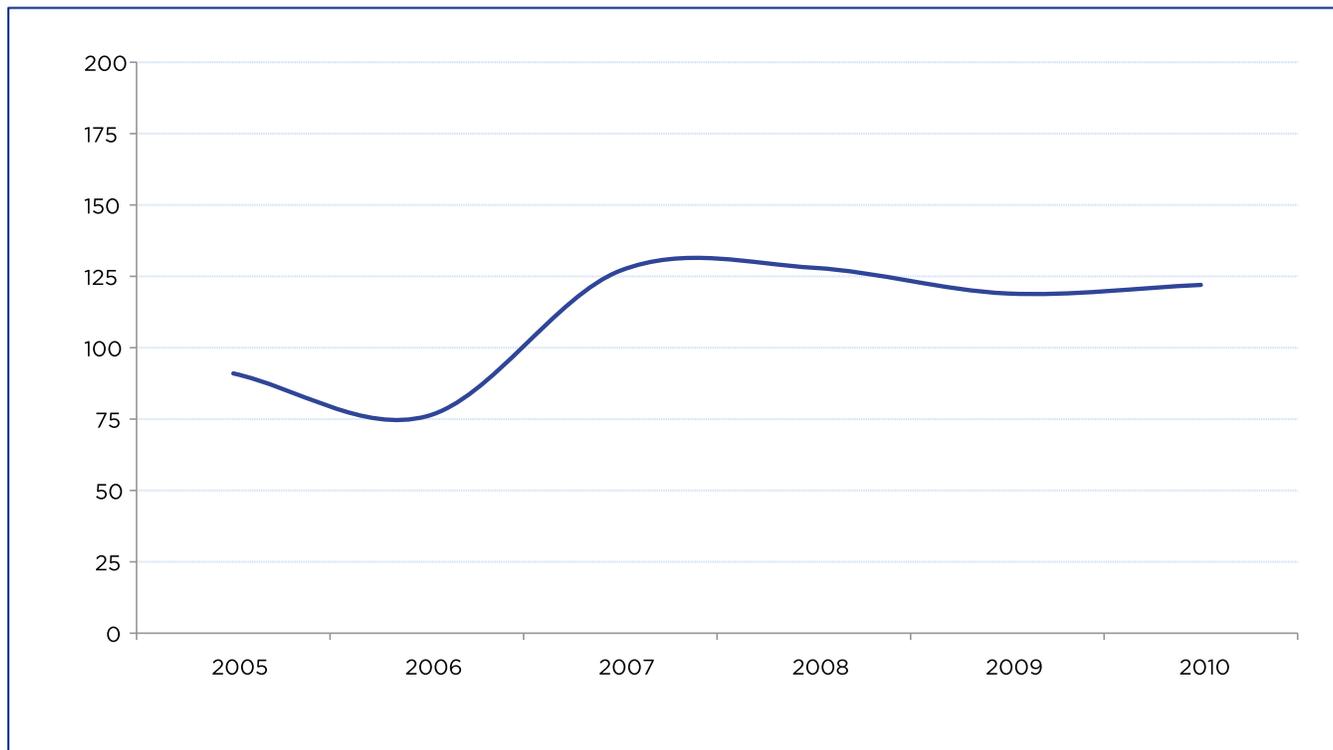


Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

²¹ 2002 was the first year California issued licenses for both OTs and OTAs.

²² This is done to avoid skewing the trend in new licenses issued each year.

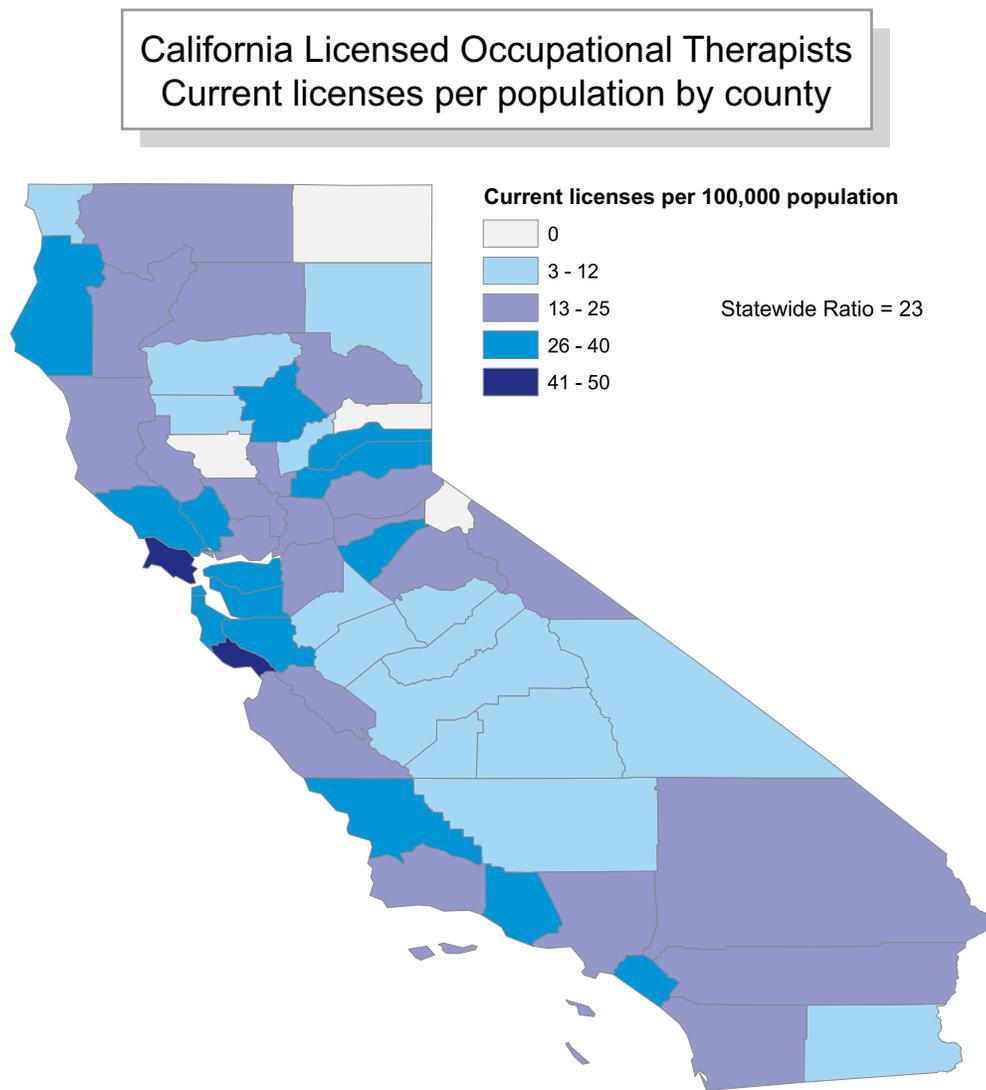
Figure 4. California licensed occupational therapy assistants - new licenses issued per year: 2005 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 8,546 individuals with a California address in possession of a current and valid license to practice as an occupational therapist in the state. As with many other licensed health care occupations, counties in the Bay Area and along the coast generally have the highest OT license per population ratios. Most counties that form the Central Valley have per population ratios less than one-half the state-wide ratio, and there are no currently licensed occupational therapists with an address of record in Alpine, Sierra, Colusa, and Modoc counties.

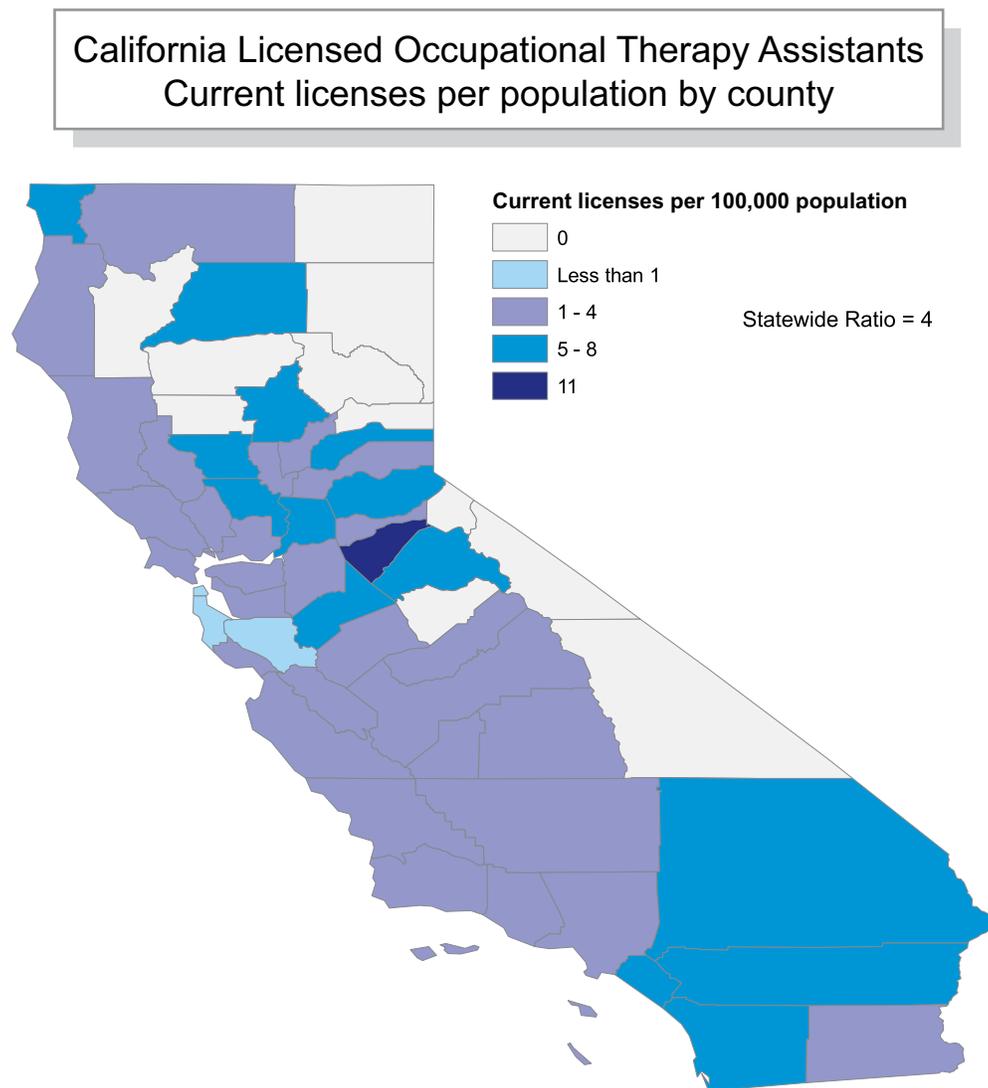
Map 3. Current California occupational therapist licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 1,547 individuals with a California address in possession of a current and valid license to practice as a licensed occupational therapy assistant (OTA) in the state. Comparing the license per population ratios of OTAs and OTs reveals that the counties that have the highest OTA license per population ratios generally have average OT license per population ratios. However, counties that have very high OT license per population ratios (Map 3) nearly all have OTA license per population ratios that rank among the lowest in the state, particularly those counties in the Bay Area. There are no OTA practitioners with an address of record in twelve counties mostly stretching along California's eastern border. Some of these counties also have no licensed OT practitioners; others may rely on the use of unlicensed aides in place of licensed OTAs.

Map 4. Current California occupational therapy assistant licenses per population by county



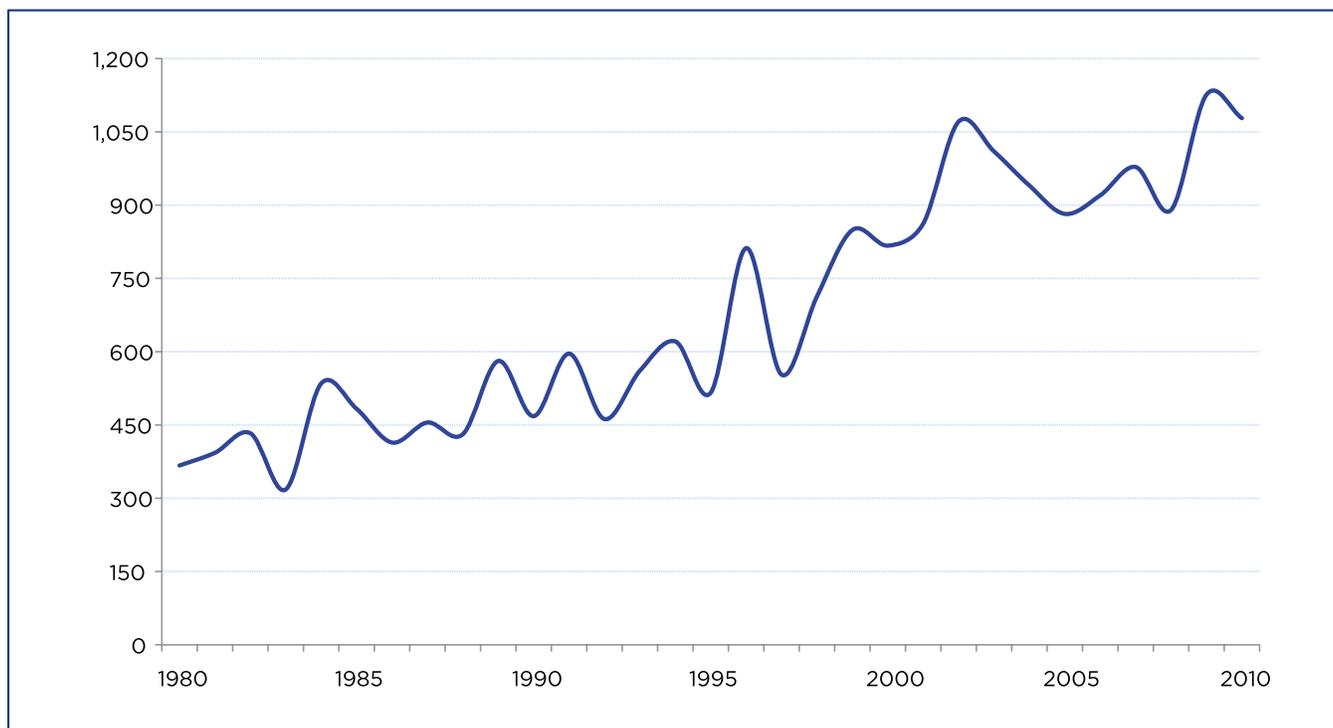
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Physical Therapists (PT) and Licensed Physical Therapy Assistants (PTA)

The fluctuating totals in new physical therapy licenses issued each year between 1996 to 2000 corresponds to a period in which schools were transitioning from bachelor's to master's degree programs; the period between 2002 and 2008 reflects a second transition from master's to doctoral degree programs. In general, the number of physical therapy licenses issued annually has grown significantly over the past 15 years.

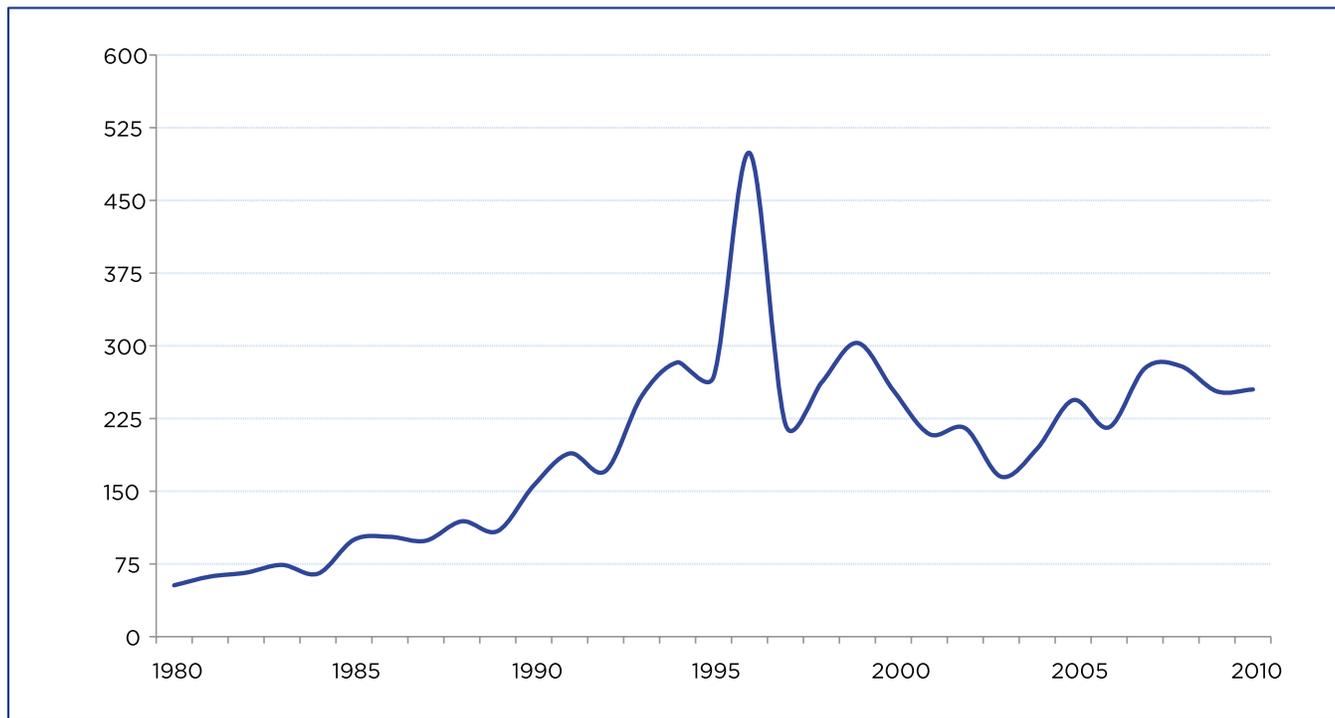
Figure 6 shows new licenses per year issued to physical therapy assistants since 1980. The big spike in the mid-1990s most likely reflects an adjustment to a new requirement that applicants for licensure possess an associate's degree. Graduating cohorts from programs that were not previously accredited to award the degree may have been delayed in their application in licensure, resulting in an unusually large number of licenses issued over a short period of time.

Figure 5. California licensed physical therapists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

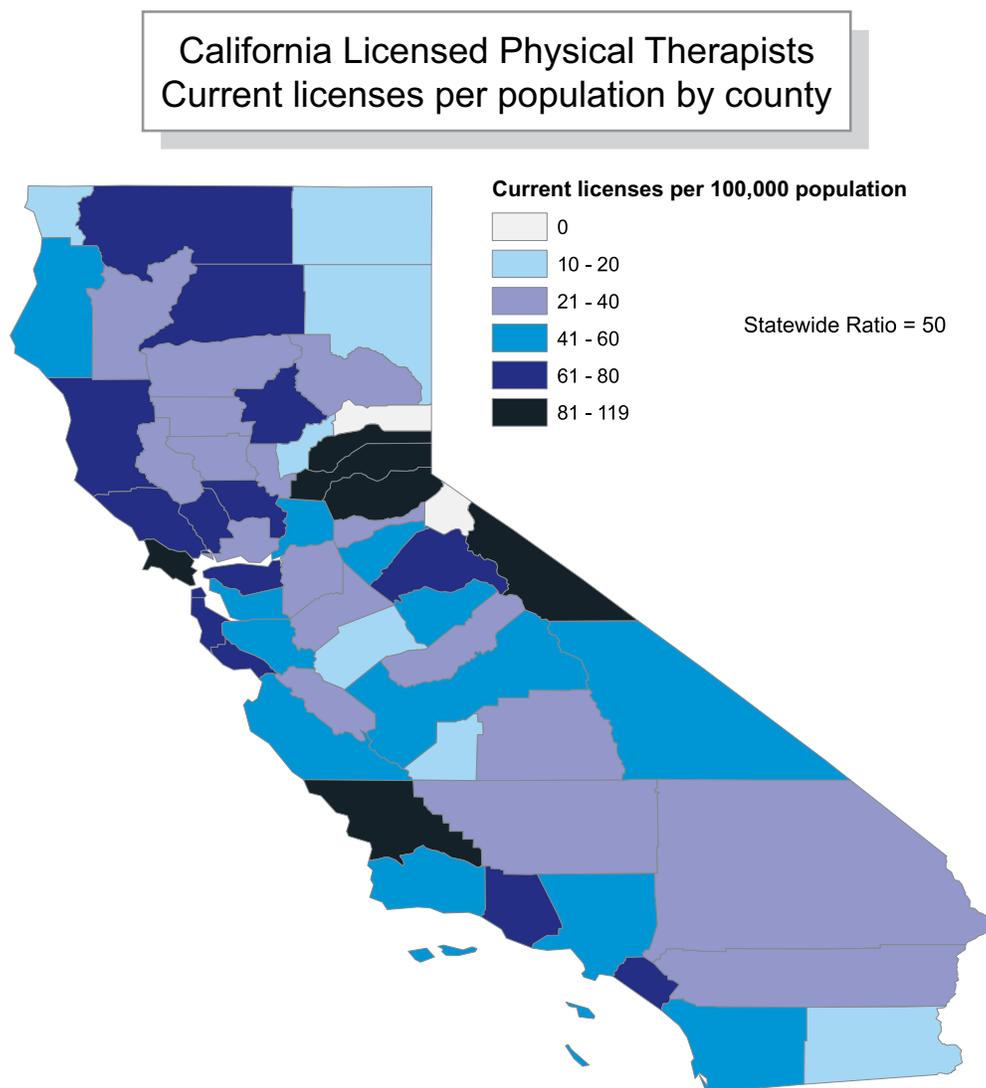
Figure 6. California licensed physical therapy assistants - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 18,674 individuals with a California address in possession of a current and valid license to practice as a licensed physical therapist in the state. The geographic distribution of physical therapists compares well with other health care occupations in terms of potential access to PT services. Very few counties have license per 100,000 population ratios far below the state-wide ratio, although there are zero currently licensed physical therapists with an address of record in Alpine and Sierra counties.

Map 5. Current California physical therapist licenses per population by county

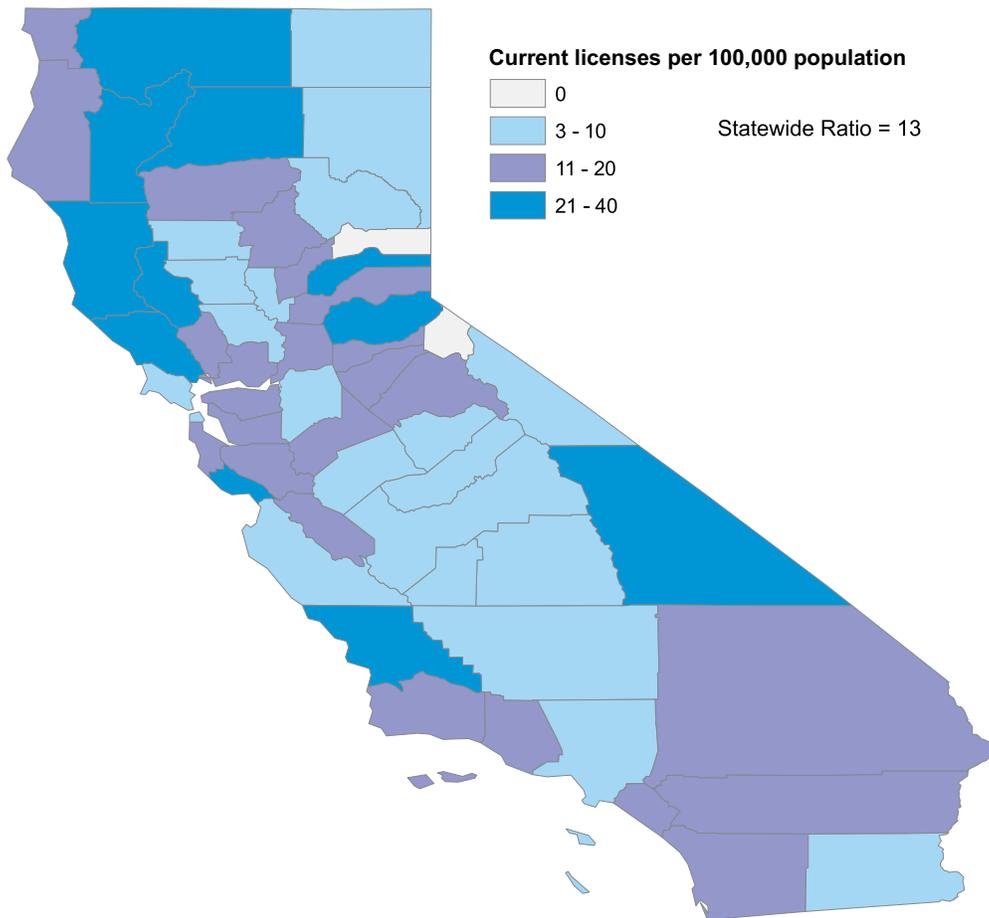


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 4,862 individuals with a California address in possession of a current and valid license to practice as a licensed physical therapy assistant in the state. Comparing the county PT and PTA license per population ratios indicates that counties with high PT license per population ratios, with few exceptions, also have high PTA license per population ratios. Two exceptions are San Francisco and Marin counties, which are heavily supplied with PTs but not PTAs.

Map 6. Current California physical therapy assistant licenses per population by county

California Licensed Physical Therapy Assistants
Current licenses per population by county

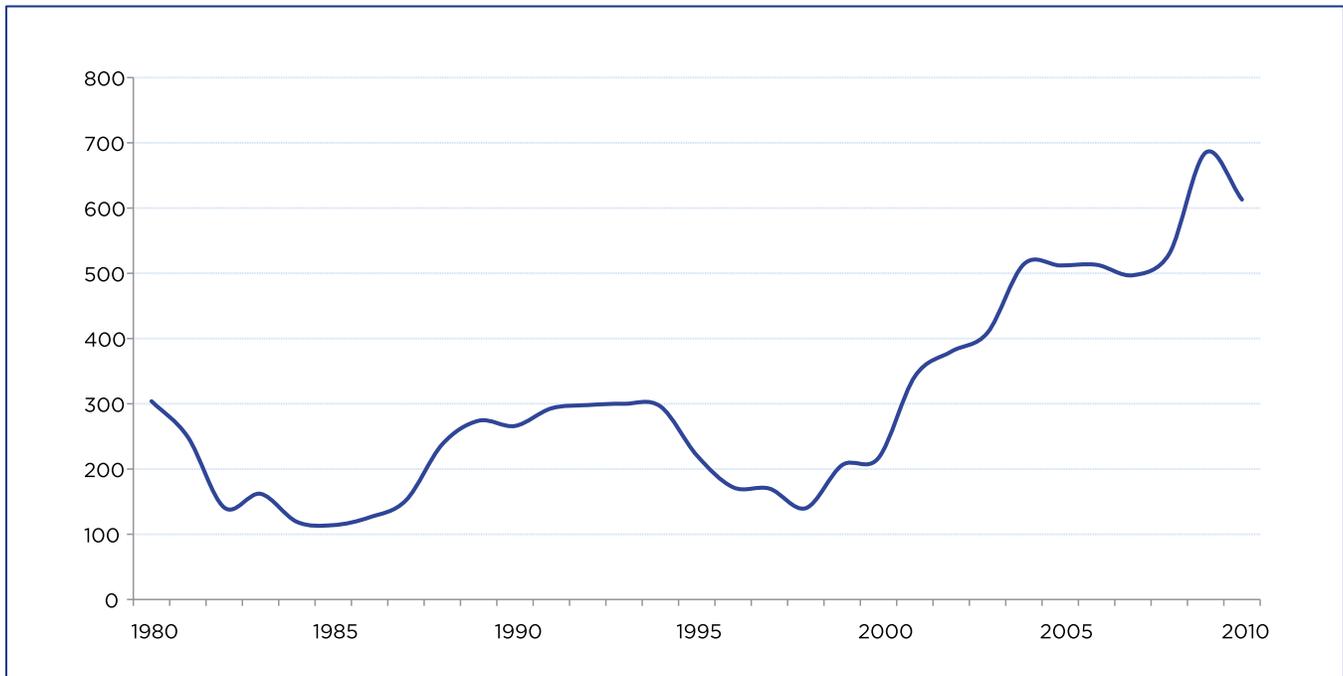


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Psychiatric Technicians

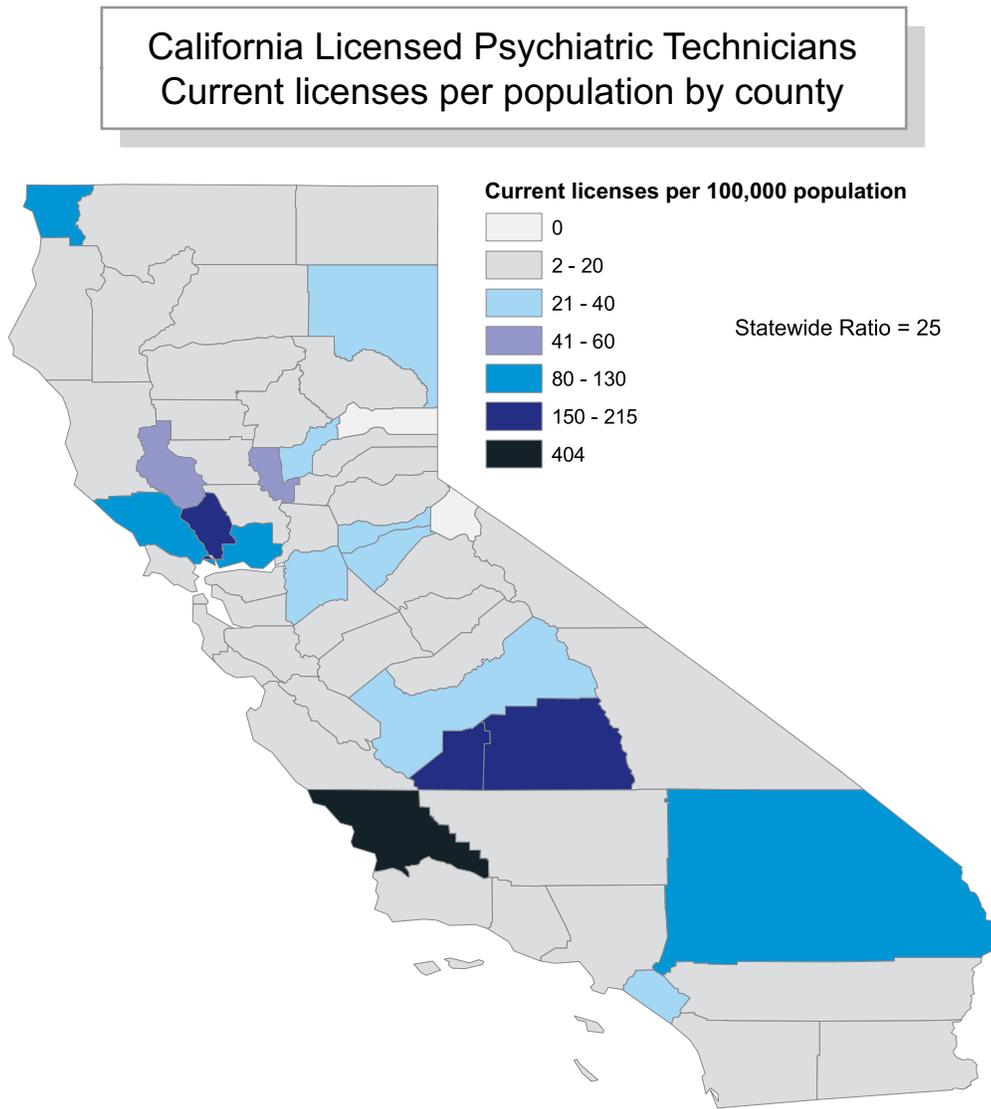
The number of new psychiatric technician licenses issued each year fluctuated over cycles approximately five years in length over the period 1980 – 1998, with a difference of roughly 200 licenses per year at its high and low points. However, beginning in 1999 the number of new licenses issued annually increased every year over the next nine years. Psychiatric technicians are frequently employed in the state's psychiatric hospitals and in mental health units within the state's correctional system; this trend may be related to an expansion in the number of such facilities.

Figure 7. California licensed psychiatric technicians – new licenses issued per year: 1980 - 2010



As of February 2011, there were 9,458 individuals with a California address in possession of a current and valid license to practice as a psychiatric technician in the state. The map indicates that psych techs are concentrated in just a few counties. Their geographic distribution of employment likely reflects the location of state psychiatric hospitals, or correctional facilities.

Map 7. Current California psychiatric technician licenses per population by county

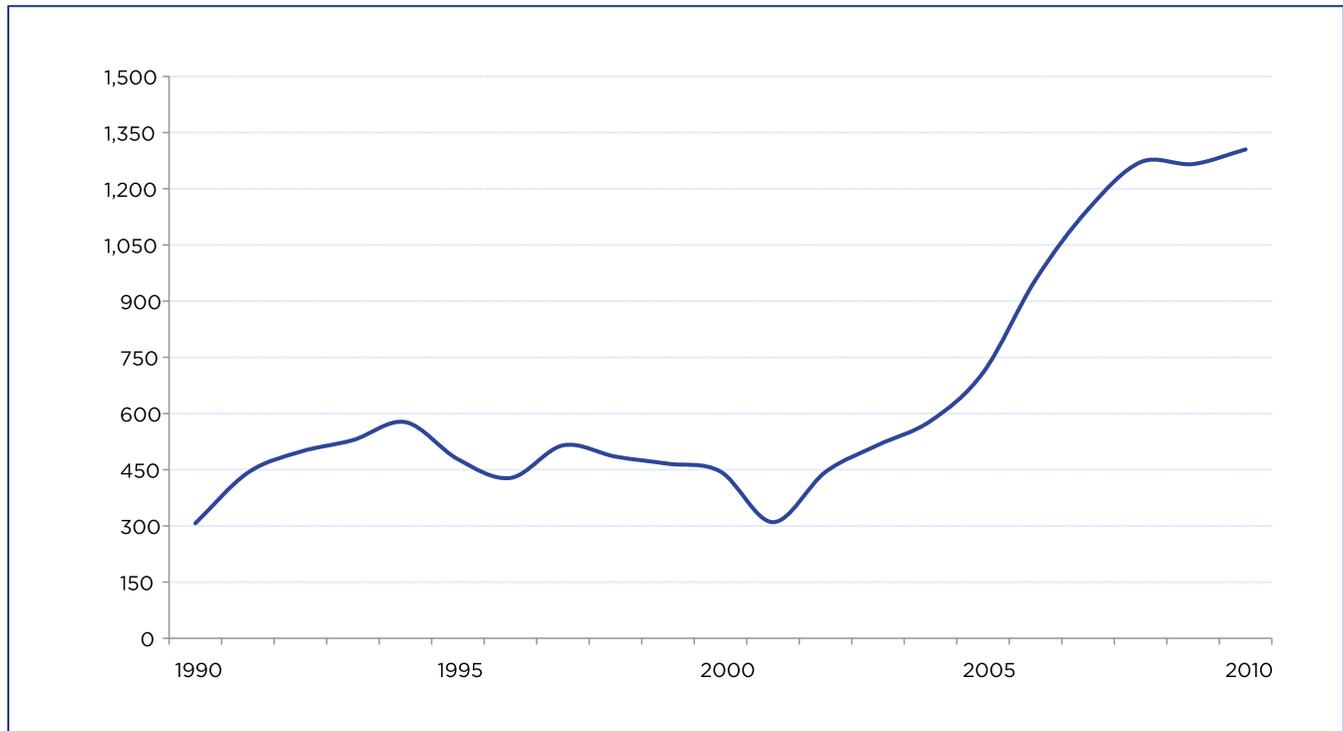


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Respiratory Therapists

The decline in the number of new respiratory therapy licenses annually, between 1997 and 2001, reflects the introduction of new regulation requiring applicants to possess an associate's degree. Several training programs that were non-degree granting did not seek accreditation to award the associate's degree. Since 2005, private for-profit training programs have proliferated around the state and the number of new respiratory therapists being licensed annually has grown dramatically.

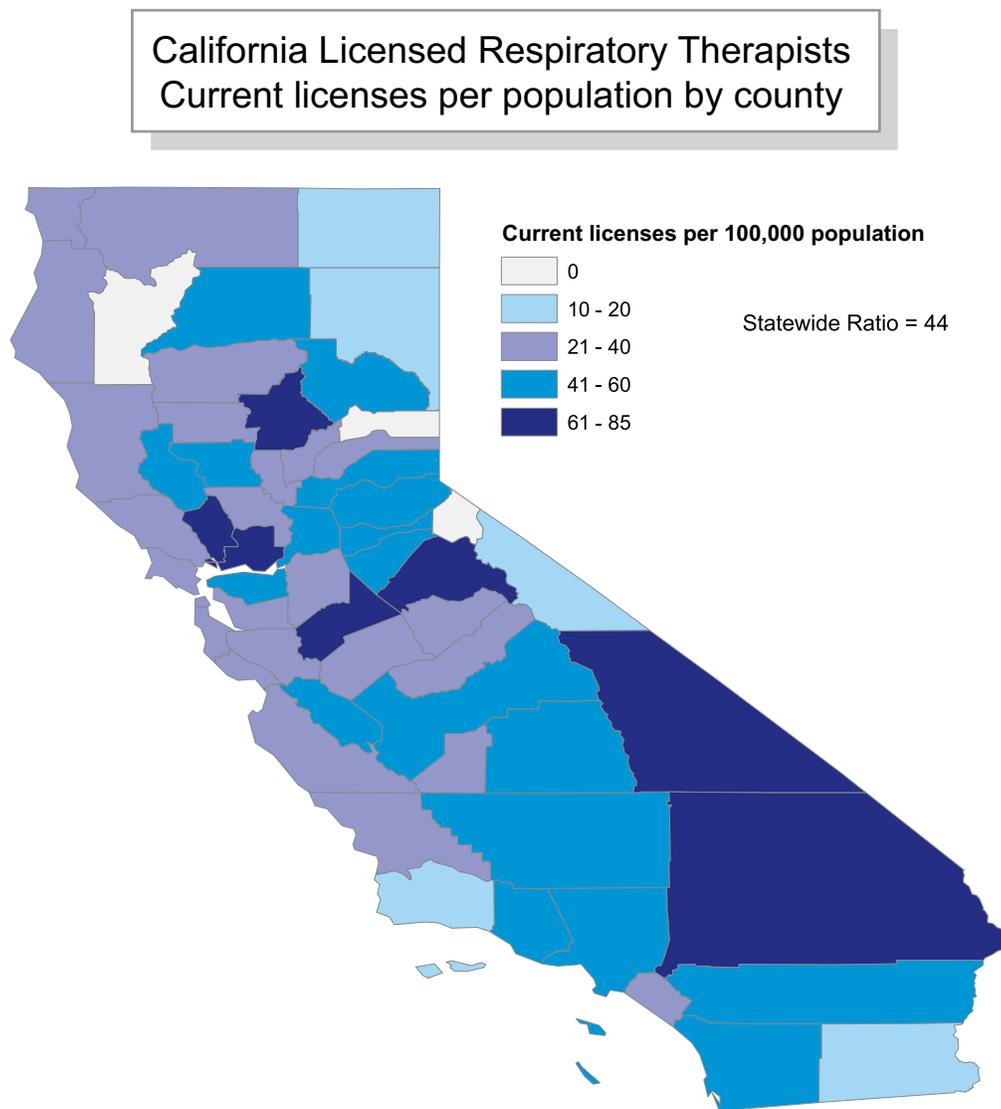
Figure 8. California licensed respiratory therapists - new licenses issued per year: 1990 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 16,312 individuals with a California address in possession of a current and valid license to practice as a licensed respiratory therapist in the state. The geographic distribution of respiratory therapists compares well with other health care occupations in terms of potential access to services. The license per population ratio is highest in central parts of the state, and in counties that frequently have lower per population ratios for other health care occupations. There are zero currently licensed respiratory therapists with an address of record in Alpine, Sierra, and Trinity counties.

Map 8. Current California respiratory therapy licenses per population by county

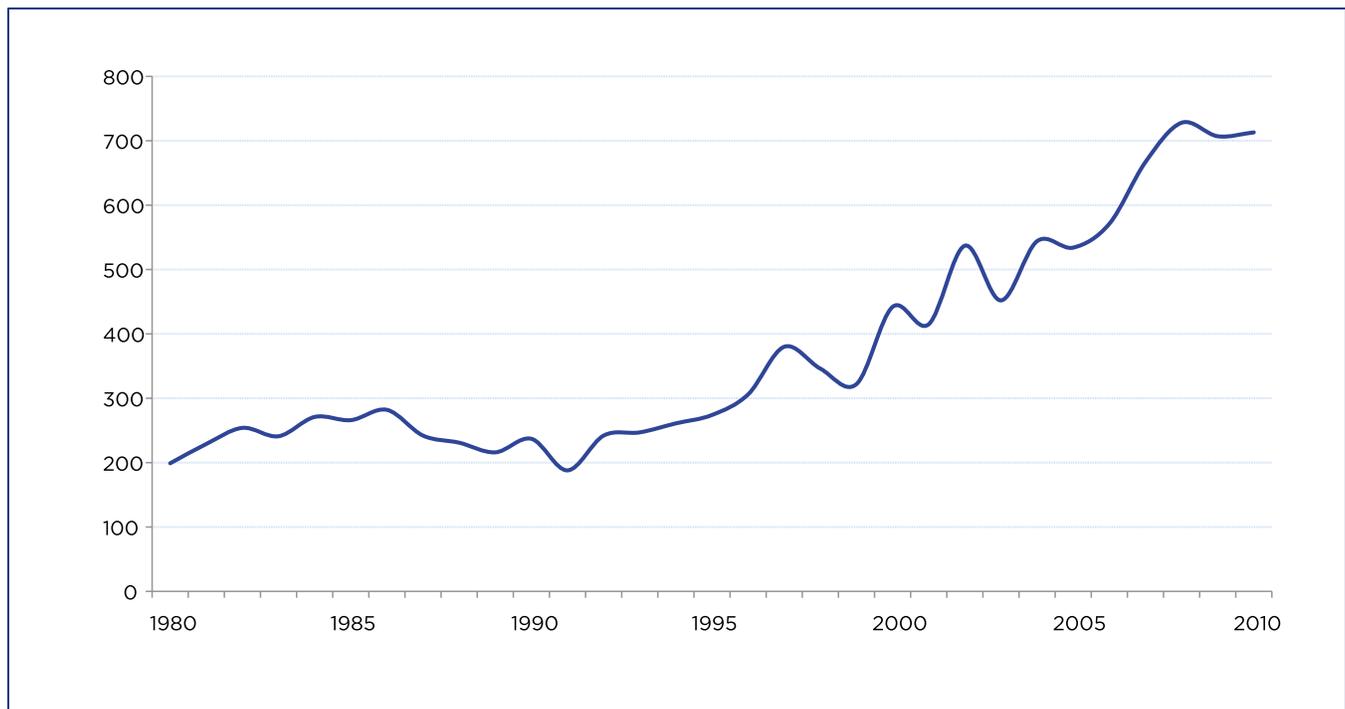


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Speech-Language Pathologists and Registered Speech-Language Pathology Assistants

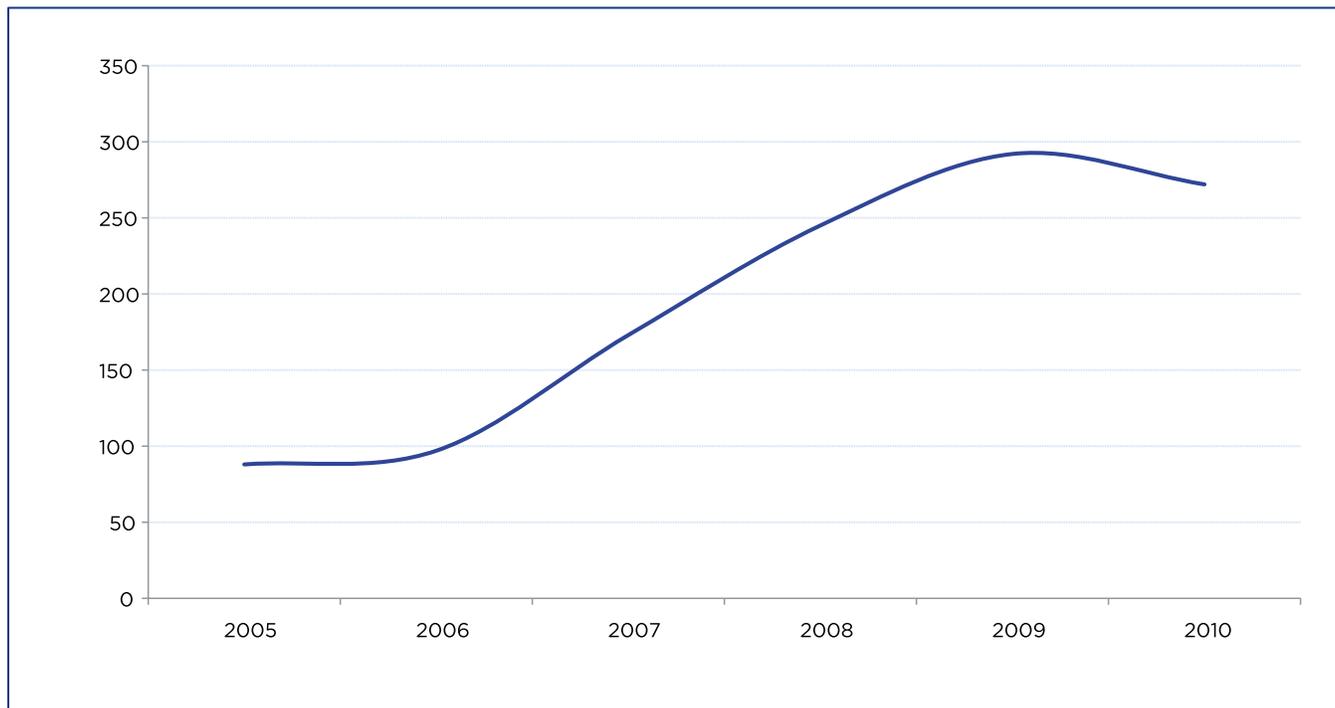
Figure 9 shows that between 1980 and 1990 the annual number of speech-language pathologist licenses issued in California was relatively consistent. Since 1991, the number of new licenses issued every year has steadily increased, more than doubling between 2000 and 2010. Figure 10 shows that the number of new registered speech-language pathology assistants grew rapidly in the first several years following its establishment as a registered occupation. However, the data suggest that the supply of new entrants to the workforce has stabilized in recent years.

Figure 9. California licensed speech-language pathologists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

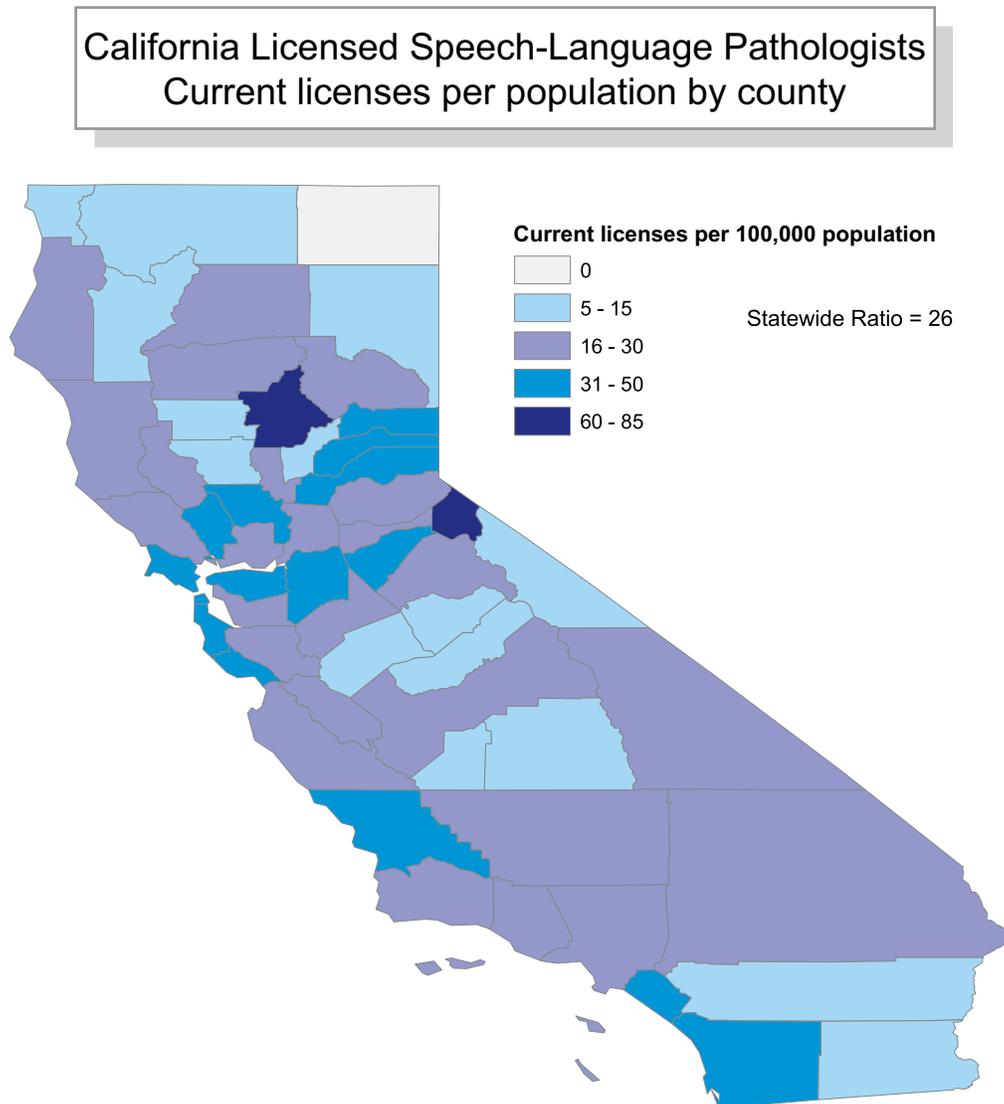
Figure 10. California registered speech-language pathology assistants - new registrations per year: 2005 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 9,630 individuals with a California address in possession of a current and valid license to practice as a licensed speech-language pathologist in the state. The geographic distribution of California's speech language pathologist workforce is less concentrated in a small number of counties, by comparison with many other health care occupations. Only a small number of counties have speech-language pathologist per population ratios above the state-wide ratio; most (approximately 40%) have ratios right around the average. Still, nearly one-quarter of the state's counties have per population ratios roughly half the state-wide ratio and there are no currently licensed speech-language pathologists in Modoc County.

Map 9. Current California speech-language pathologists licenses per population by county



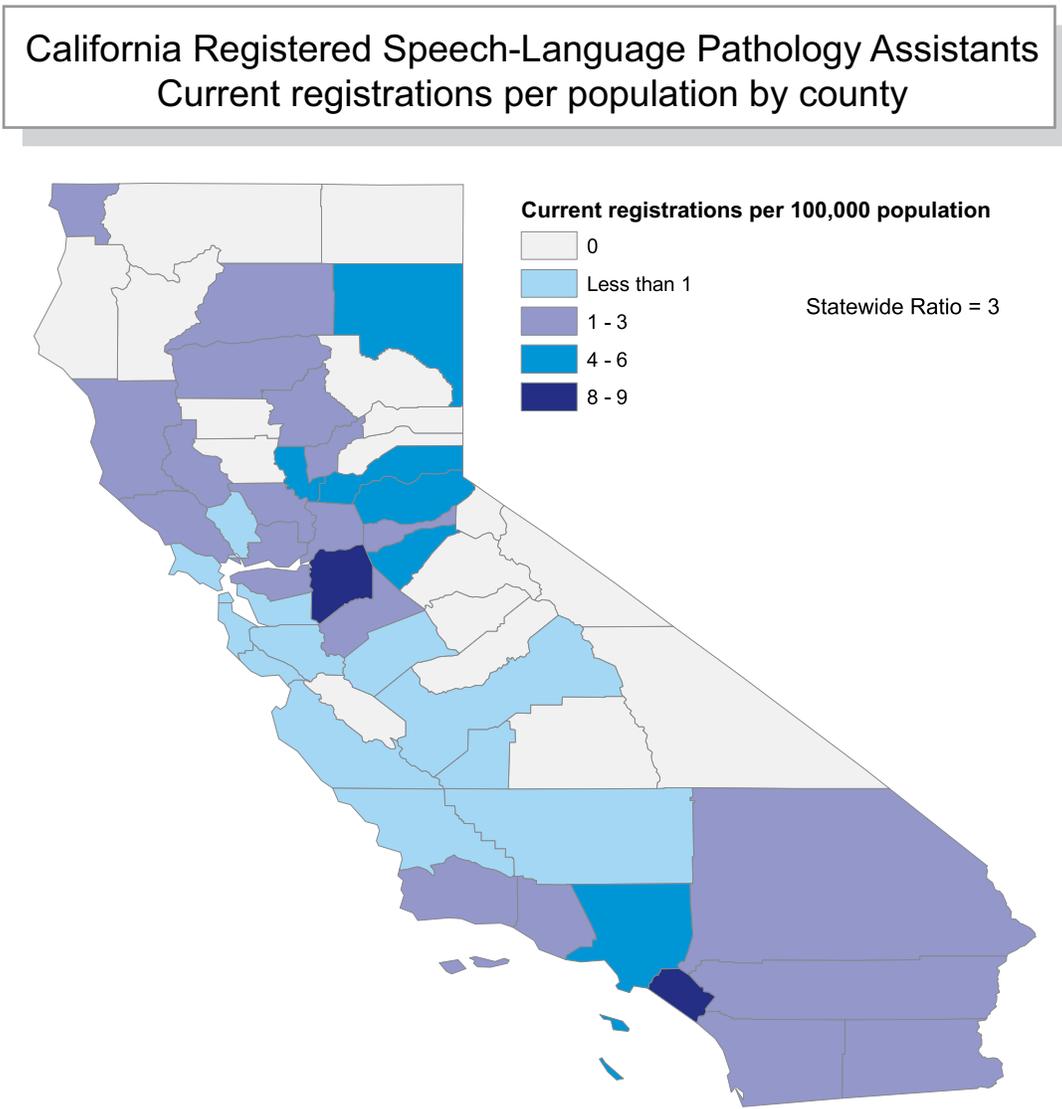
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)

County distribution is based on individual's address of record

Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
2010 Census Summary File 1

As of February 2011, there were 1,141 individuals with a California address and a current and valid registration to work as a registered speech-language pathology assistant in the state. The distribution of registered speech-language pathologist assistants in California is concentrated in a small number of counties. Half of the counties in the state have per population ratios less than one-half the state-wide ratio. Speech-language pathology assistants are trained at either the associate's or bachelor's degree level, in a board-approved program, with additional clinical experience requirements. The geographic distribution of the workforce may reflect proximity to training programs.

Map 10. Current California speech-language pathologist assistant registrations per population by county



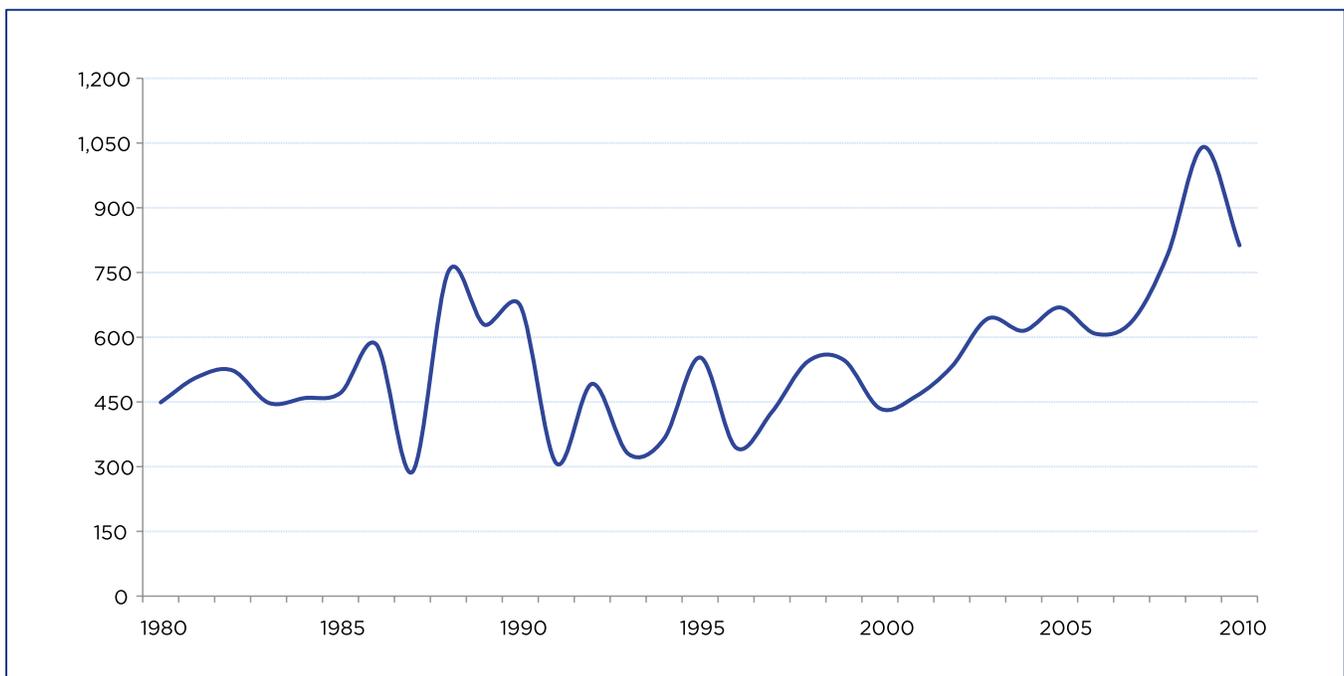
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

Behavioral and Mental Health²³

California Licensed Clinical Social Workers (LCSW) & Registered Associate Social Workers

The annual number licensed clinical social worker licenses fluctuated dramatically between 1985 and 1992. One possible explanation may be that when new educational programs graduate their first cohorts of students, they are all licensed at the same time, resulting in short term spikes in the number of licenses. The fluctuating pattern of annual licenses issued is less dramatic over the decade 1990 to 2000, after which the trend is as steady increase. Although not shown here, the increase in licenses since 2000 corresponds with an increase in the number and size of master's level social work programs during this period.

Figure 11. California licensed clinical social workers - new licenses issued per year: 1980 - 2010

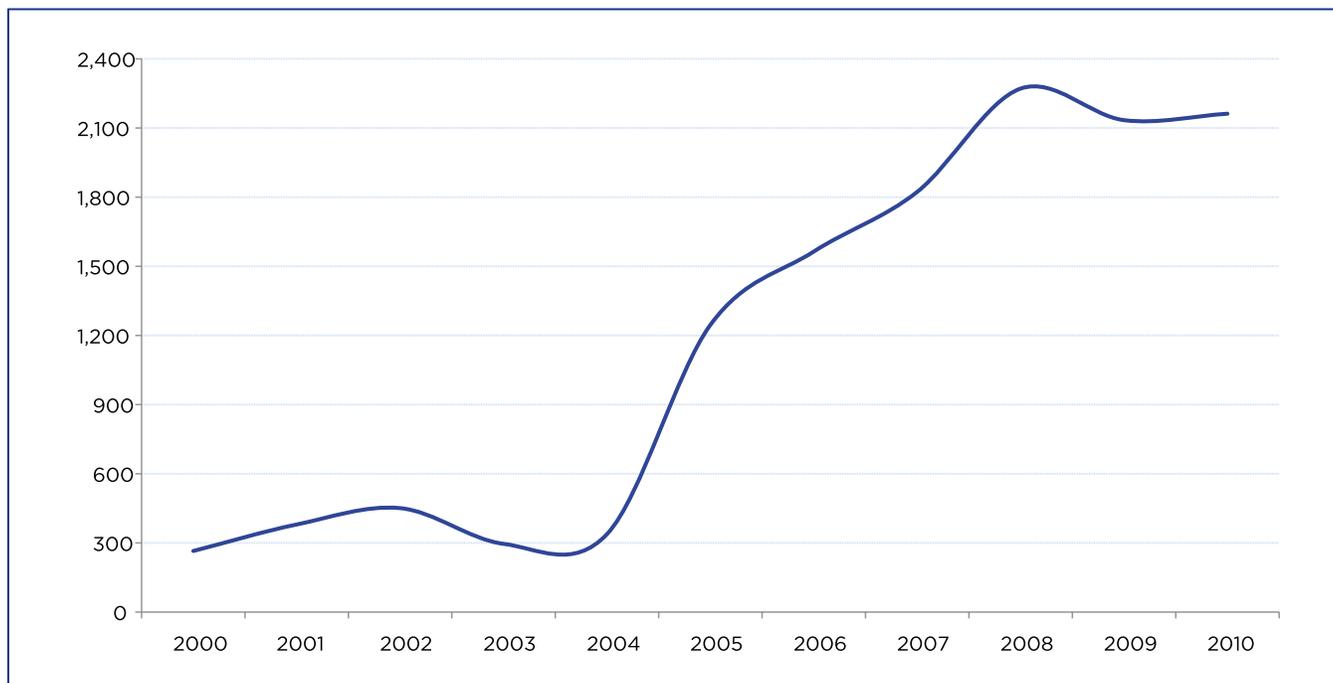


Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

23 See also "Psychiatric Technicians" under Allied Health, and "Psychiatric/Mental Health Nurses" under Nursing in this section.

Figure 12 shows the number of associate social workers registering each year to complete their supervised training hours required to sit for the LCSW licensing exam, indicating continued growth in the size of the licensed clinical social worker workforce.

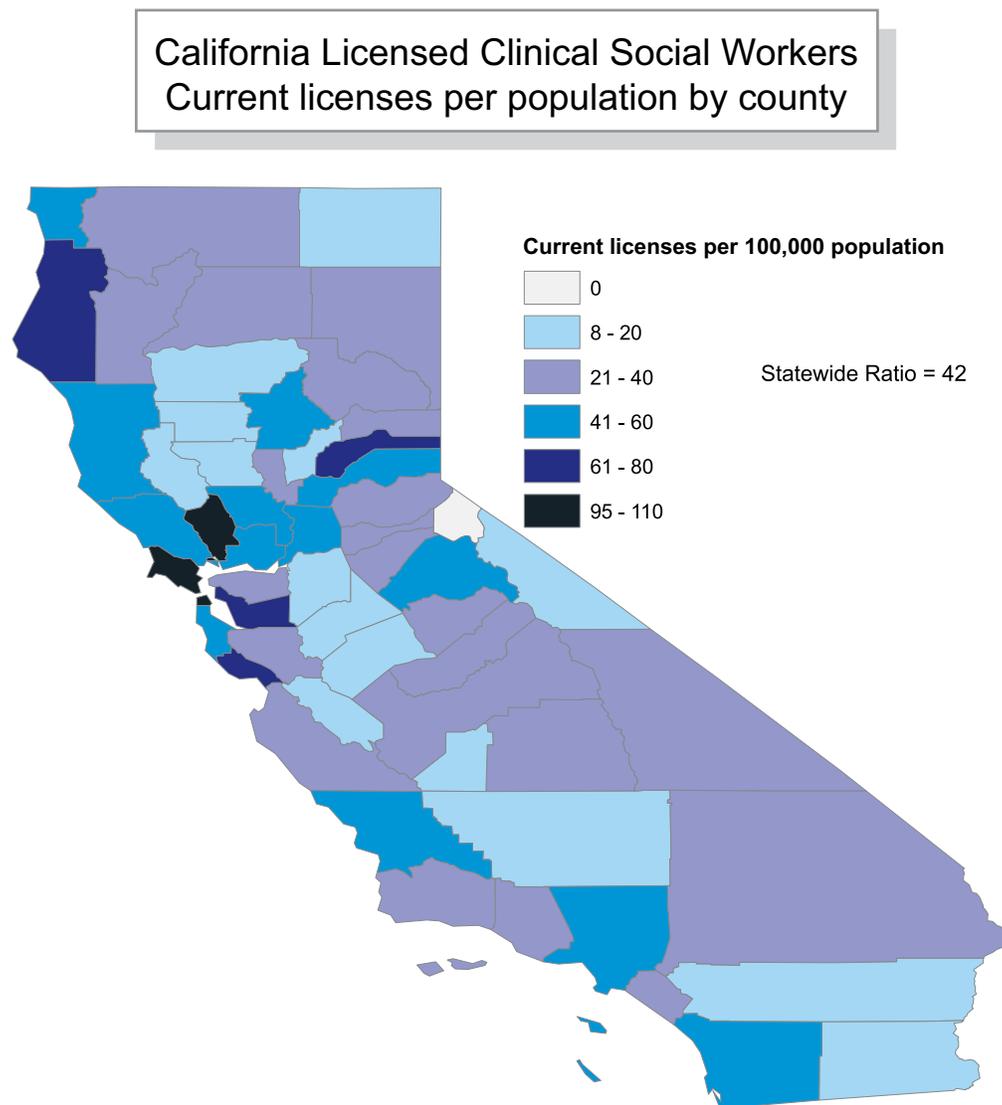
Figure 12. California registered associate social workers - new registrations per year: 2000 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 15,525 individuals with a California address in possession of a current and valid license to practice as a licensed clinical social worker in the state. These data show LCSWs are concentrated in several coastal counties, as well as a band of counties stretching east from the Bay Area. Approximately one-quarter of the state's counties have a LCSW per population ratio that is less than one-half the state-wide ratio, and no practitioners have an address of record in Alpine County.

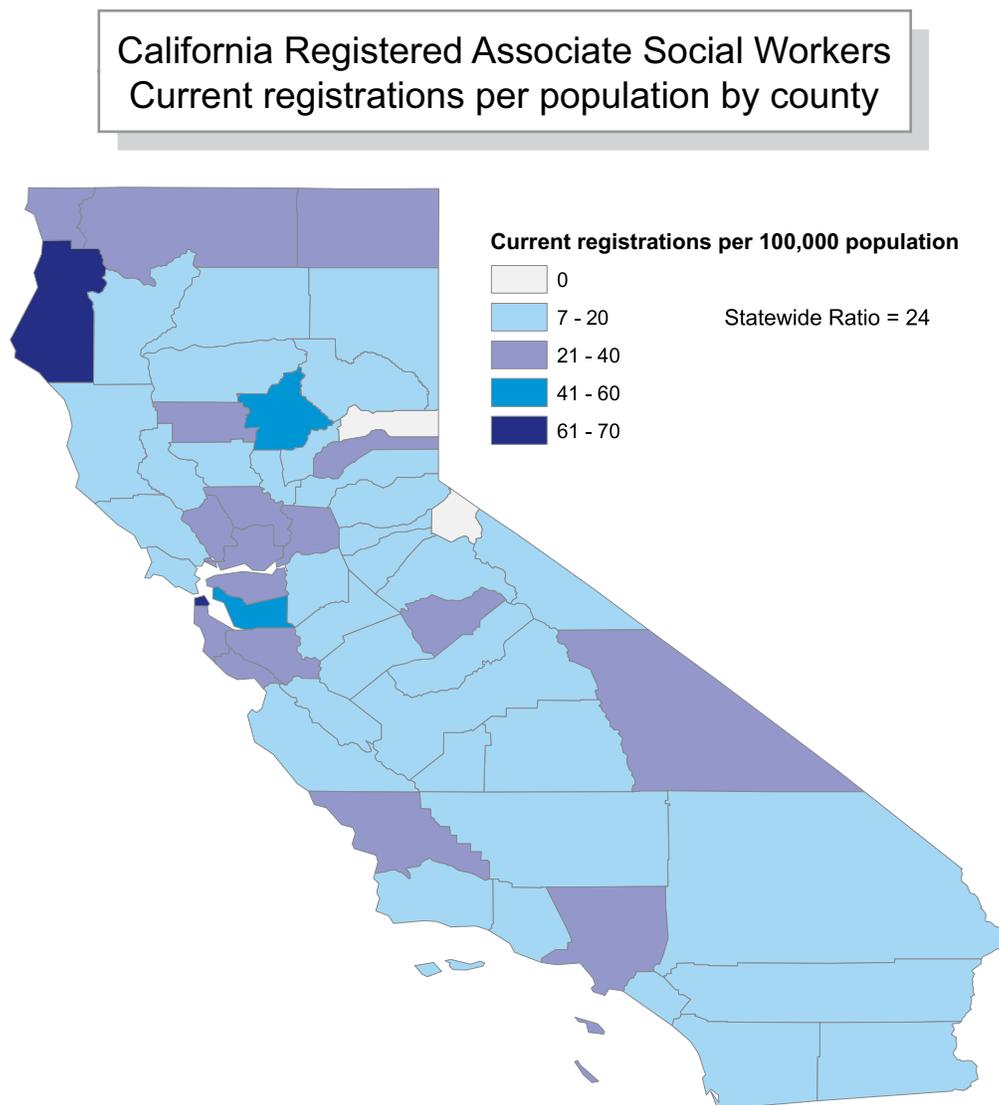
Map 11. Current California clinical social worker licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 8,988 individuals with a California address and a current and valid registration to work as a registered associate social worker in the state. The distribution of registered associate social workers may reflect proximity to graduate programs in social work, with the result that two-thirds of the counties in California have very low per population ratios.

Map 12. Current California associate social worker registrations per population by county

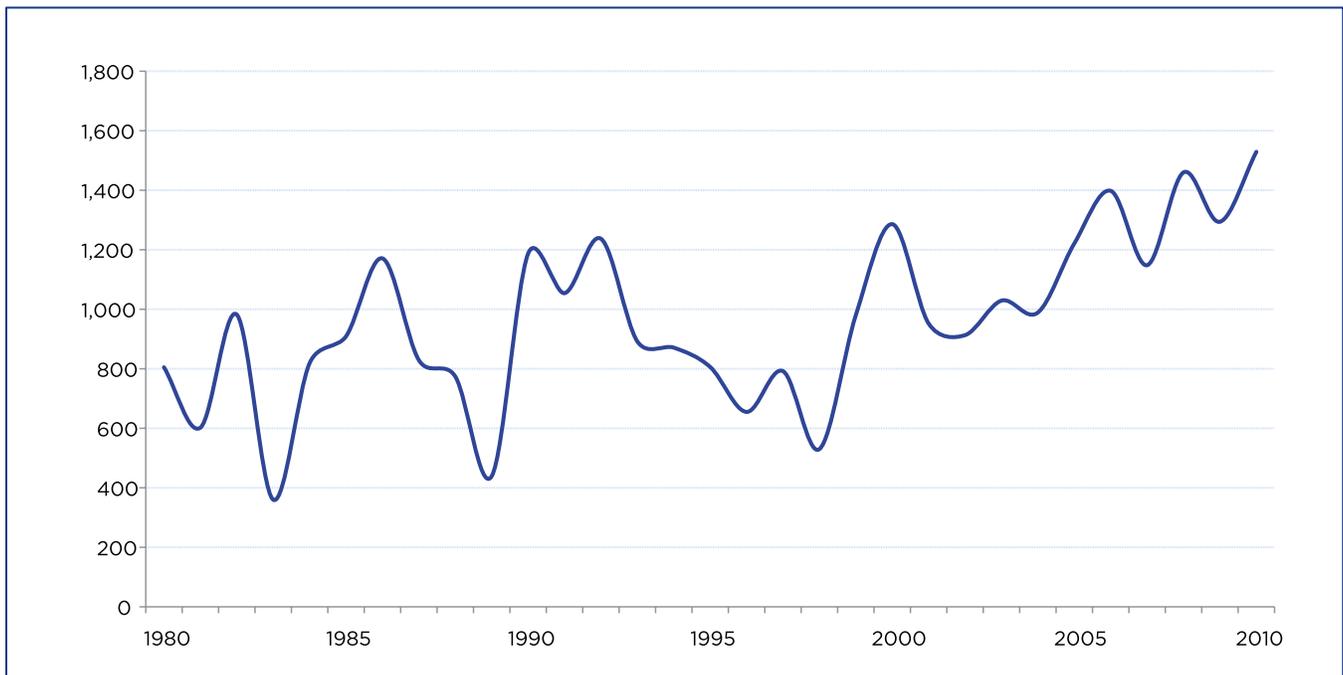


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Marriage & Family Therapists (MFT)

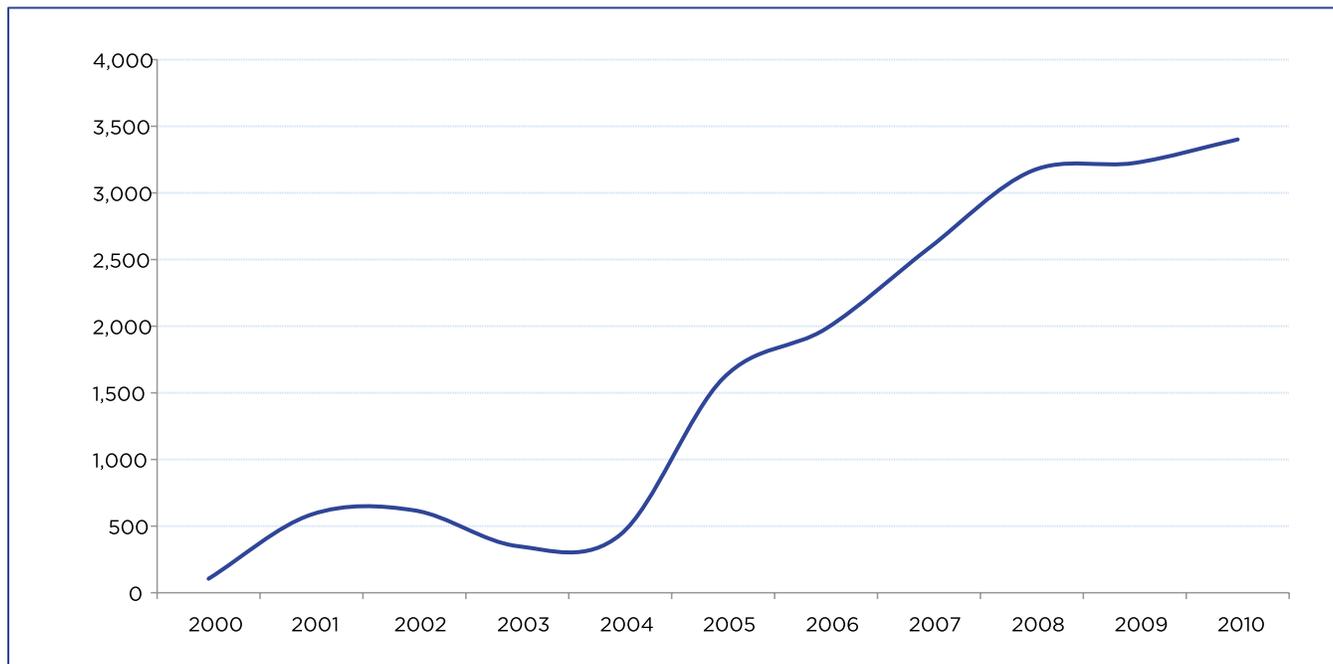
The number of new MFT licenses issued annually fluctuated dramatically over the period 1980 to 2000. The causes of this are unknown, but could be related to training program capacity, the challenges of meeting supervised professional experience requirements, or changes in economic conditions. The number of new licenses issued per year over the past decade has been much more consistent, trending steadily upward. Figure 14 shows the number of marriage & family therapist interns registering each year to complete their supervised training hours required to sit for the MFT licensing exam. As with the registered associate social workers (Figure 12), these data indicate continued growth in the size of the licensed marriage & family therapist workforce.

Figure 13. California marriage & family therapists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

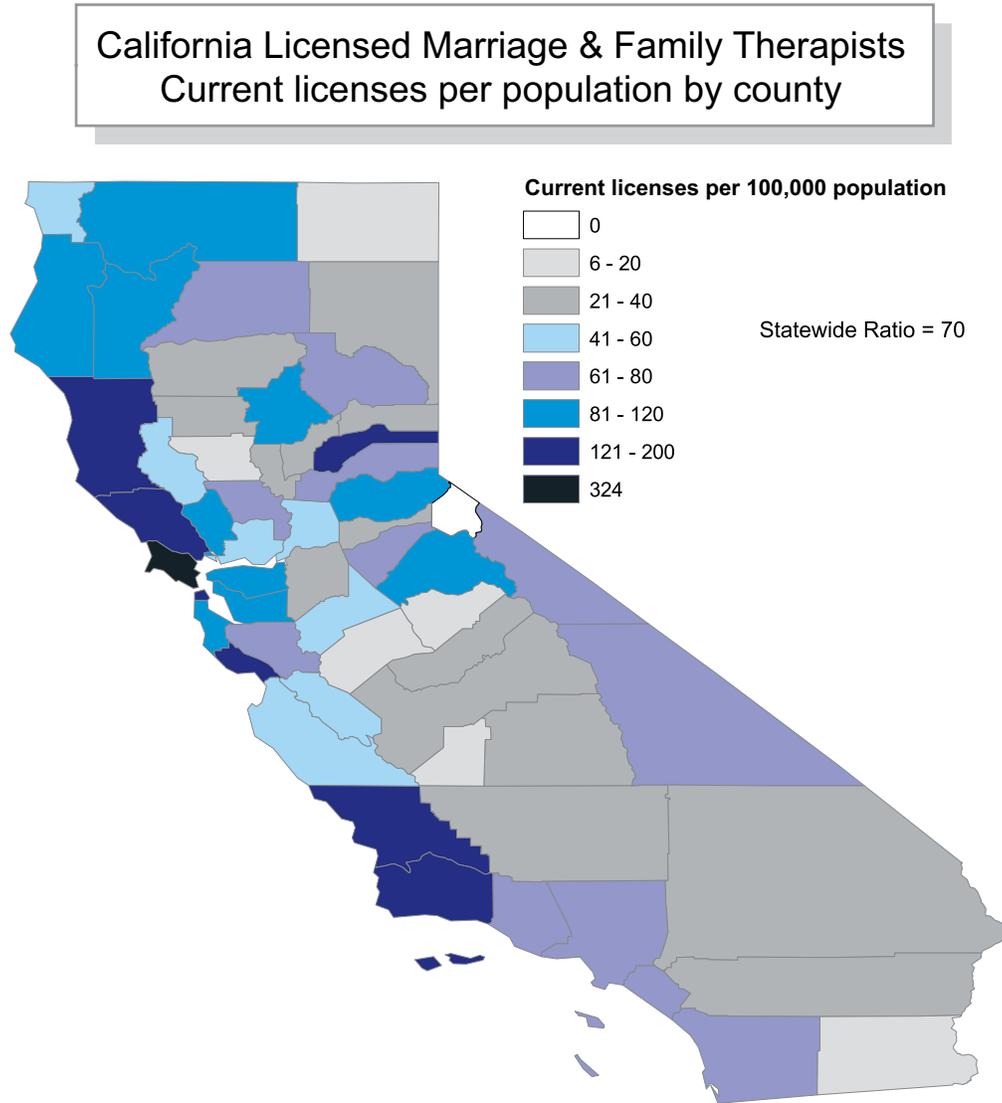
Figure 14. California registered marriage & family therapist interns - new registrations per year: 2000 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 25,948 individuals with a California address in possession of a current and valid license to practice as a marriage & family therapist in the state. These data show marriage & family therapists are concentrated along the coast, to a greater extent compared with licensed clinical social workers. Counties in the Central Valley and parts of north-central and north-eastern California have per population ratios less than one-half the state-wide ratio, raising concerns about access to mental health services.

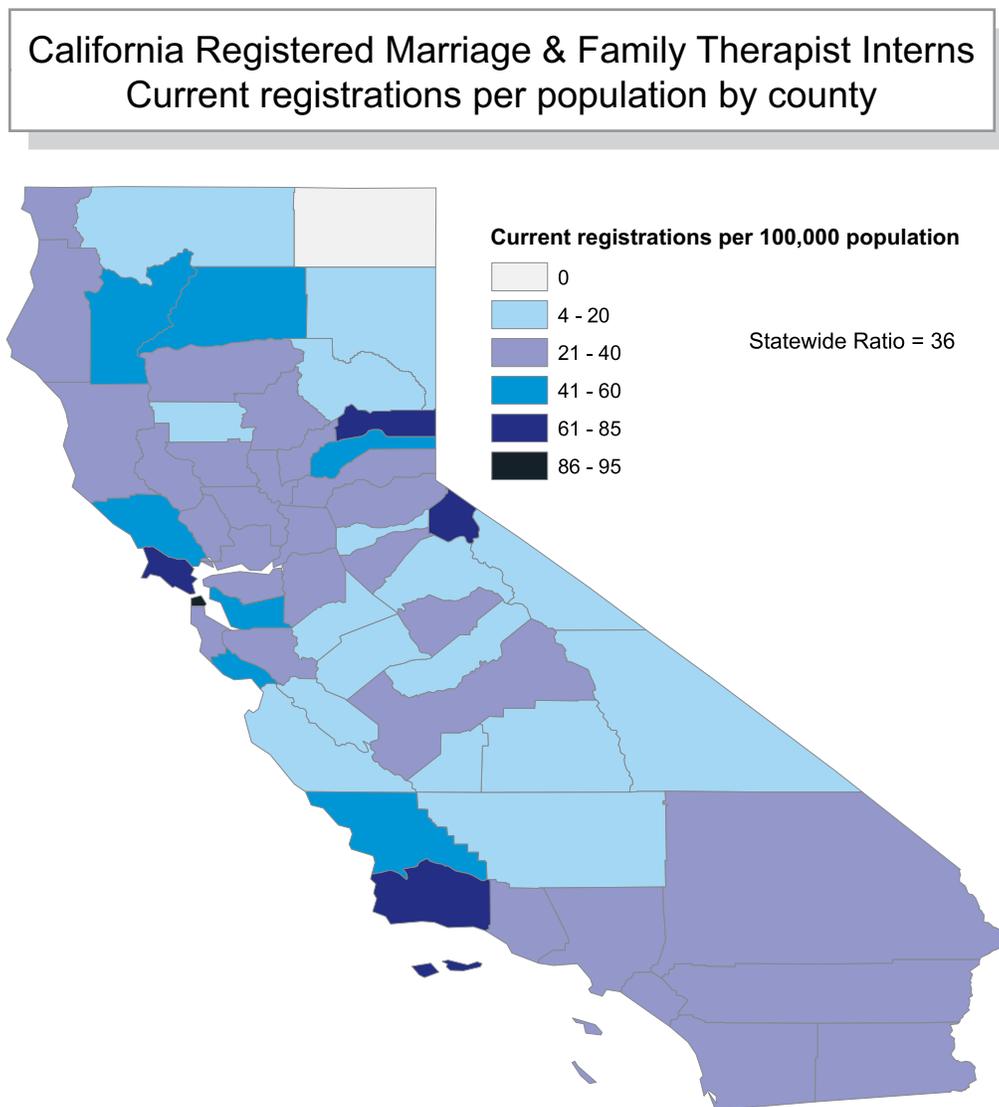
Map 13. Current California marriage & family therapy licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 13,278 individuals with a California address and a current and valid registration to work as a marriage & family therapist intern in the state. Per population ratios for marriage & family therapist interns are generally largest in those counties that also have large MFT per population ratios. Many counties in the Central Valley and along the eastern and north-eastern borders have per population ratios less than one-half the state-wide ratio, underscoring the possibility of limited access to mental health care services.

Map 14. Current California marriage & family therapist intern registrations per population by county

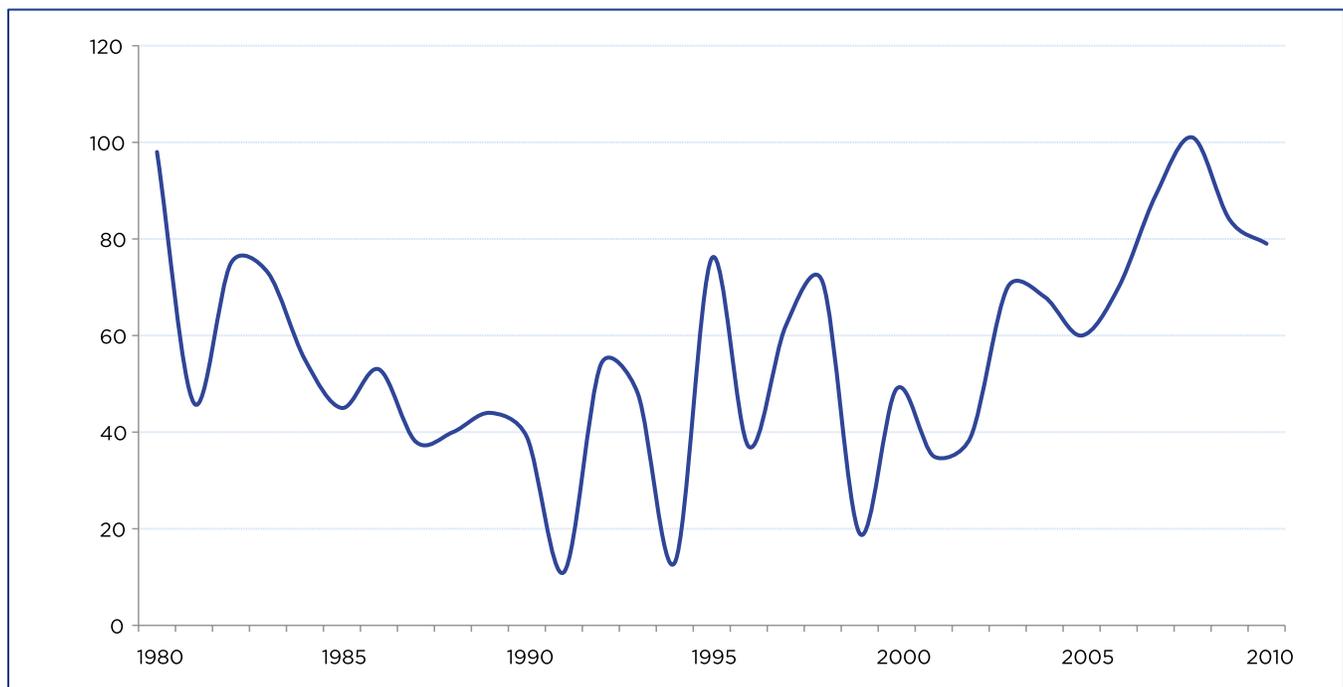


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Educational Psychologists

The number of educational psychologist licenses issued each year is very small compared with licensed clinical social workers, or marriage & family therapists. The trend in annual licenses issued over the period 1980 – 2010 resembles a V-shape, with big upward and downward spikes throughout the 1990s. Because the number of licenses issued per year is comparatively small, these fluctuations may not be indicative of any structural changes in training program capacity, or economic conditions. Licensure as an LEP requires two years of experience as a credentialed school psychologist in a public school, plus an additional year of supervised professional experience, which may contribute to fluctuating totals in the number of new licenses issued each year.

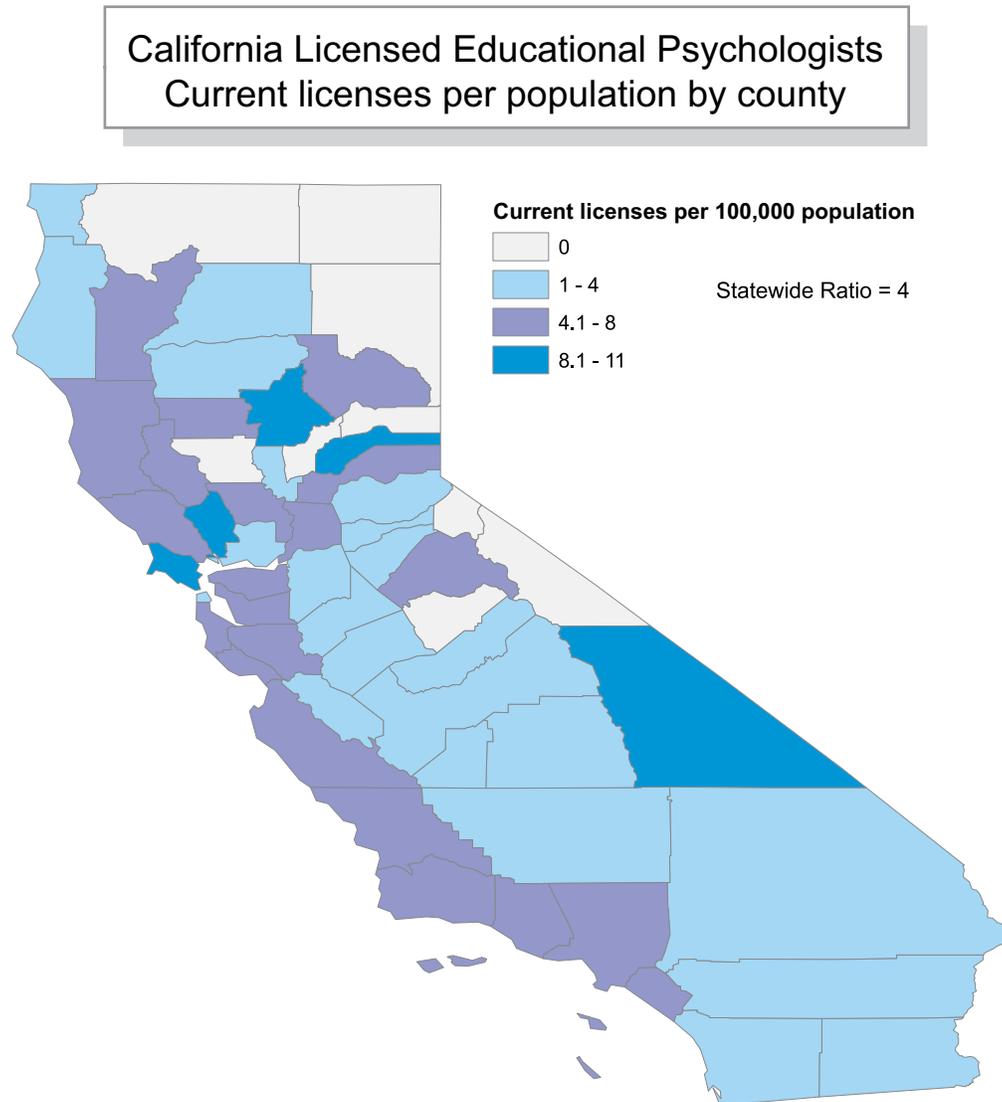
Figure 15. California licensed educational psychologists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 1,569 individuals with a California address in possession of a current and valid license to practice as a licensed educational psychologist (LEP) in the state. LEPs represent a small workforce; the state-wide ratio license per 100,000 population ratio of 4 means there are .2 LEPs for every 5,000 people. Roughly one-third of the counties in the state are below this average (most of central and southeastern California), including several with no LEPs with addresses of record in those counties (northeastern California and parts of the Sierra region).

Map 15. Current California educational psychologist licenses per population by county



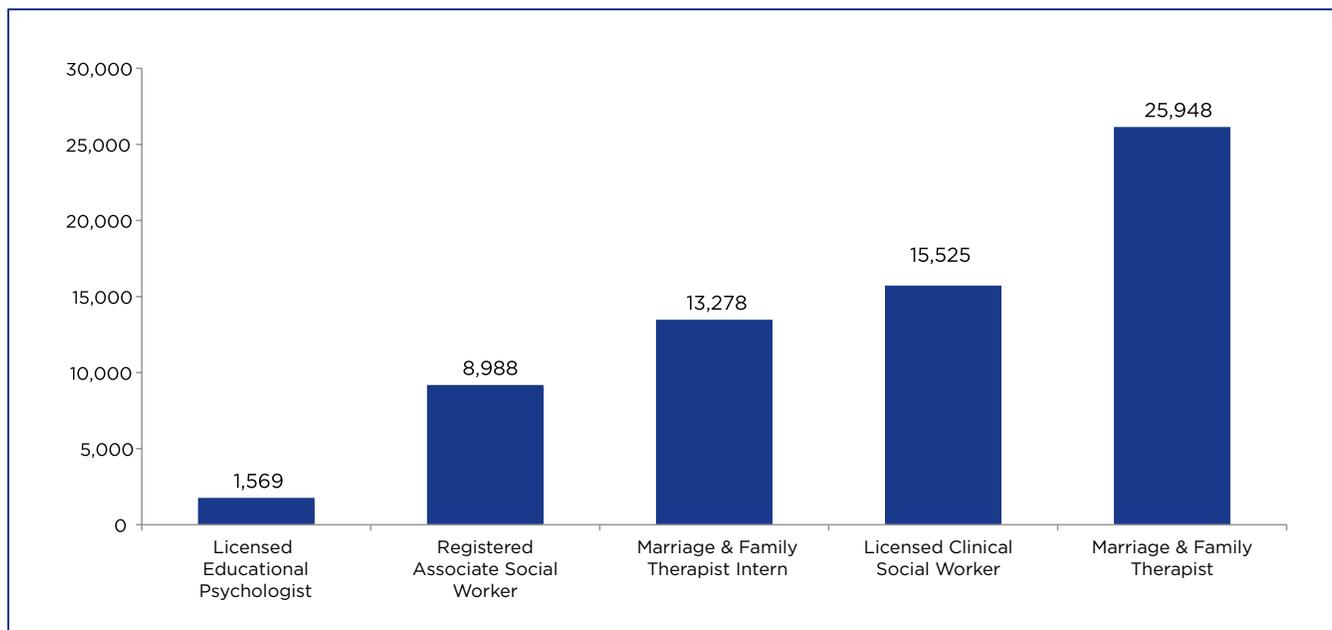
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)

County distribution is based on individual's address of record

Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
2010 Census Summary File 1

Figure 16 below is included as a point of reference. Licensed clinical social workers, registered associate social workers, marriage & family therapists, and marriage & family therapist interns, and licensed educational psychologists are all regulated by the California Board of Behavioral Sciences. Figure 16 shows the number of current licenses and registrations by type.

Figure 16. California Board of Behavioral Sciences - current licenses & registrations by type

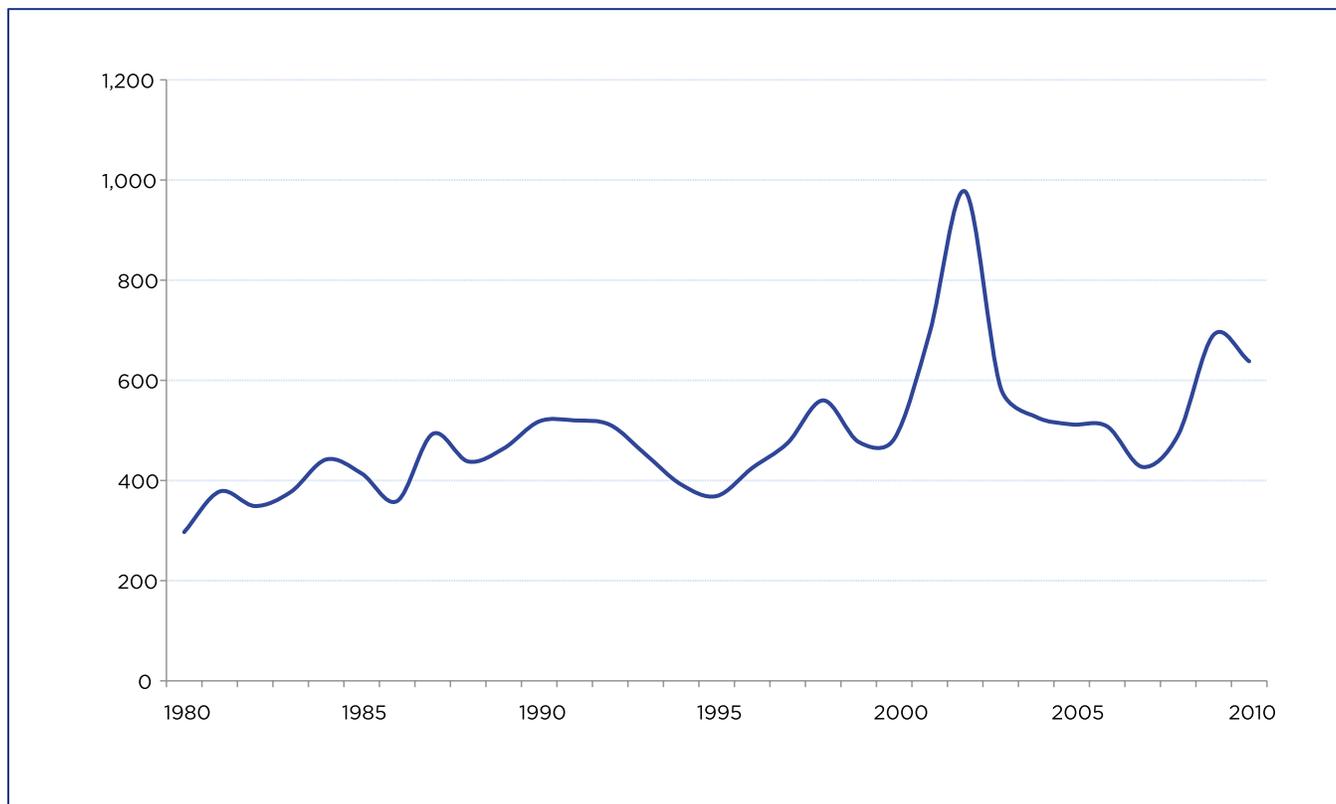


Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

California Licensed Psychologists

Figure 17 shows that the annual number of licenses issued to practice as psychologist in California increased for most of the period 1980 to 1992, before declining again. After 1995, the number of new licenses issued every year fluctuates dramatically. The spike in licenses issued occurring in 2002 could reflect an increase in training capacity, either through new programs being established or existing program expansion, which can cause a brief but dramatic increase in licenses issued over the period of several years, before stabilizing again.

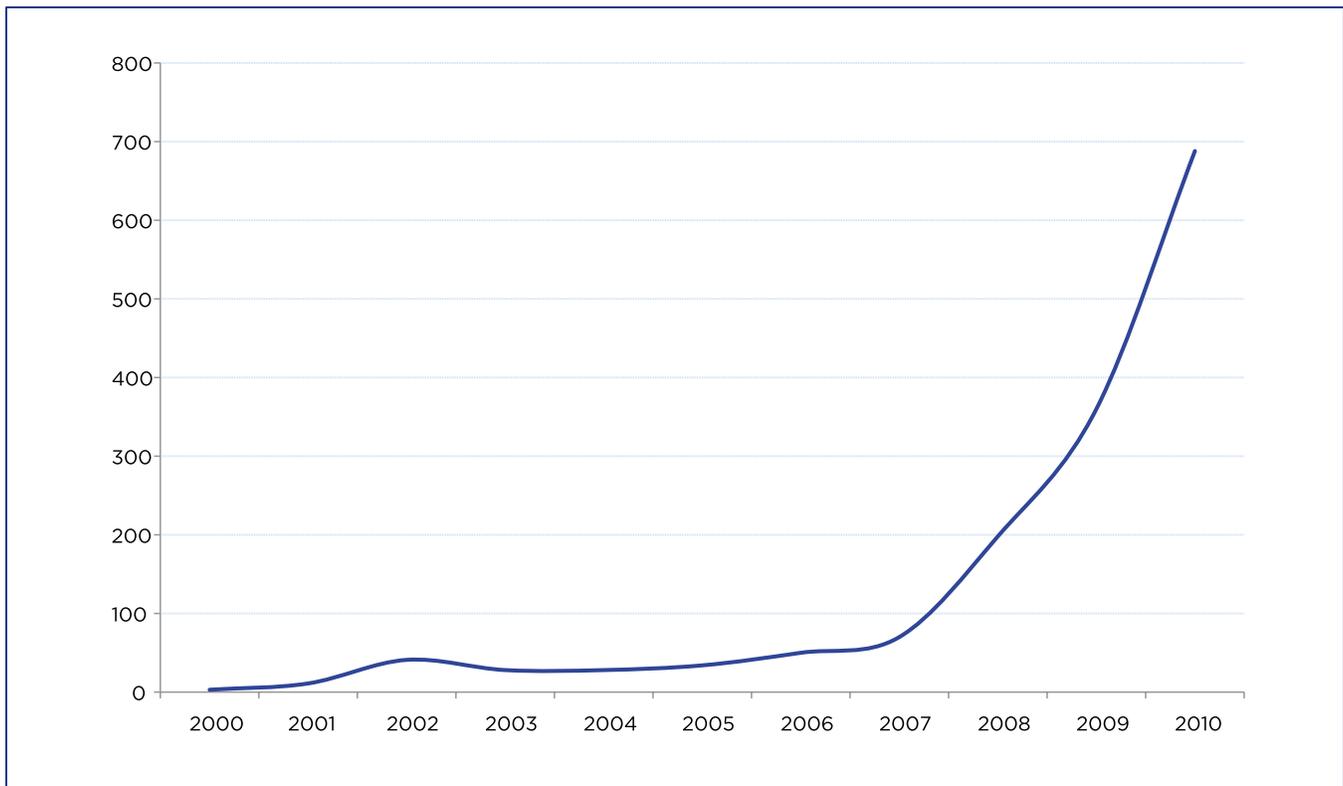
Figure 17. California licensed psychologists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

Figure 18 shows the number registered psychology assistants registering each year to complete their supervised training hours required to sit for the licensing exam. These data show a rapidly increasing number of professionals registering annually in recent years, indicating the potential for an increase in the size of the licensed psychologist workforce.²⁴

Figure 18. California registered psychological assistants – new registrations per year: 2000 – 2010

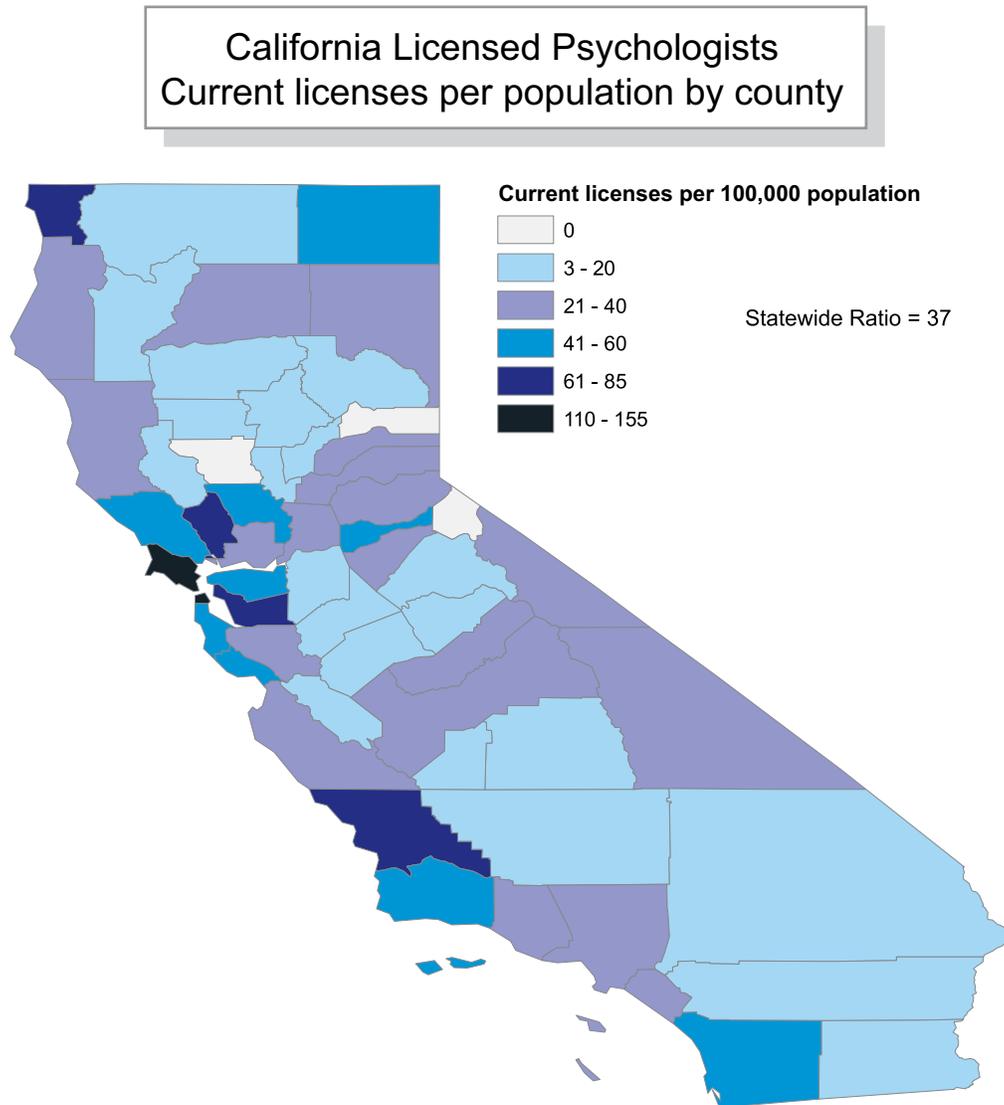


Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

²⁴ There is another category used by the California Board of Psychology to allow individuals trained at the graduate level to register and gain supervised professional experience, called the Registered Psychologist. Data indicate the category is new, and there are only 332 current registrations (as of February, 2011). They are not represented by the data in either Figure 16 or Figure 17.

As of February 2011, there were 13,853 individuals with a California address in possession of a current and valid license to practice as a licensed psychologist in the state. Licensed psychologists are concentrated in several coastal counties, in particular the Bay Area. Approximately 40 percent of California's counties have a licensed psychologist per population ratio that is less than one-half the state-wide ratio, including many counties in the Central Valley, those in the southern border region, and the northern-central region of the state. Three counties have zero practitioners with an address of record in those counties.

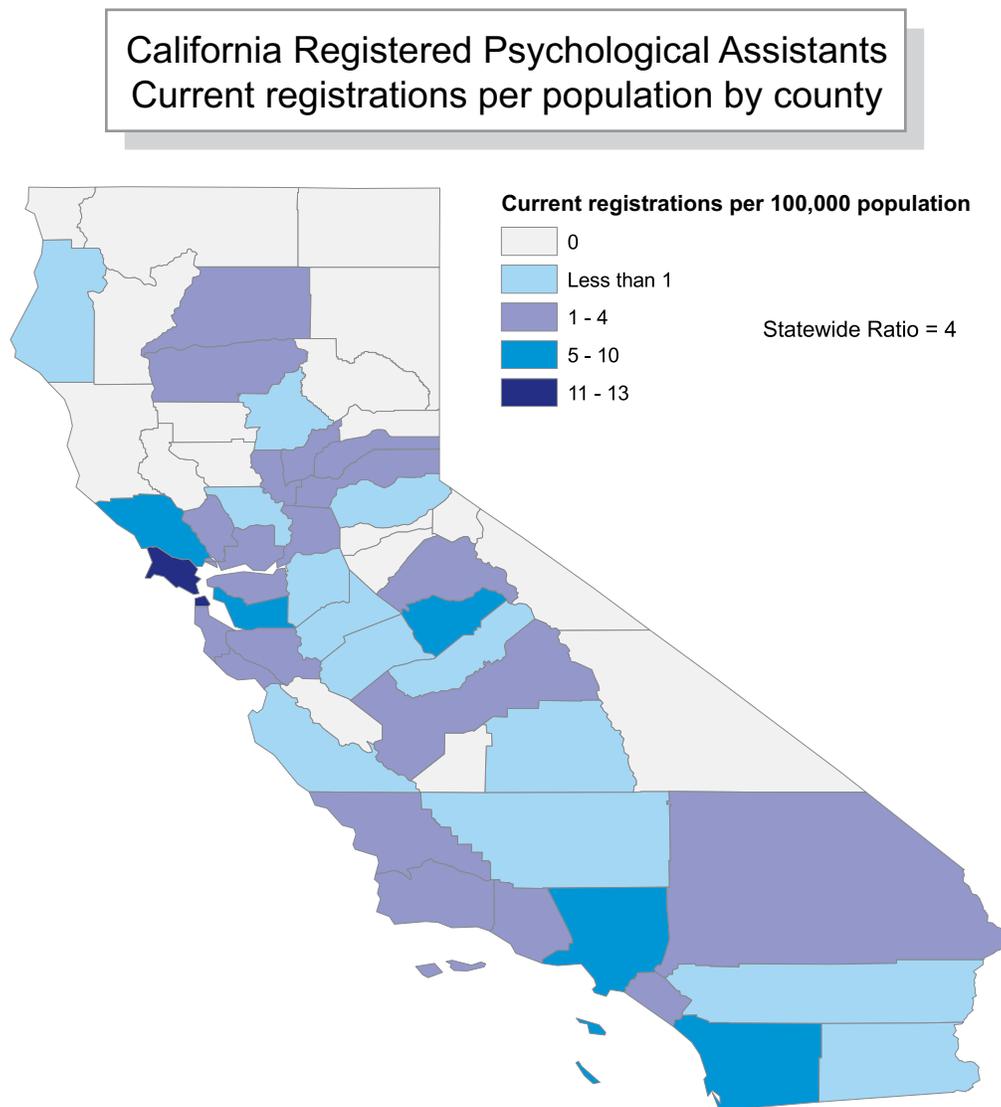
Map 16. Current California psychologist licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 1,492 individuals with a California address and a current and valid registration to work as a registered psychological assistant in the state. Registered psychological assistants are master's level graduates who are completing supervised hours of training in order to qualify to take the licensing exam to become a licensed psychologist. The distribution of registered psychological assistants may reflect proximity to graduate programs in psychology; most counties in the state have per population ratios less than half the state-wide ratio, including some with zero practitioners.

Map 17. Current California psychological assistant registrations per population by county



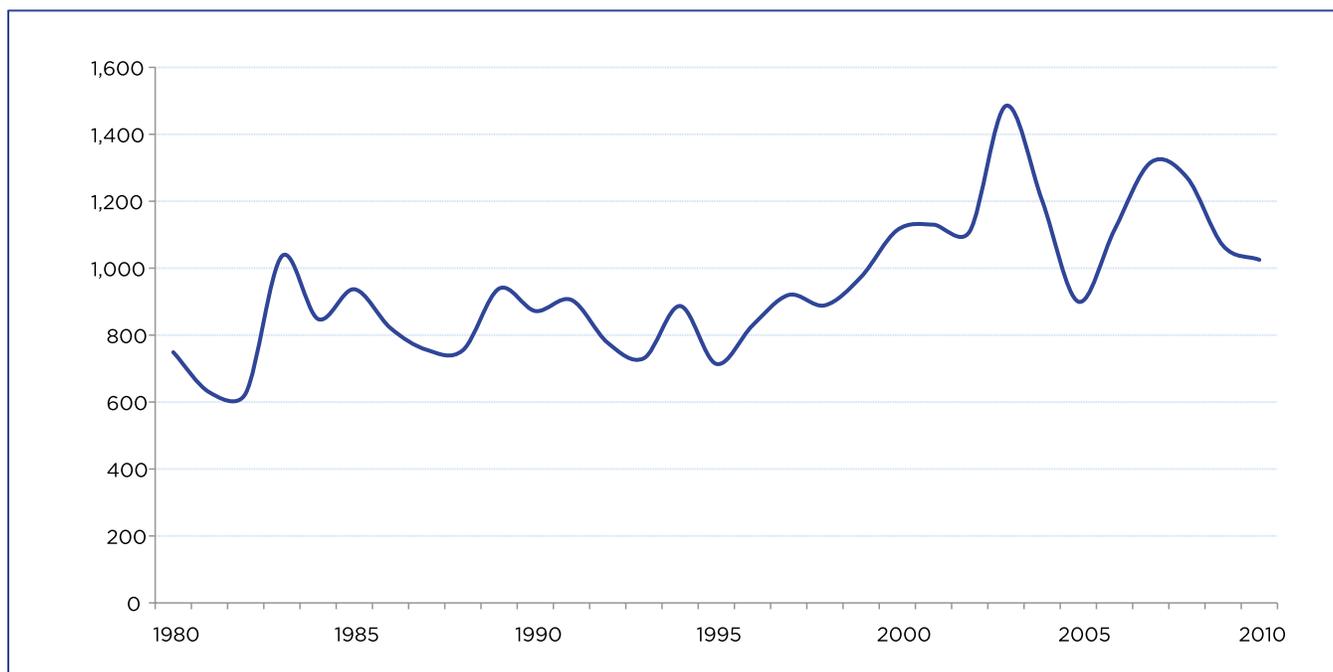
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

Dental and Oral Health

California Licensed Dentists (DDS), Registered Dental Assistants (RDA) and Registered Dental Assistants in Extended Function (RDA-EF)

The number of new licenses each year to practice general dentistry in California doubled between 1995 and 2003. Although not shown here, the number of graduates produced by California dental schools remained the same during this period (roughly 550 new graduates every year). This means that growth in the supply of dentists was the result of importing dentists who received training outside California. Following the peak in 2003, the number of new licenses issued each year declined by approximately 30 percent over the next two years; a pattern of large increases followed by declines has continued since.

Figure 19. California licensed dentists – new licenses issued per year: 1980 – 2010

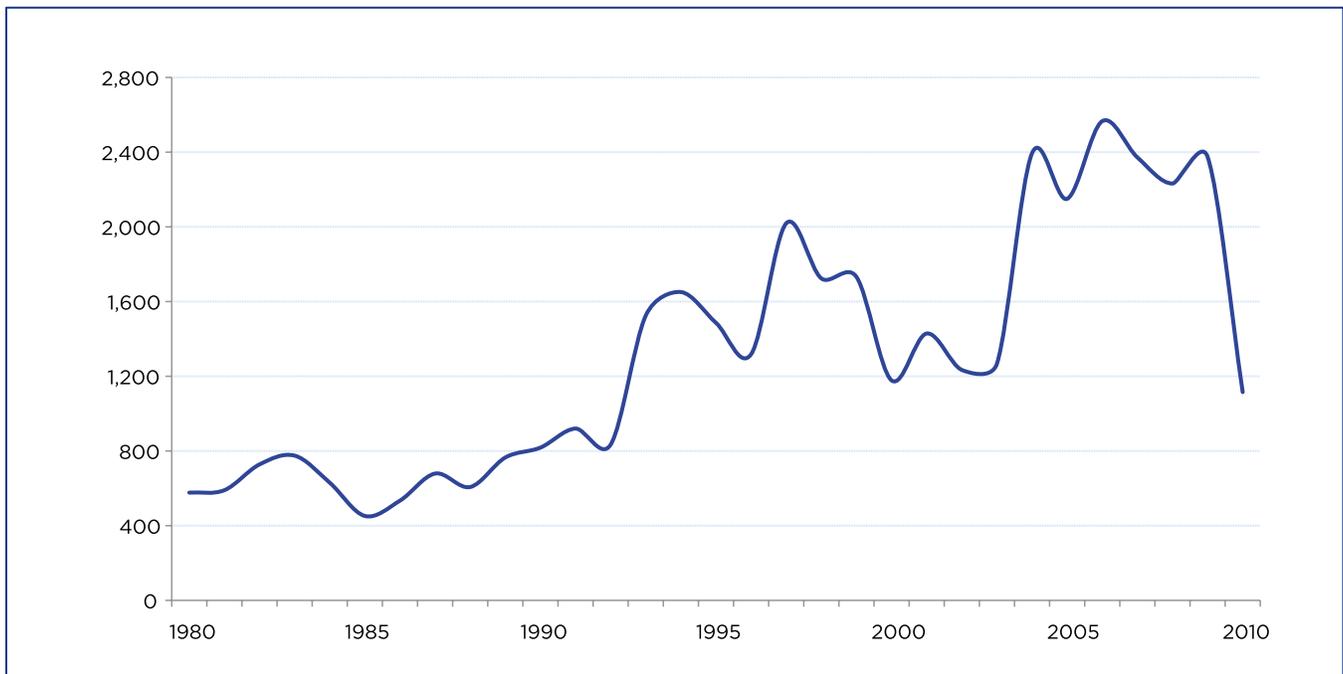


Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

Annual registrations of dental assistants quadrupled between 1985 and 1994, a period in which the number of new licenses issued to dentists remained semi-stable (the fluctuations between high and low totals fall within a range of approximately 100 licenses per year). Between 1995 and 2003, dental assistant registrations are generally declining, a period during which the number of new licenses issued to practice dentistry increased dramatically. Finally, as the annual number of dental assistant registrations doubled between 2003 and 2007, the number of new licenses issued to dentists generally declined. The data suggest a moderately inverse relationship between the supply of dentists and dental assistants.

The precipitous decline in dental assistant registrations from 2009 to 2010 is surprising. After a period of five years between 2004 and 2009 where the annual number of new dental assistant registrations was, on average, 2,343 per year, half as many registered in 2010.

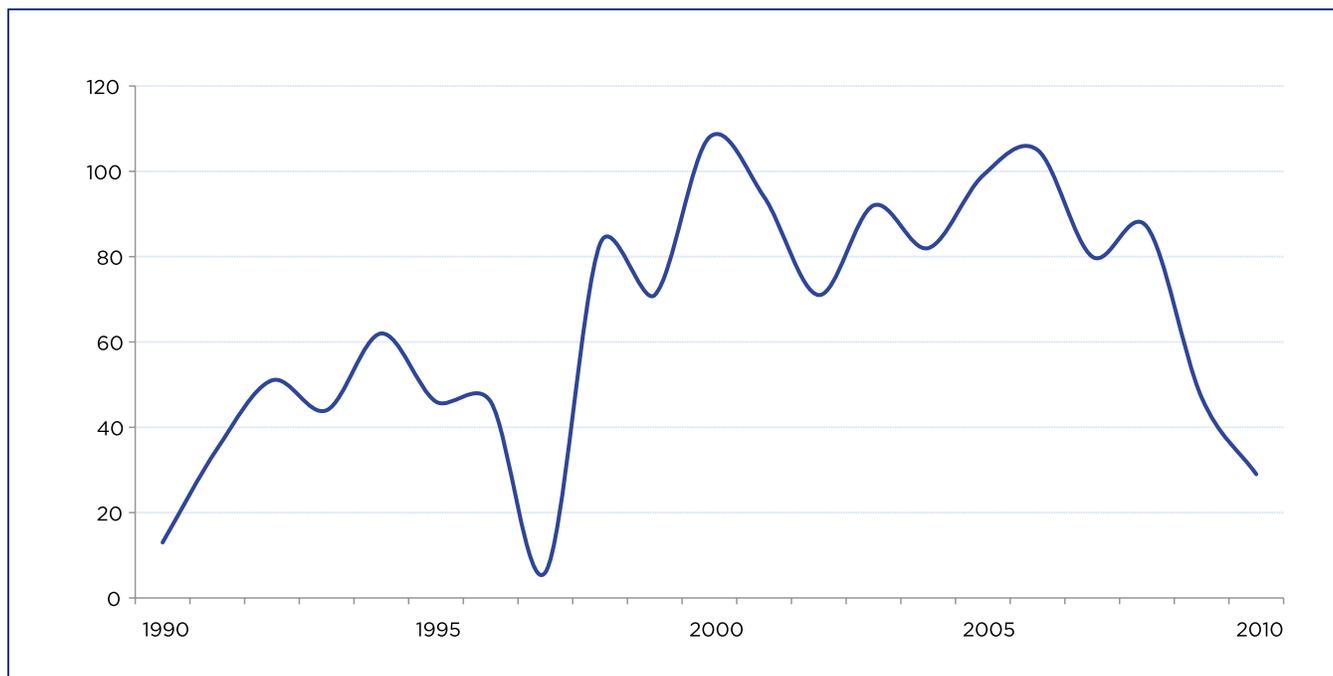
Figure 20. California registered dental assistants - new registrations per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

A small number of dental assistants in extended function are registered each year. Many are already registered dental assistants, although prior experience as a dental assistant is not a requirement. (However, completion of a board-approved training program is required.) The RDA in extended function is allowed by law to perform specific procedures under the direct supervision of a dentist, not allowable for general RDAs.

Figure 21. California registered dental assistants in extended function - new registrations per year: 1990 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 29,615 individuals with a California address in possession of a current and valid license to practice as a dentist in the state. We know from recent analysis of dentists licensed to practice in California that approximately 84 percent are in active practice, and that this proportion varies by geography.²⁵ We also know that a simple count of dentists with a current license to practice likely overstates the number who are actually practicing, and thus overstates access to care in different parts of the state. Table 1 (p. 59) compares the results of using two different sources of data to generate county-level dentist per population ratios. The dentist per population ratios in the column labeled “DCA Masterfile” were generated using the Department of Consumer Affairs, Professional License Masterfile (current as of February, 2011). The ratios in the column labeled “CDA” were generated using a membership database from the California Dental Association (current as of September, 2008) that included information about practice status.

In most cases the DCA Masterfile generates larger dentist per 5,000 population ratios²⁶ compared with the California Dental Association membership data, but the differences are smaller than might be anticipated. In a few cases the DCA Masterfile data generate smaller per population ratios compared with the CDA data. It is important to acknowledge that these data represent two different points in time, separated by approximately 2.5 years, and this could account for some of the differences seen. However, it is unlikely that the difference in time period would be the decisive factor in explaining the any size differences in these county-level ratios because they have been adjusted for the size of the population. The number of dentists licensed to practice in California did indeed grow between September 2008 and February 2011, but so did the state's population.

Table 1 suggests that San Francisco, Marin, San Mateo, Orange, Lassen, Plumas and Nevada counties may have a comparatively large share of licensed dentists who are either not active in patient care, or possibly retired. Table 1 also suggests that Glenn, Colusa, Sierra, Amador and Madera counties may have a comparatively large share of dentists who were licensed to practice in 2008, but have since let their licenses expire.

25 Pourat, N., Nicholson, G. (2009). *Distribution and Characteristics of Dentists Licensed to Practice in California, 2008*. Los Angeles: UCLA Center for Health Policy Research.

26 We used a ratio on a population size of 5,000 because that is how the data were published in the UCLA Center for Health Policy Research report we used for comparison.

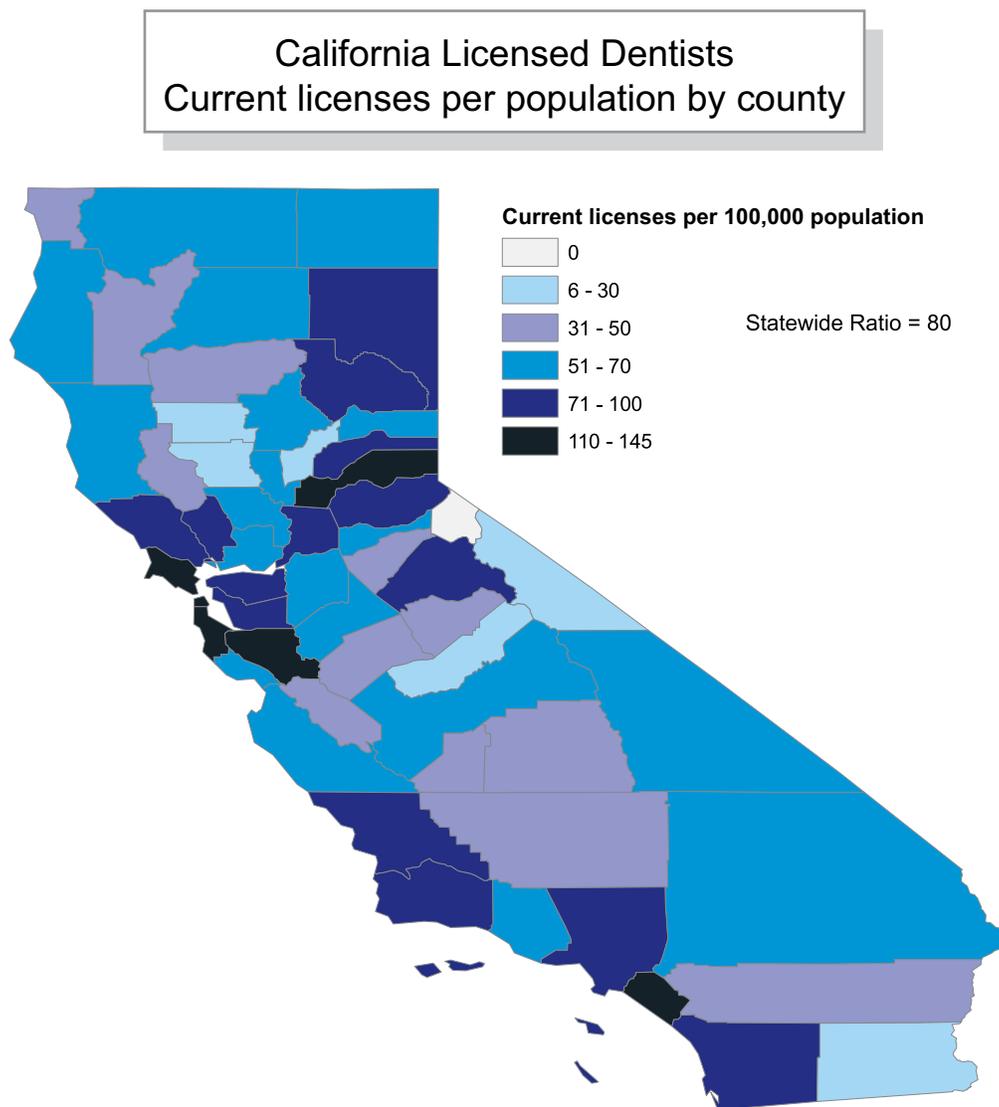
**Table 1. California dentists per 5,000 population ratios by county:
Comparing data from the DCA Masterfile and California Dental Association**

County	DCA Masterfile	CDA	County	DCA Masterfile	CDA
Alameda	4.5	4.0	Orange	5.7	4.6
Alpine	0.0	0.0	Placer	5.9	5.1
Amador	3.2	3.6	Plumas	4.7	3.6
Butte	3.4	3.2	Riverside	2.3	2.2
Calaveras	2.2	2.0	Sacramento	3.7	3.5
Colusa	0.9	1.4	San Benito	2.1	1.5
Contra Costa	4.6	3.9	San Bernardino	3.1	2.5
Del Norte	2.3	2.5	San Diego	4.0	3.5
El Dorado	4.1	3.6	San Francisco	7.2	6.1
Fresno	2.8	2.4	San Joaquin	2.5	2.4
Glenn	1.4	2.2	San Luis Obispo	4.0	3.5
Humboldt	3.2	3.3	San Mateo	5.7	4.7
Imperial	1.3	1.2	Santa Barbara	3.8	3.6
Inyo	2.7	2.2	Santa Clara	5.8	5.1
Kern	2.0	2.0	Santa Cruz	3.3	3.3
Kings	2.1	1.6	Shasta	3.1	2.7
Lake	1.9	2.0	Sierra	3.1	4.4
Lassen	4.9	3.4	Siskiyou	2.7	2.4
Los Angeles	4.1	3.3	Solano	3.3	2.9
Madera	1.5	1.9	Sonoma	3.9	3.7
Marin	6.5	5.0	Stanislaus	2.7	2.5
Mariposa	1.9	1.4	Sutter	3.1	2.8
Mendocino	3.5	3.3	Tehama	1.7	1.9
Merced	1.7	1.8	Trinity	2.2	2.1
Modoc	2.6	2.6	Tulare	2.1	1.9
Mono	1.4	1.5	Tuolumne	4.6	3.9
Monterey	3.4	3.1	Ventura	3.5	3.6
Napa	3.8	3.9	Yolo	2.8	2.8
Nevada	4.6	3.5	Yuba	0.3	0.6
California	4.0	3.5			

Sources: CA Dept. of Consumer Affairs, Professional license masterfile, February 2011; 2010 Census Summary File 1; Pourat, N., Nicholson, G. (2009). *Distribution and Characteristics of Dentists Licensed to Practice in California, 2008*. Los Angeles: UCLA Center for Health Policy Research.

The map below demonstrates that approximately one-third of the counties in the state have license per 100,000 population ratios of 50 or less (this would be 2.5 dentists for every 5,000 people), and 70 percent of counties are below the state-wide ratio of 80 per 100,000 population. Several counties in the Bay Area, as well as Placer and Orange counties stand out for the density of licensed dentists assumed to be in practice there.

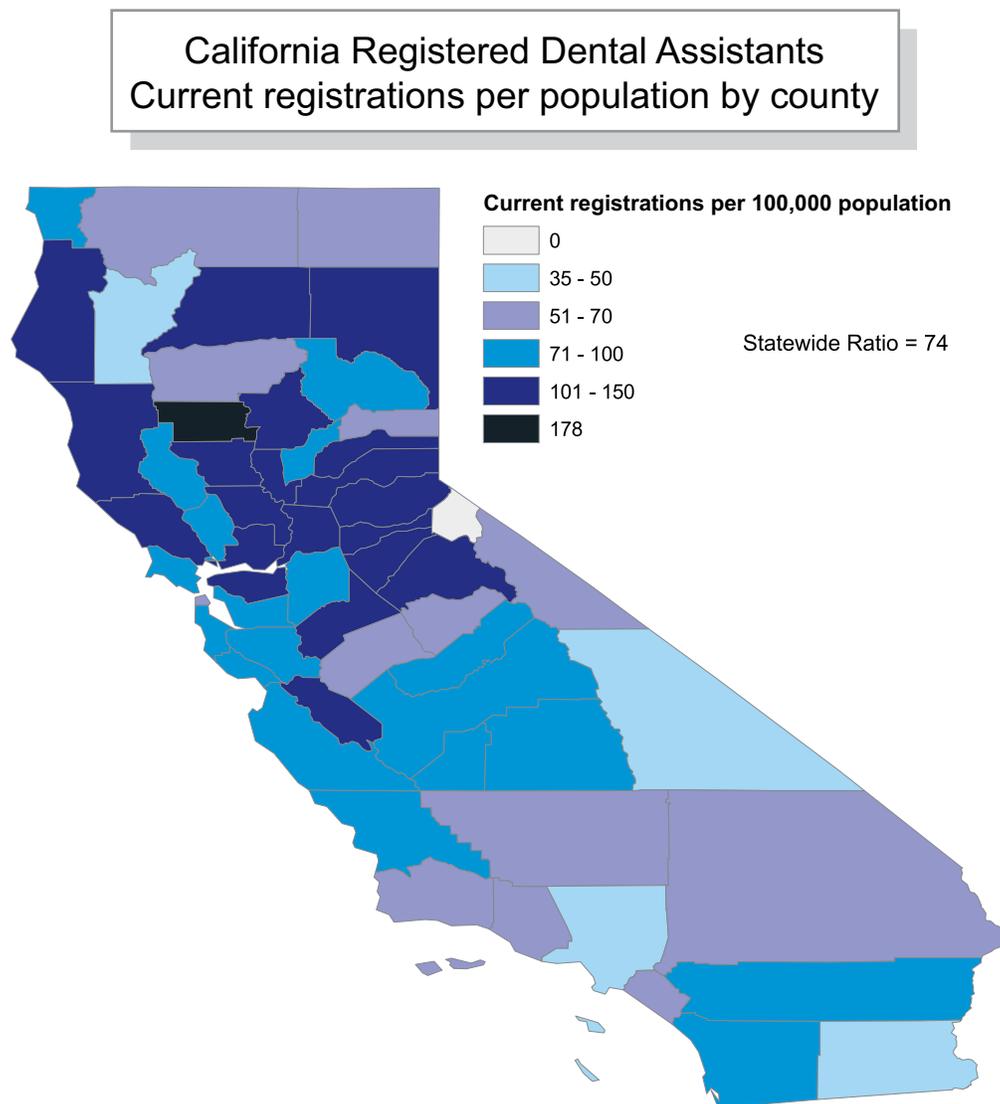
Map 18. Current California dentistry (DDS) licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 27,646 individuals with a California address and a current and valid registration to work as a dental assistant in the state. In comparing Map 19 below with Map 18 (p.60), those counties where the ratio of dentistry licenses per population is small generally have higher RDA registration per population ratios, suggesting a greater rate of RDA utilization by dentists in these counties. Although the data are not shown here, counties where the number of RDAs registrations relative to dentistry licenses is large, generally have the lowest dentistry licenses per population ratios. The converse is also true: counties with a high dentistry licenses per population ratio generally have a smaller number of current RDA registrations relative to current dentistry licenses.

Map 19. Current California dental assistant registrations per population by county

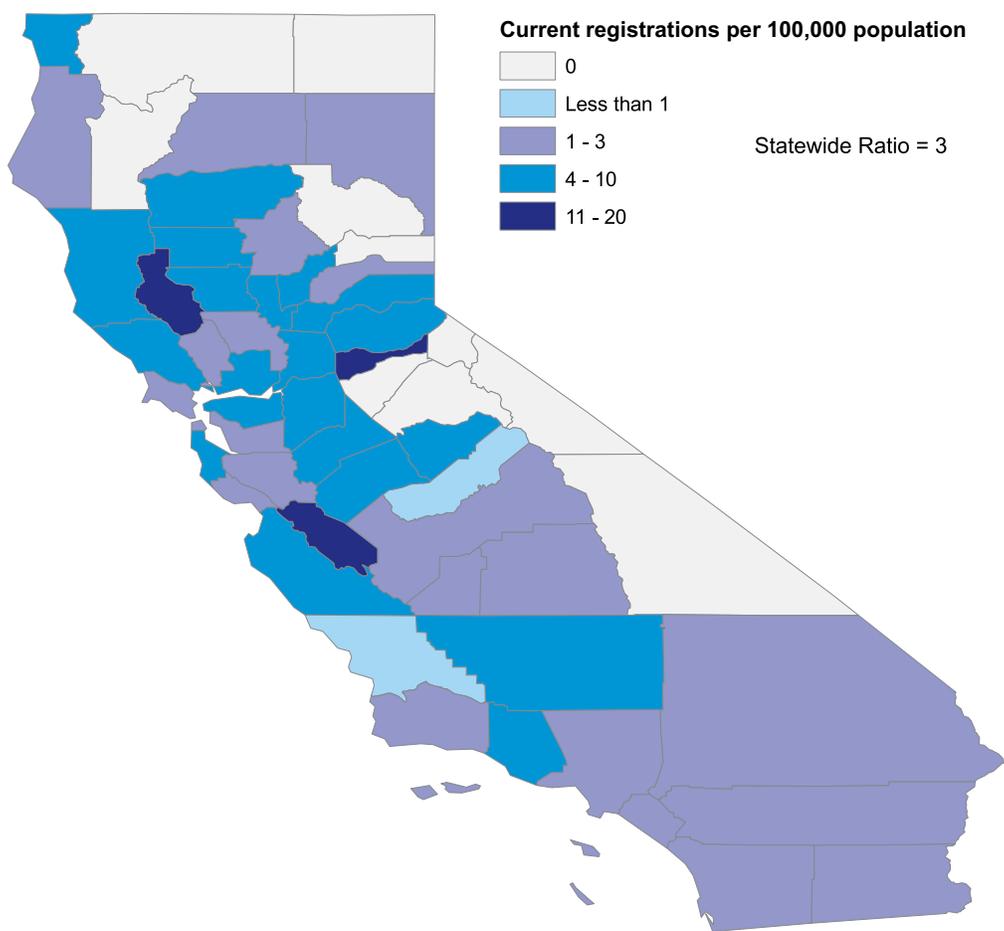


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 1,185 individuals with a California address and a current and valid registration to work as a dental assistant in extended function in the state. There are very few board-approved training programs for RDAs in extended function. Their distribution across the state may correspond with proximity to a training program. Ten counties have no RDAs in extended function with an address of record in those counties.

Map 20. Current California dental assistant in extended function registrations per population by county

California Registered Dental Assistants in Extended Function
Current registrations per population by county



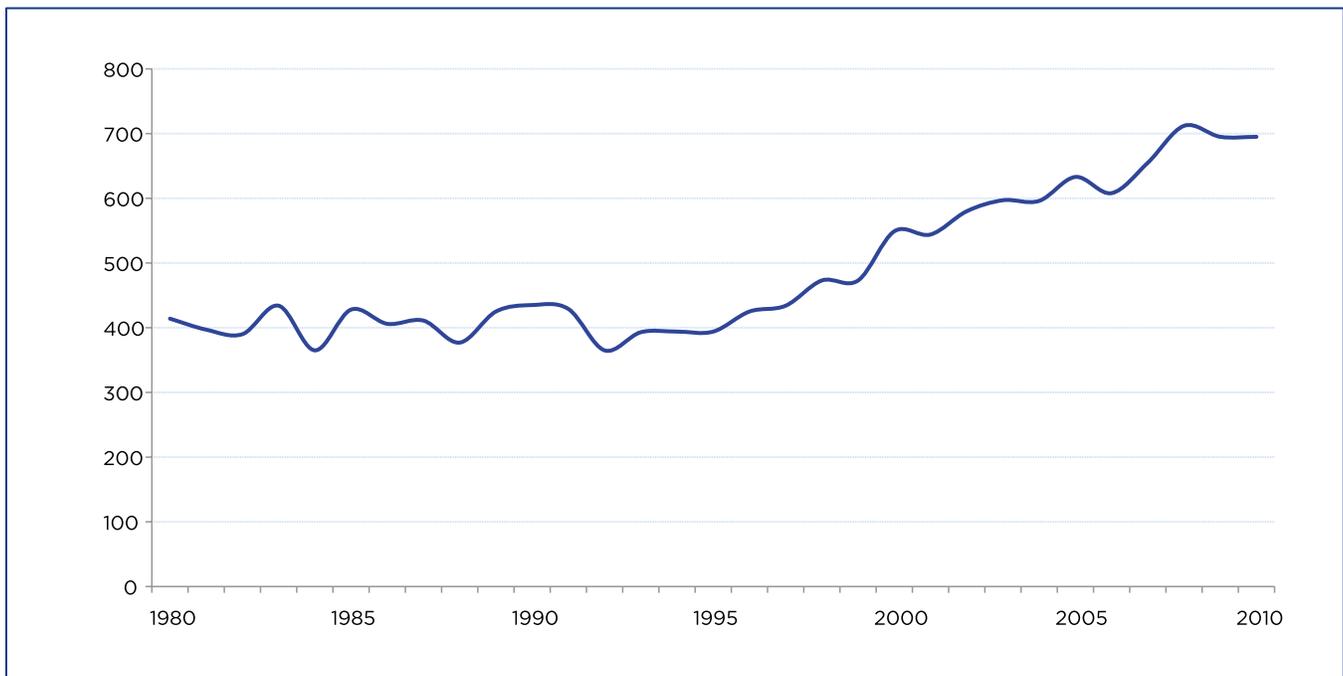
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
County distribution is based on individual's address of record
Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
2010 Census Summary File 1

California Licensed Registered Dental Hygienists (RDH) and Registered Dental Hygienists in Alternative Practice (RDHAP)

The number of dental hygiene training programs has steadily grown over the past fifteen years and this is reflected in Figure 22 below. Since 1995, the annual number of licenses issued has grown by 75 percent, as existing training programs in California have expanded and new training programs have opened.

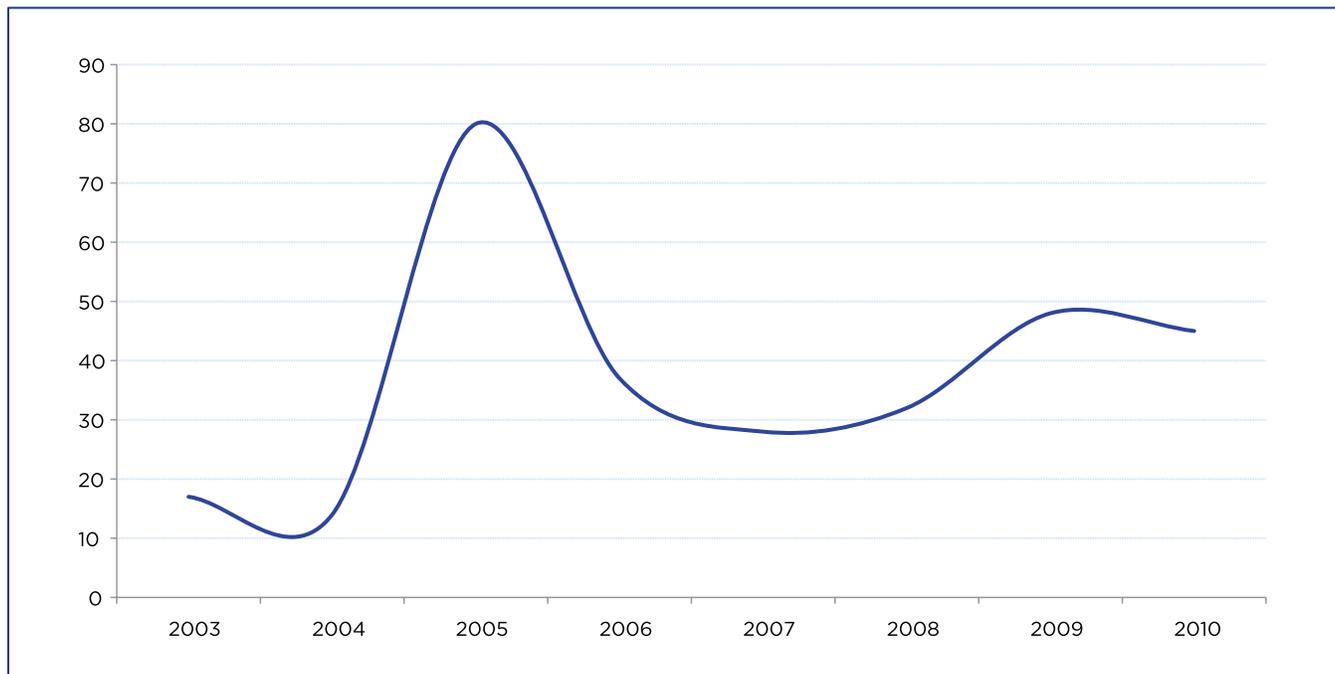
The RDH in alternative practice began as a health workforce pilot project in 1990, training a small number of participants who were ultimately licensed in 1998. The first cohort of graduates from the state's first formal training programs at West LA College were licensed in 2003, after which a program was established at the University of the Pacific, whose first cohorts of graduates were licensed in 2005. Figure 23 shows that the annual number of RDHAP licenses has since leveled off and in recent years, between 45 and 50 new license per year have been issued.

Figure 22. California licensed registered dental hygienists – new licenses issued per year: 1980 – 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

Figure 23. California licensed registered dental hygienists in alternative practice - new licenses issued per year: 2003 - 2010

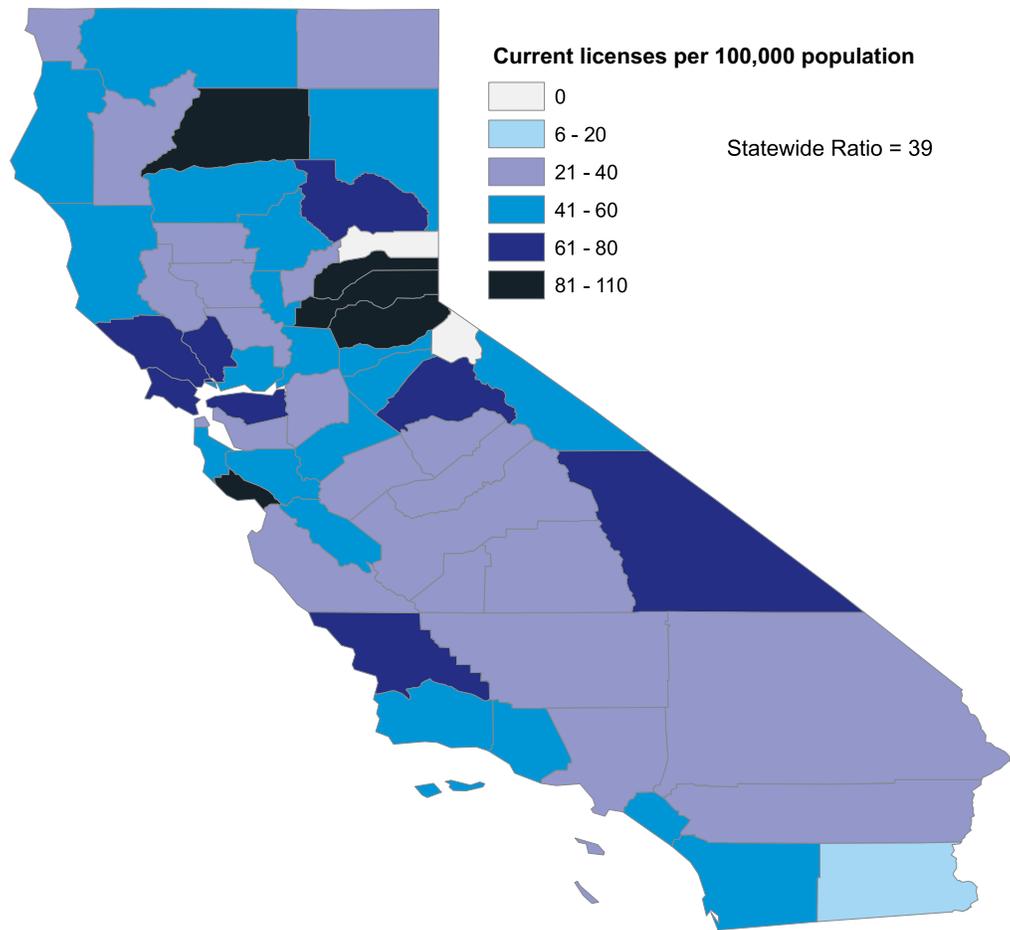


Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 14,329 individuals with a California address in possession of a current and valid license to practice as a registered dental hygienist in the state. The map demonstrates that RDHs are better represented across the state relative to dentists. These data also suggest that in counties where the ratio of licensed dentists per population is small, the ratio of RDHs per population is larger, indicating a greater rate of RDH utilization by dentists in these counties. Although the data are not shown here, counties where the number of RDHs licenses relative to dentistry licenses is large, generally have the lowest dentistry license per population ratios.

Map 21. Current California registered dental hygienist licenses per population by county

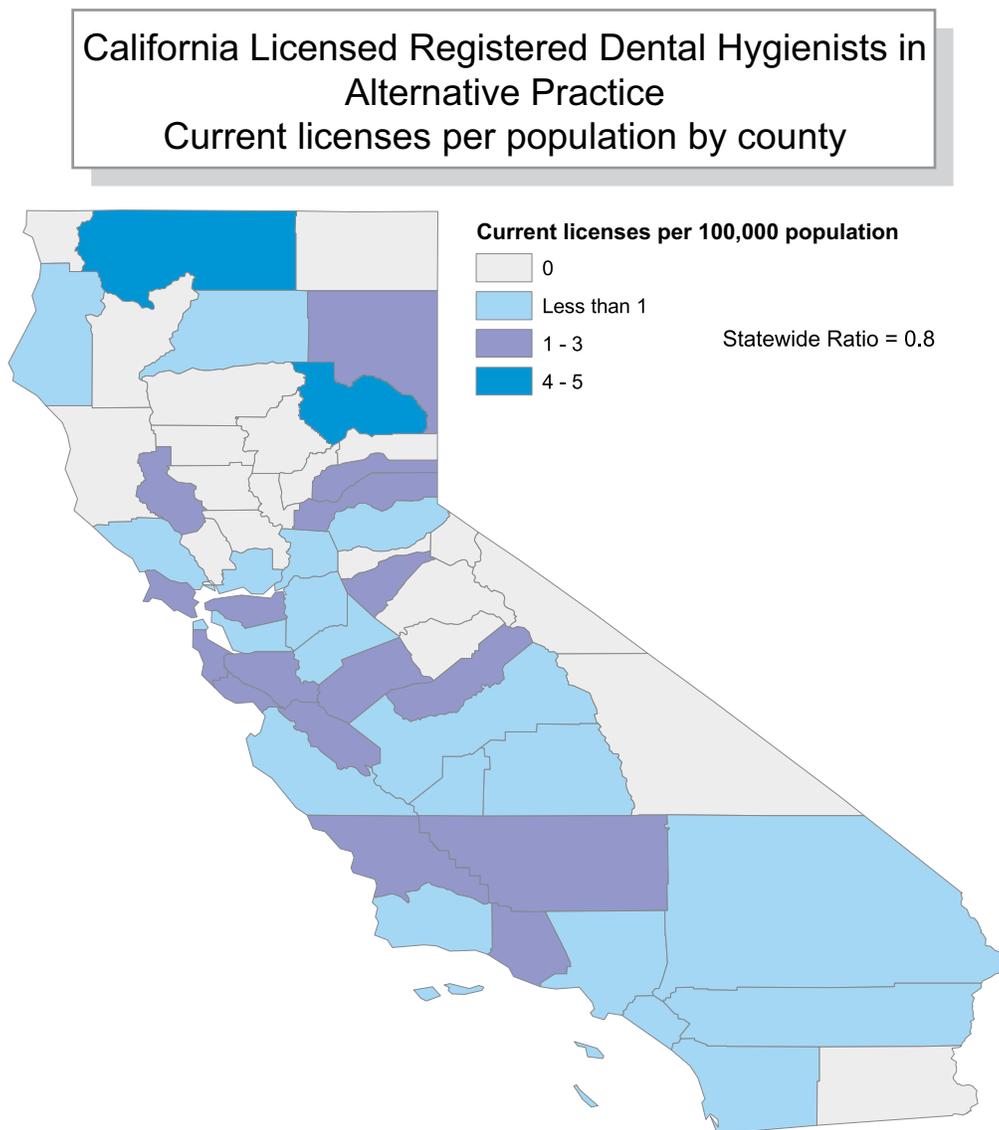
California Licensed Registered Dental Hygienists
Current licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 302 individuals with a California address in possession of a current and valid license to practice as a registered dental hygienist in alternative practice in the state. This is very small workforce and many counties have no practitioners with an address of record in those counties.

Map 22. Current California registered dental hygienist in alternative practice licenses per population by county



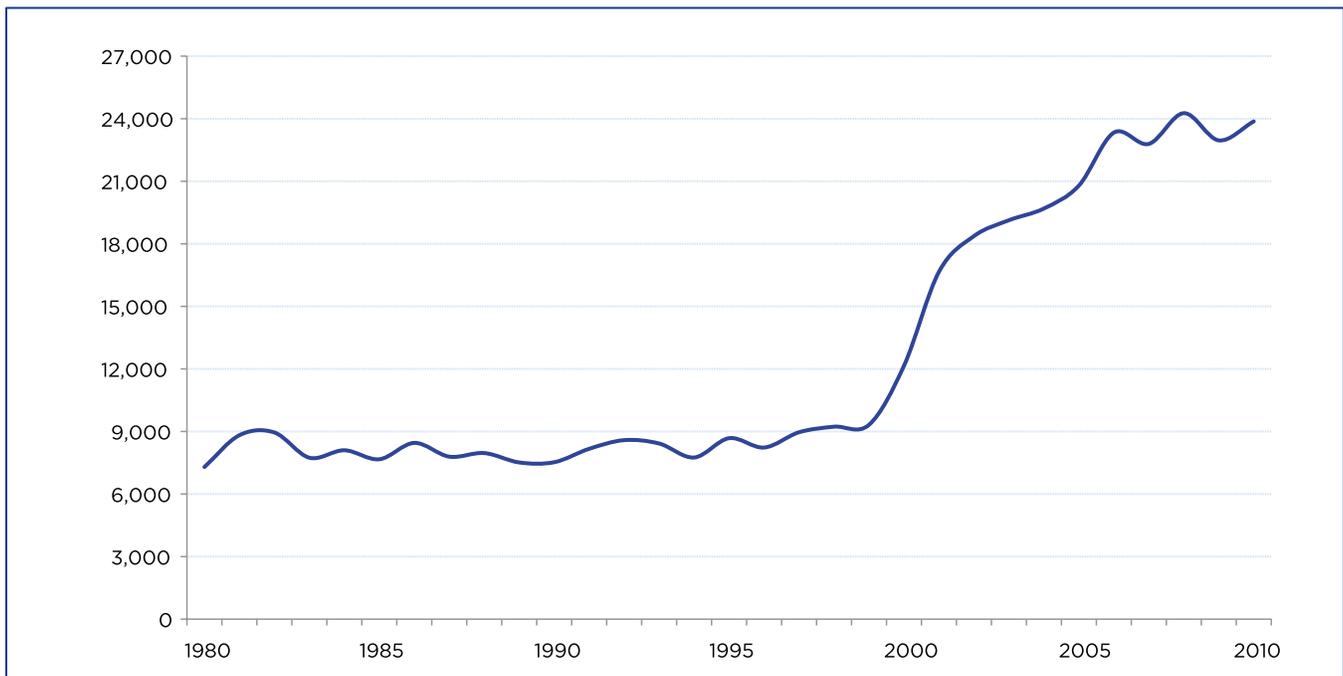
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

Nursing

California Licensed Registered Nurses (RN) and Certified Public Health Nurses

The shortage of RNs experienced in California through the 1990s is well documented and these licensing data reflect the seriousness of the situation. The number of new licenses to practice as an RN in California issued each year remained roughly the same over the period of fifteen years between 1980 and 1995. These data also reflect the aggressive effort to expand the state's capacity to train new RNs; since 2000 the number of new licenses issued each year has approximately doubled.

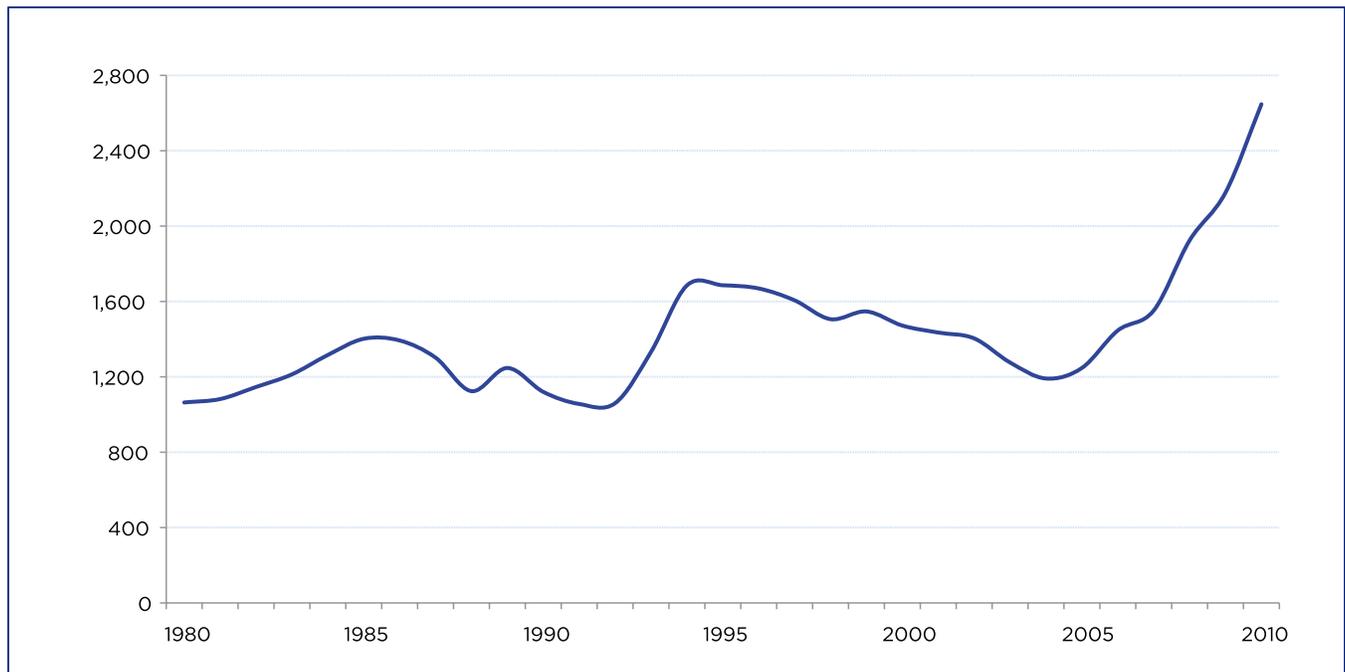
Figure 24. California licensed registered nurses – new licenses issued per year: 1980 – 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

Certified public health nurses are licensed RNs, but must have been trained at the baccalaureate level. The data show a peak in certifications issued in 1995, before declining over the next decade. Since 2005, the annual number of certificates issued has more than doubled. This may reflect efforts in California to increase the number of baccalaureate trained RNs.

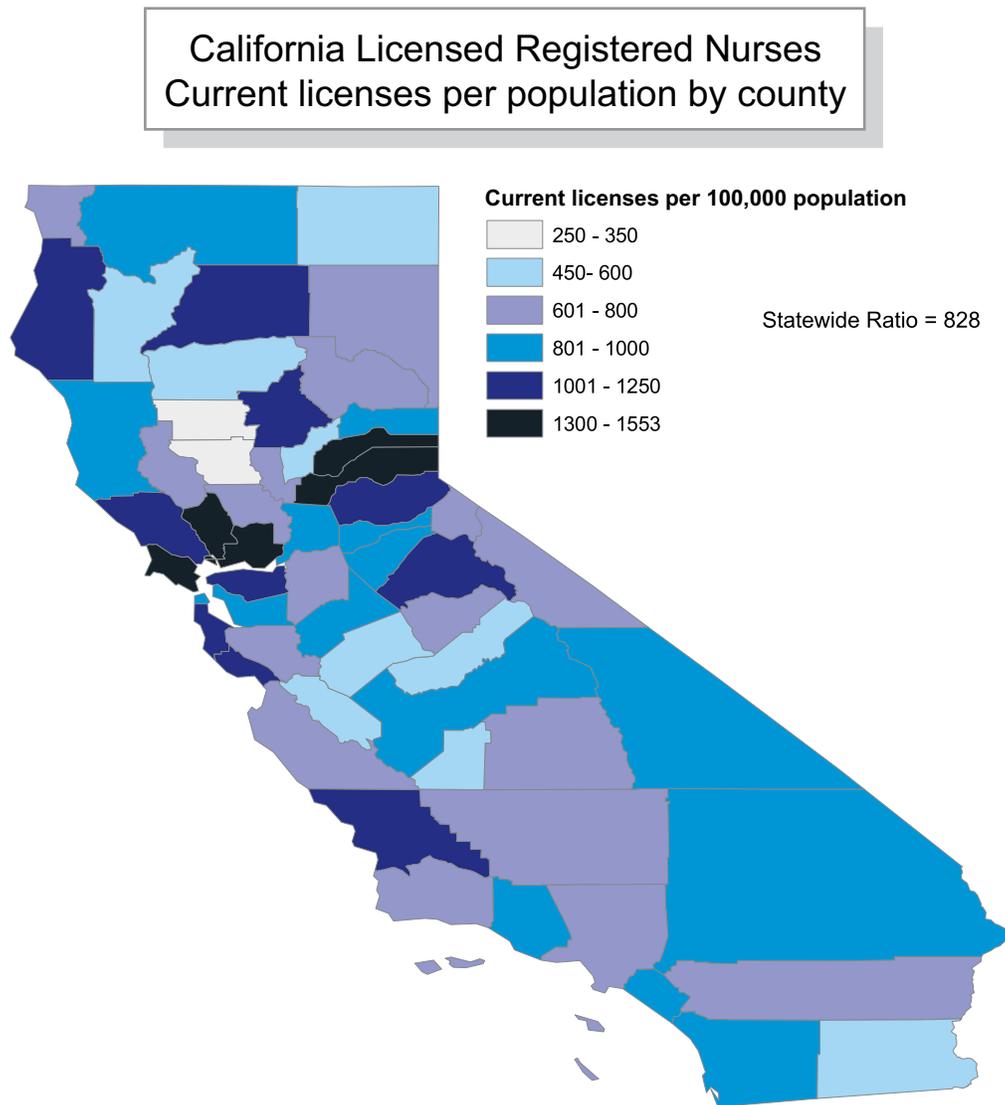
Figure 25. California certified public health nurses - new certificates issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 308,257 individuals with a California address in possession of a current and valid license to practice as a registered nurse in the state. We know from other analysis of the RN workforce²⁷ that in recent years, approximately 85 percent of currently licensed RNs have been working in nursing. Thus, the distribution of licenses shown on the map probably overstates the number of practicing RNs. It is unknown how employment in nursing among licensed RNs in California varies by county. These data appear to be consistent with what is known about RNs and employment location. The highest concentrations of RNs is in Bay Area counties, and by comparing Map 23 with Map 30 (LVNs), the data suggest an inverse relationship between RNs per population and LVNs per population.

Map 23. Current California registered nurse licenses per population by county

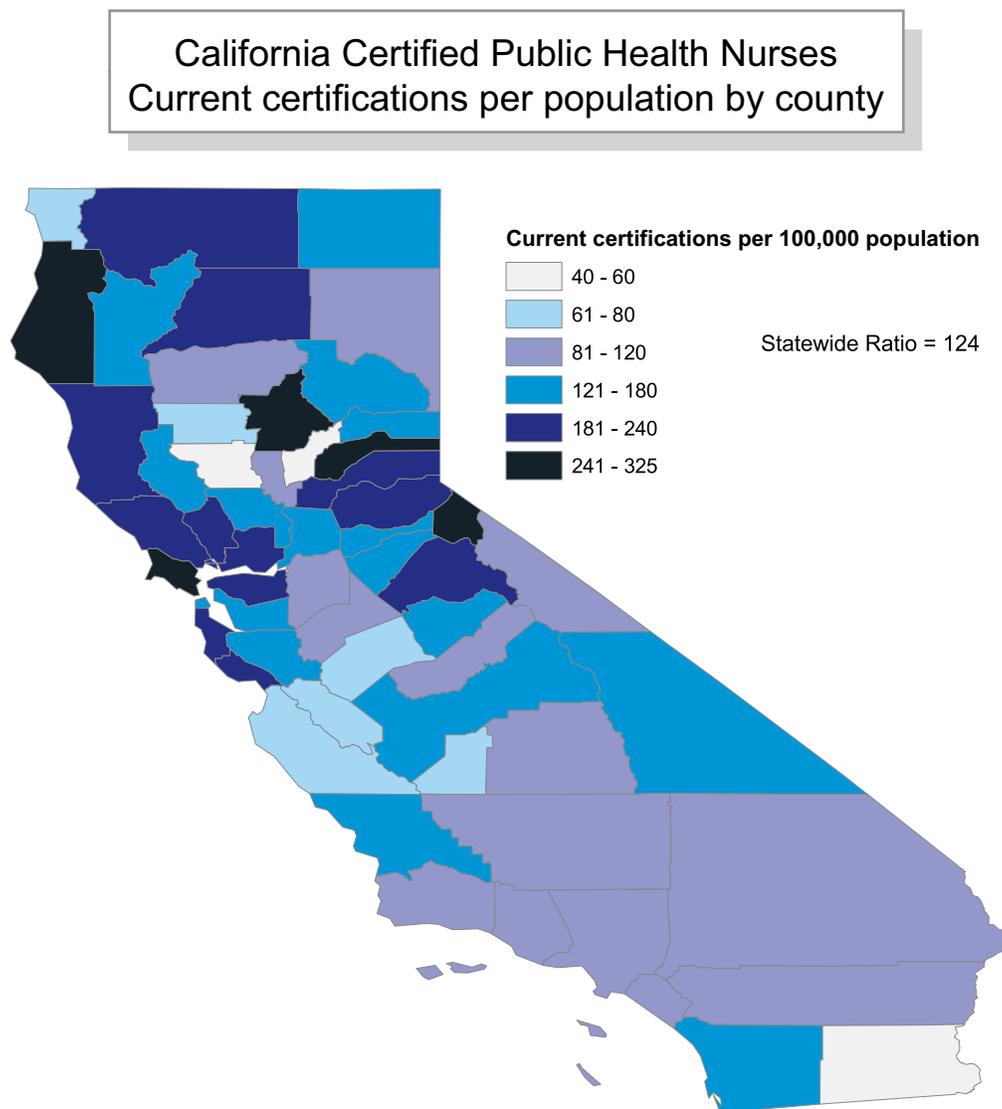


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

27 Spetz, J. 2008 Survey of Registered Nurses. Sacramento, CA: California Board of Registered Nursing.

As of February 2011, there were 46,076 individuals with a California address in possession of a current and valid certification to practice as a public health nurse in the state. Many of the counties with large public health RN license per 100,000 population ratios are the same as those with large RN ratios. In general, counties in Northern California have higher public health RN license per population ratios by comparison with counties in Southern California.

Map 24. Current California public health nurse certifications per population by county

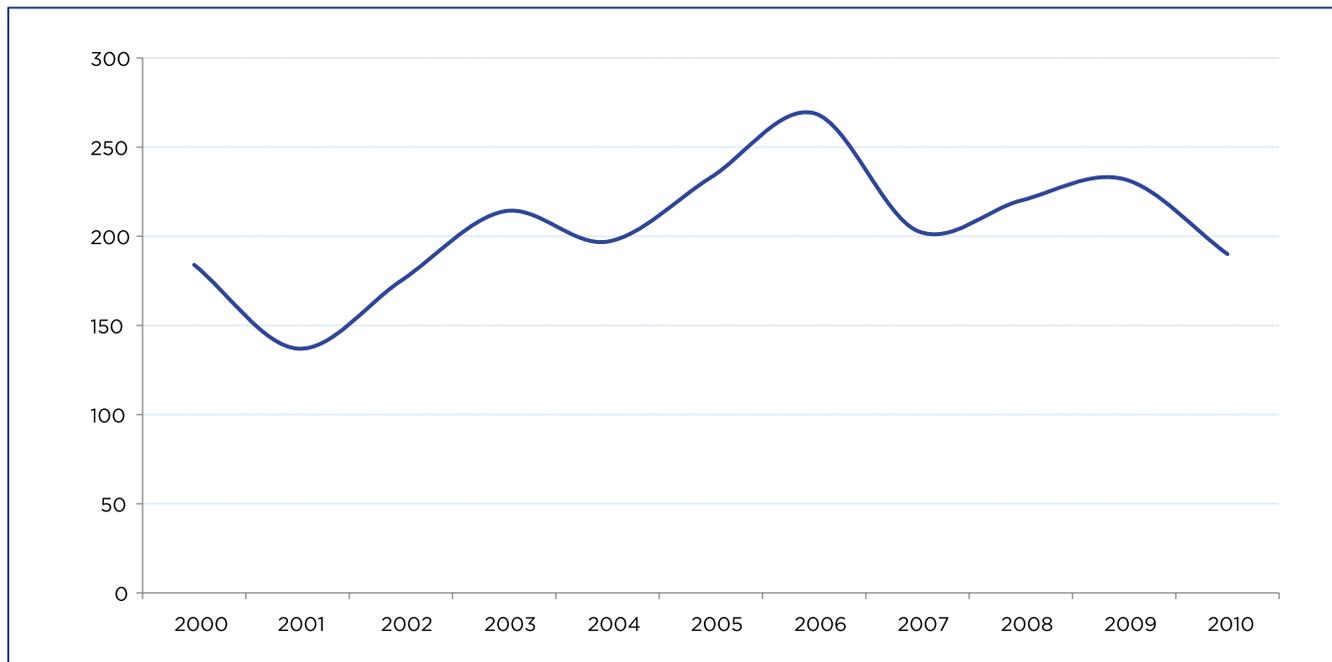


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Certified Clinical Nurse Specialists and Certified Nurse Practitioners (NP)

Certified clinical nurse specialists are advanced practice registered nurses. Certification requires 500 hours of specified clinical experience and a master's degree; the first certifications were issued in 1998. These data show a peak in the number of new certifications issued each year occurring in 2006.

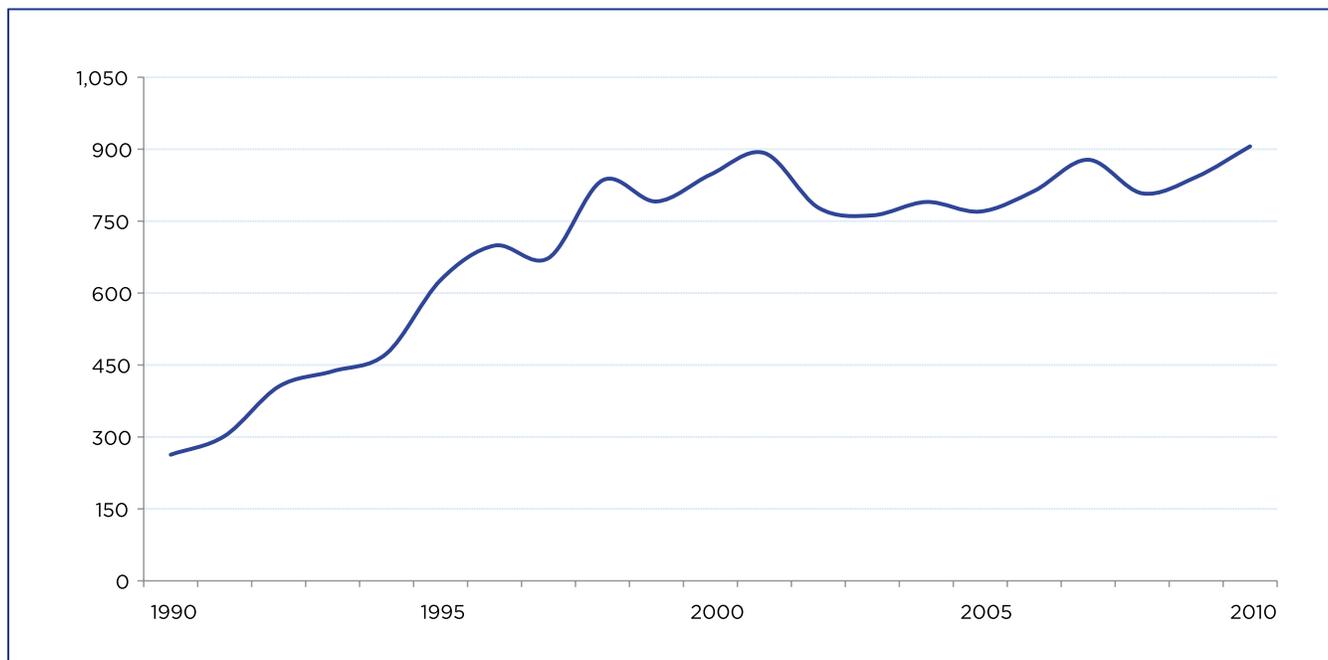
Figure 26. California certified clinical nurse specialists - new certificates issued per year: 2000 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

Figure 27 shows the number of new certifications issued to nurse practitioners (NP) between 1990 and 2010. The annual number of certificates issued begins to level off after 2001. This may reflect a new law taking effect in 2004 requiring a master's degree for certification.

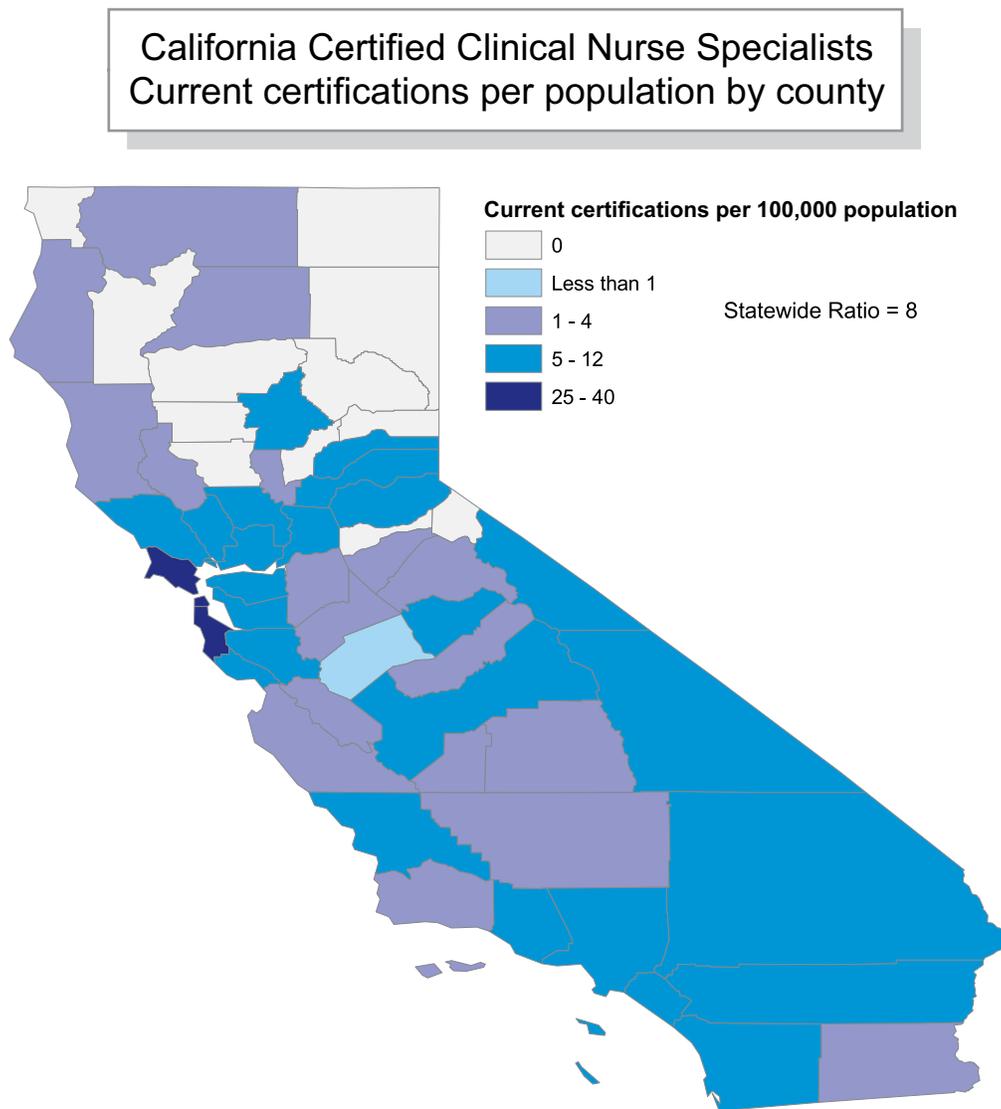
Figure 27. California certified nurse practitioners - new certificates issued per year: 1990 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 2,865 individuals with a California address in possession of a current and valid certification to practice as a clinical nurse specialist in the state. The number of certified clinical nurse specialists is relatively small and they are not widely distributed across the state; over 50 percent of counties in California have license per population ratios one-half the size of the state-wide ratio or smaller (including a dozen counties with zero practitioners).

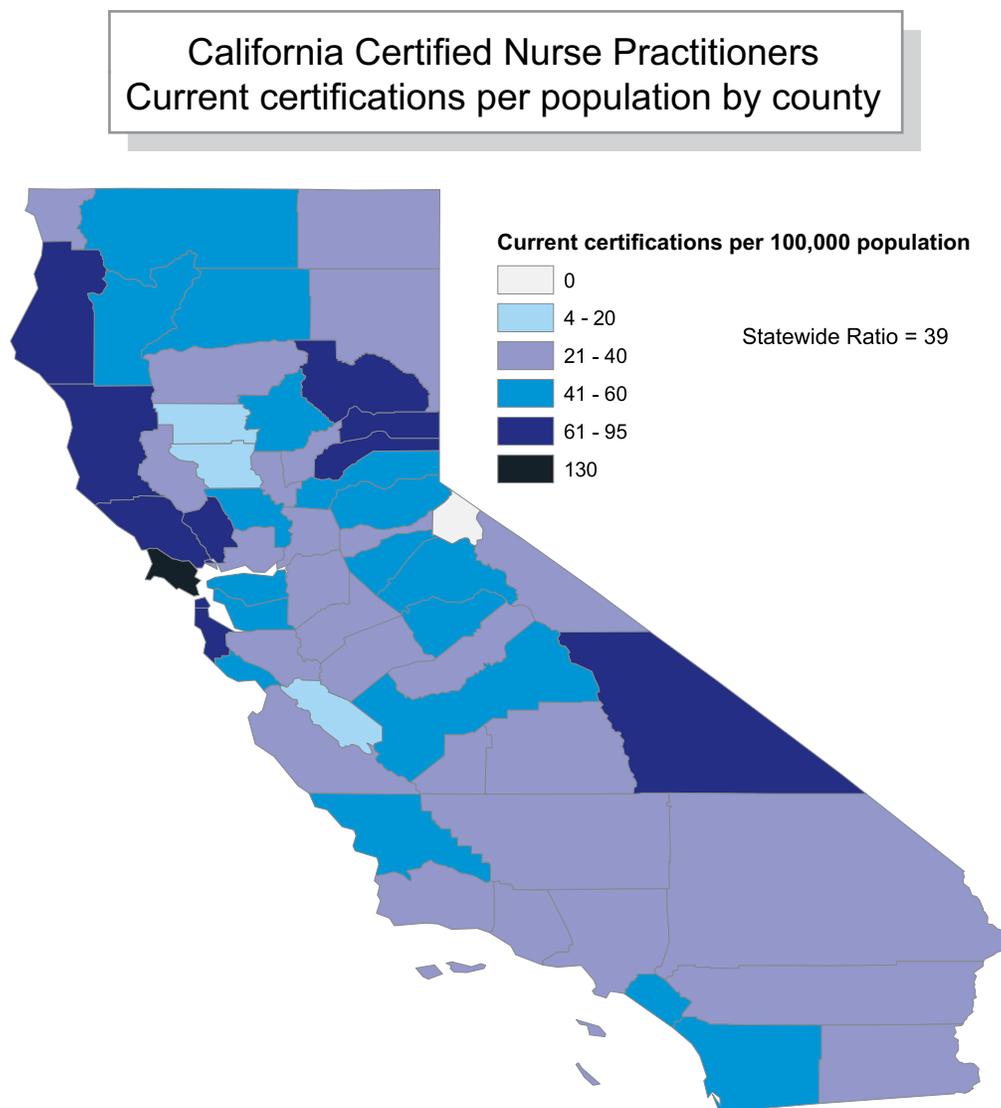
Map 25. Current California clinical nurse specialist certifications per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 14,623 individuals with a California address in possession of a current and valid certification to practice as a nurse practitioner (NP) in the state. The map suggests that NPs are working in counties that frequently have low health care provider per population ratios, but their supply is still generally much greater in the Bay Area and counties along the coast. In general, counties in Northern California have higher NP certifications per population ratios compared with counties in Southern California.

Map 26. Current California nurse practitioner certifications per population by county

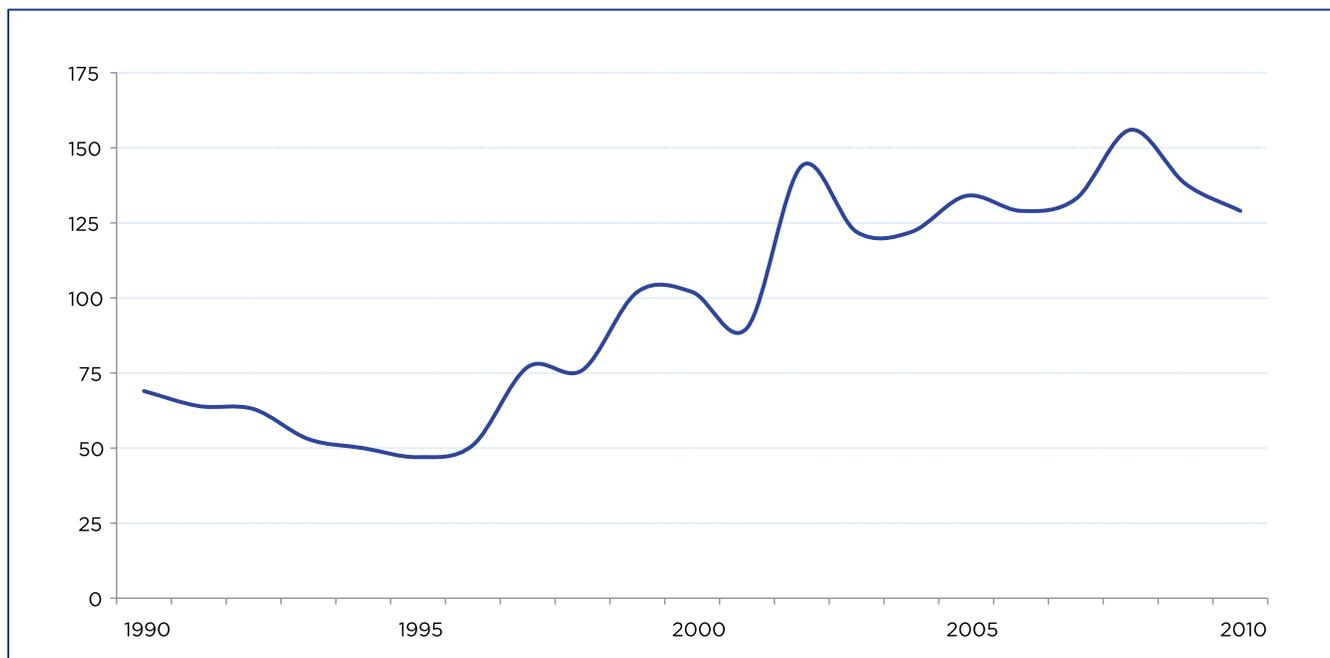


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Certified Nurse Anesthetists and Certified Nurse Midwives

Certified nurse anesthetists are also advanced practice registered nurses. The number of new nurse anesthetist certifications issued each year has generally trended upward over the past fifteen years. On average, there have been 135 new certifications issued annually since 2005.

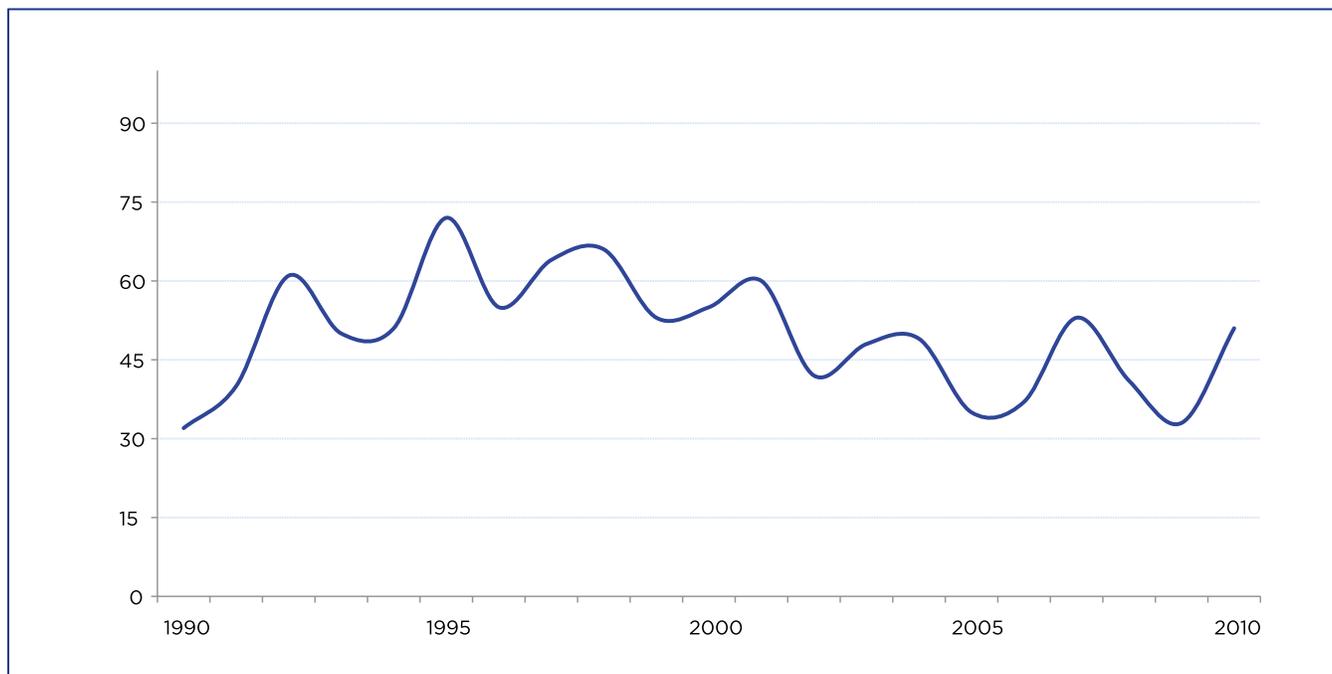
Figure 28. California certified nurse anesthetists - new certificates issued per year: 1990 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

Figure 29 shows that the number of new certificates to practice as a nurse midwife in California issued each year peaked in 1995. In the past five years, the Board of Registered Nursing has issued between 35 and 50 new certifications every year.

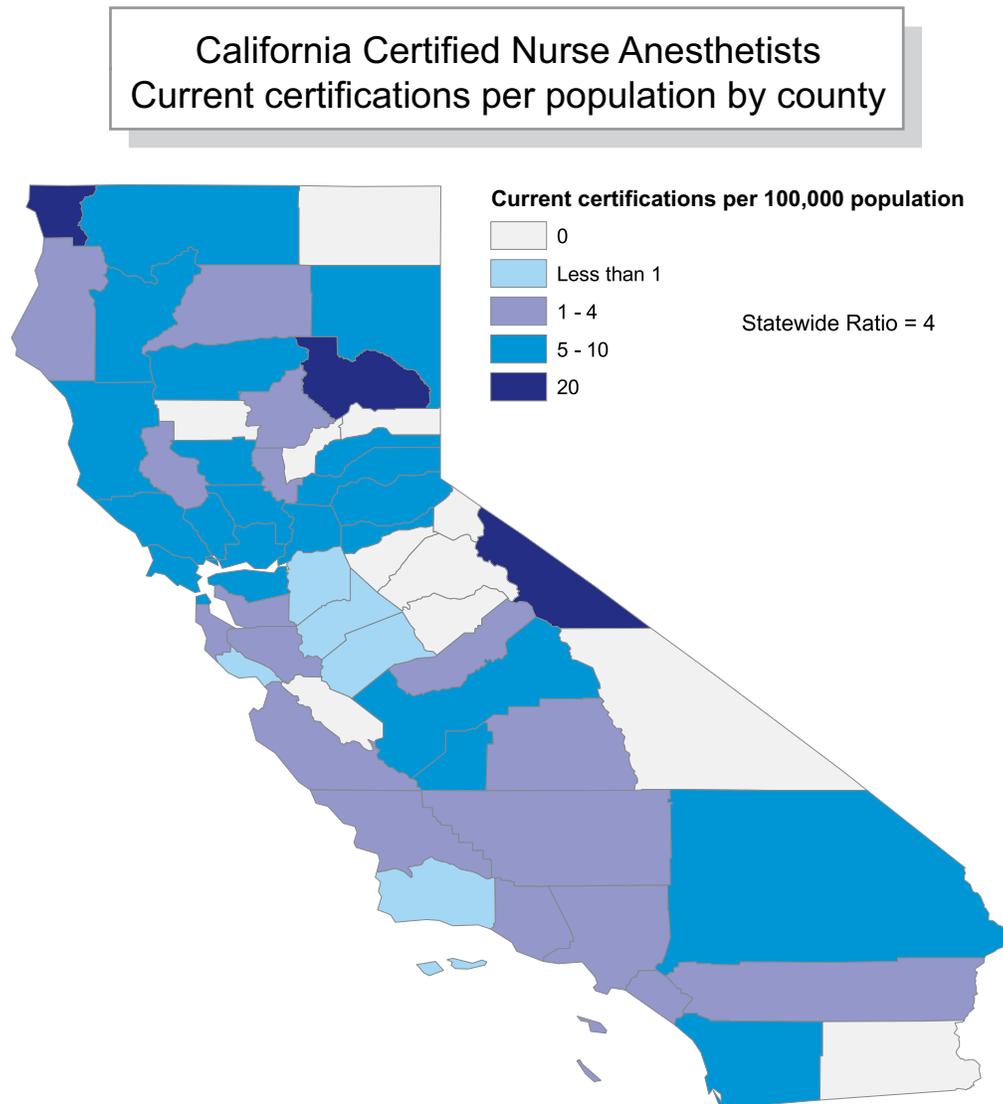
Figure 29. California certified nurse midwives - new certificates issued per year: 1990 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 1,425 individuals with a California address in possession of a current and valid certification to practice as a nurse anesthetist in the state. Nurse anesthetists represent a small workforce; ten counties have no practitioners with an address of record in those counties. In general, counties in Northern California have higher nurse anesthetist certifications per population ratios compared with counties in Southern California.

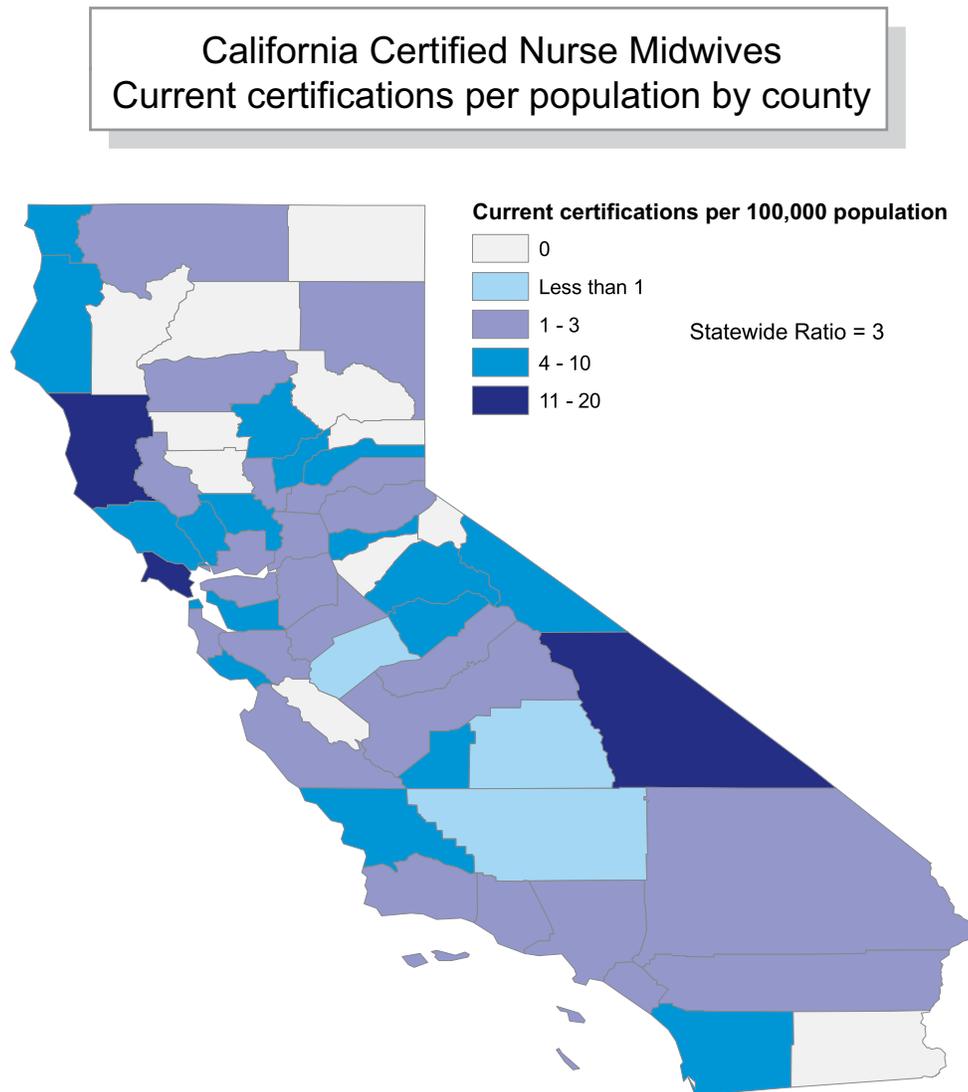
Map 27. Current California nurse anesthetist certifications per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

As of February 2011, there were 1,049 individuals with a California address in possession of a current and valid certification to practice as a nurse midwife in the state. Nurse midwives represent a very small workforce; the California state-wide license per 100,000 population ratio of 3 means there are .15 nurse midwives for every 5,000 people. There are zero practitioners with an address of record in twelve counties.

Map 28. Current California nurse midwife certifications per population by county

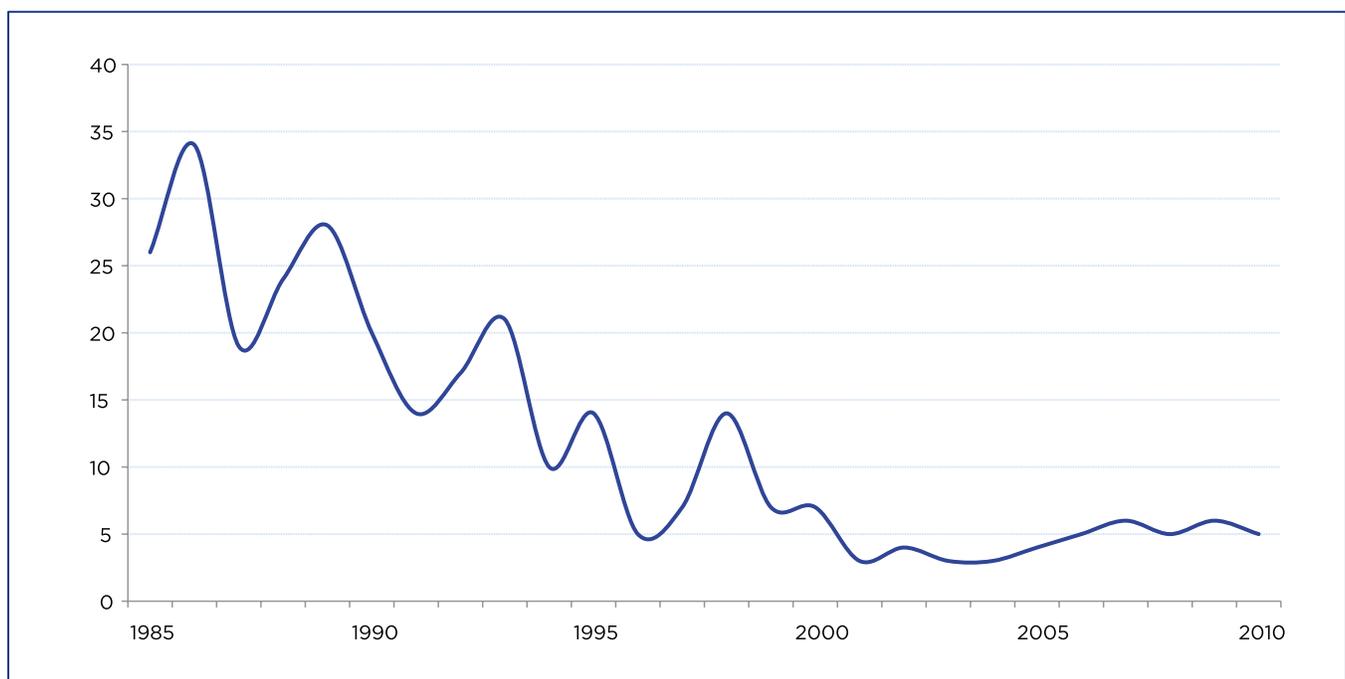


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Certified Psychiatric/Mental Health Nurses

The California Board of Registered Nursing continues to offer a certificate to practice as a certified psychiatric/mental health nurse. Requirements include education at the master's level (the degree must be directly related to mental health) and two years of supervised clinical experience providing mental health counseling services. These data show that the annual number of certifications issued has declined steadily since 1985. In recent years the BRN has certified only five or six new psychiatric/mental health nurses per year. It is important to note that this statewide certification predated national certification for Psychiatric/Mental Health Nursing and is not required for practice in the state. We do not have information from the American Nurses Credentialing Center (ANCC) about how many nurses residing in California have a national advanced practice certification in Psychiatric/Mental Health.

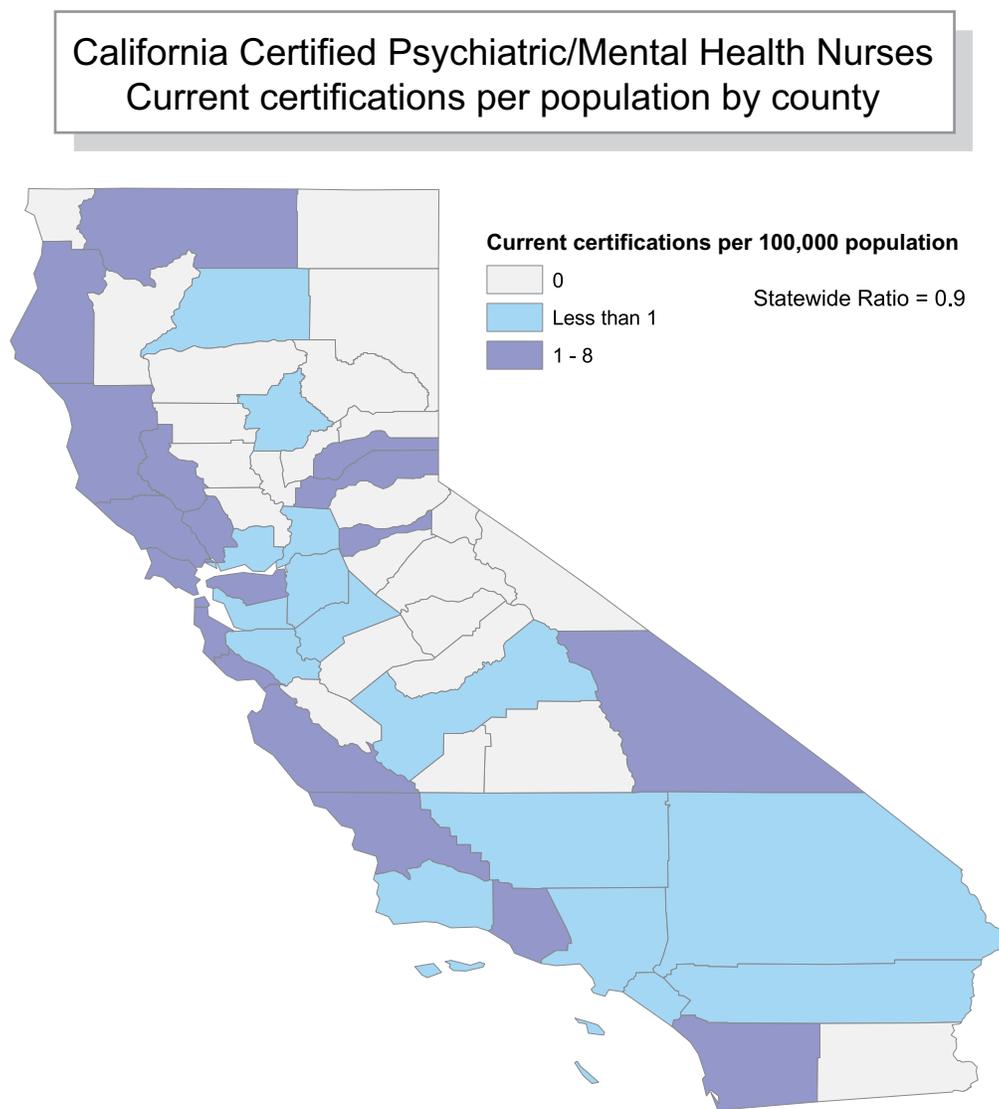
Figure 30. California certified psychiatric/mental health nurses - new certificates issued per year: 1985 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 334 individuals with a California address in possession of a current and valid certification to practice as a psychiatric/mental health nurse in the state. As Figure 30 (above) demonstrates, over the past ten years the Board of Registered Nursing has certified five or fewer new psychiatric/mental health nurses each year. Approximately 40 percent of counties in the state have no practitioners with an address of record in those counties.

Map 29. Current California psychiatric/mental health nurse certifications per population by county

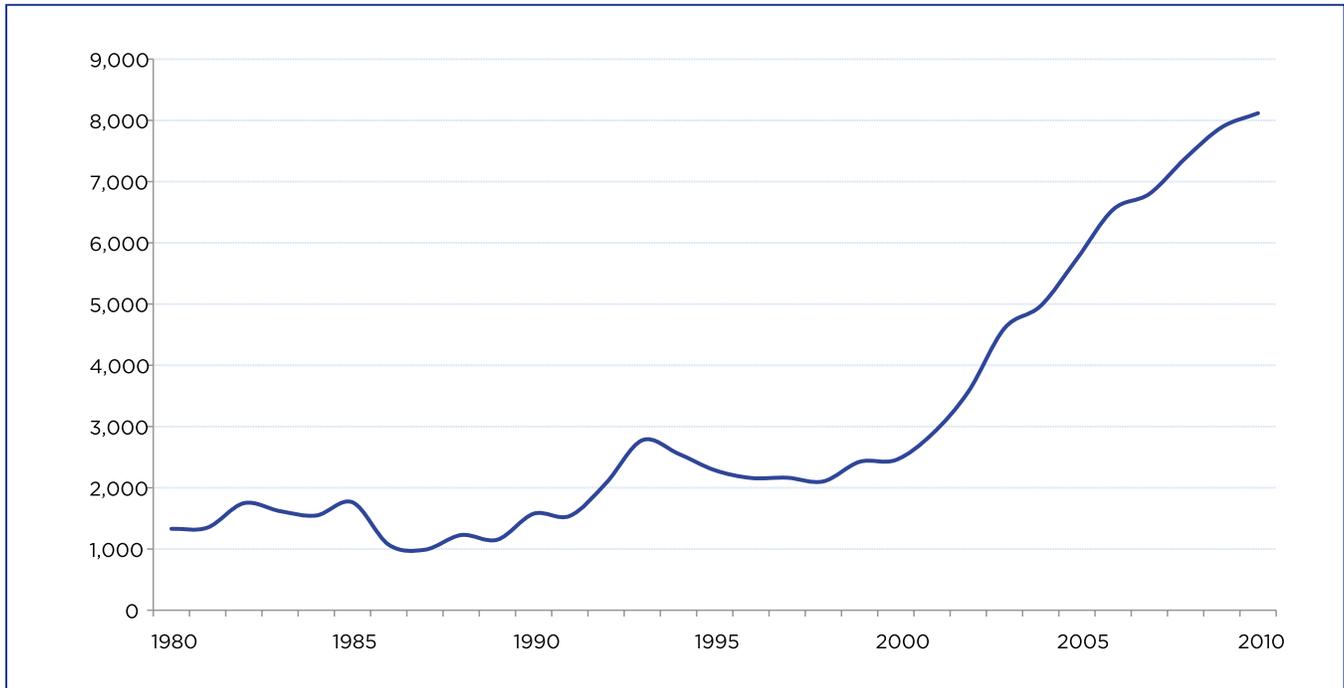


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Vocational Nurses (LVN)

The number of new licenses issued annually to licensed vocational nurses has increased dramatically in the past 10 years, more than tripling between 2000 and 2010. Although not shown here, analysis of LVN program completions data show that private for-profit LVN training programs have proliferated around the state during this period. These licensing data reflect their impact.

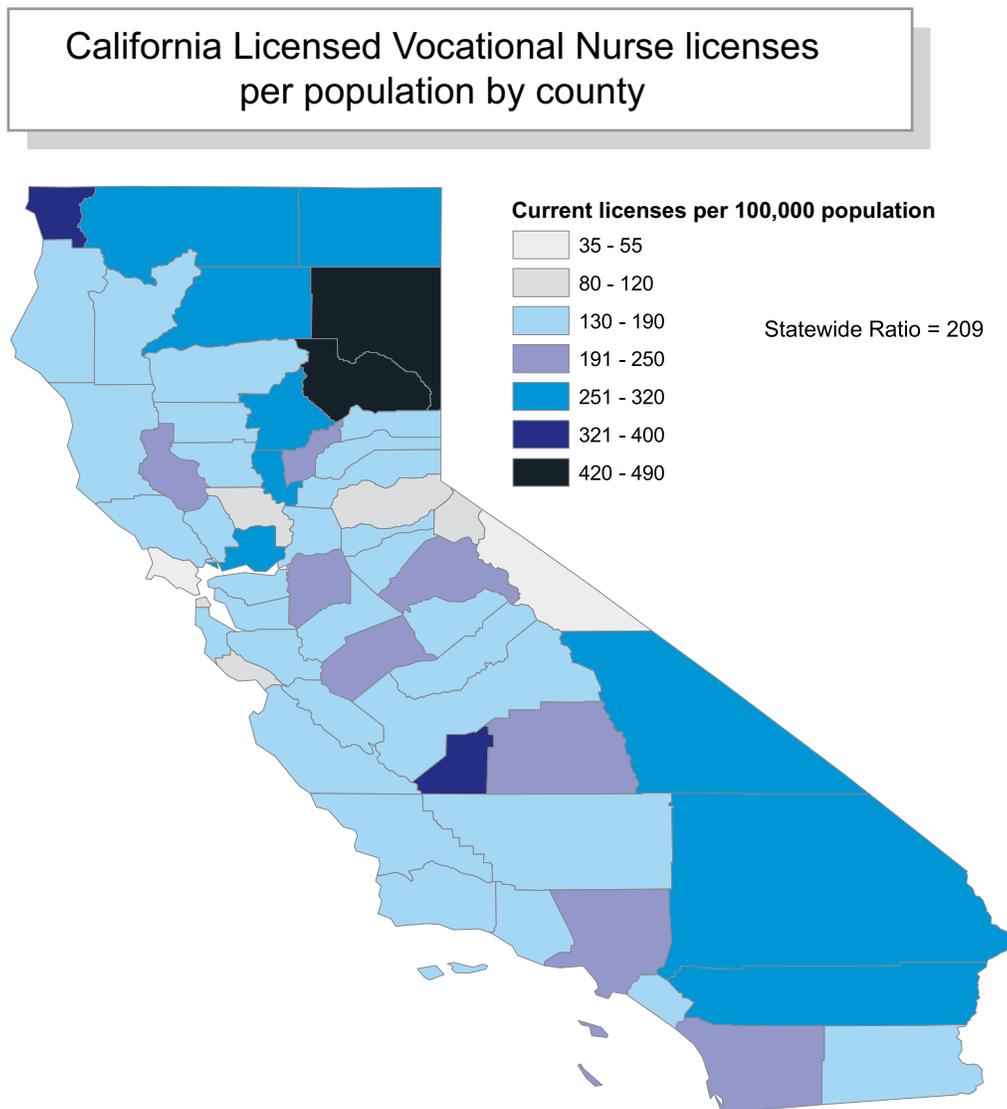
Figure 31. California licensed vocational nurses - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 77,784 individuals with a California address in possession of a current and valid license to practice as a licensed vocational nurse in the state. The map indicates that LVNs are least well represented in coastal counties, which is generally the opposite for most health care occupations. Although the data are not shown here, counties where the number of LVN licenses relative to RN licenses is large generally have the lowest current RN license per population ratios, suggesting that LVNs are more frequently utilized where there are fewer RNs.

Map 30. Current California licensed vocational nurse licenses per population by county



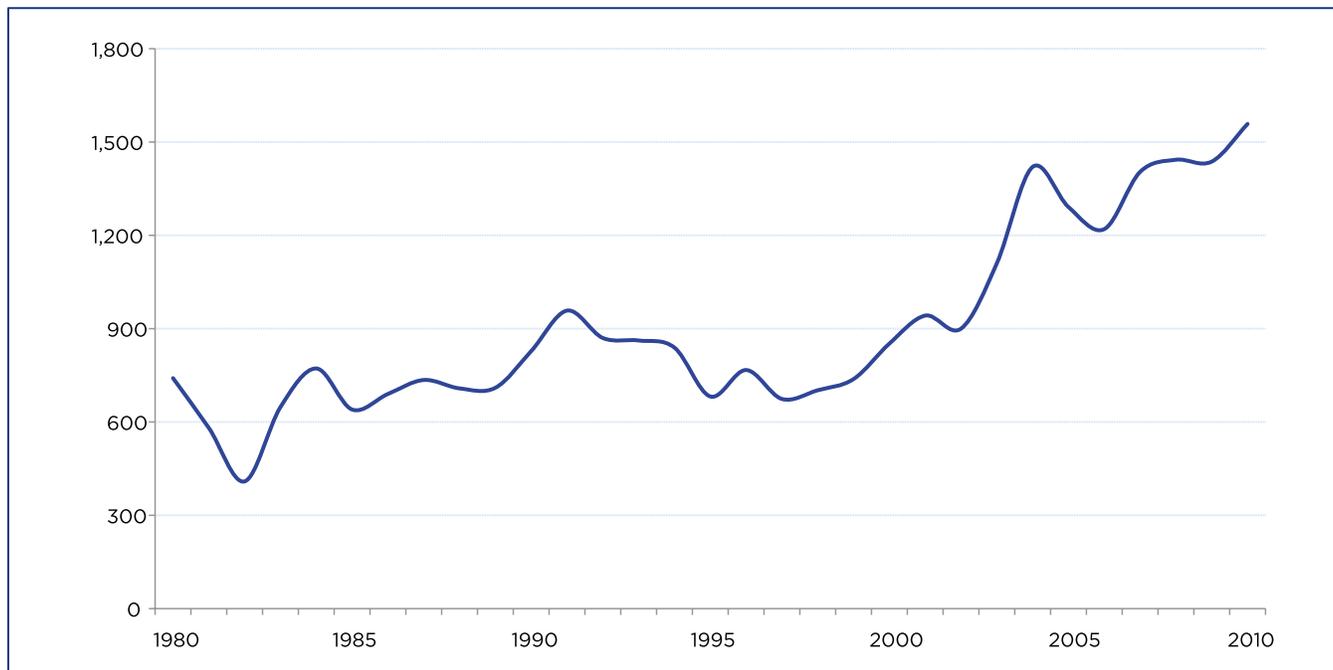
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

Pharmacy

California Licensed Pharmacists

Between 2000 and 2010, the number of new licenses issued to pharmacists every year grew by approximately 80 percent. This is mainly due to several new schools of pharmacy in California that opened in the past decade.

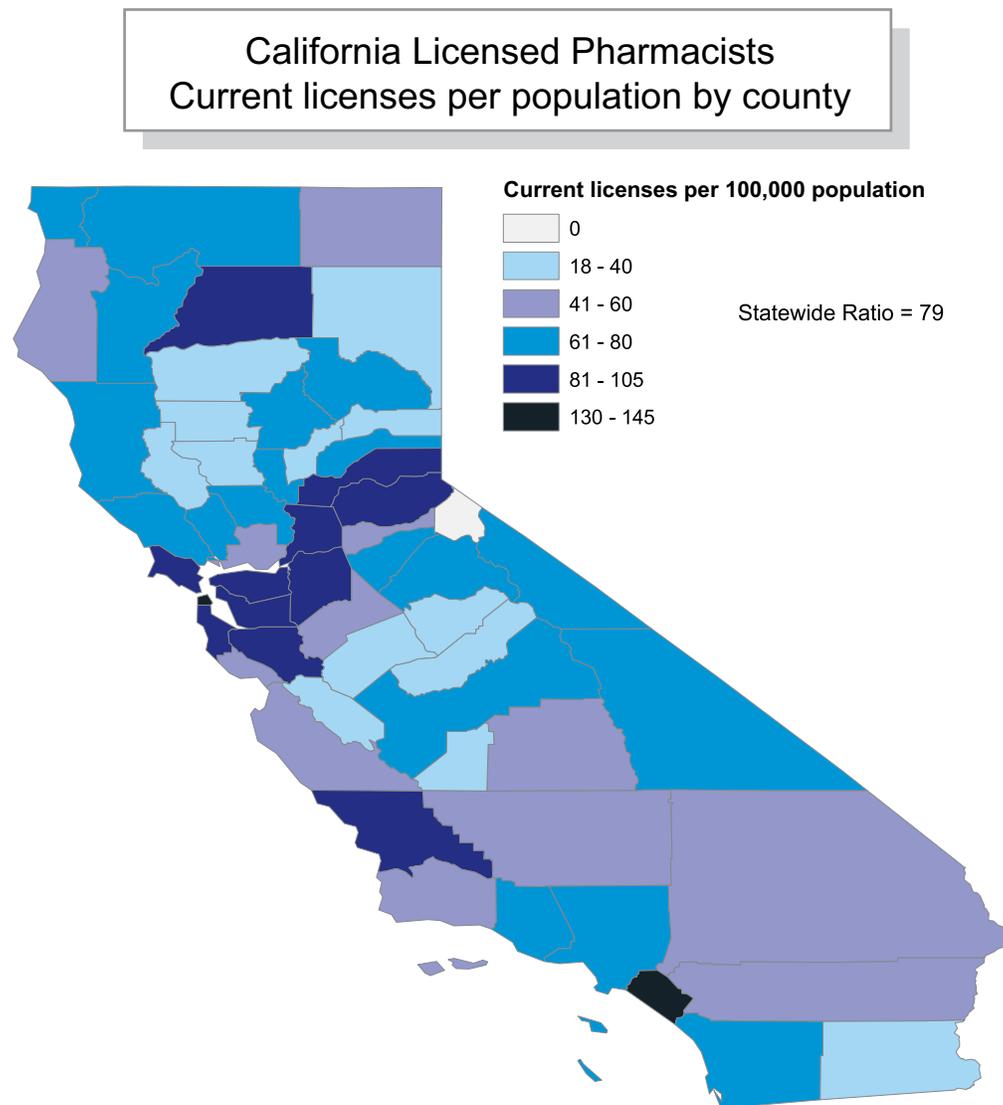
Figure 32. California licensed pharmacists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 29,245 individuals with a California address in possession of a current and valid license to practice as a registered pharmacist in the state. Pharmacists are generally concentrated in the belt of counties stretching from the Bay Area eastward across the state. Several counties have very low license per 100,000 population rates, including Imperial, Kings, San Benito, Merced, Mariposa, Yuba, and Tehama counties. The range of 18 – 30 licenses per 100,000 population ratio would mean there are between .9 and 1.5 pharmacists for every 5,000 people.

Map 31. Current California registered pharmacist licenses per population by county

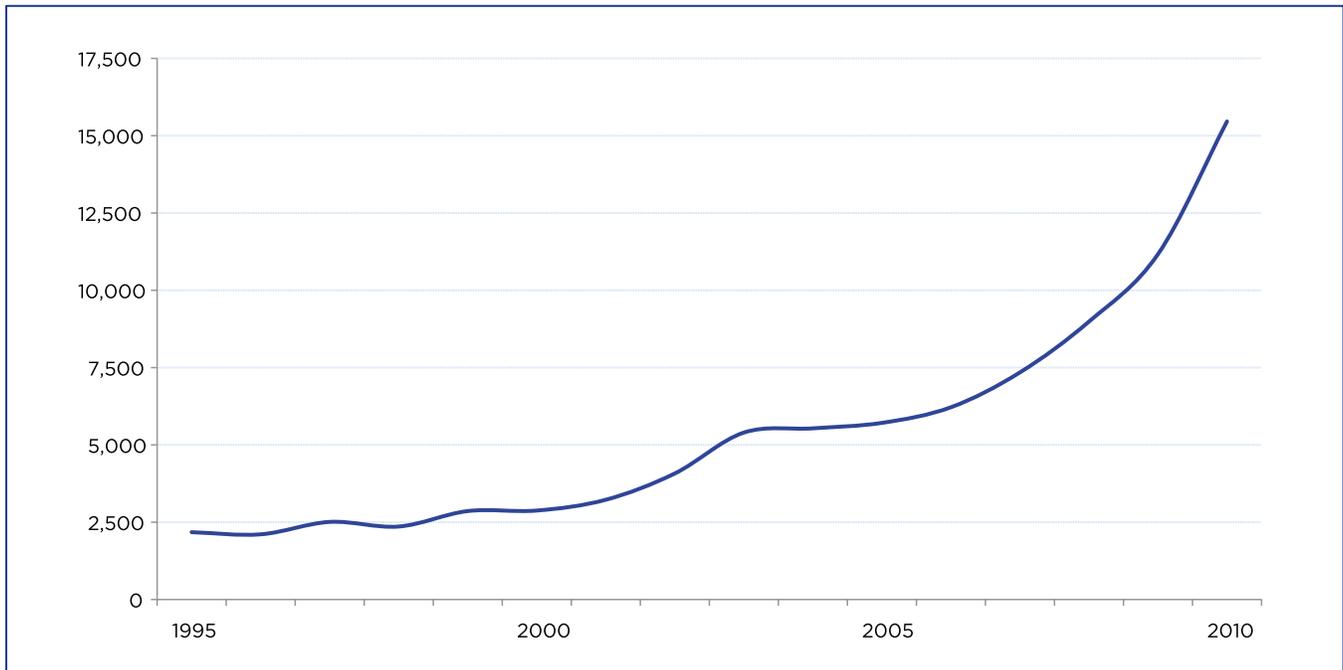


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Registered Pharmacy Technicians

The number of pharmacy technicians registered every year has tripled over the past decade. Although not shown here, analysis of pharmacy technician program completions data show that private for-profit pharmacy tech training programs have proliferated around the state during this period. These licensing data reflect their impact.

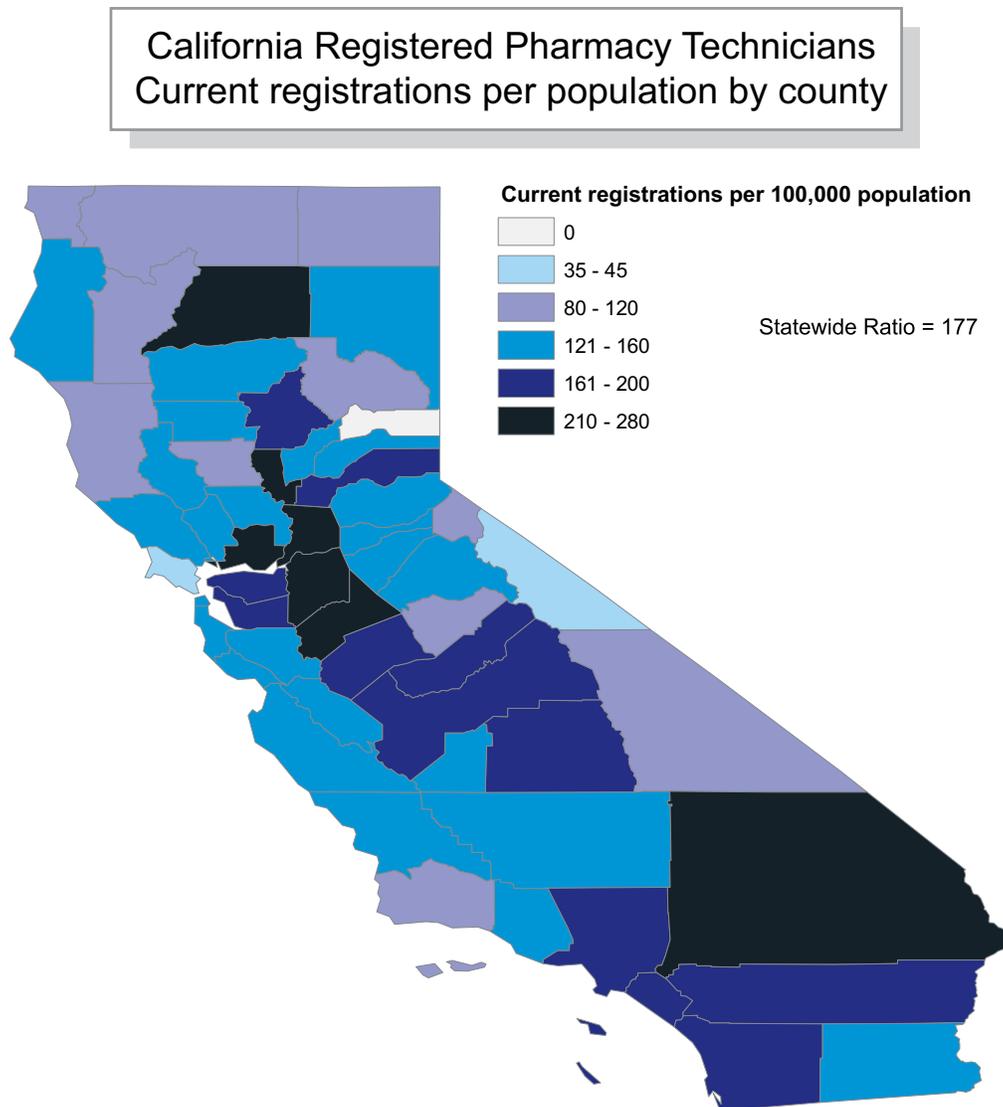
Figure 33. California registered pharmacy technicians – new registrations per year: 1995 – 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 65,636 individuals with a California address in possession of a current and valid registration to work as a registered pharmacy technician in the state. The map shows that counties with the highest pharmacy technician per population ratios are in the central regions of state, which is atypical of health care occupations. Although the data are not shown here, counties where the number of pharmacy technician registrations relative to pharmacist licenses is large, generally have the lowest current pharmacist license per population ratios, suggesting a greater rate of pharmacy technician utilization in those counties.

Map 32. Current California registered pharmacy technician registrations per population by county



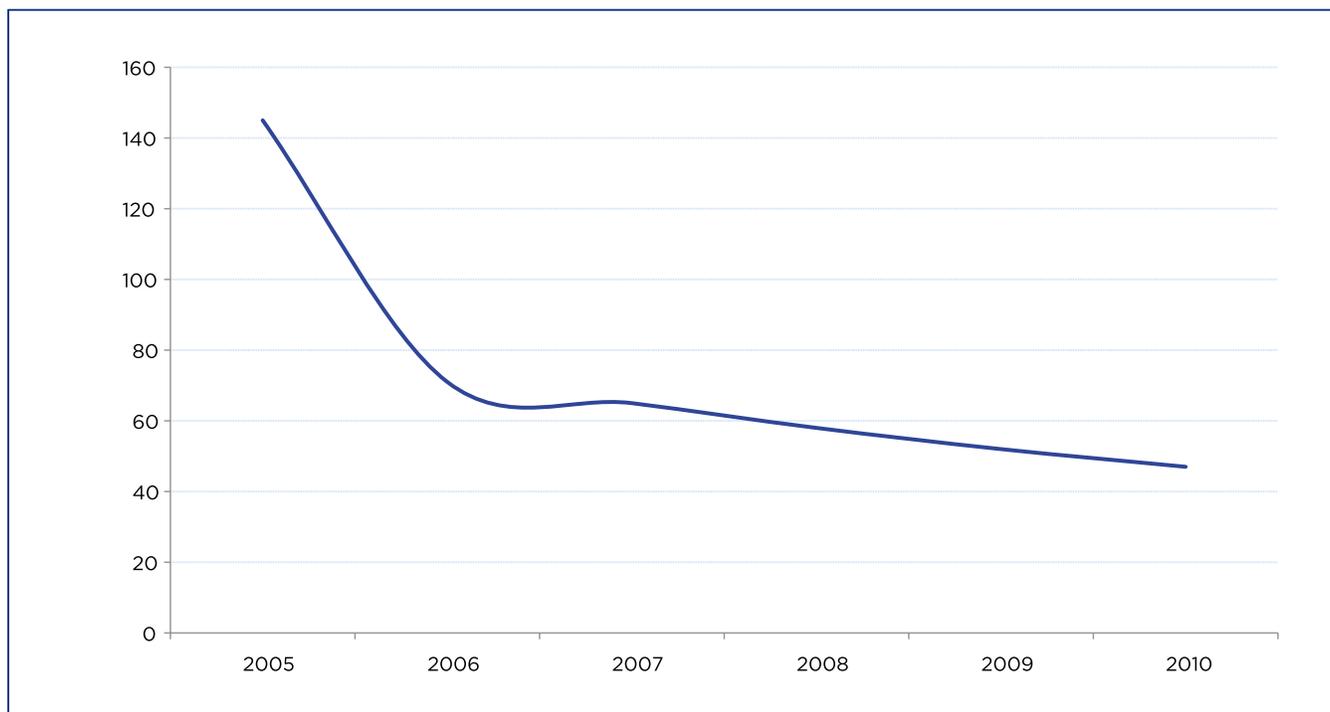
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
County distribution is based on individual's address of record
Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
2010 Census Summary File 1

Physicians and Doctors

California Licensed Naturopathic Doctors

Following the initial wave of applicants licensed to practice as a naturopathic doctor in California, the annual number of licenses issued has declined in each year since 2007.

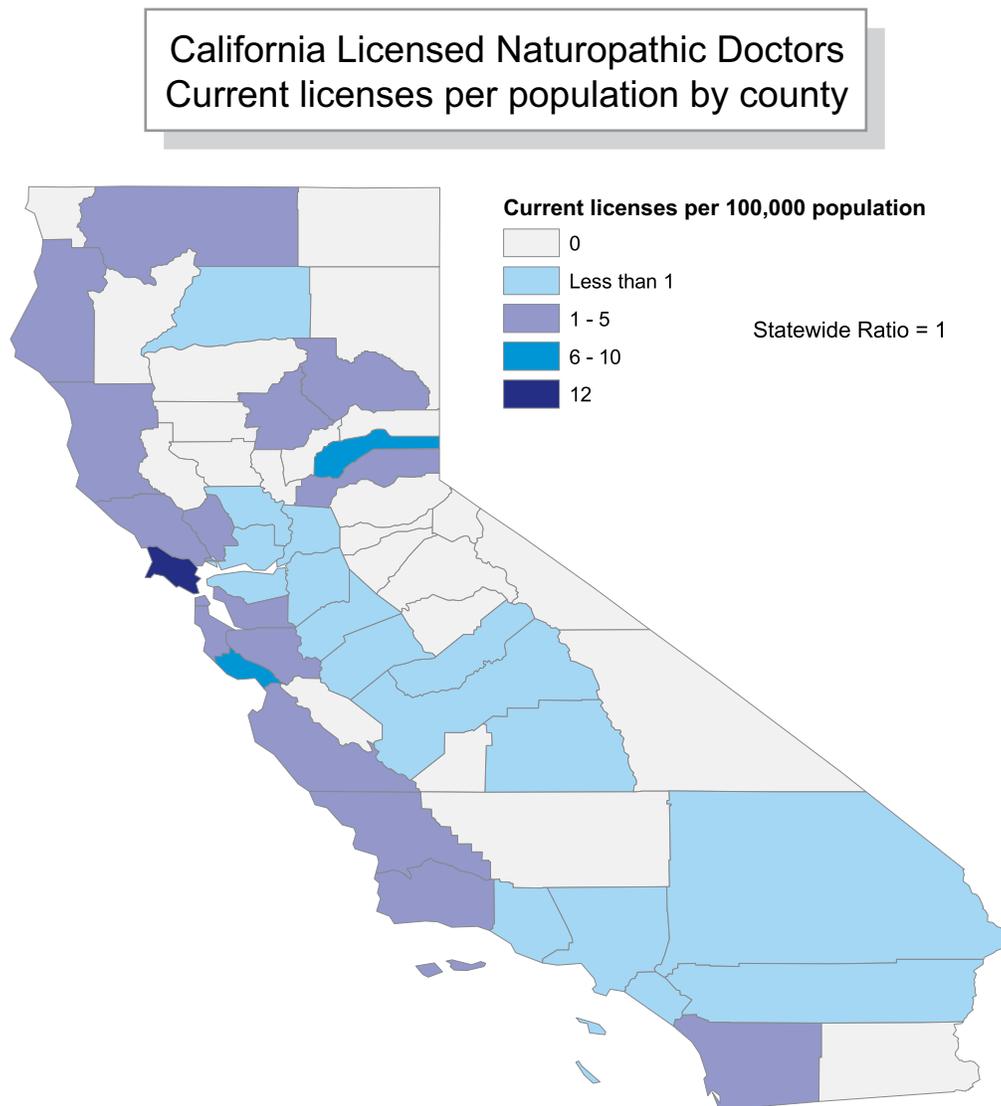
Figure 34. California licensed naturopathic doctors - new licenses issued per year: 2005 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 358 individuals with a California address in possession of a current and valid license to practice as a naturopathic doctor in the state. As with licensed professional midwives, the naturopathic doctor workforce is very small. These data indicate that naturopathic doctors are concentrated in a small number of counties, mainly along the central and northern coast. Marin County has a license per 100,000 population ratio roughly twice that of any other county in the state.

Map 33. Current California naturopathic doctor licenses per population by county

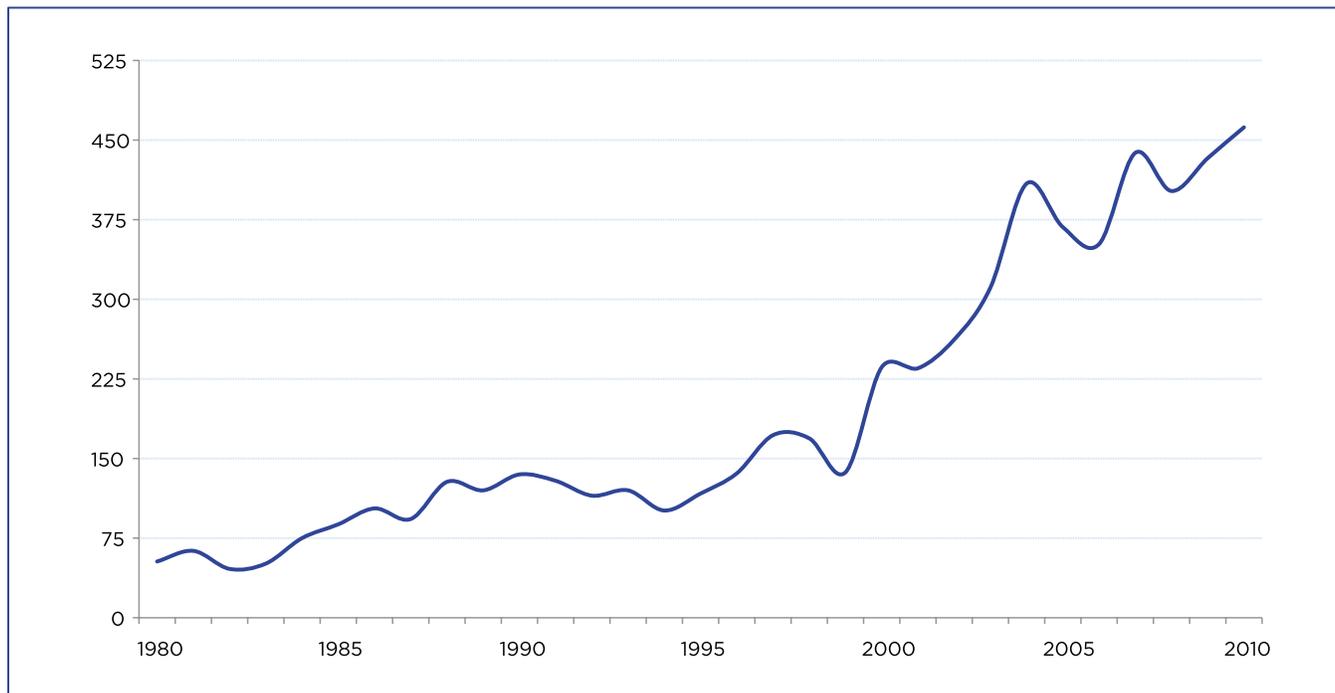


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: California Naturopathic Committee, February 2011;
 2010 Census Summary File 1

California Licensed Osteopathic Physicians (DO)

The number of new licenses issued each year to practice as an osteopathic physician in California has been steadily increasing over the past thirty years. In the past decade, however, new training programs have opened in California, boosting the rate of growth in the number of new licenses issued annually.

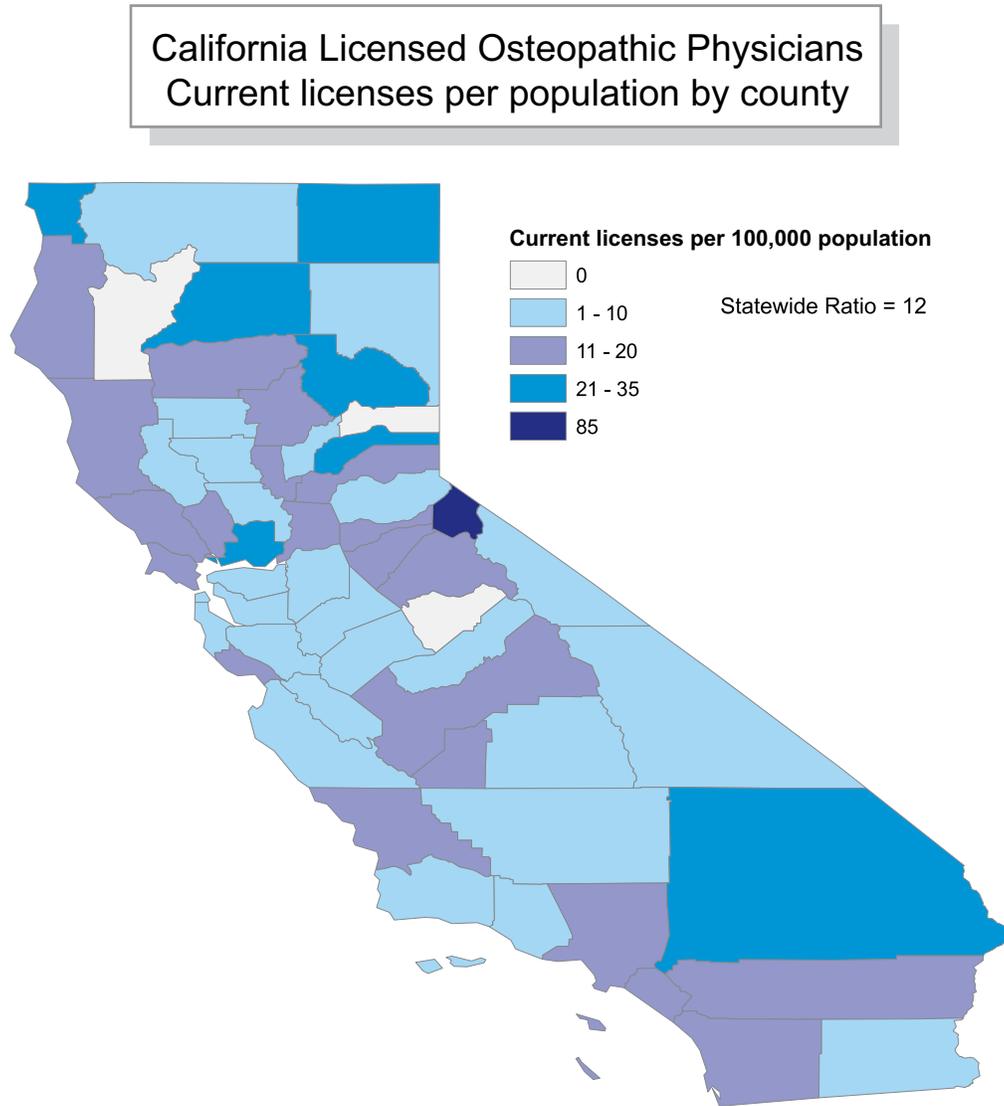
Figure 35. California licensed osteopathic physicians - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 4,390 individuals with a California address in possession of a current and valid license to practice as an osteopathic physician in the state. The map indicates that counties with higher osteopathic physician license per population ratios are those that frequently have low health care provider per population ratios. Although the data are not shown here, counties where the number of osteopathic physician (DO) licenses relative to allopathic physician (MD) license is large, generally have the lowest physician license per population ratios.

Map 34. Current California osteopathic physician licenses per population by county

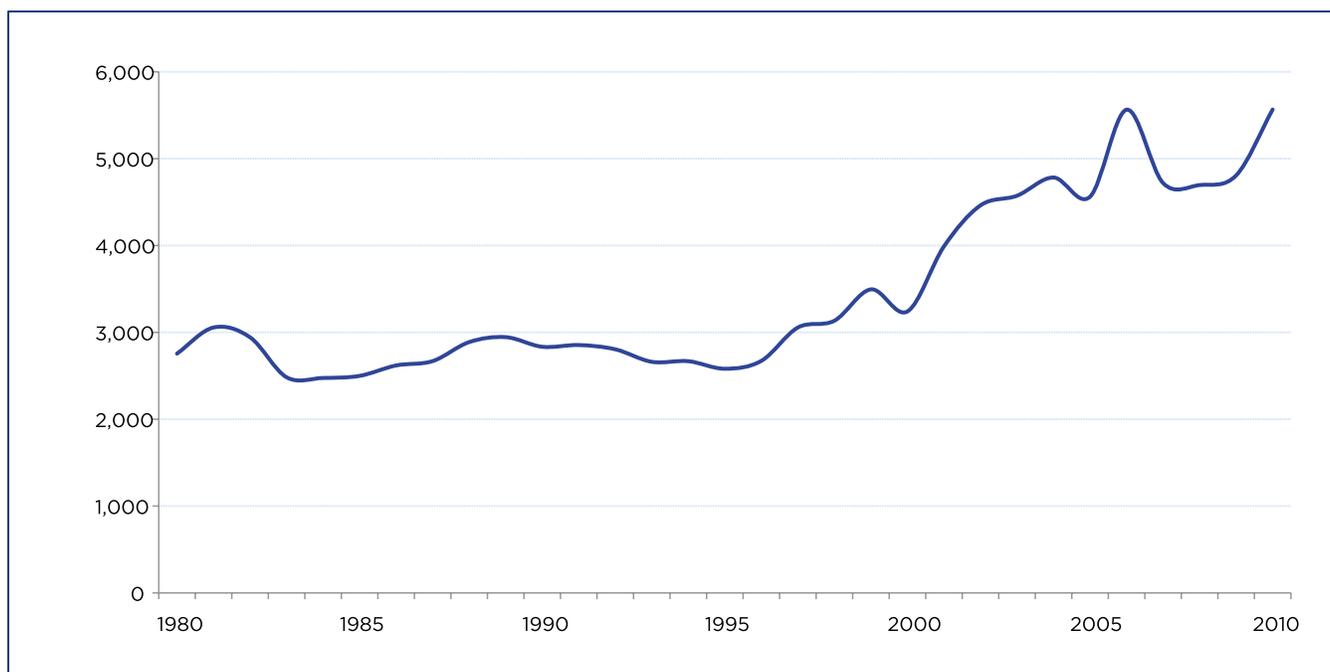


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Physicians and Surgeons (MD)

The number of physician licenses issued annually remained fairly consistent between 1980 and 1995, after which the number of licenses issued every year began increasing. The peak in 2005 appears to have been temporary, as there were a greater number of licenses issued in 2010. The most likely explanation for the growth in new licenses is economic opportunity in California. First-year enrollments in California's medical schools have increased only marginally since 1990, and the increase has occurred just in the past several years. Growth in the number of new licenses issued annually is driven by physicians trained outside California.

Figure 36. California licensed physicians - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 96,315 individuals with a California address in possession of a current and valid license to practice as a physician in the state. We know from recent analysis of physicians²⁸ that a simple count of current physician licenses will overstate how many are actually practicing, and thus overstate access to care across different parts of the state. Table 2 (p. 93) compares the results of using two different sources of data to generate county-level physician per population ratios.

The physician per population ratios in the column labeled “DCA Masterfile” were generated using the Department of Consumer Affairs, Professional License Masterfile (current as of February, 2011). The ratios in the column labeled “Medical Board” were generated using the California Medical Board survey (current as of July, 2008).

With a few exceptions, the DCA Masterfile generates larger physician per 100,000 population ratios than the California Medical Board survey data. It is important to acknowledge that these data represent two different points in time, separated by approximately 2.5 years. This could explain why Alpine County has no physicians when the Medical Board data are used, but a non-zero ratio when the Masterfile data are used. It is possible that between July 2008 and February 2011, Alpine County gained a physician. The same logic applies to Sierra County, but in reverse: It is possible that since July 2008, it lost a physician active in patient care.²⁹

Although an important consideration, the fact that these data represent two different time periods would not be a decisive factor in explaining the size difference for many of these county-level estimates because they have been adjusted for the size of the population. The number of physicians licensed to practice in California did indeed grow between July 2008 and February 2011, but so did the state's population. The decisive factor that explains why the Masterfile data generate much larger physician per population ratios is the fact that they include all physicians with a current license, whether or not they are active in patient care.

Table 2 suggests that counties in the Bay Area (including San Francisco, Marin, Santa Clara and San Mateo), along the southern coast (Los Angeles, Orange, and San Diego), and in the Sacramento area (Sacramento, Yolo, and Calaveras) have a comparatively large share of licensed physicians who are either not active in patient care, or possibly retired.

28 Grumbach, K., Chattopadhyay, A., Bindman, A. (2009). Fewer and more Specialized: A New Assessment of Physician Supply in California. Oakland, CA: California HealthCare Foundation.

29 A single physician generates a 2011 physician per 100,000 population ratio of 85 in Alpine County, and a 2008 physician per 100,000 population ratio of 27 in Sierra County.

Table 2. California physicians per 100,000 population ratios by county: Comparing data from the DCA Masterfile and California Medical Board survey

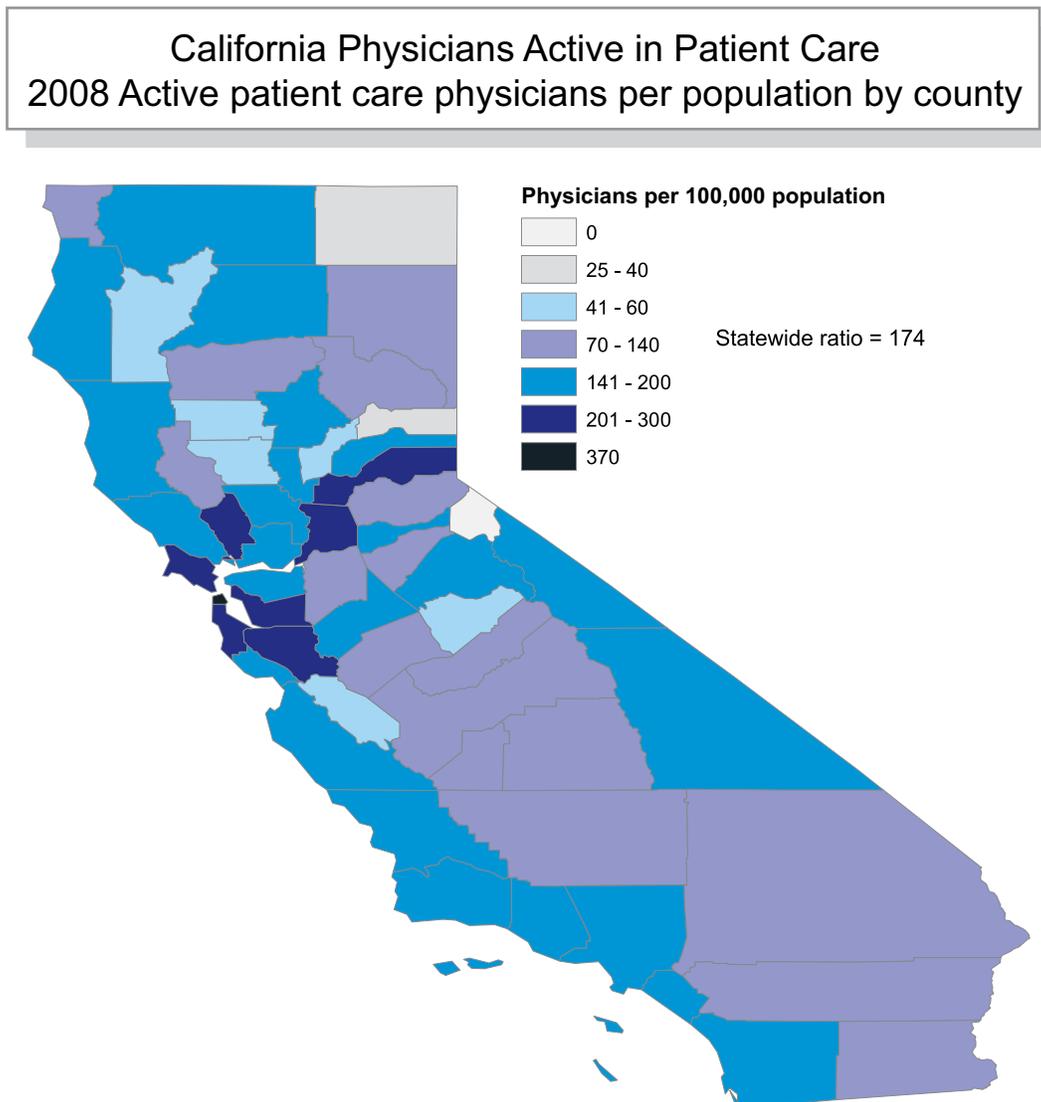
County	DCA Materfile	Medical Board	County	DCA Masterfile	Medical Board
Alameda	288	211	Orange	293	185
Alpine	85	0	Placer	266	219
Amador	168	145	Plumas	135	111
Butte	205	177	Riverside	120	99
Calaveras	108	71	Sacramento	300	201
Colusa	47	53	San Benito	47	58
Contra Costa	271	190	San Bernardino	173	121
Del Norte	140	116	San Diego	294	187
El Dorado	149	111	San Francisco	719	370
Fresno	190	135	San Joaquin	147	128
Glenn	36	43	San Luis Obispo	273	197
Humboldt	201	182	San Mateo	355	213
Imperial	77	80	Santa Barbara	256	183
Inyo	216	200	Santa Clara	387	239
Kern	130	111	Santa Cruz	247	170
Kings	90	76	Shasta	238	191
Lake	111	118	Sierra	0	27
Lassen	106	94	Siskiyou	165	150
Los Angeles	272	176	Solano	205	181
Madera	123	125	Sonoma	259	200
Marin	521	272	Stanislaus	176	142
Mariposa	60	53	Sutter	193	170
Mendocino	214	173	Tehama	74	82
Merced	88	81	Trinity	36	47
Modoc	21	28	Tulare	104	98
Mono	211	160	Tuolumne	222	167
Monterey	197	155	Ventura	195	159
Napa	322	231	Yolo	234	142
Nevada	288	170	Yuba	60	60
California	259	174			

Sources: CA Dept. of Consumer Affairs, Professional license masterfile, February 2011; 2010 Census Summary File 1; Grumbach, K., Chattopadhyay, A., Bindman, A. (2009). Fewer and More Specialized: A New Assessment of Physician Supply in California. Oakland, CA: California HealthCare Foundation.

The Medical Board survey provides the kind of information needed to identify physicians who are active in a patient care practice. For this reason, the map below is based on the analysis and findings of the 2009 report by Grumbach et al., *Fewer and More Specialized: A New Assessment of Physician Supply in California*.

The map demonstrates that the supply of active patient care physicians is far below average for most of California's Central Valley, as well as several counties north and east of Sacramento. In contrast, counties along the coast are very well supplied with physician providers (in particular the Bay Area, where San Francisco County has an active physician per 100,000 population ratio more than double the state-wide ratio), as are both Sacramento and Placer counties.

Map 35. 2008 California active patient care physicians per population by county

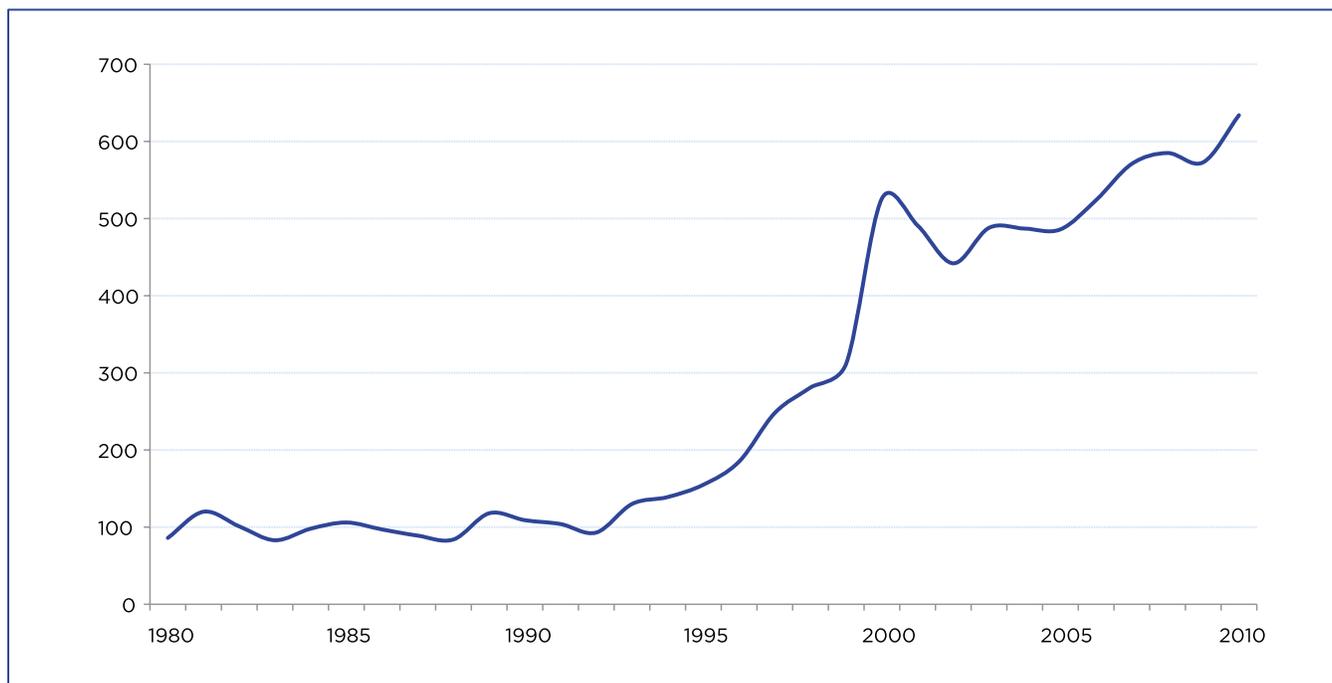


Source: Grumbach, K. Chattopadhyay, A., Bindman, A. 2009. *Fewer and More Specialized: A New Assessment of Physician Supply in California*. California HealthCare Foundation, Oakland, California

California Licensed Physician Assistants (PA)

Since 1995, the annual number of license issued to physician assistants has increased in almost every year. There were more than four times as many PA licenses issued in 2010 as in 1995, a result of the state's expanded capacity to train new PAs.

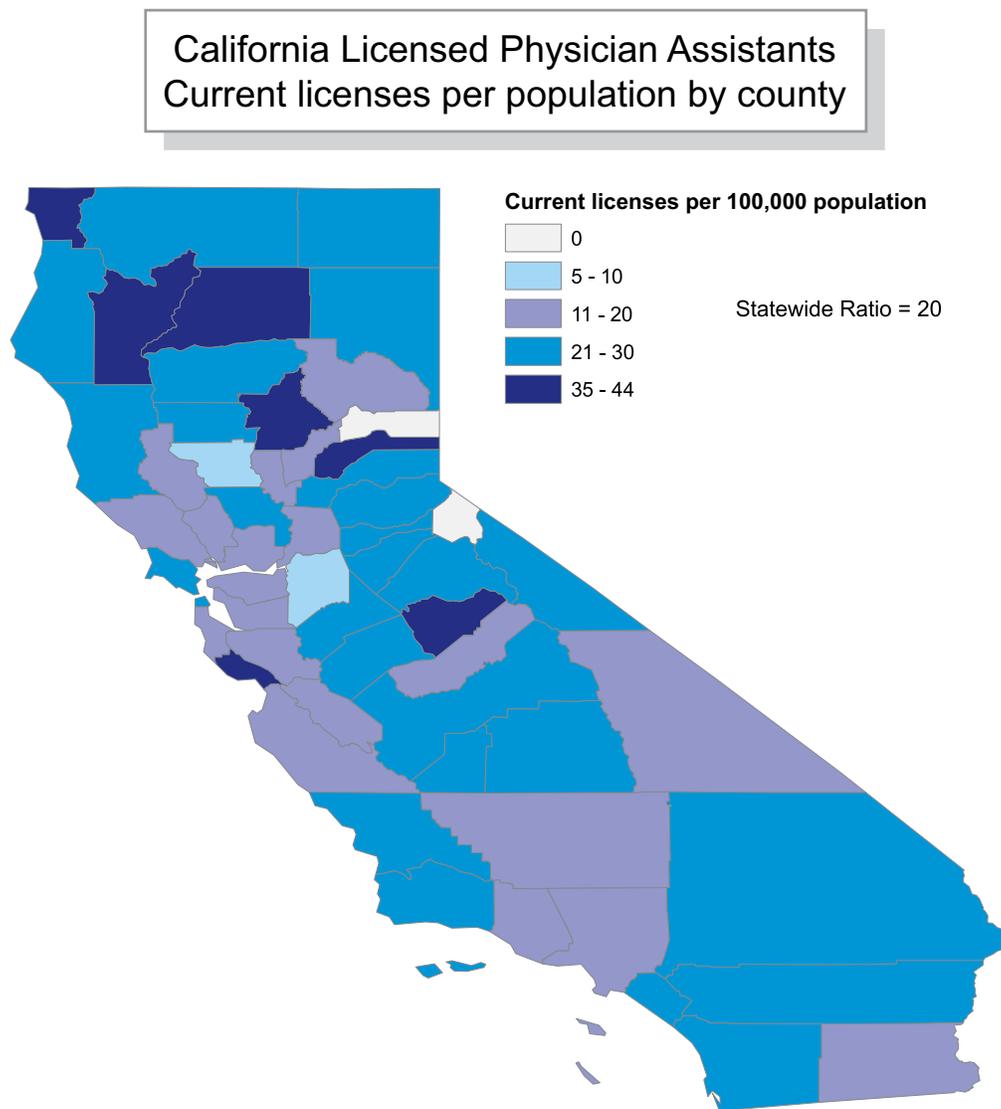
Figure 37. California licensed physician assistants – new licenses issued per year: 1980 – 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 7,439 individuals with a California address in possession of a current and valid license to practice as a physician assistant in the state. The map indicates that counties with higher physician assistant per population ratios are those that frequently have low health care provider per population ratios. Although the data are not shown here, counties where the number of physician assistant licenses relative to physician licenses is large, generally have the lowest physician license per population ratios.

Map 36. Current California physician assistant licenses per population by county



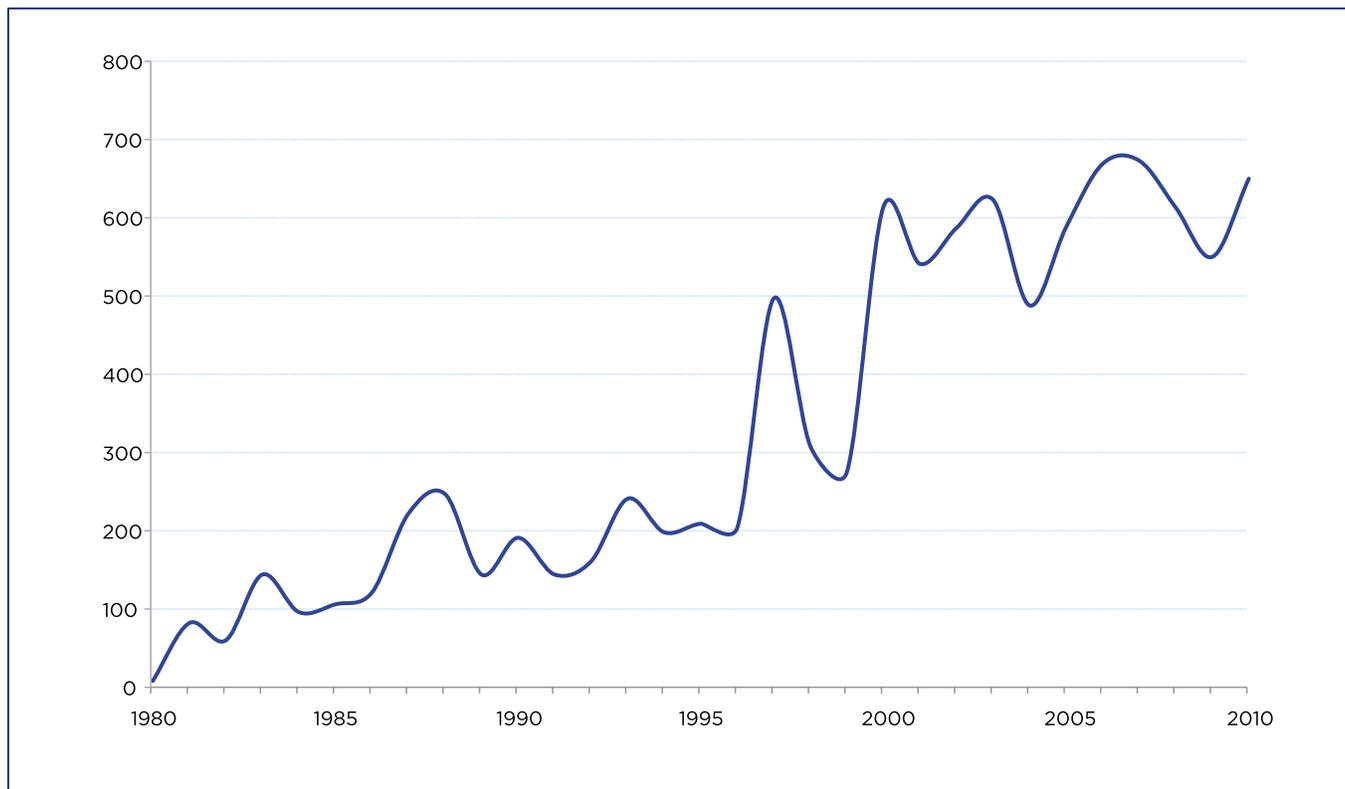
Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

Other Health Professions

California Licensed Acupuncturists

The number of licenses to practice acupuncture in California grew slowly but steadily through most of the 1980s before leveling off for the first half of the 1990s. The upward spike in the number of licenses issued in 1997 and then again in 2000 could be the result of new training programs with large cohorts of graduates being licensed at the same time. The overall growth in licenses issued per year since 1980, and particularly in the last decade, is an indicator of strong demand for acupuncture services.

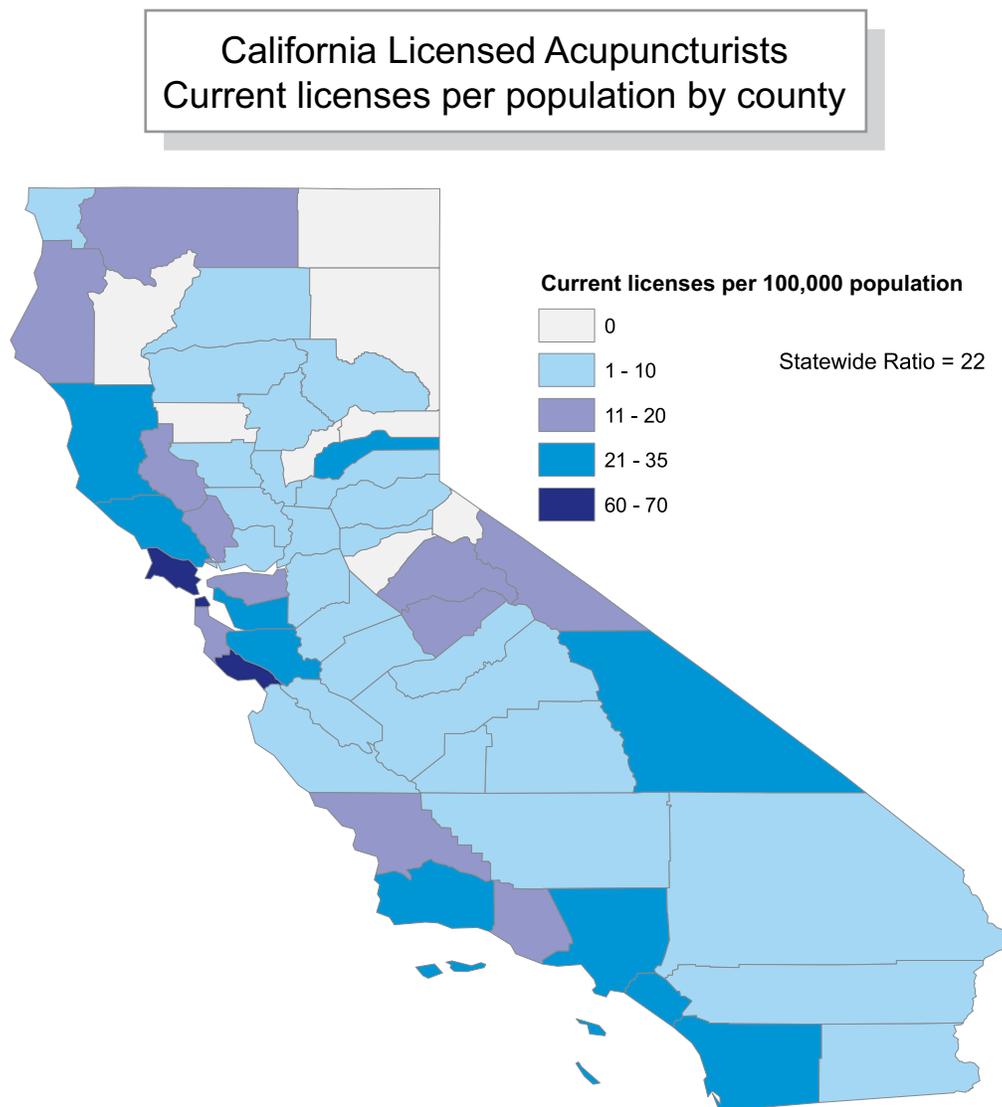
Figure 38. California licensed acupuncturists – new licenses issued per year: 1980 – 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 7,996 individuals with a California address in possession of a current and valid license to practice acupuncture in the state. Licensed acupuncturists are generally concentrated along the coast and in particular the Bay Area, with the result that most counties in California have license per 100,000 population ratios smaller than the state-wide ratio. Several counties have no licensed acupuncturists with an address of record in those counties: Alpine, Calaveras, Sierra, Yuba, Glenn, and Trinity counties.

Map 37. Current California acupuncture licenses per population by county

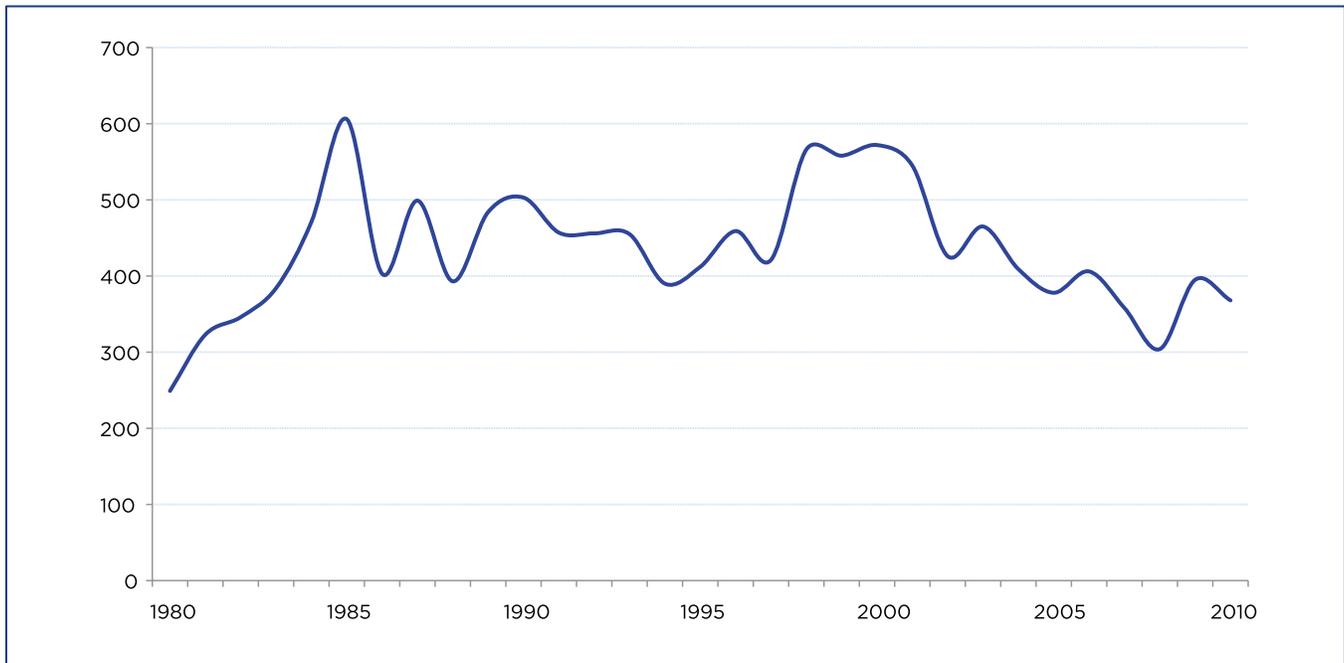


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Chiropractors

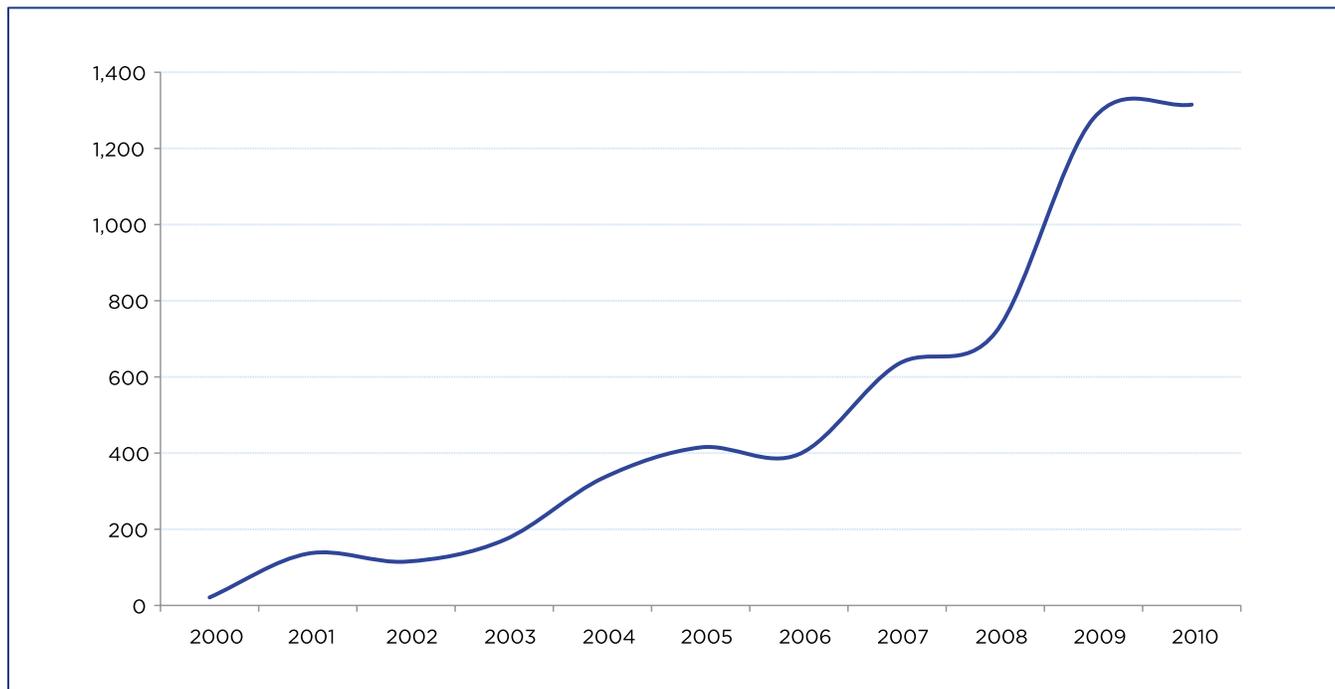
Between 1980 and 2010, the number of chiropractor licenses issued per year has three distinct trends: a large increase in annual issuances between 1980 and 1985, followed by a comparatively stable period over the next decade when they fluctuated between 400 and 500 per year and, despite the upward spike around 2000, a steady decline over the past decade. However, Figure 40 below indicates that while fewer licenses are being issued to new practitioners since 2000, there has been a sizable increase in the number of licenses issued to establish secondary practice locations.

Figure 39. California licensed chiropractors - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

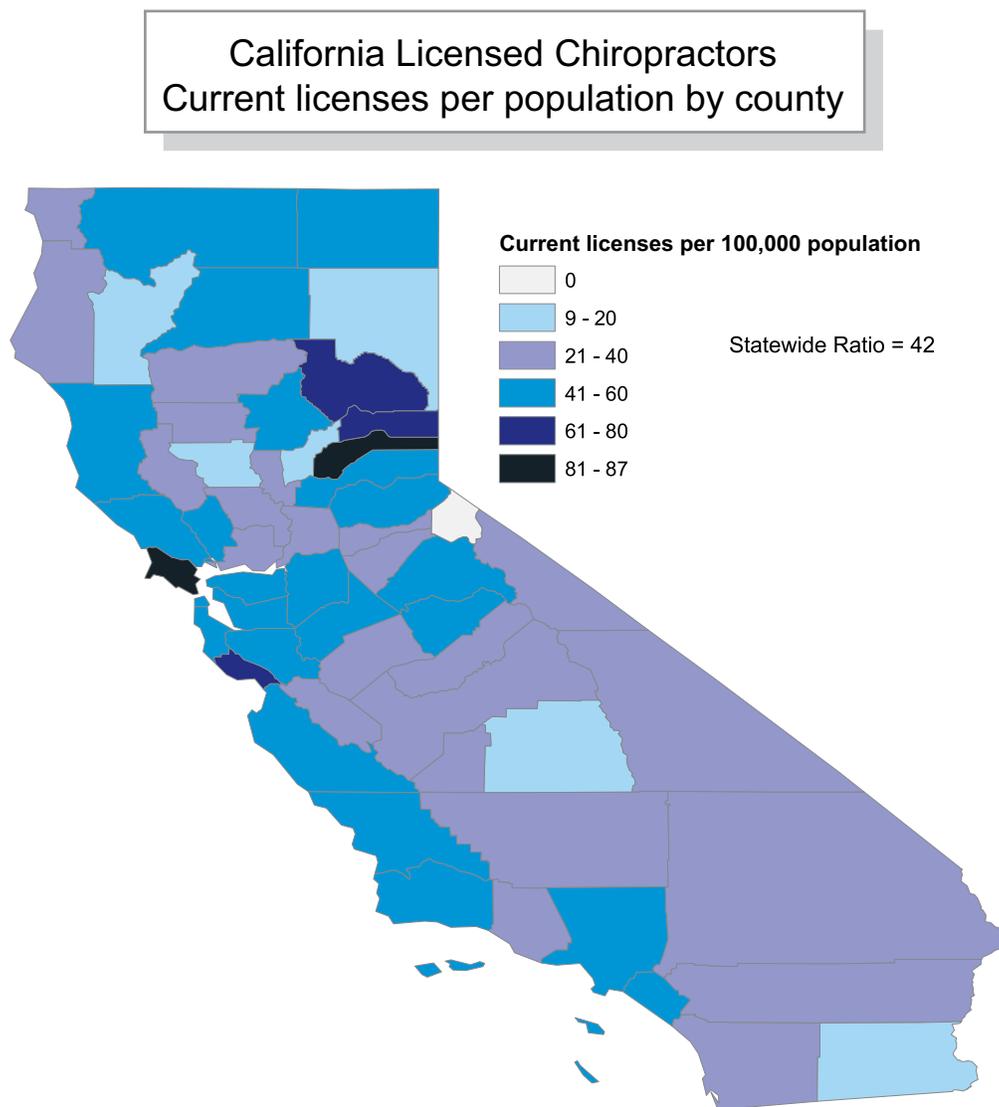
Figure 40. California licensed chiropractors - new satellite office licenses issued per year: 2000 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 11,834 individuals with a California address in possession of a current and valid license to practice as a chiropractor in the state (3,677 of whom possessed a license to provide services at more than one location—satellite office license). These data indicate that all counties in the state, excepting Alpine County, have at least some access to chiropractic services. Only a few counties have a license per 100,000 population ratio that is less than half the state-wide ratio.

Map 38. Current California chiropractor licenses per population by county

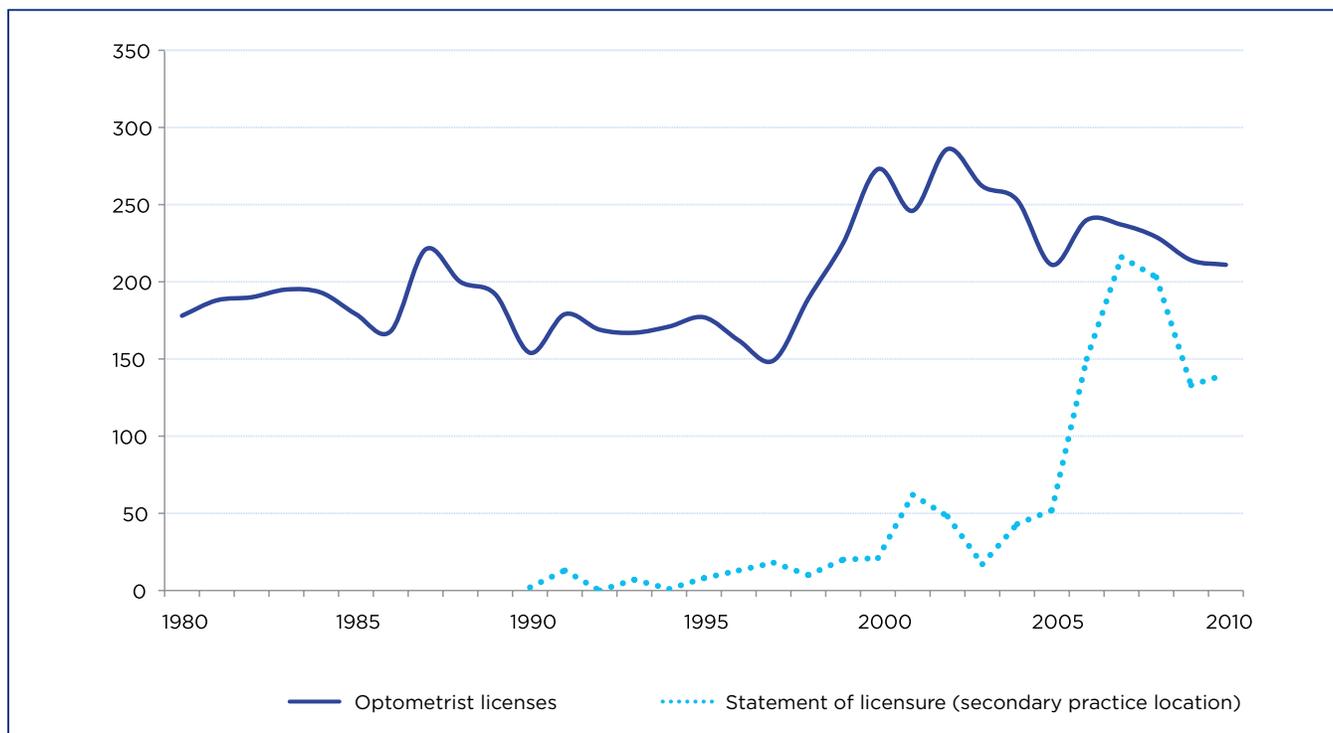


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Optometrists

The number of annual licenses issued to practice optometry in California fluctuated between 150 and 200 between 1980 and 1995, but nearly doubled between 1996 and 2002. It has since declined, and the data indicate that licenses issued per year now fluctuate between 200 and 250. However, the number of new licenses issued each year to allow a secondary practice location has increased during this same period.

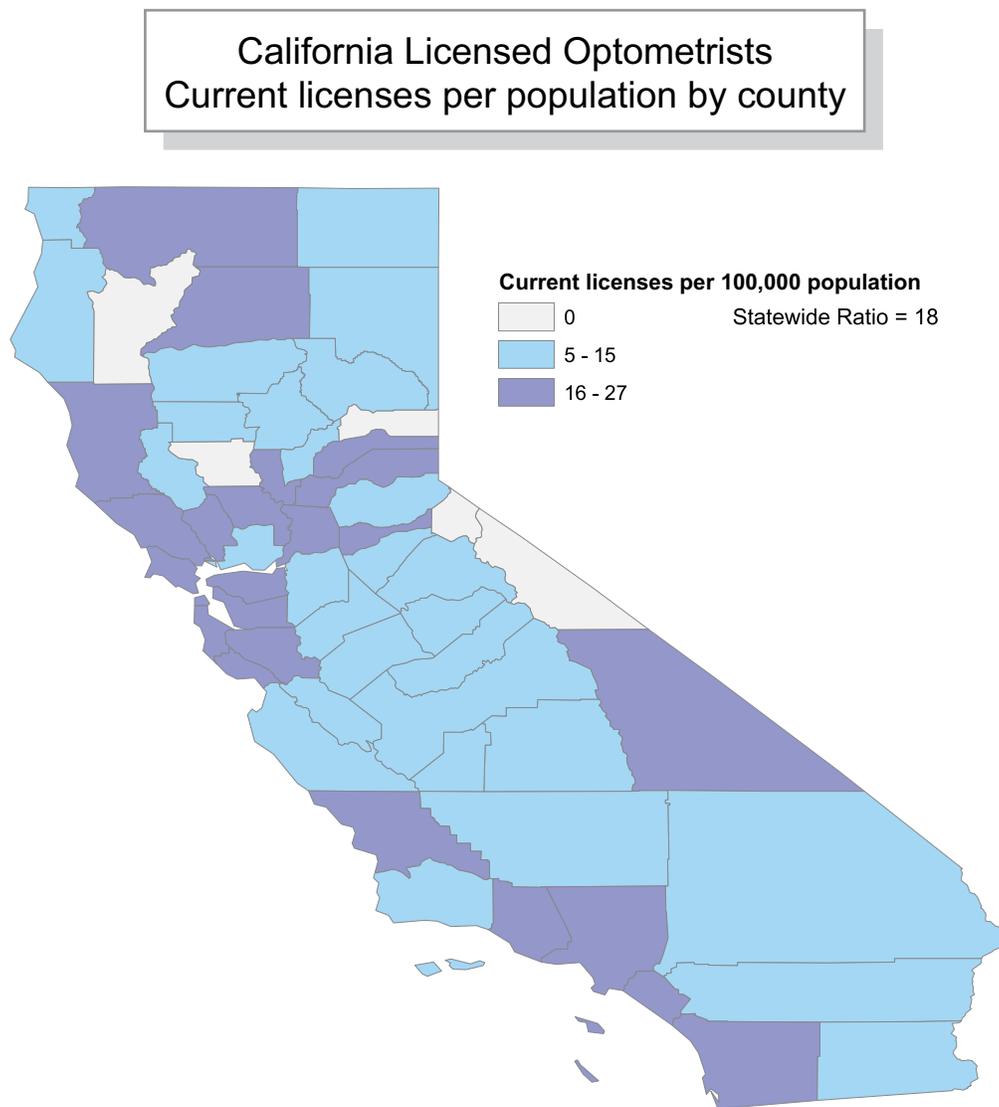
Figure 41. California licensed optometrists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 5,856 individuals with a California address in possession of a current and valid license to practice optometry in the state. Licensed optometrists in California are generally concentrated in coastal counties, the Bay Area, and counties in the Sacramento region. Several counties have no licensed optometrists with an address of record in those counties, and a number of other counties have ratios indicating there is approximately one optometrist for every 10,000 people. These data raise questions about whether access to optometric services is an issue in California.

Map 39. Current California optometrist licenses per population by county

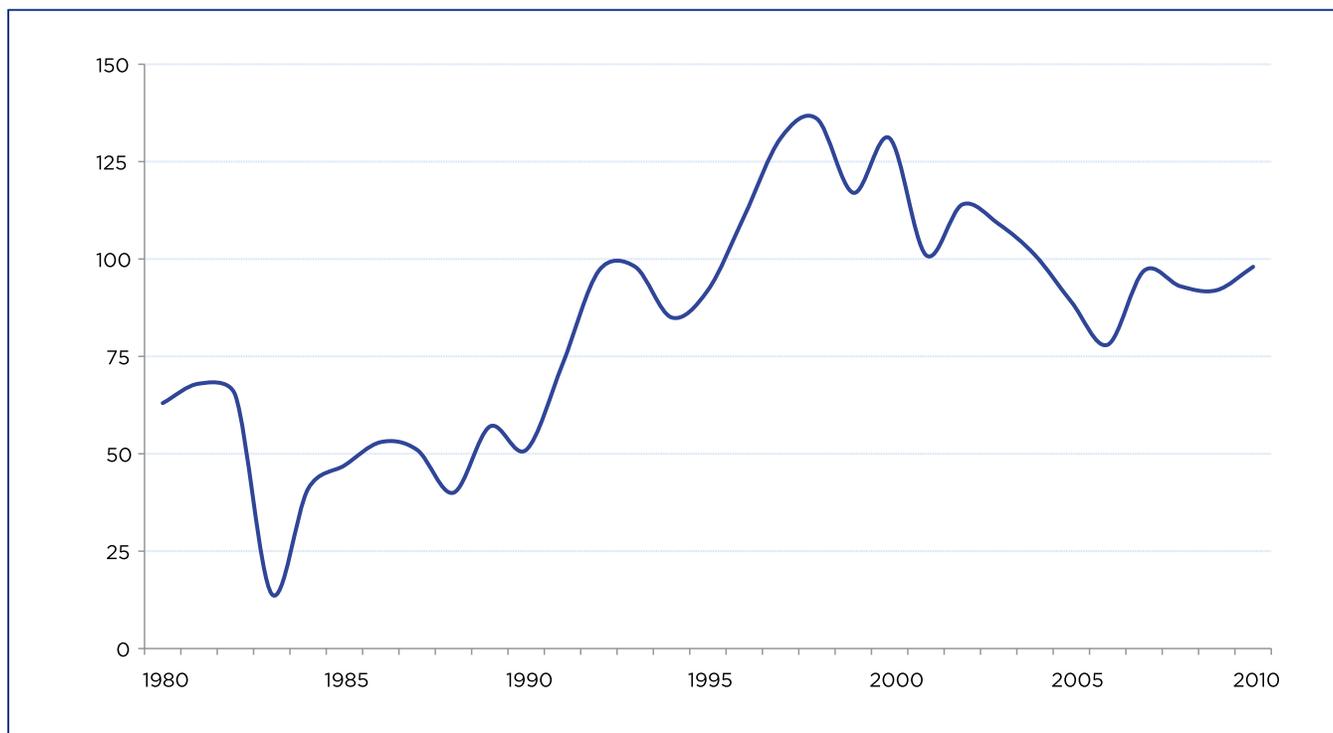


Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Podiatrists

The number of new licenses issued annually to practice podiatry in California increased between 1985 and 2000, but has since declined. In recent years the data suggest that the downward trend may be reversing itself; although it may simply be a new equilibrium point, fluctuating somewhere between 75 and 100 new licenses per year.

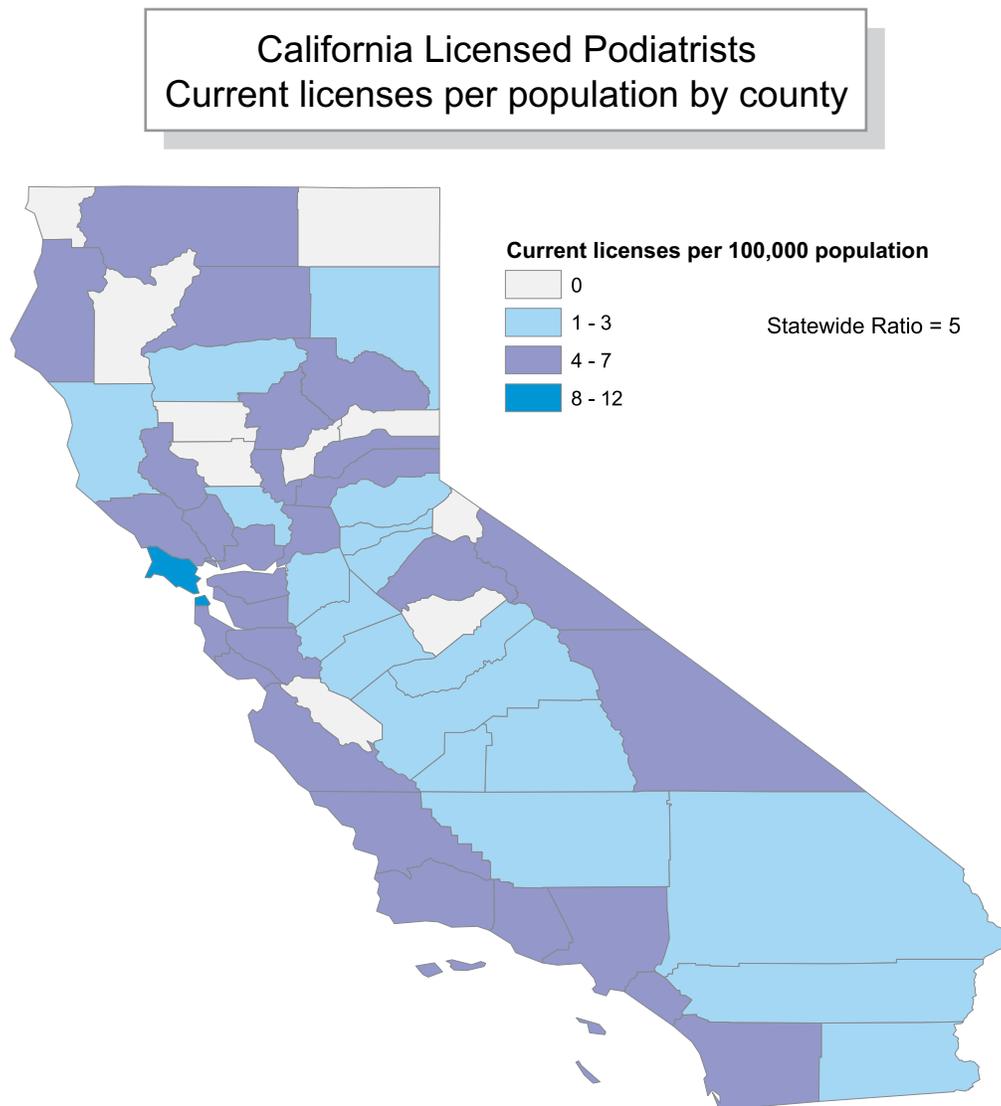
Figure 42. California licensed podiatrists - new licenses issued per year: 1980 - 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 1,834 individuals with a California address in possession of a current and valid license to practice podiatry in the state. There is not a great deal of variation in county-level ratios across the state. The range of 0 – 12 licenses per 100,000 population means that every county has somewhere between 0 and .6 podiatrists for every 5,000 people, raising the question of whether access to podiatric services is an issue in California.

Map 40. Current California podiatrist licenses per population by county

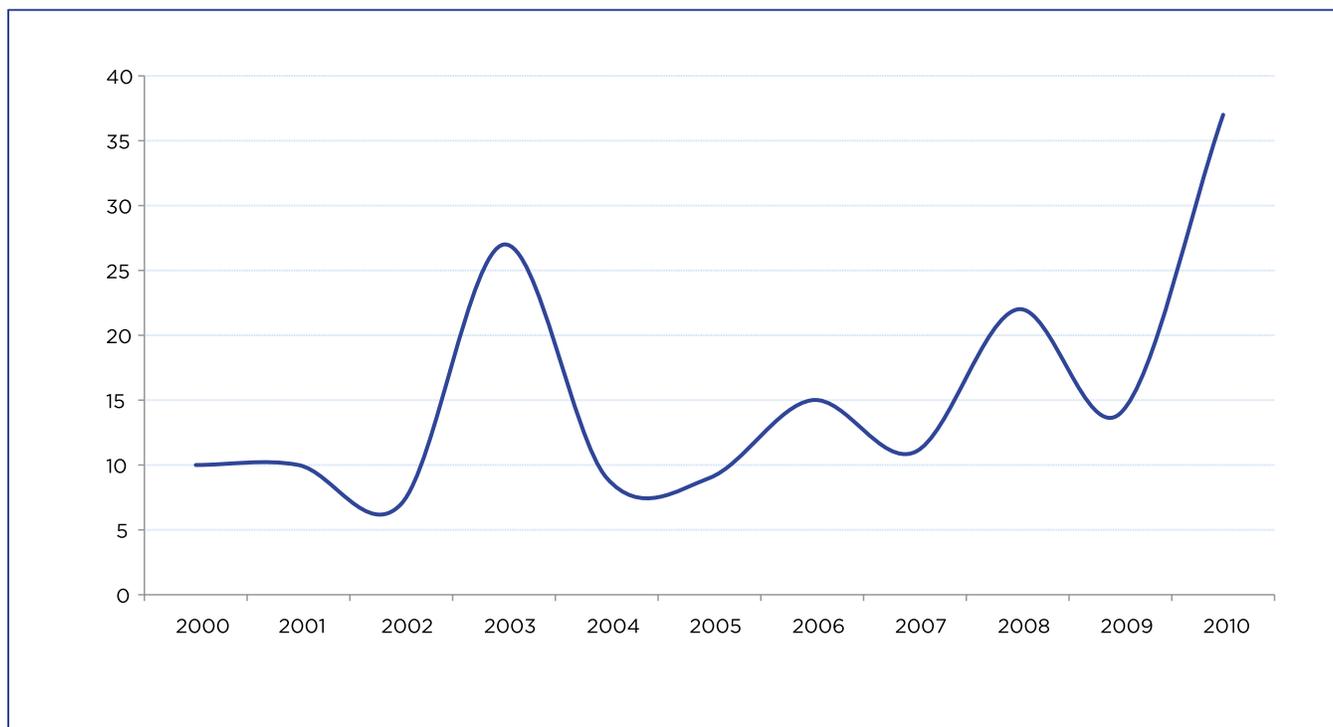


Includes active licenses reported as “clear” or “valid” (primary status code = 1000)
 County distribution is based on individual’s address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

California Licensed Professional Midwives

Only a small number of new licenses to practice as a professional midwife are issued by the California Medical Board each year. The spike in issuances occurring in 1997 is the result of the first wave of applicants being issued a license to practice. In recent years, a board-approved training program was established in California, which is likely the cause of the upward trend since 2007.

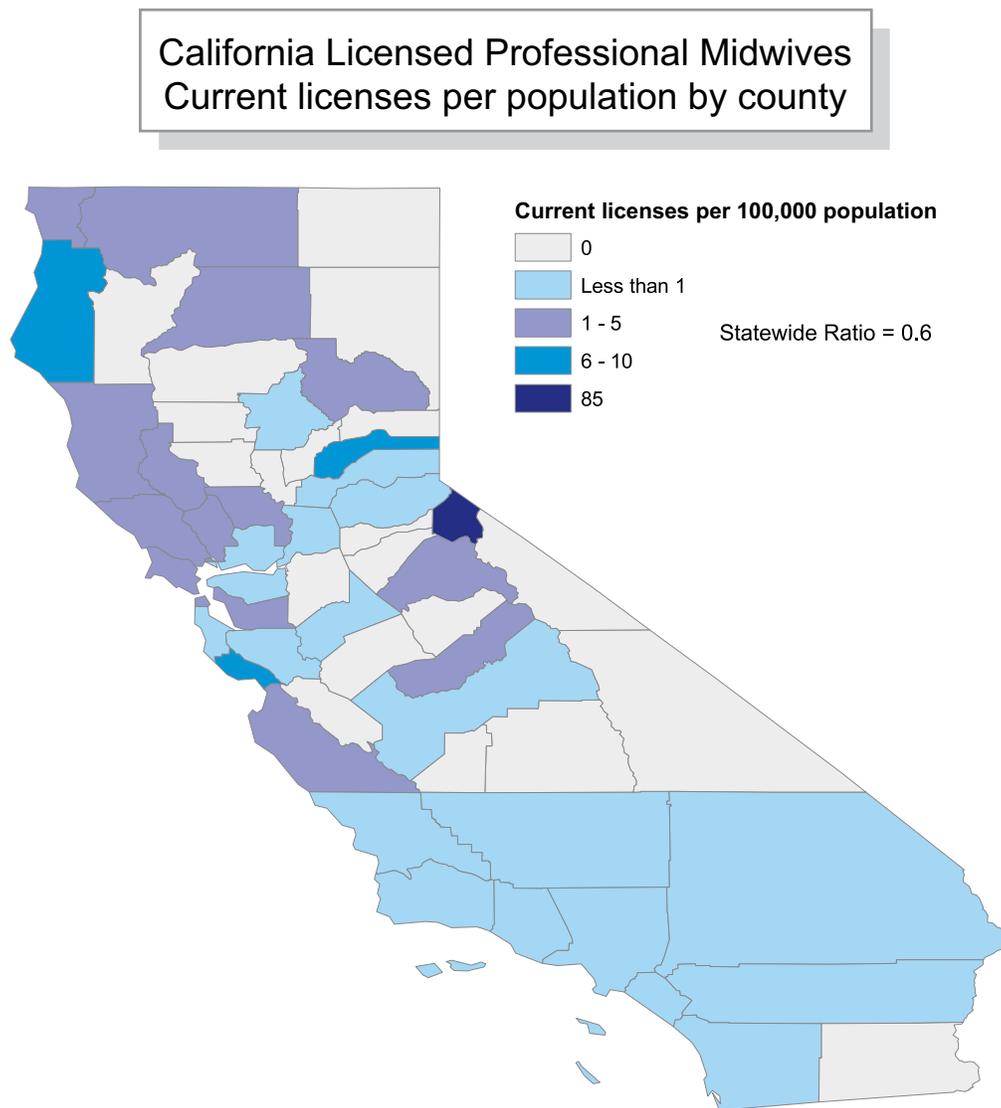
Figure 43. California licensed professional midwives – new licenses issued per year: 2000 – 2010



Source: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011

As of February 2011, there were 220 individuals with a California address in possession of a current and valid license to practice as a professional midwife in the state. The licensed professional midwife workforce is very small and the data indicate that midwives are generally concentrated in counties along the coast, particularly in Humboldt and Santa Cruz counties.³⁰

Map 41. Current California professional midwife licenses per population by county



Includes active licenses reported as "clear" or "valid" (primary status code = 1000)
 County distribution is based on individual's address of record
 Sources: CA Dept. of Consumer Affairs, Professional License Masterfile, February 2011;
 2010 Census Summary File 1

³⁰ Given the small population in Alpine County, it only takes one current license to generate a license per 100,000 population of 85.

IV. HEALTH PROFESSIONS WORKFORCE DATA

The ACA is expected to both increase demand for health care services as well as influence care delivery in terms of the type of care provided, how and where it is provided, and who provides it. All of these factors will impact the supply and demand for health care providers. High quality data is needed to be able to translate these general expectations into specific steps to be taken in preparation. The nature of healthcare workforce data collection in California is generally fragmented and incomplete for most health care occupations, resulting in partial descriptions of the workforce and generally frustrating workforce planning and analysis. One of the basic questions in health care workforce research, and one that is critical as health reform is expected to increase demand, is, “Does California have enough health care providers?”

The purpose of this section of the report is to summarize the sources of information available to answer this question, taking note of strengths and weaknesses, and highlighting current efforts to improve data collection and dissemination.

Labor Market Information Division (LMID) data

Occupational Employment Statistics (OES) Survey

The Occupational Employment Statistics (OES) Survey is conducted jointly by the Bureau of Labor Statistics and the California Employment Development Department. It contains estimates of employment and wage levels by occupation. For some health care occupations it is the only source of information on employment and wages.

However, it has several important limitations. Many health care occupations cannot be uniquely identified; they are grouped together with other occupations considered similar in terms of skill set, educational requirements and nature of work (not

always accurately). For example, the OES data describing radiologic technologists also include limited x-ray technicians. The data describing paramedics and emergency medical technicians (EMTs) do not distinguish between the two; they are grouped together. Cardiovascular technologists that perform echocardiography, or cardiac sonography, or invasive cardiovascular procedures are grouped together with electrocardiography (EKG) technicians. Clinical laboratory specialists such as cytotechnologists, clinical chemists, and clinical genetic molecular biologists are grouped with generalist clinical laboratory scientists and medical laboratory technicians. In addition, a whole range of discrete occupations with specific skill sets are grouped together and simply coded as “other”.

The OES data are also limited in their ability to describe employment conditions for sub-state geographic areas. County-level data are generally unavailable, and for rural parts of the state where counties are grouped into economic regions, estimates for many occupations are missing. The coverage of the OES data is also limited to business establishments. The survey does include the self-employed.

The OES data are not meant to be used to measure changes over time. The survey methods used to generate estimates make it problematic to compare data from one year to the next. Finally, the statistical validity of the estimates is unclear; there is no measure of confidence associated with the published estimates.³¹

Staffing Patterns by Industry & Occupation

Like the OES survey, these data are a product of the Bureau of Labor Statistics and the California Employment Development Department. For many health care occupations, this is the principal source of information describing workforce distribution

³¹ The mean relative standard error published with the OES data refers to the wage estimate, not the employment estimate.

across different employment settings. Employment setting refers to the types of facilities in which different health care occupations are employed. Acute care hospitals, long-term care facilities, private practices, community clinics, and academic institutions, are some generic examples.

It shares many of the same limitations as the OES survey data, such as the inability to uniquely identify occupations. The data are also limited to state-level estimates; they are not available at the county or even regional level. The categories of employment setting are usually more generic than is needed, offering little insight about how the workforce for a given health care occupation is distributed across different employment settings. The data lack timeliness, the estimates available typically lag the current date by several years (the most recent as of this report are from 2008). The statistical validity of the estimates is also unclear; there is no measure of confidence associated with the estimates.

Projections of Employment by Occupation

These data are a product of the California Employment Development Department. Both short-term (2-year outlook) and long-term (10-year outlook) occupational employment projections are published. The short-term projections are updated annually; the long-term projections are revised every two years. With the exception of forecasts of the state's registered nursing workforce, or other one-time analyses conducted independently, these data are the only available source of information on the expected employment outlook for specific health care occupations.

It shares many of the same limitations as the OES survey data and the Staffing Patterns data, such as the inability to uniquely identify occupations and limited ability to describe the employment outlook for sub-state geographic areas. The accuracy of the projections is undetermined; analyses of how closely the projected estimates of future

employment match the actual estimates once the future has become the present have not been widely undertaken. However, they may be useful in predicting relative growth among occupations; that is, which occupations will grow quickly and which will grow more slowly.

Professional Association Data

Nationally and state-wide, more than 200 professional associations represent health care occupations.³²

Many of these associations maintain a membership database containing information that could potentially be used to describe key characteristics of the active workforce. The California Dental Association keeps a file describing licensed dentists in the state, which includes information about whether or not the dentist has an active practice, some demographic information, and practice specialty. The American Physical Therapy Association routinely surveys its membership, collecting data on specialty practice areas, demographics, patient populations served, and other key workforce characteristics. Generally, membership data are not publicly available. Gaining access to them requires a formal agreement.

Licensing Board Data

Department of Consumer Affairs (DCA), Professional License Masterfile

As noted previously in Section III, Analysis of California Health Professions Licensing Data, the DCA Masterfile includes licensing data for nearly all of the licensed, certified, or registered health care occupations in the state. State licensing boards report these data to the DCA on a monthly basis, and every month a new, updated Masterfile is

³² The OSHPD California Healthcare Workforce Clearinghouse has compiled a list, including links to association websites. It is available here: http://www.oshpd.ca.gov/HWDD/2011/ClearingHouse/pdfs/2011_0325_HealthProfessionsAssociations.pdf.

created. The health care occupations not included in the file are those regulated by the California Emergency Services Authority (EMSA), and the California Department of Public Health (CDPH) through its Licensing and Certification Division (L&C), Radiologic Health Branch (RHB), and Laboratory Field Services (LFS) who do not report data to the Department of Consumer Affairs.

The Masterfile includes only a few basic variables for each licensed occupation: the type of license issued (e.g. physical therapist versus physical therapy assistant); license number; whether the license was issued to a business or a person; name of individual or business; an address including zip code and county; date the license was issued; date the license expires; and a code indicating the status of the license. They are an alternative to the employment estimates published by the Occupational Employment Statistics (OES) survey that can be used to estimate the size of the workforce, particularly for those occupations where other survey data (such as the Medical Board survey, or the BRN Survey of RNs) are not available.

The critical limitations of using data from the DCA Masterfile are that they do not tell us whether or not the holder of the license is actually working in the profession in which she is licensed to practice; and they only provide an address of record, which may or may not correlate with practice or employment location. In any given field, there will be individuals who hold a current license to practice who are not employed in their field (for example, a physician who conducts academic research but does not treat patients, or a dentist who is retired but prefers to keep her license current). Additionally, there are individuals holding current licenses to practice in California whose address of record is outside the state and who may or may not be working in California; and individuals with California addresses of record that do not correspond with where in California they actually practice or are employed.

These issues were illustrated in the previous section, in the context of mapping the geographic distribution of licensed health care professionals. We made the assumptions that maintaining a current license is a reasonably good proxy for being active in the workforce, and that a licensee's address of record corresponds with practice or employment location (when the address is California-based).

We demonstrated that using this approach with licensed physicians leads to a substantial overestimation of the number of physicians active in patient care. With other professions, however, the limitations of the DCA Masterfile that lead to biased estimates which overstate the size of the active workforce may be less significant. We compared estimates of practicing dentists per population generated by using the Masterfile licensing data, and published estimates derived from a California Dental Association membership database that contained information on practice location and active status. The DCA estimates were generally larger by comparison, but the difference was not so large as to distort the picture of how dentists in California are distributed across the state.

Ideally, the Masterfile would contain information that would identify where the license holder is employed or maintains a practice, and give some indication of the level of employment activity (e.g. part-time versus full-time). As noted, some licensing entities may be collecting these data elements but they are not reported to the Department of Consumer Affairs and included in the Masterfile. At this time, obtaining these data (if they exist) requires direct negotiation with the licensing entity, and based on the experience of preparing this report, may not yield results. In the absence of an alternative, the Masterfile data are a useful tool for workforce analysis, when used with caution.

For further discussion of the strengths and weaknesses of these data, see Section III, Analysis

of California Health Professions Licensing Data, Description of Data.

California Medical Board Survey

The Medical Board survey is the result of legislation enacted in 2001, requiring physicians to complete a survey upon renewing their license every two years.

The survey collects data describing the following physician workforce characteristics: hours per week by activities in medicine (patient care, research, teaching, administration, or other activities); practice location by zip code; current training status (resident, fellow, not-in-training); medical practice specialty and board certification (approximately 50 different specialty areas); years of post-graduate training; ethnic background (28 different options); and foreign languages spoken (31 different language options).

The survey has become a standard for collecting information that describes key characteristics of the workforce. Among other reasons, the Medical Board survey is valuable for the fact that it disaggregates the too-broad category of Asian, used by so many other survey instruments. The Medical Board survey lists eleven different Asian ethnicities that can be selected by physicians completing the survey. It also disaggregates Native Hawaiians, Polynesians, Micronesians, or other Pacific Islander ethnic groups; the survey lists seven different Native Hawaiian/Pacific Islander ethnicity options for physicians completing the survey.

Dental Board of California Survey

The Dental Board survey is the result of legislation enacted in 2007, requiring dentists, dental hygienists, and dental assistants to complete a survey upon renewing their license every two years. It is modeled after the Medical Board survey and collects the same critical pieces of data describing characteristics of the workforce: primary practice location by zip code (and number of hours per week at location); secondary practice location by zip code (and number of hours per week at location);

years of post-graduate training; dental practice specialty and board certification (14 different specialty areas); ethnic background (28 different options); foreign languages spoken (31 different language options).

Data collection began on January 1, 2009. However, there have been no published analyses of these data to date; their quality and reliability have not been evaluated.

Osteopathic Medical Board Survey

Legislation passed in 2009 established that the Osteopathic Medical Board of California will begin collecting detailed information about osteopathic physicians (DO) at the point of license renewal. The language of the legislation is based on those bills that established the physician and dental workforce surveys; presumably it will collect the same types of data elements, at the same level of detail.

The legislation states that data collection was to begin on July 1, 2010. To date there have been no published analyses of these data.

Board of Behavioral Sciences Demographic Survey (2006)

The California Board of Behavioral Sciences Demographic Survey includes information describing a small number of characteristics the licensed and registered professions it regulates: licensed clinical social workers, registered associate social workers,³³ marriage and family therapists, marriage and family therapist interns,³⁴ and licensed educational psychologists. The data elements collected by the survey included race/ethnicity, gender, foreign language capabilities, number of years in practice, practice setting, and specialty certifications. Technical notes on the survey

³³ Registered associate social workers are completing their supervised training hours in order to be eligible for the LCSW licensing exam.

³⁴ Marriage and family therapist interns are completing their supervised training hours in order to be eligible for the MFT licensing exam.

methodology and validity of the estimates are not published with the data findings, which makes it difficult to know how well the data represent the workforce they describe, and because the survey is not ongoing, its ability to accurately describe the workforce for those occupations surveyed will lessen over time.

California Board of Registered Nursing, Survey of Registered Nurses

The BRN Survey of RNs was first conducted in 1990, and since 2004 has been conducted every two years. The purpose of the survey is to collect and evaluate nursing workforce data in order to understand key characteristics of the workforce, including demographics, levels of education, patterns of employment, perceptions of the work environment for RNs, reasons for discontinuing work in nursing, and plans for future employment.

The survey is a rich source of information about California's nursing workforce, containing hundreds of different variables that can be used to analyze different relationships. The survey is designed to provide regional analysis, but because it is a sample survey, estimates for geographic areas smaller than multi-county regions are unreliable.

Other Workforce Surveys

California Survey of Dental Hygienists, 2005-2006: A Workforce Profile

The California Survey of Dental Hygienists, 2005-2006: A Workforce Profile was conducted by Beth Mertz at the UCSF Center for the Health Professions. It is a rich source of detailed information describing characteristics of the dental hygiene workforce in California, including its demographic profile, levels of educational attainment, size of the active workforce, practice characteristics and the patient population served. However, the survey is not ongoing; the ability of these data to reliably describe characteristics of the RDH workforce will lessen over time.

2009 Survey of Alternative Dental Hygiene Practice

This survey of registered dental hygienists in alternative practice was conducted by Beth Mertz at the UCSF Center for the Health Professions. It contains information describing the practice characteristics, demographic profile, patient population served, the level of collaboration with other providers, and perceptions of job satisfaction and the professional environment for RDHAPs. This survey is not ongoing, and so the ability of these data to reliably describe characteristics of the RDHAP workforce will lessen over time.

California Respiratory Care Practitioner Workforce Study (2006/2007)

The California Respiratory Care Practitioner Workforce Study is actually three surveys, conducted by the Institute for Social Research at CSU Sacramento. The first survey describes respiratory care practitioners, a second survey describes employers of the respiratory care workforce, while the third survey is focused on the educational providers of respiratory care training.

It is a very detailed survey, containing information about hundreds of variables, including size of the active workforce, educational levels, specialty credentials held, practice specialties, earnings, employment setting, position titles, and demographic characteristics, among many others. Again, because the survey is not ongoing, its ability to accurately describe California respiratory care workforce will lessen over time.

Health Professions Education Data

Integrated Postsecondary Education Data System (IPEDS)

The Integrated Postsecondary Education Data System (IPEDS) is the principal data collection system at the federal level for all postsecondary educational institutions that participate in Title IV funding. It consists of a battery of surveys that describe institutional characteristics, faculty,

and students. At the individual program level it uses the Classification of Instructional Program (CIP) coding system³⁵ to describe and classify the content of specific educational programs. In terms of its uses for analysis of the health care workforce pipeline, its strength is the completions survey data, which describe health care training programs and graduates in California's postsecondary education system. Key data elements include institutional sector,³⁶ gender, and race/ethnicity. These data are often the only source of data describing allied health programs in the rapidly expanding private for-profit less than 2-year market for health care occupations training.

The weakness of these data is that institutions do not consistently report short-term certificate programs, which is the nature of training for entry-level health care support occupations. And institutions frequently do not use the full range of detail available in the CIP classification system, reporting program completions using a generic code when a more specific code exists.

The IPEDS enrollment surveys are less useful for analysis of California's health professions education pipeline. For all but medicine and dentistry, enrollment data are only reported at the institutional level, not at the level of individual programs. The enrollment data describing programs in medicine and dentistry are reported every two years.

American Association of American Medical Colleges

This is the standard source of information about medical education. AAMC is prolific in the amount of data it generates describing medical students; it also conducts its own high quality analysis and regularly publishes reports on current topics in medical education. Key data elements available through AAMC include unduplicated

³⁵ <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>

³⁶ The different institutional sectors are 2-year and 4-year institutions, both public and private; 2-year and 4-year institutions, both private-for-profit and private not-for-profit; and both private for-profit and private not-for-profit schools, as well as public schools, that offer training programs taking less than a year to complete.

counts of applications for admission to medical school, by school, by gender, and by race/ethnicity; accepted applicants; matriculants (first-year enrollments); MCAT scores and GPA for applicants and matriculants, by state of residence, gender, and race/ethnicity; data describing applications for post-graduate residency positions; and selected data describing medical school faculty. Public access to data is limited to what is available on the AAMC website, but access to more detailed and complete data contained in the AAMC data warehouse may be available with a formal agreement.

American Association of Colleges of Osteopathic Medicine

This is the standard source of information about osteopathic medical education. AACOM is less prolific than AAMC, but maintains a database containing many of the same key variables describing osteopathic medical students and programs: applicants, first-year enrollments, and graduates by gender, race/ethnicity and by school; MCAT scores and GPA for applicants and matriculants; and selected data describing faculty at osteopathic medical schools. AACOM regularly publishes tables and reports that are available to the public, but more detailed and complete data typically requires a formal agreement.

American Association of Colleges of Pharmacy

This the standard source of information about pharmacy students and education programs. The variety of student and program data collected by AACOP is similar to what has already been described in terms of data collected by both AAMC and by AACOM. Public access to summary reports of student, faculty and institutional data is provided on the AACP website.³⁷

American Dental Education Association

ADEA is the standard source of information describing dental students and programs. Key variables include: gender, age, race/ethnicity of applicants, first-year enrollments and graduates;

³⁷ <http://www.aacp.org/resources/research/institutionalresearch/Pages/default.aspx>

geographic distribution of applicants and first-year enrollments; data describing the debt burden of students by institutional sector of school, and by race/ethnicity of student; and selected data describing postdoctoral students, and faculty in dental education programs. ADEA also conducts its own surveys of students, faculty, and dental school administrators, and publishes its own analysis and reports. Data are available on the ADEA website, but typically the tables describe all dental programs in the U.S.; data that could be used for analysis of California's dental schools may require a formal agreement with ADEA. In addition, ADEA will periodically publish student and program data in the *Journal of Dental Education*.

Board of Registered Nursing Annual School Survey

The Annual School Survey conducted by the Board of Registered Nursing is the standard source of information on registered nursing education in California. The survey has been conducted every year for the past ten years. It includes information on both pre-licensure and post-licensure RN training programs. There are hundreds of different data elements that can be used to describe aspects of nursing students and training programs, including institutional and faculty characteristics. Annual reports are available on the BRN website.³⁸

California's Higher Education Systems

All of California's higher education systems, UC, CSU, and CCC, collect a vast array of data describing the students, faculty, and programs they offer in the many fields of health professions education. Much of this data remains internal to those systems, but it could be shared. Collaborative systems designed to help track the pathways of students through these systems and into the health care workforce are being discussed. In the near term, some of the basic data elements are available here:

California State University Division of Analytic Studies

<http://www.calstate.edu/as/>

California Community Colleges Chancellor's Office Data Mart

<http://www.cccco.edu/SystemOffice/Divisions/TechResearchInfo/MIS/DataMartandReports/tabid/282/Default.aspx>

University of California Office of the President, Statistical Summary of and Data on UC Students, Faculty, and Staff

<http://www.ucop.edu/ucophome/uwnews/stat/>

OSHPD Healthcare Workforce Clearinghouse

When the California legislature passed Senate Bill 139 in 2007, it authorized the Office of Statewide Health Planning and Development (OSHPD) to establish a new centralized repository of health workforce information, the Healthcare Workforce Clearinghouse. A critical function of the Clearinghouse will be to serve as a source of workforce data specific to health care occupations. The core capability of the Clearinghouse promises to be its ability to consolidate data from the various entities responsible for licensing, certifying and registering health professionals in the state, as well as coordinate a new process for capturing the variety of student data collected by the many institutions that offer health professions education programs in California.

In this role, it is expected that the Clearinghouse will be in position to advocate for the standardization of data elements collected, and to leverage resources that can be used to support these institutions in their efforts to improve the process of data capture, storage, and retrieval.

Over the past several years, the Clearinghouse has met with nearly all of the various licensing and certifying entities, and the state's three big

38 <http://www.rn.ca.gov/forms/pubs.shtml>.

higher education systems (California Community Colleges, Universities of California, and California State Universities), to document the variety of data already being collected and to establish the relationships that will be necessary to ensure the success of this effort. The Clearinghouse has identified a wide array of data elements describing students, faculty and health professions education programs being collected by the higher education systems; data elements currently being collected by the different licensing entities, either through the initial application for licensure process, the license renewal process, or with a workforce survey (such as the BRN Survey of RNs) have also been identified.

Of the many data elements identified by the Clearinghouse as being currently collected by one or another licensing entity, very few of them are collected by all entities. In preparing this report, however, we looked at every initial application form, for every licensed or certified or registered health care occupation, and found that all of them ask for a birth date, gender, and for the name of the educational training program that was completed. These data should already be available in the licensing data files that each entity shares with the Department of Consumer Affairs, which is then published as the DCA Masterfile. These data elements should also be made available by those agencies within the Department of Public Health that license and certify health care occupations but do not share information with the Department of Consumer Affairs. This is the kind of coordinating role the Clearinghouse is expected to play.

In preparing this report, we unsuccessfully attempted to obtain data on licensed or certified personnel from the California Emergency Services Authority (EMSA), and the California Department of Public Health (Licensing & Certification Division, Radiologic Health Branch, and Laboratory Field Services) to be included in the analysis presented in this report. The attempt to get the data, however, was informative. In general, the agencies are not oriented toward making licensing

data available. In the case of EMSA, it was never clear what licensing and certification data they keep on record. Our contact with the agency resulted in a promise to look into our request, but was ultimately left unresolved. The CDPH Licensing & Certification division indicated that it did not keep track of the number of initial certifications issued, and once certified, the division does not track re-certification. It also does not collect any demographic information, and we were told that providing an address of record would violate confidentiality policies.

The CDPH Laboratory Field Services does make a personnel list available for purchase, but obtaining the file is not a straight-forward process. The following categories of LFS personnel are available to be included in the purchased list: director level, clinical laboratory scientist, phlebotomist, public health, and trainee, but the instruction form indicates that list can only include one personnel category at a time.

Laboratory Field Services regulates nine different types of clinical laboratory scientist, but the instruction form used to purchase the personnel list only includes a single category for clinical laboratory scientist. If one did not know there were internal codes used to identify one type of laboratory scientist from another, it would be impossible to make this distinction (nor would one know that these codes would not be included in the purchased list). We did not purchase any personnel records for this report as we were not able to confirm with someone at LFS that we would be able to get the information we were requesting. We did learn, however, that no records are kept for the newly established license category of medical laboratory technician. We were told that this is because there are not very many of them.

The CDPH Radiologic Health Branch indicated that in order to obtain information about licensees we would have to file a public records act request, and that there would be no guarantee that the

requested information would ultimately be available. The main challenge appeared to be that the records containing information about licensed personnel were kept in different systems that did not relate to one another. The time frame for completion of our request and its cost to us was unknown, due to the fact that it would require unusual effort from information technology staff to retrieve it (if it was ultimately possible to do so).

By comparison, the Clearinghouse effort to consolidate and standardize the collection of education program and student data is likely to be less challenging. Educational institutions routinely collect a wide range of information on both faculty and students and are accustomed to reporting these data. Their information systems are typically more sophisticated; data are captured electronically, and they are more likely to have dedicated technical staff that can help build up additional capacity. However, there remains the issue of different institutions capturing different types of information, and classifying it in different ways. But this is why the Clearinghouse promises to be such a valuable asset to health workforce development. It is expected to have the capabilities, the resources, as well as a statutory mandate to identify those data elements critical to quality workforce analysis and planning, and to coordinate their efficient capture, storage and ability to be reported.

Other sources of workforce data

American Community Survey (ACS)

The ACS was formerly the long-form Decennial Census questionnaire. It is a rich source of information regarding a wide array of socio-economic characteristics of the general population. Its strength is this richness of detail, particularly the descriptive categories of race and ethnicity. Its weakness is the fact that it is not designed specifically as a source of information about California's health care workforce.

Because it is not intended to be a survey of health care occupations, it is frequently the case that there are not enough sample observations to generate meaningful estimates, even at the state-level. To estimate key demographic characteristics of a particular health care occupation, in detail, might require combining sample observations with other similar occupations, or combining more than one year of data. Nonetheless, it has value as a source of demographic information for the many occupations where no other source of data is available.

V. SUMMARIES OF THE LITERATURE BY PROFESSION

Section V offers summaries of the literature included in the bibliographies that are in Section VI.

California's Physician Workforce

Overview of published literature

In 2008, there were approximately 66,000 physicians and surgeons (also known as MDs for the Doctor of Medicine degree awarded) actively practicing in California. The number of MDs grew faster than the population from 1998 to 2008, and MDs per 100,000 population grew from 245 to 262 across this period. This does not include Doctors of Osteopathy (DOs) who also practice in California. Quality data is scarce on DOs, although the American Medical Association estimates that there were approximately 3,000 DOs practicing in California in 2008.³⁹

1. Supply, Geographic Distribution and Demographics: Key Issues

Primary Care Physicians are in Short Supply in Many Areas of the State

- According to California Medical Board Data, California's overall supply of active primary care physicians falls within but on the low end of the range of physicians per capita recommended by the Council on Graduate Medical Education (COGME).
- Geographic distribution is uneven. Only three regions—the Greater Bay Area, Orange County, and the Sacramento Area—fall within COGME's recommended supply range. Orange County and the Sacramento Area barely meet the range minimum, which is 60 primary care physicians (PCPs) per 100,000 population.

³⁹ Grumbach, K., Chattopadhyay, A. and Bindman, A.B. (2009) Fewer and More Specialized: A New Assessment of Physician Supply in California. Oakland, CA: California HealthCare Foundation. 9.

The remainder of the state's regions falls below the minimum of the range.

- Primary care physician shortages are especially pronounced in the Inland Empire and San Joaquin Valley. These regions also have a significant shortage of specialists (based on the COGME standard).⁴⁰

Physicians Less Likely to Accept Publicly-Insured Patients

- California's physicians are less likely to have publicly insured patients in their practice than privately-insured patients in 2008. While 93 percent of primary care physicians had privately insured patients in their practices, only 74 percent had Medicare patients and 69 percent had Medi-Cal patients.
- Even more problematic, physicians are much less willing to accept new patients with public coverage. Just over half of California's primary care physicians were accepting new Medi-Cal patients in 2008.⁴¹

Aging Physicians a Looming Problem for Rural Counties

- Over half of the physicians practicing in seven rural counties (Amador, Inyo, Lassen, Mendocino, Modoc, Sierra, and Trinity) are older than 55 (compared to one-third statewide). These counties face potentially severe physician shortages as their older physicians retire.⁴²
- California's active physician workforce was slightly older than that of the US in 2008, with 29 percent of the state's physicians aged 60 or older, compared to 25 percent of all US MDs.

Women Underrepresented in MD Workforce but Not in Medical Schools

- While only 30 percent of active physicians in 2008 were women, half of the medical school graduates that year were women.

⁴⁰ Paxton, C. (2010). California Physician Facts and Figures. Oakland: California Health Care Foundation. 7.

⁴¹ Paxton 8-9.

⁴² Grumbach et al (2009) 11.

2. Diversity and Cultural Competence: Key Issues

Latinos Underrepresented in California's MD Workforce

- The racial/ethnic make-up of the MD workforce does not match the population make-up, with Whites and Asians overrepresented and Latinos and African Americans underrepresented. In 2008, only 5 percent of California's MDs were Latino, compared to 37 percent of the population, and 3 percent were African American, compared to 6 percent of the state's population.
- The Latino MD underrepresentation is most pronounced in the three regions with the highest population of Latinos. Latinos represent only 5-6 percent of MDs in Los Angeles County, San Joaquin Valley, and the Inland Empire, three regions where Latinos make up nearly half of the population.⁴³
- In addition, California has very few physicians of Samoan, Cambodian, and Hmong/Laotian ethnicity.
- The lack of diversity among California's physicians may be limiting physician supply in underserved communities, as minority physicians are much more likely than Whites to practice in those communities.⁴⁴

Access to Spanish-Speaking and Chinese-Speaking MDs is Likely Limited

- Only 18 percent of California's MDs speak Spanish. Even in regions with high concentrations of Spanish speakers, less than one quarter of MDs speak Spanish (e.g. 22 percent of MDs in Los Angeles speak Spanish). This likely limits the ability of Spanish-speaking patients to find providers they can understand.
- Statewide, only 8 percent of California's MDs speak Chinese.⁴⁵

⁴³ Paxton (2010) 14.

⁴⁴ Grumbach, K., Odom, K., Moreno, G., Chen, E., Vercammen-Grandjean, C. and Mertz, E. (2008) Physician Diversity in California: New Findings from the California Board Survey. San Francisco: UCSF Center for California Health Workforce Studies. 16.

⁴⁵ Paxton (2010) 15.

California Relies Heavily on Foreign Medical Graduates for Primary Care Physician Supply

- In 2009, 31 percent of primary care physicians practicing in California were foreign medical graduates, compared to 15 percent in the surgical specialties.

3. Education and Training: Key Issues

National Physician and Medical School Groups Calling for Increased Enrollment

- Both the AAMC and the AMA favor an increase in medical school enrollments to head off potential shortages of physicians in the future.
- Others insist that increasing enrollment may not be the best use of scarce resources.
- At a minimum, it seems important that any plans for enrollment growth include provisions to increase the diversity of the physician workforce and to encourage medical students to choose primary care professions and practice settings in underserved areas.

California Medical School Enrollment Stagnant

- The number of graduates from California's medical schools has remained virtually flat from 1995 and 2009, at roughly 1000 per year. Over this time period, University of California medical schools steadily produced 60 to 65 percent of MDs trained in the state.⁴⁶ California's two osteopathic schools graduate approximately 300 new doctors of osteopathy (DOs) per year.
- California retains a high percentage of its medical students and residents: 62 percent of physicians practicing in California attended medical school in-state and 69 percent of MDs completed their residency in state.

⁴⁶ Bates, T. and Chapman, S. (2007). Tracking the Supply of Health Professions Education Programs in California. San Francisco: UCSF Center for the Health Professions. 9.

Increasing Supply of Primary Care-Trained Physicians a Difficult Task

- Primary care physicians earn less money compared to specialists, and primary care physicians in California earn less compared to their counterparts nationwide.
 - The sizable average debt of medical school graduates may dissuade them from pursuing less lucrative medical specialties. Over 80 percent of medical school graduates have debt, and the median debt was \$150,000 for public schools and \$177,500 for private schools.⁴⁷
- Current Medicare GME reimbursement policies are skewed toward hospital-based training, while primary care specialties require significant outpatient residency-based training.
- During the last decade, 20 family medicine residency programs have been closed, and 645 fewer residents are being trained in family medicine today than ten years ago. Between 2002 and 2007, hospitals opened 7754 more new residency positions, 88.3 percent of which were in specialty care despite the Medicare GME cap.
- One possible solution is to increase the use of community clinics as training sites, as studies show that students and residents who train in community clinics are more likely to choose primary care residencies and to practice in underserved areas.⁴⁸

4. Scope of Practice: Key Issues

Unclear Potential Impact of Using NPs and PAs in Primary and Specialty Care Roles

- The potential for a significant change in practice exists with the continued expansion of physician assistants and nurse practitioners serving as primary care providers and

specialized support providers. Insufficient study has been devoted to this issue to understand what impact this might have on the required supply of physicians in the future.

5. Limitations of Available Data and Research

- Obtaining accurate data on physician supply is a challenge. In California, the Medical Board has recently developed a more accurate supply data source than the widely-used AMA data; however, there are still some problems with this data set and use of the California data set precludes interstate comparisons. In addition, there is little data available on the supply or diversity of the state's Doctors of Osteopathy (DOs).
- Recommended per capita ratios of primary care physicians and specialists are based on data that is more than a decade old. New federal attention to this issue, particularly on primary care, is likely warranted.
- NPs and PAs make up part of the primary care workforce but data sets are not comparable among the professions so trends and comparisons cannot be made. Further, there is insufficient data and study on the impact of NPs and PAs working as primary care providers on supply and demand modeling.

⁴⁷ Paxton (2010) 19.

⁴⁸ Morris, C.G., Johnson, B., Kim, S. and Chen, F. (2008). "Training Family Physicians in Community Health Centers: A Health Workforce Solution", *Family Medicine* 40(4) p. 271-276.

California's Physician Assistant Workforce

Overview of published literature

In 2009, there were slightly more than 8,000 physician assistants (PAs) practicing in the state. The vast majority of physician assistants work in ambulatory care services (85%), with the remainder in hospitals (14%) and government (1%).

1. Supply, Geographic Distribution and Demographics: Key Issues

Significant Growth in Supply in California

- From 2001 to 2009, the number of Physician Assistants working in the state grew by 62 percent. This was significantly higher than growth nationwide (36.8%). However, California still has fewer PAs per 100,000 population (21.7) than the nation (25.0).⁴⁹

Physician Assistants an Important Provider of Primary Care in Rural Settings

- There appear to be some clustering of physician assistants in more rural areas, with greater numbers per 100,000 people, relative to more urban areas. Statewide, there were 21.7 PAs per 100,000 population, but nearly 27 PAs per 100,000 population in the largely rural Northern and Sierra region of the state.⁵⁰
- In addition, rural federally qualified health clinics rely more on PAs as providers than do non-rural clinics.⁵¹

Majority of Physician Assistants Integrated into Specialty Practices (Nationally)

- The American Academy of Physician Assistants (AAPA) estimates that over 60 percent of

physician assistants practice in a specialty care setting. Most of these PAs are in surgery (including orthopedics) and emergency medicine. An estimated 10 percent of PAs practice in internal medicine (which includes the subspecialty of gastroenterology) and 4 percent in dermatology.⁵²

2. Diversity and Cultural Competence: Key Issues

PAs a Relatively Diverse Workforce in California

- Whites made up 43 percent of the PA workforce in 2009, with 21 percent Latino, 17 percent Asian, 7 percent African American, and 11 percent other.⁵³

3. Education and Training: Key Issues

Currently Small Education Infrastructure for PAs

- Physician assistants must obtain a degree from one of the country's 150+ accredited programs, nine of which are in California.
- There are few postgraduate PA training programs.⁵⁴

4. Scope of Practice: Key Issues

Physician Assistant Have Broad Scope of Practice with Physician Supervision

- In California, a physician may supervise up to four PAs at a time and delegate duties within the physician's scope of care, the PA's competencies, and state law. PAs are authorized to take patient histories, perform physical exams, order laboratory tests, establish treatment plans, prescribe medications, and provide patient education.⁵⁵

49 California HealthCare Foundation (2011). California's Physician Assistants. Oakland, CA.

50 CHCF (2011).

51 Bates, T., Chapman S. (2010). Physician Assistant and Nurse Practitioner Staffing Patterns in California's Licensed Community Clinics: 2005 – 2008. San Francisco: UCSF Center for the Health Professions. 5.

52 Dower, C. and Christian, S. (2009). Physician Assistants and Nurse Practitioners in Specialty Care: Six Practices Make It Work. Oakland: California HealthCare Foundation. 23.

53 CHCF (2011).

54 Dower and Christian 8.

55 Dower and Christian 4.

Unclear Potential Impact of Using NPs and PAs in Primary and Specialty Care Roles

- The potential for a significant change in practice exists with the continued expansion of physician assistants and nurse practitioners serving as primary care providers and specialized support providers. Insufficient study has been devoted to this issue to understand what impact this might have on the required supply of physicians in the future.

5. Limitations of Available Data and Research

- Additional study and data is needed on the demand for PAs and the impact of PA utilization and supply on physician demand.

California's Registered Nurse and Licensed Vocational Nurse Workforce

Overview of published literature

Registered Nurses (RNs) are the single largest health profession in California, with nearly 300,000 actively-licensed RNs residing in the state. RNs include Advanced Practice Nurses (Nurse Practitioners, Nurse Anesthetists, Nurse Midwives, and Clinical Nurse Specialists). Licensed Vocational Nurses are counted separately and discussed in a later section. California's RN incomes increased more than 50 percent since 1990 (after adjusting for inflation). The majority of California's RNs (64%) work in acute care hospitals.

1. Supply, Geographic Distribution, and Demographics: Key Issues

California's RN Workforce is Growing, but Also Aging.

- The RN workforce added nearly 27,000 nurses from 2004 to 2008, largely as a response to legislatively-imposed nurse-staffing ratios. This addition of nurses helped narrow an RN shortage. The estimated size of the workforce in 2008 was 243,761.
- In 2008, the average age of working RNs was 47.2, and nearly half of the workforce was over 50 years old.⁵⁶

2. Diversity and Cultural Competence: Key Issues

A Diverse Workforce but Key Groups Underrepresented

- Diversity in the nursing workforce has increased steadily over the last two decades; the most recent data shows over 40 percent of RNs are non-White.
- Yet, the Latino population is still widely underrepresented in the nurse workforce,

representing only 8 percent of the RN workforce statewide compared to 37 percent of the population. Latinos make up more than 10 percent of the RN population in Los Angeles County, the Inland Empire and San Joaquin Valley, but that still pales in comparison to their portion of the population.⁵⁷

- A key contributor to nursing's diversity is the workforce's reliance on foreign-born workers, especially nurses trained in the Philippines. Filipinos represented 18 percent of the workforce in 2008. This reliance on foreign-born workers (in 2008, nearly a quarter of California's RNs were trained in a foreign country) leaves California vulnerable to changes in immigration law and international economies.
- Men also continue to be underrepresented, making up only 14 percent of California's RN workforce.

3. Education and Training: Key Issues

Nurse Education Plays a Pivotal Role in Ensuring Sufficient Nurses for the Future

- California's nurse shortage has narrowed over the last five years, according to recent research, which also suggests that the shortage will likely continue to narrow. A key factor driving this change was the recent expansion of nursing education programs in the state.⁵⁸ From 2001 to 2009, the number of pre-licensure RN programs increased by 40 percent and the number of graduates nearly doubled.⁵⁹
- One potential challenge to the continued expansion of new nursing graduates is the difficult job market facing new graduates today. The poor economy has contributed

56 Bates, T., and Dower, C. (2010) California Nurses Facts and Figures. Oakland: California HealthCare Foundation. 6.

57 Bates and Dower 8-9.

58 Spetz, J. (2009). Forecasts of the Registered Nurse Workforce in California 2009. Sacramento: California Board of Registered Nursing. 4.

59 Bates and Dower 11 & 13.

to fewer nurse vacancies, leaving as many as 40 percent of nursing school graduates without jobs in California hospitals.⁶⁰

- Despite the large increase in the number of nursing school slots, demand for education still far exceeds the supply.⁶¹ It is unclear whether the difficult job market will dissuade some from pursuing a career in nursing and nurse education.
- An additional challenge is the lack of qualified faculty to train new nurses. While the number of nursing faculty has doubled since 2000/1, more faculty are and will be needed due to the continued growth of nursing education programs and enrollments and expected increases in retirements due to aging faculty. Key barriers include lower compensation for academic teaching than positions in clinical areas for master's-prepared nurses, and not enough master's and doctoral-prepared nurses to fill the needed nurse educator positions.⁶²

Licensed Vocational Nurses a Potential Pipeline for New RNs

- Licensed Vocational Nurses (LVNs) constitute an important part of the health care workforce, filling important roles especially in long-term care settings. In May 2010, approximately 60,000 LVNs were employed in California.
- LVNs could also provide a potentially large source of future RNs. California currently has ten LVN-to-RN education programs, and research suggests that many LVNs are interested in becoming RNs.
- Investing in LVN-to-RN education programs offers an opportunity to increase the diversity of the RN workforce. The LVN workforce is more diverse than the RN workforce, with 24 percent African

Americans, 21 percent Latino, and 16 percent Filipino.

- One potential note of caution concerning LVNs is the significant role that for-profit schools have played in the recent growth in training programs. The number of programs more than doubled between 2004 and 2008, and it does not appear that the number of LVN jobs has increased commensurately to accommodate all of the newly trained LVNs.⁶³

4. Scope of Practice: Key Issues

Nurse Practitioners Poised to Fill Primary Care Gaps

- The number of Nurse Practitioners (NPs) doubled in California between 2004 and 2008 to over 17,000.⁶⁴
- NPs already play an important primary care role in safety net clinics in California. In 2008, over one-fifth of California's FQHCs and FQHC look-alikes used NPs and Physician Assistants (PAs) as the principal provider of primary medical care.
- The role of NPs in California has been somewhat limited due to the lack of legislation expanding their scope beyond the traditional scope of practice for RNs. Unlike 11 states (including Oregon and Arizona), California does not yet allow NPs to practice independently. Researchers and analysts, including a committee of the Institute of Medicine, recommend expanding the NP scope of practice to match their competence.
- Concerns about shortages of primary care physicians, especially in rural areas and rapidly growing regions of the state, increases the importance of addressing and expanding the NP scope of practice.
- There is the potential for NPs to become needed providers of routine care in specialty practices, but two barriers are preventing this: the scarcity of post-graduate specialty

⁶⁰ California Institute for Nursing and Health Care, CINHC. (2009). *Hiring Dilemma of New Graduates*. Oakland, CA. 3.

⁶¹ Bates and Dower 12.

⁶² Allen, L. (2008), "The nursing shortage continues as faculty shortage grows." *Nursing Economics*, 26(1):35-40.

⁶³ Bates and Dower 25-30.

⁶⁴ Bates and Dower 15.

programs for NPs and the prevailing culture of physician specialty practices.

5. Limitations of Available Data and Research

- Accurately forecasting nurse shortages and surpluses has proven difficult for researchers over the last few decades. Changes in the economy, coupled with policy changes designed to address shortages have led to smaller and shorter surpluses than had been predicted.
- Current assessments of the adequacy of California's RN workforce should be considered cautiously, as the recent recession coinciding with a surge in new RN graduates will likely have hard-to-predict consequences for future supply.
- Research is lacking on the impact that team practice models fully leveraging NPs in primary care and routine specialty care roles would have on demand for NPs.

California's Pharmacists and Pharmacy Technicians

Overview of published literature

In 2009, there were 23,000 pharmacists in California, up from 21,500 in 2001. California's 7 percent increase in pharmacists is small compared to the 20 percent increase in pharmacists nationwide over the same time period. Over the same time, the emerging field of pharmacy technicians grew over 50 percent in California, to 27,600 in 2009.

1. Supply, Geographic Distribution and Demographics: Key Issues

Increase in Actively Practicing Pharmacists, but Also in Part-Time Work (Nationwide)

- A national survey found an increase in the proportion of licensed pharmacists actively practicing pharmacy between 2004 and 2009. At the same time, the prevalence of part-time work has been increasing since 1990.
- In 2009, full-time pharmacists devoted 55 percent of their time to medication dispensing, 16 percent to patient care services, 14 percent to business/organization management, 5 percent each to education and other, and 4 percent to research.⁶⁵

Modest Growth of Pharmacists in California Likely Insufficient to Meet Needs

- California lags the nation in pharmacists per capita, employing only 62.4 pharmacists per 100,000 population, compared to 87.2 per 100,000 nationwide.
- Most experts agree that California currently has a shortage of pharmacists, especially in rural areas and for treating safety net patients.

⁶⁵ Midwest Pharmacy Workforce Research Consortium, MPWRC (2010). 2009 National Pharmacist Workforce Survey. Alexandria: Pharmacy Manpower Project, Inc. 48.

Future Demand Hard to Predict Due to Significant Changes in Field

- Medications, medication therapy, and medication dispensing are all undergoing rapid change, all of which could have significant impact on the need for pharmacists. Advances in biotechnology, the development of individualized drug therapy, and the continual development of new drugs all increase and change the need for pharmacists. At the same time, innovations in the process of ordering and dispensing medications could reduce the need for pharmacists.⁶⁶

2. Diversity and Cultural Competence: Key Issues

Asians Vastly Overrepresented in Pharmacy Workforce

- In 2009, 64 percent of pharmacy graduates were Asian. The next largest group was Whites at 20 percent.⁶⁷
- A detailed look at Asian pharmacists reveals that Vietnamese, Japanese, and Chinese pharmacists were overrepresented compared to their representation in the overall Asian workforce, while Filipino pharmacists were underrepresented.⁶⁸
- Statewide efforts since the 1990s to increase diversity have had little effect.

Cultural Competence an Important and Under-Emphasized Skill Required of Pharmacists

- As pharmacists assume more direct contact with patients and become more integrated into patient care teams, their ability to effectively communicate complex drug information with

⁶⁶ Bureau of Health Professions, Health Resources and Services Administration (2008). The Adequacy of Pharmacist Supply: 2004 to 2030. Washington D.C.: U.S. Department of Health and Human Services. 24.

⁶⁷ California HealthCare Foundation (2011). California's Pharmacists and Pharmacy Technicians. Oakland, CA.

⁶⁸ Bates, T. and Chapman, S. (2008). Diversity in California's Health Professions: Pharmacy. San Francisco: UCSF Center for the Health Professions. 2-3.

diverse groups of patients becomes paramount. Specifically, there will be an increased need for pharmacists who speak other languages and appreciate the different cultural beliefs surrounding the use of drugs.

Latinos Much Better Represented in Diverse Pharmacy Technician Workforce

- In 2009, Latinos represented 34 percent of pharmacy technician graduates. African Americans were 22 percent, Whites 20 percent, and Native Americans 10 percent of the graduates. Of course, the education requirements are much less intense for Pharmacy Technicians, requiring only an Associate's Degree compared to a Doctorate for Pharmacists. Salaries reflect this difference; in 2009, California pharmacy techs earned \$36,680 compared to \$103,470 for that state's pharmacists.⁶⁹

3. Education and Training: Key Issues

Significant Growth in Educational Capacity

- California more than doubled the number of pharmacy programs since 1999, from only three programs to seven programs in 2007. Enrollment also grew over this period, from approximately 2,200 students in 2001 to approximately 3,000 in 2007.⁷⁰
- Despite the growth, there is some evidence that there remains unmet demand for education.
- There are concerns that the current budget pressures may limit the University of California's ability to continue increasing educational and research opportunities in response to market need.

⁶⁹ CHCF (2011).

⁷⁰ CHCF (2011).

Further Growth May Be Limited by Shortages of Qualified Faculty

- Growth in pharmacy programs and enrollments has occurred nationwide; nearly 20 new pharmacy schools opened within the last eight years. This has created additional competition for the small pool of qualified pharmacy professionals to serve as faculty.
- At the same time, salaries in the private sector continue to grow as demand for pharmacists and pharmaceutical scientists increases.

Despite Growth, California's Role in Training the State's Pharmacists has Declined

- In 2008, only 45 percent of pharmacists passing the state's licensing exam had trained in California, down from 58 percent in 2000. The role of pharmacists trained out-of-state and out of the country both contributed to this change: those trained out-of-state increasing from 36 percent to 41 percent and those trained in another country from 7 percent to 14 percent.⁷¹

For-Profit Schools Driving Significant Growth in Pharmacy Technician Students

- The number of pharmacy technician schools nearly tripled from 1999 to 2009, largely driven by growth in the number of for-profit schools. Nearly 80 percent of pharmacy technician schools are now for-profit.

4. Scope of Practice: Key Issues

Emerging Partnership between Pharmacists and Pharmacy Technicians Increases Efficiency

- Surveys indicated that both pharmacists and technicians agree that technicians free pharmacist time. The use of technicians to assume some of the work previously done by

⁷¹ CHCF (2011).

pharmacists has proven an effective way to better leverage pharmacists.⁷²

- In California, ongoing questions remain about the best pharmacist-to-technician ratio, level of oversight required and potential for technicians to check other technicians on some tasks in some settings.

Pharmacist Role Expected to Become More Patient-Care Oriented in Next Decade

- Many experts predict that in the future pharmacists will be less directly involved in dispensing drugs and more involved in direct and indirect patient care, including assuming more responsibility for managing drug therapy in direct patient care settings.
- Such a change has significant implications for pharmacy training, scope of practice, and workflow.

5. Limitations of Available Data and Research

- There is insufficient data about the distribution of actively working pharmacists throughout the state.
- In order to effectively use teams in pharmacy, additional research and data is needed concerning the effectiveness of teams, the optimum size, and increasing the span of pharmacists. Such study could also help understand how teams might impact the demand for both pharmacists and pharmacy technicians.
- Comprehensive data is lacking on the supply and demand of pharmacy technicians.

⁷² McRee, T. (2003). Pharmacy technicians in California: Snapshot of an emerging profession. San Francisco: UCSF Center for the Health Professions. 1.

California's Dentists and Dental Hygienists

Overview of published literature

In 2008, over 31,000 dentists were licensed in California, which gives the state 14 percent of the total dentists nationwide. Over 26,000 dentists are estimated to be actively practicing in the state, providing on average one dentist for every 1,440 residents of the state. As of May 2010, there were estimated to be 18,000 dental hygienists employed in California.

1. Supply, Geographic Distribution and Demographics: Key Issues

Significant Dentist Shortages in Rural and Traditionally Underserved Areas

- Despite the significant supply of dentists, there are many areas of the state with severe shortages. Alpine County has no dentists, Yuba has less than one dentist per 5,000 residents, and five other counties have less than 1.5 dentists per 5,000 residents.
- Statewide, there are 233 dental health professional shortage areas.⁷³
- In 2010, only 25 percent of active dentists participated in Medi-Cal, down from 40 percent in 2003.⁷⁴ While dental benefits for adults on Medi-Cal were eliminated in 2009, children on Medi-Cal continue to receive dental coverage.
- Only 2 percent of California's dentists provide care in the state's 256 community clinics.
- The recent recognition of importance of oral health to overall health heightens the importance of these shortages.

Supply of Dental Hygienists Varies Widely by Region in California

- In 2005/06, the baseline supply of registered dental hygienists (RDHs) varied from a low of 20.2 RDHs per 100,000 population in the

Inland Empire to a high of 47.9 RDHs per 100,000 population in North Sacramento Valley.

- There was also a wide variation in the ratio of active RDHs to dentists. On average, there were 0.43 RDHs per dentist, with a high of 0.92 in North Sacramento Valley and a low of 0.32 in Southern Coast.⁷⁵

Changing Oral Hygiene Contributing to Changing Needs for Dental Care

- Good dental care, oral hygiene, and widespread use of fluoride have caused an age-related shift in the type of dental care needed. Young cohorts demand primarily preventive, diagnostic, and cosmetic care, whereas the aging baby-boomers require more significant restorative work and expensive treatment options.
- Poor access of significant portions of the population to dental services may mitigate some of this long-term effect.

Potential Aging issue

- A large proportion of dentists (19%) have been in practice for more than 30 years, indicating a potential wave of retirements in the upcoming years.⁷⁶

Representation of Female Dentists Increasing, While Females Continue to Dominate RDH Profession

- While only 29 percent of active dentists were female in 2008, 44 percent of the newly licensed dentists were women.
- In addition, only 4 percent of dentists nearing retirement (those in practice for more than 30 years) are female.⁷⁷
- In 2007, 93 percent of graduates from dental hygiene education programs were female, down slightly from 96 percent in 1995.⁷⁸

73 Pourat, N., and Nicholson, G. (2009). Distribution and Characteristics of Dentists Licensed to Practice in California. Los Angeles: UCLA Health Policy Research Center. 2.

74 Maiuro, L.S. (2010). Denti-Cal Facts and Figures. Oakland: California Health Care Foundation. 24.

75 Mertz, E. & Bates, T. (2008). Registered Dental Hygienists in California: Regional Labor Market Chart Book. San Francisco: UCSF Center for the Health Professions. 6.

76 Pourat 3.

77 Pourat 3.

78 Mertz and Bates 9.

2. Diversity and Cultural Competence: Key Issues

Latinos Underrepresented in Dentist Workforce

- Nearly 90 percent of the active dentist workforce in California in 2005/6 was either White (57%) or Asian (32%). Latinos were only 7 percent of the workforce and African Americans 3 percent.
- Recent data shows an upward trend among the three underrepresented racial/ethnic groups in DDS programs. While enrollment for Latinos, African Americans, and Native Americans was 5-7 percent for most of the past decade, recently students from these populations represented 11 percent of the programs. The increase was mostly due to greater numbers of Latino students at UOP.⁷⁹
- Underrepresentation of minority dentists may be contributing to lack of dentists in underserved areas, as research indicates that minority dentists are more likely to practice in underserved areas.

Vast Majority of Practicing Hygienists are White

- Over three-quarters of California's active hygienists were White in 2005/06. Asian RDHs made up 9.5 percent of the statewide RDH population, and Latinos 7.4 percent.
- Of active RDHs, over one-quarter (27%) report that they can communicate with their patients in a language other than English. The majority of these speak Spanish, although 36 different languages were listed as spoken by RDHs in California.⁸⁰

79 Bates, T. and Chapman, S. (2008). Diversity in California's Health Professions: Dentistry. UCSF Center for the Health Professions.

80 Mertz and Bates 12.

3. Education and Training: Key Issues

Growth in Dental School Graduates and Interest in Dental Education

- Graduates from California's DDS programs have grown from 500 in 1998 to over 600 in 2005.
- Nationally, an emerging concern is whether there will be sufficient training slots to educate new dentists to replace retiring dentists. An uptick in applicants has resulted in approximately three applicants for every available slot.⁸¹
- With less than 1 percent of graduating dental students indicating an interest in academic careers, and projected retirement rates for faculty greatly exceeding the number of new graduates available to replace them, new efforts will be required to recruit and retain faculty educators and researchers.⁸²

Innovative Programs at UC Schools Effectively Targeting Diverse Students

- The UCSF School of Dentistry developed the nation's first post-baccalaureate, pre-dental program in 1998. Admitting 15 students per year, the program targets disadvantaged students who have failed to gain admission to a U.S. dental school. The one-year curriculum provides residential and academic experiences to increase academic competitiveness. In the six years of the program's existence, 100 percent of the students who completed the program have been admitted to at least one U.S. dental school. To date, 37 percent have graduated and most are currently practicing in underserved communities.
- The UCLA School of Dentistry has also implemented a dental post-baccalaureate program.⁸³

81 Institute of Medicine (2009). The U.S. Oral Health Workforce In the Coming Decade – Summary of a Workshop. Washington D.C.: National Academies Press. 25.

82 University of California, Health Sciences Committee (2004). Dental Education and the University of California. Oakland, CA: UC Office of the President. 12.

83 UC (2004) 11.

- Research also suggests that offering clinical rotations with diverse groups of patients may help recruit minority students. Another factor found to contribute to the successful recruitment of minority students is the presence of minority clinical faculty.

Growth in Dental Hygiene Educational Programs, Although Some Regions Still Rely on Out-of-State Graduates

- From 1985 to 2007, the number of dental hygiene educational programs increased 64 percent to 23 programs. The growth in graduates grew even more, with an 84.8 percent increase from 1985 to 2007.
- The increase in California's graduates led to a decrease in the percent of younger hygienists educated out-of-state. Still, about one-sixth of hygienists under the age of 34 were educated out-of-state. The Bay Area, Southern Border, Northern California East and West, and the Northern Sacramento Valley continue to rely more heavily on out-of-state educated RDHs under the age of 34.⁸⁴

4. Scope of Practice: Key Issues

Pressure to Formalize Roles of Oral Health Care Providers Increasing

- The large number of areas underserved by dentists nationwide has heightened calls for developing and deploying new types of dental professionals including community dental health coordinators, dental health aide therapists, oral health practitioners, registered dental hygienists in alternative practices, and pediatric oral health educators.⁸⁵

84 Mertz and Bates 3.
85 IOM (2009) 81-96.

- In 1998, California recognized a new dental profession, Registered Dental Hygienist in Alternative Practice (RDHAP); RDHAPs can practice unsupervised in homes, schools, residential facilities and in Dental Health Professional Shortage Areas.⁸⁶

Time to Develop Clear Standards for Assessing and Measuring Quality and Effectiveness of Dental Care

- Dentistry lacks general standards for quality assessment, and little effort has been devoted to defining the appropriateness or effectiveness of care.⁸⁷
- This becomes particularly important as additional dental providers assume primary dental care roles.

5. Limitations of Available Data and Research

- It is difficult to evaluate the potential demand for dental services in California as data is lacking on disease prevalence, dental utilization, and provider productivity.
- Additional study and data is needed on best methods to recruit and retain dental health providers in underserved areas of California and to provide care to underserved populations.
- Lack of consistent data on geographic distribution of dentists and dentist's employment patterns of registered dental hygienists (RDHs) make it impossible to determine whether projections indicate too many, too few or enough RDHs in the future. Additional study is needed on RDHAPs to determine their impact on access to dental care in underserved populations.

86 Mertz, E. (2008). Registered Dental Hygienists in Alternative Practice: Increasing Access to Dental Care in California. San Francisco: UCSF Center for the Health Professions. 1.
87 IOM (2009) 63.

California's Allied Health Workforce

Overview of published literature

As of May 2010, more than one million people were employed in a health care occupation in California, up 20 percent from 2001, while overall employment fell slightly. Employment in health care occupations now constitutes 7.5 percent of all employment in the state. Employment in health care support occupations (e.g. nursing aides, medical assistants, home health aides) grew at a faster rate than employment in practitioner and technical occupations (e.g. physicians, nurses, therapists, technicians).

Allied Health is an amorphous term that has been used to describe the myriad types of health care workers that are not physicians, nurses, pharmacists, or dentists. It is estimated that 60 percent of health care workers are in allied health fields. This section will focus on allied health occupations that are expected to be most affected by health care reform.

1. Therapists

Therapists are a wide-ranging group of occupations, which includes Occupational Therapists, Physical Therapists (PTs), Recreation Therapists, Respiratory Therapists, and Speech Language Pathologists. The educational requirements of these occupations range from an Associate's Degree for Respiratory Therapists to primarily Doctoral Degrees for PTs. In 2009, the average salary of these occupations ranged from \$65,135 for Respiratory Therapists to \$82,255 for PTs in California.

Significant Growth Over the Last Decade

- The employment of therapists in California experienced double-digit growth from 1999 to 2009, with speech-language pathologists increasing the most (48%) and occupational therapists the least (15%).
- Employment for both occupational therapists and physical therapists grew at a slower rate

in California than the nation over this time period. In 2009, California had far fewer PTs per capita than the US, with 38.6 PTs per 100,000 people in California compared to 56.8 PTs per 100,000 in the US.⁸⁸

- Despite the growth, respiratory therapists had the largest number of vacancies in a recent California Hospital Association Survey at 162 vacancies. PT was second with 151 vacancies but had the highest reported vacancy rate at 7.8 percent.⁸⁹

Range in Diversity Across Therapist Occupations

- Of the therapist occupations, Respiratory Therapists are the most diverse; over half of their program's 2009 graduates were non-White, with 32 percent African American and 20 percent Latino. Speech Language Pathologists were the least diverse, with 59 percent White graduates in 2009.
- PT graduates were 47 percent White, 17 percent Asian, 8 percent Latino, and 3 percent African American
- Occupational Therapy graduates were 43 percent White, 31 percent Asian, 9 percent Latino, and 3 percent African American.

Shifting Educational Requirements

- Over the last decade, both occupational therapy and physical therapy have experienced a major shift in educational training. From 1999 to 2009, the educational background of occupational therapists has shifted from a majority of Bachelor's degrees to a majority of Master's degrees, while physical therapists have shifted from majority of Master's degrees to a majority of Doctoral Degrees.
- This resulted in an overall decrease in degrees awarded for occupational therapists, while degrees for physical therapy increased slightly.⁹⁰

88 California HealthCare Foundation (2011). California's Health Diagnostic and Treatment Therapists. Oakland, CA. 1.

89 California Hospital Association (2011). Critical Roles: California's Allied Health Workforce California Hospital Association Allied Health Workforce Survey. Sacramento, CA. 5.

90 CHCF (2011) 1.

For Profit Programs Drive Large Increase in Respiratory Therapy Graduates

- From 1999 to 2009, the number of respiratory therapy graduates nearly doubled to 1,147 graduates in 2009. For-profit programs contributed 70 percent of the growth.⁹¹
- These recent increases in program graduates have led to regional concerns about oversupply of entry-level graduates,⁹² although vacancies remain in hospitals in some regions.⁹³
- In addition, some educators and employers (38%) are concerned that entry-level respiratory therapists were not sufficiently prepared for work duties.⁹⁴

Opportunity to Increase Scope of Practice for Physical Therapists

- Some policy makers have called for allowing physical therapists to diagnose and refer patients without a prior diagnosis and referral from a physician. A California bill attempted to allow physical therapists to initiate treatment within their scope of practice without diagnosis, but it was defeated in 2009.

2. Imaging

Imaging includes several related professions: primarily radiologic technologists (also known as x-ray technologists and radiographers); diagnostic medical sonographers; radiation therapists, and nuclear medicine technologists. Of these, radiologic technologists are the largest occupation at nearly 16,000 employees, and radiation therapists the smallest, at 2,000 employees in California in 2009. There were 5,100 diagnostic

medical sonographers and 1,640 nuclear medicine technologists employed in the state in 2009.

California Lags the Nation in Employment of Imaging Professionals per Capita

- With the exception of radiation therapists, California employs fewer of these imaging professionals per capita than the US as a whole. The most pronounced difference is with radiologic technologists (RTs); in 2009, California employed 42.9 RTs per 100,000 compare to 69.6 per 100,000 nationwide. This is partly explained by the fact that the US increased its RT employment by 27 percent from 2001 to 2009, while California increased its RT employment by only 4 percent.
- Both radiation therapists and diagnostic medical sonographers experienced significant growth from 2001 to 2009, with the number of therapists more than tripling and sonographers doubling.⁹⁵
- California's hospitals are concerned about the supply of imaging professionals, as vacancies in these areas have a significant impact on care delivery and hospital efficiency.⁹⁶
- Many experts predict that demand for imaging professionals will continue to increase, driven both by the aging population and by the development of new imaging technologies and protocols.

Wage Growth Strong Across Imaging Occupations

- Annual wages for these four imaging occupations experienced strong growth in California from 2001 to 2009, with total increases ranging from 34 percent to 53 percent. Wages for all of these professions are higher in California than in the rest of the US.

91 CHCF (2011) 2.

92 Spetz, J. (2008). Health Workforce Needs in California and the Role of Community Colleges. San Francisco: UCSF Center for the Health Professions. Presentation for California Colleges Economic Development Program Advisory Committee Strategic Review and Advance Subcommittee. 8.

93 CHA (2011) 5-8.

94 Cowles, E., Sutherland, S., Eggers, R., & Small, M. (2007). California Respiratory Care Practitioner Workforce Study. Sacramento, CA: California State University, Sacramento, Institute for Social Research. 100.

95 California HealthCare Foundation (2011). California's Imaging Professionals. Oakland, CA. 1.

96 CHA (2011) 5-8.

Radiologic Technologists A Relatively Diverse Occupation

- In 2009, 56 percent of RT graduates were non-White, with 27 percent Latino, 24 percent Asian, and 5 percent African American.

Emerging Need for Licensing and Accreditation Standards for Sonographers

- In California, diagnostic medical sonography is a licensed occupation; however, professional certification seems to be developing into a standard for employment. Certification typically requires attending an accredited educational program.
- In 2009, only eight of the 28 sonography programs in California were accredited. Only 11 percent of that year's 781 graduates attended an accredited program.

Need for Additional Data on Individual Imaging Occupations

- As the role of imaging increases in health care delivery, access to detailed data on each of the imaging occupations in California will become necessary.

3. Clinical Laboratory Scientists and Medical Lab Technologists

Clinical Lab Shortages a Significant Concern in California

- California's employment of Clinical Lab Scientists (CLS) has been stagnant since 2001, while national CLS employment has grown 15 percent. California's per capita supply of CLS is much lower than the nation's: 35.0 CLS per 100,000 population in California compared to 54.4 per 100,000 in the US overall.
- From 1980 to 2005, the number of CLS licensure candidates dropped precipitously in California, from 2,515 to 724.
- In a 2009 California Hospital Association (CHA), clinical lab scientists had the third highest number of vacancies at 146.

- CLS had the highest average age of the 14 allied health occupations included in the CHA survey. Over 30 percent of the surveyed hospital's clinical lab scientists (844) will be eligible for retirement by 2015.⁹⁷
- California's hospitals are concerned about the supply of clinical lab professionals, as vacancies in these areas have a significant impact on care delivery and hospital efficiency.⁹⁸

Lack of Gender Equity and Diversity in CLS Workforce (Nationally)

- Nationally, the CLS workforce is predominantly female (79%) and predominantly White (71%). Data for California workers are unavailable.⁹⁹

Medical Lab Technologists Recently Recognized in California in Effort to Alleviate CLS Shortage

- California only started licensing MLTs in 2007 (later than many other states).
- Training programs were approved in 2006, but the in-state production of new MLTs remains quite low. In 2009, California's six MLT training programs graduated 23.

Data on Clinical Lab Workforce in California is Severely Limited

- California-specific data is needed on supply and demand of clinical lab scientists and medical technologists. In addition, data often aggregates multiple lab occupations. Data on individual occupations working in laboratories is needed to better understand adequacy of supply throughout the state.

4. Mental Health

In addition to psychiatrists and psychologists, there are a number of mental health professionals working in California. In 2007, California employed 14,010 Mental Health and Substance

⁹⁷ CHA (2011) 7.

⁹⁸ CHA (2011) 6.

⁹⁹ Lindler, V. & Chapman S. (2003). The Clinical Laboratory Workforce in California. San Francisco: UCSF Center for the Health Professions. 3.

Abuse Social Workers, 10,390 Psychiatric Technicians, 9,360 Mental Health Counselors, 8,300 Substance Abuse and Behavioral Disorder Counselors, 7,620 Rehabilitation Counselors, and 6,130 Marriage and Family Therapists.¹⁰⁰

Significant Shortages of Mental Health Professionals Throughout the State

- Current data show significant shortages across mental health workforce, with vacancy rates for mental health providers ranging from 20 percent to 25 percent in 2008. Vacancies are even higher in rural areas.
- Data show additional mental health workers will be needed to care for a growing, aging, and increasingly diverse population.

Varying Degrees of Diversity Across Occupations

- In 2007, just over 60 percent of Marriage and Family Therapists were White, and 21 percent were Latino.
- Psychiatric Technician graduates are a fairly diverse group, with an equal percentage of White and Latino graduates (30%) in 2006. Asian/Pacific Islanders made up just over 20 percent of graduates and African Americans just under 20 percent.
- Graduates from substance abuse and addiction counseling programs were also fairly diverse. In 2006, Whites represented just over half of graduates, with Latinos and African Americans representing approximately 22 percent of the total graduates.
- In 2006, half of the graduates of master's level vocational and rehabilitation counseling programs were White, 20 percent Latino, 15 percent Asian/Pacific Islander.

100 Lok, V. & Chapman, S. (2009). *The Mental Health Workforce in California: Trends in Employment, Education, and Diversity*. San Francisco: UCSF Center for the Health Professions. 3.

Graduates of Mental Health Educational Programs Have Fluctuated Over Recent Years

- From 1996 to 2006, graduates from psychiatric technician programs steadily increased. In 2006, programs in California were graduating around 400 more students than in 1995.
- After dropping through the early 2000s, graduates of Master's-Level Marriage and Family Therapy Programs rebounded to 426 graduates in 2006.
- Between 2003 and 2006, graduates from both associate degree and 1 - 2 year certificate-of-completion programs for psychiatric technicians fluctuated between 700 and 800.

5. Support Occupations

In 2010, California employed nearly 370,000 individuals in health care support occupations. The largest of these occupations are: medical assistants, certified nurse assistants, and home health aides. Medical assistants tend to work in physician offices, while CNAs primarily work in long-term care settings, and home health aides work for home health agencies. These occupations do not require a high school diploma for entry to work, and none are licensed in California.

Demand for CNAs and Home Health Aides Expected to Grow Dramatically

- As the population ages, experts are concerned that there will be a critical workforce shortage in long-term care. Despite the strong demand, these occupations are challenged by low wages, the demanding nature of the work, low professional status, and insufficient career paths.

Diverse Occupations but Low Wages and Limited Career Ladders

- All three of these occupations tend to be dominated by women of minority race/ethnicity. In 2005/06, 88 percent of the medical assistant workforce was female, and 44 percent Latino.¹⁰¹

101 Chapman, S., Marks, A. & Chan, M. (2010). *The Increasing Role of Medical Assistants in Small Primary Care Physician Practice: Key Issues and Policy Implications*. San Francisco: UCSF Center for the Health Professions. 2.

Growing Need for More Structured Training Programs and Career Paths for Medical Assistants

- Aside from physicians, medical assistants are the most common staff found in medical office practices, and they play an important role in patient care delivery there. Yet, there is very little regulation or standardization of education and certification of medical assistants.
- Experts recommend focusing attention on the educational requirements, career ladders, and professional recognition of CNAs and HHAs as well, considering the important role these workers will play in caring for the country's aging population.

Research Needed on Potential New Roles for Support Workers in Outpatient Settings

- As more health care shifts to the outpatient setting, there may be opportunities for CNAs and HHAs to shift their roles and scope of practice to meet patient needs in these settings. Additional research is needed on how best to use these workers in residential care and home settings.

6. Emergency Medical Technicians/Paramedics

In 2010, California employed over 15,000 EMTs/Paramedics, up from 12,750 in 2001. (EDD) California has relatively fewer EMTs and Paramedics than other large states and the US as a whole. In 2003, California had 46 EMTs and Paramedics per 100,000 population compared to 63 nationwide.¹⁰²

High Turnover, Underserved Rural Areas Key Challenges

- The work life of an EMT/Paramedic is intense and stressful, leading to high turnover. EMTs work long hours, are on call for extended periods of time, and often have to confront severe trauma and death.
- Rural areas tend to be underserved by EMTs and Paramedics, and they have difficulty recruiting EMTs/Paramedics. In addition to the normal stresses of the job, rural area EMTs and Paramedics have less available back-up, longer driving times, and must attend to more severe automobile-related injuries.¹⁰³

Largely a White, Male Workforce

- The EMT/Paramedic workforce is still a male-dominated field with national data estimates from 2001 showing the workforce is 69 percent male and predominantly White with only 15 percent minority professionals.

Changing Certifications and Potential New Roles for EMTs/Paramedics

- Some local agencies are phasing out one of the three levels of EMT training, replacing their EMT-II training programs with Paramedic programs. In 2004, California had fewer than 200 EMT-IIIs and only four training programs, all in rural areas.
- A potential new trend is hospitals' hiring EMTs and paramedics to work in critical care units because of their training in emergency care and life-saving tasks. Research is needed on the prevalence and impact of this new trend.¹⁰⁴

102 Franks, P., Kocher, N. & Chapman, S. (2003). *Emergency Medical Technicians and Paramedics in California*. San Francisco: UCSF Center for the Health Professions. 2.

103 Franks et al 5.

104 Franks et al 6.

VI. ANNOTATED BIBLIOGRAPHIES OF SELECT PUBLISHED LITERATURE BY PROFESSION AND ISSUE

CALIFORNIA'S PHYSICIAN WORKFORCE

1. Supply & Demographics

Bates, T. and Chapman, S. (2008). *Diversity in California's Health Professions: Physicians.* San Francisco: UCSF Center for the Health Professions.

This issue brief is one in a series of briefs presenting a profile of California's current and projected population, selected health professions, and trended data describing selected health professions education programs in the state. In this brief, authors present data describing key characteristics of the state's physician workforce including age, gender, race/ethnicity and income, and trended enrollment data describing gender and race/ethnicity for first-year enrollments in California's eight MD programs.

Beckett, M.K. and Morrison, P.A. (2007). *Forecasting the Supply of and Demand for Physicians in the Inland Southern California Area.* Santa Monica: Rand Corporation.

This report, commissioned by proponents of the proposal for a UC Riverside medical school, summarizes Rand researchers' analysis of the projected supply of and demand for physicians who provide patient care in a region that includes the Inland Empire. For comparison purposes, they also analyzed the projected demand for and supply of physicians in the San Joaquin Valley and California as a whole under different scenarios including the existence of a new medical school in Inland Southern California. The report also discusses some of the limitations of the analyses, as well as those of other efforts, to project physician supply and demand, and makes recommendations for future

efforts to project physician supply and demand at the local or regional level. Their model found that without an increase in the physician supply in California, there would be about 59 fewer patient care physicians per 100,000 persons in the Inland Empire than needed to meet projected demand. When they created a scenario where the number of residents-in-training in the state were increased by 20 percent by 2016 and a new medical school was built as planned with its component residency slots added, the gap of needed physicians in Inland Southern California would be decreased from 32 percent to less than 24 percent or <44 physicians per 100,000. Authors believe that the strength of their model is that they: 1) present multiple sets of projections allowing different inputs to vary, 2) they identify components that over the past ten years have been significantly associated with MD to population ratios in California counties. Their model projected that the San Joaquin Valley area expected supply gap for physicians to be much smaller than for the state as a whole and the Inland Empire. Authors do point out that their model does not take into account the complexity added by the fact that physician supply will respond to changes in physician demand in the long run. Authors point out another limitation to the model is the fact that it does not take into account the use of nonphysician clinicians such as NPs and PAs. Finally, their modeling did not take into account the varying need for different physician specialties nor was it very sensitive to variation among regions in the use and/or outcomes of health care and the varying types of utilization improvements that are needed in the region.

Dower, C., O'Neil, E. (2011). *Primary care health workforce in the United States. Research synthesis report no. 22.* Princeton, NJ: Robert Wood Johnson Foundation.

This report provides a synthesis of the research available on the US primary care workforce in the US (including MDs, DOs, NPs and PAs). It and a companion issue brief can be found at

www.policysynthesis.org. The report covers the profile, supply and distribution of the US primary care workforce; the nation's primary care workforce needs and demands; effects of payment policies and market forces on primary care; effects of state scope of practice laws on primary care workforce supply and practice; and pressures being exerted on the primary care workforce to evolve. It concludes with policy implications for state and federal policy makers to consider.

Goodell, S., Dower, C., O'Neil, E. (2011).
Primary care workforce in the United States.
The Synthesis Project. Policy Brief No.
22. Princeton, NJ: Robert Wood Johnson
Foundation.

This issue brief provides summary of a companion report available at www.policysynthesis.org. Findings of an overview of published information on the primary care workforce (including MDs, DOs, NPs and PAs) in the US include: the maldistribution of primary care providers appears to be a more significant problem than overall shortage; state laws have increased the scope of practice of nurse practitioners and physician assistants although there is wide variation among states; and new practice models are redefining primary care.

Grumbach, K., Chattopadhyay, A. and Bindman, A.B. (2009) *Fewer and More Specialized: A New Assessment of Physician Supply in California.*
Oakland, CA: California HealthCare
Foundation.

This report presents the findings of the first comprehensive study of the Medical Board of California survey data on practicing physicians in the state. The data were used to enumerate, more accurately than had been done previously, M.D. patient care physicians actively practicing in California in 2008, for the state overall and by individual county. The results showed that: The overall supply of M.D. physicians in the state is 17 percent lower than that estimated from American

Medical Association (AMA) Physician Masterfile data. Of active patient care physicians in California, 34 percent were in primary care, which is 20 percent fewer than the estimate from AMA data. The number of primary care physicians actively practicing in California is at the very bottom range of, or below, the state's need based on Council on Graduate Medical Education estimates. There is an abundance of specialists practicing in the state, though geographically they are unevenly distributed.

Rural counties suffer from low physician practice rates, and from a diminishing supply of primary care physicians. Authors state that if these trends continue, the shortage of primary care physicians in California is likely to worsen, which could pose a significant threat to health care access in the state.

The report also discusses a number of steps California policymakers might consider to address these problems, including: creating financial incentives increasing the number of new providers entering primary care and practicing in underserved areas by supporting specifically targeted training programs; investing in information technology to support systems improvements and connections across practices; and investing in the continued monitoring of the state's health care workforce.

The study offers an important assessment of available data on physician supply in the state. In 2008, 11 percent of licensed physicians in the state didn't provide information on their training status, practice hours or office location. Half of these didn't participate at all in the survey because it only included physicians applying for re-licensure. The survey used did not include the number of DOs practicing in the state. The study classified MDs as either primary care MDs or specialist MDs on the basis of self reporting which doesn't necessarily reflect their training, board certification or the type of services provided. Further, it is unclear how accurately the questionnaire is completed and how consistently it is filled out among respondents.

While it may be an improvement over the AMA data, the survey instrument used to gather the data for the state board data set seems inadequate to assess the size and characteristics of the state's physician workforce.

Grumbach, K., Odom, K., Moreno, G., Chen, E., Vercammen-Grandjean, C. and Mertz, E. (2008) *Physician Diversity in California: New Findings from the California Board Survey*. San Francisco: UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

The report presents findings from an analysis of survey responses from 61,861 physicians who are active in patient care in California and no longer in training. Key findings include: 1) The underrepresentation of Latinos and African Americans among California physicians remains dire. 2) California has very few physicians of Samoan, Cambodian, and Hmong/Laotian ethnicity, and these ethnic groups should also be recognized as underrepresented in medicine and more actively recruited into the profession. 3) Minority physicians in California play a key role in underserved communities. Minority physicians in California are much more likely than White physicians to practice in Medically Underserved Areas, Health Professions Shortage Areas, communities with high proportions of minority populations, and low income communities. The authors conclude that The California Medical Board survey represents a major step forward in the ability of the state to have reasonably accurate and complete data on key characteristics of California physicians, and is a valuable resource for physician workforce analysis and planning in the state.

Hough, H., Dower, C., and O'Neil, E. (2001). *Profile of a Profession: Naturopathic Practice*. San Francisco: UCSF Center for the Health Professions.

The integration of allopathic and non-allopathic health care systems, disciplines and modalities, including acupuncture and Oriental medicine, is fast becoming a part of the mainstream health care delivery system in the United States. This is a primarily qualitative report which explores the profession of naturopathic practice. Practitioners include those obtaining formal 4-year degrees as naturopathic physicians, and those obtaining training and experience in naturopathic medicine through other paths. Finally, practitioners with traditional allopathic training may incorporate pieces of naturopathic traditions into their practice.

Practitioners in this field (naturopaths) recognize certain key tenets, including a holistic approach to treatment emphasizing enhancing the body's ability to heal itself by addressing the physical, mental, emotional, genetic, environmental, social, and spiritual context of healing. Naturopathic physicians are licensed in 11 US states (but not California). Legal scope of practice varies by state. There is no legal scope of practice for naturopaths (non-physicians) because they are not licensed. There is no known research on utilization rates, demand, or patient satisfaction rates for naturopaths and very little for naturopathic physicians.

Iglehart, J. (2008). "Grassroots Activism and the Pursuit of an Expanded Physician Supply". *New England Journal of Medicine* 358(16) p. 1741-1749.

In this article, the author cites the increasing number of physician-supply reports and responses by many medical educators who have expanded their schools and, in some instances, developed new ones. He states that "although there has been no recent national discussion on the question of how

many doctors are enough, and thus no consensus on the matter, one cannot dispute the new stirrings that suggest disequilibrium between the supply of physicians and the demand for their services.” He points to the need for an informed discussion at the national as well as state and local level.

Nicholson, S. (2009) *Will the United States Have a Shortage of Physicians in 10 Years?* Washington D.C.: Academy Health Changes in Health Care Financing and Organization.

Several studies have forecast that there will be a shortage of about 100,000 to 200,000 physicians in 2020, and many medical schools are responding by expanding capacity. However, a prominent group of researchers argue that the perceived shortage of physicians is a symptom of a more fundamental problem rather than being the problem itself, and expanding the supply of physicians would merely lead to the provision of relatively low-value medical care. It is important for policymakers to determine the adequacy of physician supply as they consider provisions to reduce the uninsured and increase the demand for physician services. This paper provides a brief history of government involvement in physician workforce planning, describes and assesses the methods used by the two sides in the physician-shortage debate and addresses the fundamental underlying views that determine many observers' positions in this debate. In his presentation of the arguments made, the author also examines the limitations of models to predict physician supply and demand. Ultimately, the author points out that the current debate regarding whether there will be a shortage of physicians is fundamentally a debate regarding whether physicians induce demand (consciously or subconsciously) for their own services and the value of increased medical spending.

Paxton, C. (2010). *California Physician Facts and Figures*. Oakland, CA: California Health Care Foundation.

This report, published as part of CHCF's California Health Care Almanac, draws from numerous sources to describe the market landscape for physician services in California. The author presents key demographic characteristics of the California physician workforce in charts and graphs. Most of the data on physician supply comes from Grumbach et. al., 2009 (see below). Key findings include: California barely meets the COGME standard for supply of primary care physicians. Major regions of the state have fewer than the lowest number recommended by the group. While Latinos represent almost 40 percent of the population, only 5 percent of the state's physicians are Latinos, a fact that could have implications for language and cultural aspects of care. California draws a substantial portion of physicians, especially primary care physicians, from foreign and out-of-state medical schools. While family and general practitioner compensation has been rising, they earned only 88 percent of the national average in 2008. Footnotes in the report point to some issues with available data such as how the counts of doctors of osteopathy practicing in the state would affect the supply estimates of physicians in California. Also, by including all Internal Medicine specialists as primary care physicians does this over-count the supply of primary care physicians because they may not be practicing primary care? Further, would not including OB/GYNs in primary care under count physicians providing primary care since many women see them for their primary care?

Staiger, D. O., Auerbach, D.I. and Buerhaus, P.I. (2009) “Comparison of Physician Workforce Estimates and Supply Projections” *JAMA* 302(15) p. 1674-1680.

Authors compare physician workforce estimates and supply projections using the American Medical

Association Physician Masterfile (Masterfile) data with estimates and projections using data from the US Census Bureau Current Population Survey (CPS). Compared with the Masterfile data, estimates using the CPS data found more young physicians entering the workforce and fewer older physicians remaining active, resulting in estimates of a smaller and younger physician workforce now and in the future. The authors point out that projections of physician requirements rely on estimates of the current number of physicians as a starting point for projections. Workforce projections are driven by estimates from the past and assumptions about the future. Authors point out that much of the debate over supply projections has focused on assumptions about the future, such as whether baby boomers will retire earlier than prior generations (or perhaps later because of the current economic downturn) or whether changing lifestyle choices of new physicians will reduce the hours they are willing to work. These are considerations that were not incorporated in their study. They point out that although uncertainty about the future is important to the workforce debate, their analysis highlights that uncertainty about estimates from the past is also important. Thus, without more accurate estimates of the size and age distribution of the current workforce, projections of physician supply, requirements, and potential shortages may mislead policymakers as they try to anticipate and prepare for the health care needs of the population.

2. Education

Bates, T., Chapman, S. and Dower, C. (2010). *Men of Color in California's Health Professions Education Programs*. San Francisco: UCSF Center for the Health Professions.

This paper looked specifically at participation rates of men of color in health professions education programs in California and found that the representation of African American and Latino men is significantly below what would be expected based

on population rates. The proportion of Latino and African American men in medical doctor (MD) programs in the state decreased between 1995 and 2007. At a time when the Latino population grew substantially in the state the actual number of Latino men enrolling in MD programs actually went down. The number of African American men enrolling in MD programs fell from 27 in 1995 to 18 in 2007. State osteopathic medical programs (DO) programs did not report any African American graduates in 2008. The proportionate representation of Asian men in MD and DO programs remained essentially the same from 1995 to 2007. Authors identify research and programmatic implications for policy, education and community leaders seeking to improve the situation.

Morris, C.G., Johnson, B., Kim, S. and Chen, F. (2008). "Training Family Physicians in Community Health Centers: A Health Workforce Solution", *Family Medicine* 40(4) p. 271-276.

For more than 25 years, family medicine residencies have worked with community health centers (CHCs) to train family physicians. Despite the long history of this affiliation, little research has been done to understand the effects of training residents in this underserved community setting. This study compares CHC and non-CHC-trained family physicians regarding practice location, job and training satisfaction, and recruitment and retention to underserved areas. Authors conducted a cross-sectional survey of a cohort of the 838 graduates from the WAMI (Washington, Alaska, Montana, and Idaho) Family Medicine Residency Network from 1986–2002. CHC-trained family physicians were almost twice as likely to work in underserved settings as their non-CHC-trained counterparts (64 percent versus 37 percent). When controlling for gender, percent full-time equivalent, and years from graduation, CHC-trained family physicians were 2.7 times more likely to work in underserved settings than non-CHC-trained family physicians. CHC and non-CHC-trained family physicians report similar job and training satisfaction and

scope of practice. The authors concluded that training family physicians in CHCs helps meet the health workforce needs of the underserved, enhances the recruitment of family physicians to CHCs, and prepares family physicians similarly to their non-CHC trained counterparts.

3. Scope of Practice

Dower, C., and Christian, S. (2009) *Physician Assistants and Nurse Practitioners in Specialty Care: Six Practices Make It Work*. Oakland, CA: California HealthCare Foundation.

This study examined the emerging models for the purpose of identifying replicable strategies and current challenges with focus on areas of particularly high demand: orthopedics, gastroenterology and dermatology. For example, the researchers found widespread utilization of PAs in orthopedics. They also discovered that the scarcity of postgraduate specialty programs for PAs and NPs was a major challenge to model implementation, while state scope of practice laws were generally not a hindrance. Moreover, the study reported that PAs and NPs strengthened care coordination in specialty practices by serving as both clinicians and communication links between patients and physicians.

CALIFORNIA'S NURSING WORKFORCE

1. Supply and Demographics

Bates, T., and Chapman, S. (2010). *Physician Assistant and Nurse Practitioner Staffing Patterns in California's Licensed Community Clinics: 2005 – 2008.* San Francisco: UCSF Center for the Health Professions.

Physician assistants (PAs) and nurse practitioners (NPs) play a critical role in the delivery of primary care in California's licensed community clinics. Physicians continue to be the principal care provider at most clinics, but between 2005 and 2008, almost 3 percent more clinics relied on PAs and NPs as principal care providers. The use of PAs increased more than the use of NPs. Rural clinics rely on both PAs and NPs to a greater extent than non-rural clinics. Data used in the report is from the annual utilization data reports filed by community clinics with OSHPD. The report looked at clinics designated as Federally Qualified Health Centers (FQHCs) and FQHC look-alikes. The report found that in 2008, out of 536 FQHC and look alike clinics, roughly 22 percent reported a PA (10%) or a NP (11.6%) as the principal provider of medical care. Almost 85 percent of the clinics use either a PA or NP and many use both. Clinics that do not staff PAs or NPs are usually small in size with less than 10,000 patient encounters per year. Authors suggest that future research focus on differences in practice patterns for PAs and NPs working in primary care clinics and how their roles overlap and are distinct.

Bates, T. and Dower, C. (2010), *California Nurses Facts and Figures.* Oakland, CA: California HealthCare Foundation.

Published as part of the California Health Care Foundation Health Care Almanac, *California Nurses Facts and Figures* examines California's nursing workforce, including supply, education, and demographics. The publication presents

current and historical data from multiple national and state sources in 27 charts and graphs.

Bates, T., Hailer, L. and Chapman, S. (2008). *Diversity in California's Health Professions: Current Status & Emerging Trends.* Oakland, CA: Public Health Institute.

The objective of this analysis is to provide a current picture of diversity in the health professions workforce and educational pipeline in a number of health professions. This inquiry also presents current and projected population data as a benchmark against which to measure diversity in the health professions. It also provides a picture of emerging trends and their implications for meeting California's current and future health workforce needs. The analyses in the report were based on publicly available data on population, workforce, and educational pipeline. Wage data were included so that differences in income across the professions as well as within professions could be examined along with workforce diversity measures. Wide variations were found in the racial and ethnic composition of the selected professions. Whites and Asians represent the largest portion of the workforce for professions with high barriers to entry. Current estimates indicate that roughly nine out every ten physicians, dentists, and pharmacists in California are either White or Asian. The workforce is increasingly diverse in those professions with low barriers to entry. Among healthcare support occupations, where opportunity is greatest, one in three workers is Hispanic or Latino and proportional representation of African Americans is nearly twice its size in the working age population. In comparing wage data across the professions with workforce diversity, it is evident that the highest paid health occupations are the least racially and ethnically diverse while the lowest paid health occupations are the most racially and ethnically diverse.

The authors point out several limitations of the available data used in the study. A major limiting

factor was that the categories describing race and ethnicity are not consistent across data sources. In addition, race and ethnicity data are overly general and most sources do not include detailed data that might be of interest in understanding how different ethnic groups are distributed within broader race groups.

Perhaps the most limiting factor in conducting the analysis was the difficulty in making precise connections across the three different sectors of analysis: population, health professions workforce, and health professions education programs. These data were collected during different time periods and from a variety of sources and the level of detail and breadth of coverage varies substantially by source. Many of the report recommendations relate directly to the need for better data collection on California's health care workforce.

Regarding findings on the RN workforce, the report states that the more racially and ethnically diverse regions of the state are represented by a more racially and ethnically diverse RN workforce. Authors summarize that labor markets for RNs are localized and training opportunities are more widely distributed with fewer barriers to entry. They also found that younger RNs are more racially/ethnically diverse than older RNs. Authors found that employment opportunity for RNs is projected to grow at a rate far above average.

The report details the increase in the number of qualified applicants denied entrance to nursing programs. Qualified applicants increased 183 percent between 2001 and 2006. In 2001, almost six out of ten qualified applicants were accepted while in 2006, the number accepted decreased to four out of every ten qualified applicants.

Pre-license RN education programs cover the entire state. The size of the student body increased dramatically between 2001 and 2006, by 43 percent. The associate degree programs have greater diversity than do bachelor's programs or entry-level masters programs. Across all pre-license programs

between 2001 and 2006, the proportion of White non-Hispanic students declined slightly and the proportion of Filipino students increased slightly. The proportion of Hispanic/Latino students, African American students and Asian students remains fairly consistent throughout this period. The number of Native American students pursuing pre-license RN education remains very small, representing well under 1 percent of the student body. Change in proportional representation over the past six years has been small at the state-level and in most regions. Although groups of non-White RN students in most regions of the state are growing more rapidly than the group of White students, the proportional effect is small because of the difference in absolute size. In 2001, every region of the state with the exception of the Los Angeles area had a RN student body that was predominantly White; and White students have continued to pursue RN education in large numbers.

Beacham, T., Askew, R., W. and Williams, R., P. (2009). "Strategies to Increase Racial/Ethnic Student Participation in the Nursing Profession" *ABNF Journal Summer*, pp 69-72.

The nursing profession has fewer racial and ethnic minority groups than the United States population, at large. Racial / ethnic minority students have lower admission and retention rates than White non-Hispanic students. A review of strategies reveals that to recruit and retain racial ethnic minority students, schools of nursing will have to use interventions that reach diverse student populations, make connections with middle and high school students, support students during the application process, and mentor current students.

California Institute for Nursing and Health Care, CINHC. (2009). *Hiring Dilemma of New Graduates*. Oakland, CA. See: www.cinhc.org.

This white paper describes an unfavorable job market for newly trained nurses in California.

Authors state that the current predicament is driven by the recession and the elasticity of nursing workforce employment patterns - when the economy is good, nurses work less; when the economy is bad, nurses work more. They state that RN vacancy rates in hospitals have decreased to 4 percent, compared to 7 percent in 2008. Senior nurses have postponed retirement, part-time RNs have increased hours worked, and RNs who were not working have returned to the workforce.

In March of 2009 the California Institute for Nursing and Health Care (CINHC) surveyed employers and found that approximately 40 percent of new graduates may not find jobs in California hospitals (the usual place of first employment for nurses) as only 65 percent of hospitals reported hiring new graduates, and these hospitals were also significantly decreasing the number of new RNs they plan to hire from the number hired the previous year. All hospitals hiring new graduates reported overwhelming numbers of applicants for few positions. The survey (and another conducted by the hospital association) indicated jobs were available but hospitals wanted experienced nurses.

The Institute discussed various solutions to the current hiring dilemma with stakeholders at five regional meetings across the state. The solution that most resonated was development of internships to keep newly graduated RNs in the workforce and improve employability. Depending on the needs of regional employers, the proposed programs would be 12 to 18 weeks in length, and either include training for an acute area specialty (e.g., labor and delivery, emergency room, critical care, or operating room), a non-acute healthcare setting (e.g. long-term care, hospice, public and community health, or home health), or focus on developing more advanced generalist skills.

Cullen, E., Ranji, U. and Salganicoff, A. (2010). *Addressing the Nurse Shortage*. Washington D.C.: Kaiser Family Foundation, see www.kaiseredu.org/Issue-Modules/

The paper cites an AHA and AHCA estimate of the current nurse shortage (8%) based on current vacancies in long term care facilities and hospitals. The shortage is expected to grow and by 2025 to be twice as high as any shortage experienced since the 1960s. This article briefly summarizes the literature on what is causing the shortage and proposed strategies to fill it. Authors summarize current research on the causes of the shortage to be: 1) the steep population growth in several states 2) a diminishing pipeline of RN students, 3) a decline in RN earnings relative to other careers, 4) an aging RN workforce, and 5) an aging population that will require more services. They report that RNs' high levels of job dissatisfaction related to scheduling, workloads, mandatory overtime, and lack of responsiveness to concerns as main reasons for high turnover and early retirement among RNs. Finally, the authors summarize major past and present efforts underway to accommodate the demand for nursing care including the 2009 Recovery and Reinvestment Act and the 2010 Patient Protection and Affordable Care Act.

Dower, C., O'Neil, E. (2011). *Primary care health workforce in the United States*. Research synthesis report no. 22. Princeton, NJ: Robert Wood Johnson Foundation.

This report provides a synthesis of the research available on the US primary care workforce in the US (including MDs, DOs, NPs and PAs). It and a companion issue brief can be found at www.policysynthesis.org. The report covers the profile, supply and distribution of the US primary care workforce; the nation's primary care workforce needs and demands; effects of payment policies and market forces on primary care; effects of state scope of practice laws on primary care workforce supply and practice; and pressures being exerted on

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Goodell, S., Dower, C., O'Neil, E. (2011). *Primary care workforce in the United States. The Synthesis Project. Policy Brief No. 22.* Princeton, NJ: Robert Wood Johnson Foundation.

This issue brief provides summary of a companion report available at www.policysynthesis.org. Findings of an overview of published information on the primary care workforce (including MDs, DOs, NPs and PAs) in the US include: the maldistribution of primary care providers appears to be a more significant problem than overall shortage; state laws have increased the scope of practice of nurse practitioners and physician assistants although there is wide variation among states; and new practice models are redefining primary care.

Hansen, F. (2007) "Reorganizing the Recruiting Function". *Workforce Management Online.* <http://www.workforce.com/section/recruiting-staffing/feature/reorganizing-recruiting-function/>

The initial results from Kaiser Permanente's recruiting reorganization indicate that health care organizations can manage vacancy rates and generate recruiting efficiencies with the right recruitment function structure and new accountability programs. All health care organizations will have to step up their own market analysis and rescale their recruiting functions to meet the new demands of the market in the context of an increasingly severe labor shortage. A 2006 Bernard Hodes Group survey of 138 health care recruiters found that the average RN turnover rate was 13.9 percent, the vacancy rate was 16.1 percent and the average RN cost-per-hire was \$2,821. These already high numbers will rise as the market continues to tighten. The greatest shortage lies in registered nursing, where 17 percent of all jobs will remain unfilled by 2010, according to the

U.S. Department of Health and Human Services. Growth in entry-level baccalaureate nursing enrollment rose sharply from a 3.7 percent increase in 2001 to 16.6 percent in 2003, but plummeted to 5 percent in 2006, according to the American Hospital Association. At the other end of the supply equation, the average age of registered nurses is rapidly rising and mass retirements are projected from 2011 to 2020, according to survey data from the Bernard Hodes Group.

Knox, M., Dower, C., and O'Neil, E. (2008). *US Military and California Health Personnel: Select Comparisons.* San Francisco: UCSF Center for the Health Professions.

This report compares a select set of U.S. military health occupations with similar civilian health occupations in California, including nursing. Characteristics compared include job descriptions, education and training, legal scope of practice and certification or licensure requirements for individuals transitioning from military to civilian jobs.

Lin, V.W, Lee, A., Juracheck, S., Jones, D. (2006), "California Regional Registered Nurse Workforce Report Card". *Nursing Economics*, 24(6) 290-297.

The paper considers the metric RN jobs per capita across various regions of California. Authors claim that a per capita value allows comparisons to be made based on RN job "density," which is a useful measure of RN allocation and availability to the public. Authors constructed a grading rubric based on the 2004 national RN jobs per 100,000 general population and standard deviation among the 2004 RN jobs per 100,000 population values of each state and the District of Columbia. The majority of California's regions received a C- or D grade, indicating RN jobs per capita ratios substantially below the national value. The paper's results could be pointing out differences in the California health care labor force such as the use of alternative staff

and/or could be highlighting differences in the utilization rates of health care in California. Or, such comparisons may not prove to be useful when assessing California's needs as a fast growing state. The national variation in population growth rates may drastically overstate California's RN shortage. Perhaps it would be more useful to compare California's RN staffing rates to states with similar growth rates to California, not all states in the country or national averages.

Miller, J., Grumbach, K., and Mertz, E. (2002). *Nursing For The Public's Health: A Profile of Public Health Nurses in Five California Counties.* San Francisco: UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

Public health nurses (PHNs) make up the largest group of public health workers and are important health care providers for a variety of underserved populations, yet data about PHN demographics and practice are limited. This report provides data on the demographics of the PHN workforce in five counties in California; the educational preparation of the PHN workforce; the job market and employment issues for the PHN workforce; and the scope of PHN practice. Although the study was limited to five counties, these counties span a wide range of geographic areas in the state and are representative of the types of PHN systems in many California counties. Information about the PHN workforce in California can be useful for projecting future trends, shaping nursing education, and guiding public health practice. Demand for PHNs outstrips supply and PHN managers report difficulties recruiting for open positions. Authors recommend reforming PHN educational curricula to incorporate a greater population health focus. They report that most PHNs are educated in general nursing training programs that emphasize preparation for clinical practice and have minimal curricular requirements in community and public health. Even nurses with baccalaureate degrees are unlikely to have received substantial training in

epidemiology, organizational theory, public policy, and related subjects that are integral to public health practice. Equipping PHNs with the skills needed for a public health model of practice may require consideration of educational reforms such as joint RN and MPH degree programs and more intensive and sustained continuing education models.

Rickles, J., Ong, P.M., and Spetz, J. (2005) *California Policy Options: Supplying California's Need for Nurses.* Los Angeles: UCLA School of Public Affairs. p 101-115. <http://www.escholarship.org/uc/item/19x3w2ps>

The report provides an overview of the demand-side factors that influence the labor market for nurses, including the minimum nurse staffing regulation. It explores the sources of California's nursing stock and discusses the nursing shortage before concluding with some recommendations for augmenting the nursing supply. Authors conclude that "further investment in education and training, along with an exploration of new training paths, to push potential nurses through the structural bottleneck" are necessary to solve the nursing shortage

Spetz, J. (2006). *Regional Forecasts of the Registered Nurse Workforce in California.* San Francisco: UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

In most regions of California, authors found that there was a shortage of registered nurses, and shortages will grow over the next 25 years. This report presents forecasts of supply and demand for RNs in regions of California. In forecasting regional RN supply, this analysis takes into account the aging of the RN workforce, new graduates (including those from international nursing programs), intra-state movements of RNs, interstate flows of RNs, and changes in license status. The forecasts presented in this report demonstrate that

the nursing shortage varies greatly across California regions, but that all regions face a growing shortage over the next decades.

Spetz, J., Keane, D. and Herrera, C. (2009). *2008 Survey of Registered Nurses*. Sacramento: California Board of Registered Nurses.

The 2008 Survey of California Registered Nurses is the sixth in a series of surveys designed to describe licensed nurses in California and to examine changes over time. Other studies were completed in 1990, 1993, 1997, 2004, and 2006. Like the 2004 & 2006 surveys, the 2008 survey targeted two populations: (1) RNs with active California licenses who reside both in California and outside California, and (2) RNs whose California licenses had been renewed with inactive status in the previous two years or lapsed within the 13 months prior to the survey, but who still lived in California. The 1990, 1993, and 1997 surveys were sent only to RNs with active licenses and California addresses; these previous surveys did not include out-of-state RNs, RNs with inactive licenses, or RNs with lapsed licenses. Many of the key findings of the survey are reported above in Bates & Dower, 2010. Some additional findings reported in this document are the dominant reasons RNs do not currently hold nursing positions which are: retirement, childcare responsibilities, and family responsibilities. Authors also report that many nurses have temporarily or permanently left the field due to job dissatisfaction and stress on the job. Nurses note dissatisfaction with some specific aspects of their work, particularly the amount of paperwork required, lack of involvement in policy and management decisions, non-nursing tasks required, leadership from administration, and clerical support.

Spetz, J. (2009). *Forecasts of the Registered Nurse Workforce in California 2009*. Sacramento: California Board of Registered Nurses.

This report presents supply and demand forecasts for the Registered Nurse (RN)

workforce in California from 2009 through 2030. These forecasts were based on data from the 2008 California Board of Registered Nursing (BRN) Survey of Registered Nurses, the U.S. Bureau of Health Professions (BHP) 2004 National Sample Survey of RNs, and data extracted from the BRN license records. The 2009 forecasts indicate that the shortage of RNs identified in 2005 has narrowed, and will continue to narrow in the foreseeable future, provided that recent expansion of RN education programs is maintained.

Policymakers should be cautioned that the 2009 BRN forecasts were based on current data and trends; the factors that affect RN supply and demand are unlikely to remain static. Continuous tracking of factors that affect the nursing workforce allows the BRN to adjust supply and demand projections as needed, identify the degree to which California's workforce strategies have been successful in reducing the nursing shortage, and pinpoint new approaches to sustain progress in narrowing the gap between RN supply and demand. California leaders also should observe closely the employment paths of recent nursing graduates who are entering a difficult job market and may choose to leave the nursing profession. Moreover, they should watch new enrollments in nursing programs, which could drop as state colleges and universities face tight budgets and as potential students hear there might not be enough nursing jobs. California will need to maintain the present number of nursing graduates in order to meet long-term health care needs.

Tellez, M., Spetz, J., Seago, J.A., Harrington, C., and Kitchener, M., (2009) "Do Wages Matter? A Backward Bend in the 2004 California RN Labor Supply." *Policy, Politics, and Nursing Practice* 10(3): 195-203.

Using data from the 2004 California Board of Registered Nursing Survey, a two-stage least-square equation was estimated to examine the effect of wages on hours worked by female registered nurses. Wages were found to have a nonlinear effect on

hours worked, with a backward bending supply curve. Wages had a positive effect on the average hours worked per week up to \$24.99 per hour and a negative effect between \$30.00 and \$100.00 per hour when compared with the wage category of \$25.00 to \$29.99. Results suggest that wages are important to secure the labor supply but do not increase aggregate supply beyond a wage threshold.

2. Education

Allen, L. (2008), "The nursing shortage continues as faculty shortage grows." *Nursing Economics*, 26(1):35-40.

This article claims that academic nursing institutions are not adequately prepared for the influx of new applicants. The lack of faculty to educate the growing demand for baccalaureate-prepared RNs directly impacts the nursing shortage. The main reasons for the lack of faculty to meet the demand for more nurses include the increased age of the current faculty and the declining number of years left to teach, expected increases in faculty retirements, less compensation for academic teaching than positions in clinical areas for master's-prepared nurses, and finally, not enough master's and doctoral-prepared nurses to fill the needed nurse educator positions. The average age of nursing faculty in four year and graduate degree programs is 51.5 years and the rate of retirement will exceed the rate of replacements. (Tanner, 2006) Nurses typically enter faculty role later in life and retire earlier around 62.5 years. There needs to be more encouragement of those already teaching to remain in their positions while future faculty are trained. In addition, the author proposes five short-term and three long-term strategies to address the nursing faculty shortage. The article cites successful collaborations between hospitals and universities where hospital nursing staff serve as faculty on nights and weekends. They maintain their hospital positions and benefits and the school reimbursed the hospital for teaching hours at the faculty rate of pay. The effort provided clinical instruction for

more students, professional growth for the faculty and increased recruitment for the hospital.

American Association of Colleges of Nursing. (2011). "Despite Economic Challenges Facing Schools of Nursing, New AACN Data Confirm Sizable Growth in Doctoral Nursing Programs". Press release: <http://www.aacn.nche.edu/media/newsreleases/2011/enrollsurge.html>. Retrieved 2011-08-08.

Final survey data show enrollment in B.A. programs in nursing increased 5.7 percent in 2010. Accelerated nursing programs are important pathways into nursing for individuals with degrees in other fields seeking a nursing career. Enrollment in these programs increased 14 percent in one year. Accelerated master's degree programs are also available. Responding to the desire to have nurses continue their education, there was also an increase in enrollment in RN to baccalaureate programs by almost 22 percent. There is also a sizeable number of such programs under development nationally. The survey also reported an increase of seven new Clinical Nurse Leader master's programs with enrolment up 24.7 percent there are 88 programs nationwide. Another educational pathway to bring younger faculty and scientists into nursing is the Baccalaureate to Doctoral program. Seventy-three such programs are now available with another 13 under development.

The top reasons reported by nursing schools for not accepting all qualified students into entry level BA programs include: insufficient clinical teaching sites, lack of faculty, limited classroom space, insufficient preceptors, and budget cuts.

Bates, T., Chapman, S. and Dower, C. (2010). *Men of Color in California's Health Professions Education Programs*. San Francisco: UCSF Center for the Health Professions.

In this issue brief authors looked specifically at participation rates of men of color in health

professions education programs in California and found that the representation of African American and Latino men is significantly below what would be expected based on population rates. Representation in some professions has declined over time. The authors identify research and programmatic implications for policy, education and community leaders seeking to improve the situation. Representation of men of color in registered nursing programs in California has improved. Among the groups studied, Asian men improved their representation in nursing programs the most during the study period 1995 to 2008.

Spetz, J. and Waneka, R. (2010). *2008-2009 Annual School Report: Data Summary and Historical Trend Analysis*. Sacramento: California Board of Registered Nurses.

Each year, the California Board of Registered Nursing (BRN) requires all pre-licensure registered nursing programs in California to complete a survey detailing statistics of their programs, students and faculty. In this report, authors present nine years of historical data from the BRN Annual Schools Survey and describe trends in the data. All nine of the surveys used in the analysis include questions regarding program administration, student and faculty demographics, and student admission, completion and retention rates.

The study found that the number of pre-licensure nursing programs has grown by 42.3 percent from 2001-2009. New student enrollment more than doubled during this period. The rate of annual enrollment growth has stabilized, peaking at 25 percent in 2005/6 and slowing to lower rates, (between 14 and 2 percent) for the following three years. RN programs more than doubled the number of graduates from their programs since 2000/1. The statewide attrition rate was the lowest in 2008/9 compared to the previous 9 years at 14.7 percent. Authors claim that if the rate of program enrollment growth stabilizes and the attrition rate remains at current levels, the number of graduates from state programs will also stabilize in the next few years.

The number of nursing faculty has almost doubled since 2000/1. However, authors point out that new hires have not kept pace with the growth in the need for faculty. In 2008/9 181 faculty vacancies were reported amounting to a vacancy rate of 4.7 percent. Authors state that while this is the lowest in five years, programs will not be able to maintain or expand enrollments without adding more faculty members.

State of California, *The California Nurse Education Initiative Annual Report, March, 2009*.

The report describes the California Nurse Education Initiative and reports its progress to date. Governor Schwarzenegger launched the California Nurse Education Initiative in April 2005, in response to a critical shortage of Registered Nurses (RNs) in California. In the first year of the Initiative, the Governor and his partners found ways to build educational capacity to graduate an estimated 10,900 RNs to the workforce by 2010. Work groups operating under the direction of the Governor's Task Force, have met regularly since the inception of the California Nurse Education Initiative to continue to chart progress and identify needs for future change. The Initiative began as a five-year, \$90 million public-private partnership designed to expand nursing education capacity, faculty development, and student support services. In 2008, the program was extended with a new five-year, \$60 million partnership. The report details all the new educational programs launched by the initiative. Authors report the following statistics:

- More than 23,500 students are currently enrolled in California nursing programs, which reflects a 68.9 percent increase in new student enrollments in the past four years.
- 1,240 faculty members joined California nursing schools in the past four years, reflecting a 56 percent increase in nursing faculty for pre-licensure nursing programs.
- California currently has 131 nursing education programs, an expansion of 23 programs in the past four years.

- 9,580 Registered Nurses (RNs) graduated in 2008, reflecting an increase of over 54 percent in RN graduates over the past four years.

Wilson, S. (2009). *Making Sense of the Nursing Education Crises in California: A Program Planning Study Prospectus.* California Postsecondary Education Commission, Report 09-10, see www.cpec.ca.gov

This document lays out the plan for the Commission, a statewide planning and coordinating body, to produce a comprehensive plan for nursing education that addresses the issues pertaining to the nursing supply. They planned to first measure the current supply of nurses and compare that to the nursing demand projections from the Labor Market Information Division of the California Employment Development Department. They also plan to assess the contributions of the four systems of higher education on nursing education. They point out the new nursing program at UC Davis. The school will reach full enrollment by 2016-17 with 200 undergraduates, 200 master level students and 56 doctoral level students. The California State University System is currently planning a Doctor of Nursing Practice degree program. The Commission will assess and estimate the number and size of new public nursing degree programs that should be established and funded over the next ten years. The Commission will review the recommendations from the 2007 Legislative Analyst report on proposed nursing education efforts and advocate for those that are found to have policy value. In 2009-2010, the state budget provided \$3.6 million to fund 3 percent enrollment growth at the community colleges. The system can use those funds to expand enrollment in nursing or any other program.

3. Education Issues

Chapman, S. and Christian, S. (2009). *Career Programs for California's Pipeline of Secondary Students: An Opportunity to Address the State's Workforce Shortages.* San Francisco: UCSF Center for the Health Professions.

The study examined health career programs for the state's pipeline of secondary students. It revealed a broad range of program structures, including academy models, Regional Occupational Centers and Programs, magnets and stand-alone health professions high schools. Key barriers to making these programs more widely available to students include insufficient data surrounding the career programs' impact on students' academic and career outcomes; fragmented funding streams from a variety of state, federal and private sources; and teacher shortages, due in part to restrictive credentialing requirements. Authors point to earlier researchers' claim that California lacks a coherent strategy to integrate Career Technical Education (CTE) into high school education, hampering the state's ability to effectively use its resources to expand proven CTE programs to meet workforce goals. Consequently, they summarize, high quality programs are not sufficiently accessible to students, while some outdated programs that lack academic rigor and relevance to the labor market are still offered. Authors recommend that more attention must be placed on clarifying CTE objectives at the programmatic level, tracking progress towards those objectives, and coordinating efforts to replicate successful models. The report concluded that the programs hold great promise, despite the challenges.

Seago, J.A., Spetz, J., Chapman, S. and Dyer, W. and (2006). “Can the Use of LPNs Alleviate the Nursing Shortage?” *AJN, American Journal of Nursing* 106(7): 40-49.

LPNs may be able to help fill some of the gaps caused by the nursing shortage, but little research has been conducted on the demographic characteristics of LPNs, their education and scope of practice, and the demand for their services, all of which vary from state to state. In 2002 and 2003, the authors conducted a comprehensive national study, *Supply, Demand, and Use of Licensed Practical Nurses*, and have summarized that study's findings in this article. They found that RNs and LPNs are similar in age and tend to have similar numbers of children, but that racial and ethnic minorities, particularly African Americans, and those who are single, widowed, divorced, or separated, are better represented among LPNs. Expanding LPN educational programs might draw more people into nursing. Some LPNs would like to become RNs, so expanding LPN-to-RN “ladder” programs could also be beneficial. LPNs cannot replace RNs entirely, but they could perform much of the work now performed by RNs. While long-term care facilities already depend heavily on LPNs, hospitals could benefit from employing more LPNs. The authors make several specific policy recommendations to improve the education and employment of LPNs.

Wallace SP, Lee M, Price RM, Abbott P, Frank JC. (2010). *California Unprepared for the Aging of the Baby Boom – Cutbacks at the California State University System Reduce Workforce Readiness.* CGEC Issue Brief. Los Angeles, CA: UCLA California Geriatric Education Center, July. Available at <http://www.geronet.ucla.edu/index.php/cgec/overview/resources.html>

Coordinators and/or faculty in aging-related programs or courses at 22 California State University campuses were invited to participate in an online survey. Sixty-one of the 103 (59.2%)

invited individuals responded to the survey. The California State Universities (CSU) – trains the largest number of social workers, psychologists, program managers, policy analysts, nurses, and others who will staff the positions that current and future older adults rely upon. In FY2009-10, the 23 campuses of the CSU system lost \$584 million in state funding, resulting in salary and hiring freezes for faculty and staff, furloughs, and restrictions on student enrollment. Two out of every five gerontology faculty in the CSU's reported teaching more and almost half reported a decline in administrative support. This logically leads to high rates reporting work overloads.

The increased demands on fewer faculty and reduced resources also result in faculty reporting less professional development time. Over half reported that they will not be able to take advantage of faculty development programs and half will not be able to attend professional conferences. These changes, if they persist, will leave the skill and knowledge levels outdated among those who teach the next generation of gerontological professionals. Current budget cuts are worsening shortages at a time when we need to be educating more, not fewer, CSU students in issues of aging.

Waneka, R., Spetz, J. and Kaiser, J. (2009). *Evaluation of the Centralized Clinical Placement System and the Centralized Faculty Resource Center.* San Francisco: UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

Nursing schools have reported a lack of clinical placement sites and insufficient numbers of qualified nursing faculty as two of the prominent barriers to expansion of their nursing programs. The Centralized Clinical Placement System (CCPS) and the Centralized Faculty Resource Center (CFRC) are two systems that were implemented in the San Francisco Bay Area to help address these barriers to program expansion. Researchers at the Center for the Health Professions at the University of California, San Francisco evaluated these systems

and their impact on nursing student enrollments in the San Francisco Bay Area. Findings from the evaluation indicate that (1) there was an increase in the percentage of hospitals in the region that took students during non-traditional times (weekday off shifts and weekends), (2) a greater share of hospitals accepted students in high-demand clinical areas such as pediatrics and psychiatry, and (3) all clinical departments increased the number of weekly student hours. Analysis of both quantitative and qualitative data indicate that CCPS may have helped facilitate between 15.3 percent (n=218) and 20.6 percent (n=294) of the total increase in enrollment in nursing schools in the five-county Bay Area since 2004.

4. Scope of Practice

Christian, S., Dower, C. and O'Neil, E. (2007). *Overview of Nurse Practitioner Scopes of Practice in the United States – Discussion*. San Francisco: UCSF Center for the Health Professions.

The paper provides an overview of statutes and regulations governing the practice of nurse practitioners (NPs) across the 50 states. The profession originated in the mid-1960s in response to shortages of physicians (MDs). NP educational requirements, certification mechanisms and legal scopes of practice are decided at the state level and vary considerably. Unlike California, eleven states permit NPs to practice independently, without physician involvement. NPs in all states may prescribe, but MD involvement is generally required to varying degrees. Additional limitations such as 72-hour or 30-day supplies may apply. Specific practice authorities are sometimes articulated although states may require MD involvement for any task: 44 states explicitly authorize NPs to diagnose (sometimes limited to a nursing diagnosis); 33 states explicitly authorize NPs to refer; and 20 states explicitly authorize NPs to order tests. Education and certification requirements vary. Forty-two states require national certification as part of NP licensure.

Just over half of the states require NPs to be prepared with a master's degree, while some states only require completion of a few months of post-RN education. Authors conclude that preventing professionals from practicing to the full extent of their competence negatively affects health care costs, access and quality. Secondly, NP practices are impeded by scope of practice laws, financing and reimbursement mechanisms, malpractice insurance policies and outdated practice models. Finally, authors state that the professions and the public are ill-served when practice authorities differ dramatically among states.

Dower, C., and Christian, S. (2009) *Physician Assistants and Nurse Practitioners in Specialty Care: Six Practices Make It Work*. Oakland, CA: California HealthCare Foundation.

Physician assistants (PAs) and nurse practitioners (NPs) are increasingly being incorporated into outpatient specialty practices to improve access to care and reduce wait times. PAs and NPs also bolster the quality and financial profitability of specialty practices by allowing physicians to focus more on complex duties. Increasing workforce data and literature on PAs and NPs in specialty practices confirm the growth of these new models of care. This study examined the emerging models for the purpose of identifying replicable strategies and current challenges with focus on areas of particularly high demand: orthopedics, gastroenterology and dermatology. For example, the researchers found widespread utilization of PAs in orthopedics. They also discovered that the scarcity of postgraduate specialty programs for PAs and NPs was a major challenge to model implementation, while state scope of practice laws were generally not a hindrance. Moreover, the study reported that PAs and NPs strengthened care coordination in specialty practices by serving as both clinicians and communication links between patients and physicians.

Dower, C., Christian, S., and O'Neil, E. (2007). *Promising Scope of Practice Models for the Health Professions*. San Francisco: UCSF Center for the Health Professions.

Legal scopes of practice for the health professions exist in statutes enacted by the state legislature and in regulations developed and implemented by administrative agencies, such as health professions boards. The purpose of this brief is to examine scope of practice issues within the context of improving access to care in California. Out of the hundreds of differences in scopes of practice between California and other states, the authors highlight a small sampling and compare the California scopes of practice of four occupations to more expansive scopes of practice in other states or institutions. The authors discuss efforts to improve scope of practice decision-making.

5. Mandated Nurse Staffing Ratios

Aiken L.H, Sloane D.M, Cimiotti J.P., Clarke S.P., Flynn L., Seago J.A., Spetz J., Smith H.L., “Implications of the California nurse staffing mandate for other states”. *Health Services Research*. 2010, 45(2), 1-18.

This article compares nurse workload, attitudes and patient outcomes for hospital based nurses in California, New Jersey and Pennsylvania. Nurses in California cared for one fewer patient per shift than nurses in comparison states and two fewer on medical-surgical units. While California nurses had workloads in compliance with law, only 19 percent of med/surg nurses in New Jersey and 33 percent in Pennsylvania had workloads at or below the limit of five patients each. Nurse burnout, job dissatisfaction, intent to leave was significantly lower in California hospitals than in comparison states. Authors found that if nurse workloads were reduced in Pennsylvania and New Jersey to California levels, surgical deaths would be reduced by 11 percent and 14 percent respectively.

Harless, D.W., Mark, B. and Spetz, J. (2009). “California’s Minimum -Nurse-Staffing Legislation and Nurses’ Wages”. *Health Affairs*, web exclusive: w326-w334.

This article examines the wages of registered nurses before and after 2004 legislation that implemented minimum-nurse-staffing. Using four data sets—the National Sample Survey of Registered Nurses, the Current Population Survey, the National Compensation Survey, and the Occupational Employment Statistics Survey—authors found that from 2000 through 2006, RNs in California metropolitan areas experienced real wage growth as much as twelve percentage points higher than the growth in the wages of nurses employed in metropolitan areas outside of California.

Spetz, J., Chapman, S., Herrera, C., Kaiser, J., Seago, J.A. and Dower, C. (2009). *Assessing the Impact of California’s Nurse Staffing Ratios on Hospitals and Patient Care*. Oakland, CA: California Health Care Foundation.

This issue brief examines how California’s nurse staffing regulations affected different types of hospitals in order to probe what strategies were used to meet the ratio requirements; whether the ratios influenced hospitals’ financial performance; and what effect they had on improving patient care. The research combined quantitative and qualitative analysis, including interviews with executives and other management staff at 12 acute-care hospitals. The results show that while the legislation has increased the use of registered nurses, the ratios have had no clear impact on the quality measures that are associated with nursing care. The study also found no relationship between the staffing regulations and the overall decline in hospital operating margins that occurred after the law went into effect.

Spetz, J., Donaldson, N., Aydin, C. and Brown, D.S. (2008) "How Many Nurses per Patient? Measurements of Nurse Staffing". *Health Services Research*: 1475-6773.

Authors compared alternative measures of nurse staffing and assessed the relative strengths and limitations of each. They found differences in nurse staffing levels across data sets and specific methods of measuring nurse staffing, some of which were minor and some of which were notable. The greatest differences arise when unit-level data reported directly by nurse managers is compared with hospital-level aggregated payroll, accounting, or staffing data reported in administrative databases. California Nursing Outcomes Coalition (CalNOC), which collects unit level data, has begun to develop protocols for permitting other researchers to access the data, and CalNOC measures are now being used in the California Hospital Assessment and Reporting Taskforce (CHART) public reporting project. As data access barriers are addressed, these databases are likely to be more widely used, providing more information for our understanding of nurse staffing patterns and the relationship between nursing and patient outcomes.

It would be laudable to bridge the gap between the measure of nurse staffing used in decision making and policy—patient-to-nurse ratios—and the more-reliable hours per patient day, a firm linkage between these measures cannot be established at this time. More importantly, it is unlikely that the disconnect between these measures can be corrected in large, multihospital, multi-year databases. Whether this problem has important policy and decision-making ramifications at this time is unknown. It is important to recognize that significant and substantive differences were found between these commonly used and typically considered equivalent measures. Efforts to synthesize studies using these widely varied measures need to be undertaken with caution, noting that findings using one type of measure may not be comparable to those using other measures.

CALIFORNIA'S PHARMACY WORKFORCE

1. Supply & Demographics

Bates, T. and Chapman, S. (2008). *Diversity in California's Health Professions: Pharmacy.* San Francisco: UCSF Center for the Health Professions.

This issue brief presents a profile of California's current and projected population, selected health professions, and trended data describing pharmacy education programs in the state. In this brief authors present data describing key characteristics of the state's pharmacist labor force including income, age, gender, race/ethnicity, and trended enrollment data describing gender and race/ethnicity for students in California's seven Doctor of Pharmacy programs.

Bureau of Health Professions, Health Resources and Services Administration (2008). *The Adequacy of Pharmacist Supply: 2004 to 2030.* Washington D.C.: U.S. Department of Health and Human Services.

Authors developed a model, the PhSRM to examine the current and projected adequacy of pharmacist supply in the U.S. The model was used to generate forecasts of the future balance between supply and demand and provide a range of projected outcomes based on alternative scenarios that incorporate varying values for pharmacist education and productivity and demand for pharmaceuticals based on available research and expert opinion.

Authors state that the country has responded to earlier predictions of a growing shortfall of pharmacists, and to market forces that have raised pharmacist earnings, by expanding supply and increasing the use of technology and technicians. Still, the increase in supply will only be sufficient to keep pace with a rising demand due to changing demographics. Supply would need to increase further than currently projected to

meet the demand caused by growth in per capita consumption of pharmaceuticals. Improvements in productivity through further employment of pharmacy aides and technicians and the application of evolving technologies should continue to help the supply meet these increases in demand.

Authors point to the fact that the study focused on national supply and they recognize geographic disparities in access to pharmacist services. They also state that projections of future supply and demand are made with a good amount of uncertainty about the future need for pharmacists. They point to the following developments as having potentially large effects on the need/demand for pharmacists: advances in biotechnology and the impact of individualized drug therapy, the development of new drugs and the development of improved methods for ordering and dispensing medications. On the supply side, the following factors could have a substantial impact on projections: the number of new graduates could deviate from projections, work patterns can change towards desiring to work less and retirement patterns can change. Authors recommend updating projections every few years to reflect changes in policies and trends.

California HealthCare Foundation (2011). *California's Pharmacists and Pharmacy Technicians- California Health Care Almanac Quick Reference Guide.* Oakland. (See www.chcf.org.)

Factsheet compiles the most recent statewide summary data from the California Board of Pharmacy, the California Employment Development Department Industry, Occupation Matrix, IPEDS Completions Survey, California Department of Finance, E-3 Race/Ethnic Population Estimates. Some comparisons are made with national statistics. This factsheet provides a snapshot of the current supply, recent graduates and work settings of pharmacists and pharmacy technicians in the state.

Knox, M., Dower, C., and O'Neil, E. (2008). *US Military and California Health Personnel: Select Comparisons*. San Francisco: UCSF Center for the Health Professions.

This report compares a select set of U.S. military health occupations with similar civilian health occupations in California, including pharmacy. Characteristics compared include job descriptions, education and training, legal scope of practice, and certification or licensure requirements for individuals transitioning from military to civilian jobs

McRee, T. (2002) *Pharmacy staffing: A silent but critical concern*. San Francisco: UCSF Center for the Health Professions

Widely perceived shortages of pharmacists have been reported across California by a spectrum of providers. Advances in drug therapies and technology, the sheer number of prescriptions now written for American consumers, and an aging demographic likely to increase pharmaceutical usage has severely impacted the dynamics of supply and demand for pharmacy related workforces. This issue brief examines these critical workforce dynamics as well as national trends, challenges in rural areas, and diversity of both gender and ethnicity within the profession.

Midwest Pharmacy Workforce Research Consortium, MPWRC (2010). *2009 National Pharmacist Workforce Survey*. Alexandria: Pharmacy Manpower Project, Inc.

The Pharmacy Manpower Project, Inc. (PMP) was established in 1989 as a nonprofit corporation comprised of major national pharmacy professional and trade organizations. Its mission is to serve the public and the profession by collecting, analyzing, and disseminating data regarding the size and demography of the pharmacy practitioner workforce and conducting and supporting research in areas related to that workforce.

Data were collected from a random sample of 3,000 individuals selected from a list of 249,381 licensed pharmacists in the United States. A response rate of 52 percent was obtained. Authors' results suggest that there was an increase in the proportion of licensed pharmacists actively practicing pharmacy between 2004 and 2009 and the proportion increased to a level that was similar to pharmacist work participation levels seen in 2000. Although a greater proportion of pharmacists were actively practicing pharmacy, the FTE contribution of pharmacists did not increase between 2004 and 2009 mainly due to increasing rates of part-time work among male and female pharmacists and no significant increase in hours worked among pharmacists working full-time and part-time.

One explanation for the increase in the proportion of pharmacists actively practicing pharmacy was the economic downturn in 2008 and 2009. As the economy impacted other business sectors, pharmacists working in other fields or not working at all may have decided to enter the pharmacy workforce, either on a full or part-time basis, to shield themselves and their families from the impact of the bad economy.

The prevalence of part-time work by actively practicing pharmacists has been an increasing trend since 2000. Working part-time has been an attractive option for male and female pharmacists because the demand for pharmacists has been high, allowing pharmacists to choose the amount they will work. In 2009, the economic downturn and reactions from pharmacist employers likely contributed to the rate of part-time work by pharmacists. Roughly one-third of hospitals and chain settings restructured schedules and some settings reduced hours in reaction to the economy. It will be important for workforce researchers to track the rate of part-time work among pharmacists as the number of new pharmacy graduates increases and the economy rebounds. The work contribution of retirement age pharmacists has been a significant factor in the dynamics of the pharmacist workforce.

Regarding work contributions, full-time pharmacists in 2009 devoted 55 percent of their time to medication dispensing, 16 percent to patient care services, 14 percent to business/organization management, 5 percent to education, 4 percent to research, and 5 percent to other activities. Sixty-eight percent of pharmacists rated their workload level at their place of practice as high or excessively high, which is an increase of 14 percentage points compared to 2004 (54%).

Penfil, B., and Mertz, E. (2005). *The Pharmacy Safety Net in California*. San Francisco: UCSF Center for the Health Professions; UCSF Pharmacy Leadership Institute.

Authors find that the growing number of uninsured and underinsured and the continually increasing use and cost of drugs are outpacing the expertise and size of the current safety net pharmacy workforce. Despite many skilled and dedicated pharmacists, potentially fewer patients will have access to the care they need and the safety net pharmacy workforce will be unable to meet the needs of its patients. Two recommended interventions are outlined – pharmacist education and the establishment of a formal organization – that will enable pharmacists to apply their unique and badly needed expertise to the challenges faced by safety net institutions.

University of California, Health Sciences Committee (2004). *Pharmacy Education and the University of California – Final Report*. Oakland, CA: UC Office of the President.

This report examines state and national pharmacy workforce projections; provides commentary on the scope of practice for licensed pharmacists; reviews educational programs, application and enrollment trends, and pharmacy licensure requirements in California; and presents findings and recommendations regarding future steps the University of California (UC) might take in

addressing current and projected state needs with respect to the pharmacy workforce.

2. Education

Bates, T., Chapman, S., and Dower, C. (2010). *Men of Color in California's Health Professions Education Programs*. San Francisco: UCSF Center for the Health Professions.

It has long been known that certain ethnic and racial groups are underrepresented in the health professions. Authors looked specifically at participation rates of men of color in health professions education programs in California and found that the representation of African American and Latino men is significantly below what would be expected based on population rates. The representation of African American and Latino men in Pharmacy school has persisted since 1995 and the representation of Asian American men has decreased. The representation of Latino men also reportedly grew slightly among pharmacy students between these years. There were two African American male graduates of pharmacy school in 1995 and 10 in 2008. However, authors point out that this is only half of what would be expected based on their representation in the population of California.

Cohen, J.L. (2009) "Today's Mandate for Pharmacy Deans: Anticipating Change" *American Journal of Pharmaceutical Education*. 73(1), Article 19 pp.1-7.

This paper examines the challenges and opportunity facing leaders of pharmacy schools today. The author refers to a task force from 2000 that looked at the pharmacy workforce in year 2020, predicting reduced direct involvement of pharmacists in dispensing and a major increase in the number of pharmacists required to provide direct and indirect patient care. He cites recent policy papers by national pharmacy societies that stated that a minimum of 1 year of residency training

will be required of all pharmacy graduates doing direct patient care after 2020. However he states subsequent policy discussions at the American Pharmacy Association diluted the mandate as a direction for education without a specific timeline. The author states that the field is still debating the role of the pharmacist and trying to create educational approaches that balance the dispensing role with the one that is purely patient care. He cautions that this is happening at a time when pressure to reduce health care costs is growing and carved out drug benefits represent easy targets for cuts. He states that pharmacy leaders must exert leadership to assure that pharmacists succeed in becoming full members of the health care team who are recognized and compensated for adding value. He stresses that resolving these issues of the future role of the pharmacist are key in terms of curricula, faculty recruitment and retention, commitment to scholarship, and amassing the requisite resources and infrastructure needed to meet societal needs and the profession's institutional and collegiate goals.

3. Scope of Practice

McRee, T. (2003). *Pharmacy technicians in California: Snapshot of an emerging profession*. San Francisco: UCSF Center for the Health Professions.

The pharmacy technician profession is experiencing rapid change and growth, mirroring changes in the pharmacy profession and in pharmaceutical treatment. In fact, authors report it is one of the fastest growing occupations nationally. This issue brief examines the growth and evolution of this profession as it has emerged over the last 10 years in retail, hospital, and other pharmacy settings. Critical issues and policy concerns for the profession are the debate over increased authority for technicians, easing mandated staffing ratios of technicians to licensed pharmacists, and the possibility of raising educational requirements.

CALIFORNIA'S DENTAL WORKFORCE

1. Supply & Demographics

Anderson, J., Patterson, A., Temple, H., Inglehart, M. (2009). “Lesbian, Gay, Bisexual, and Transgender (LGBT) Issues in Dental School Environments: Dental Student Leaders’ Perceptions”. *Journal of Dental Education*. (73): 105 – 118.

Article summarizes a recent study of US and Canadian dental schools focused on assessing the educational environment for LGBT topics and issues. Authors surveyed student leaders at the schools who self-identified as LGBT or as heterosexual on their perceptions of the extent to which they felt their dental education prepared them to treat LGBT patients and their perceptions of the institutional environment as it regards LGBT issues. The authors found that student leaders do not feel that dental schools are preparing students to treat patients with a non-heterosexual orientation, and that in 75 percent of the participating schools student leaders could not list a single course in which they’d received information about treating LGBT patients. The authors also note that most student leaders reported a more positive perception of the institutional commitment to diversity from the parent university, compared to the dental school.

Barzagan, N., Chi, D., and Milgrom, P. (2010) “Exploring the potential for foreign-trained dentists to address workforce shortages and improve access to dental care for vulnerable populations in the United States: a case study from Washington State.” *BioMed Central (Online)*, see: <http://www.biomedcentral.com/1472-6963/10/336>

Authors state that the study is the first to examine the potential role that foreign-trained dentists can have on addressing dental workforce shortages and improving access to dental care for vulnerable

populations. The authors used dental license and Medicaid license data for the state of Washington from 2006 to 2008 to compare the proportions of newly licensed, foreign- and U.S.-trained dentists who participated in the Medicaid program and the proportions that practiced in a dental HPSA. The study found that significantly lower proportions of newly licensed, foreign-trained dentists participated in the Medicaid program than newly licensed, U.S.-trained dentists. Second, among newly licensed dentists who participated in the Medicaid program, there was no significant difference in the proportions of foreign- and U.S.-trained dentists practicing in a dental HPSA.

Authors discuss the possibility that their findings relate to dental school debt. Earlier research shows that school debt influences recent graduates’ practice behavior. A 2004 study conducted by the American Dental Education Association found that 90 percent of dental school seniors graduated with a mean student debt of \$135,721. In the early 1970s, the Institute of Medicine found that dental education subsidies were unnecessary, as the rate of return on dental education was large and subsidies did not yield more dentists who served the poor. Consequently, the cost of dental education has continued to increase, leading to a concomitant rise in indebtedness. It is unknown if foreign-trained dentists have greater student debt than U.S. trained students.

Authors state that all states should systematically collect data on newly licensed foreign- and U.S.-trained dentists. These data should be easily linkable to Medicaid claims data for individual providers so that state Medicaid programs can be evaluated and compared. Effective programs could then be identified and promulgated in other states. In addition, future research efforts should be directed at collecting qualitative data from newly licensed dentists to identify the factors associated with the decision to treat vulnerable populations. A 2001 study found that newly graduated dentists in Louisiana were more likely to be active Medicaid

providers than established dentists, which suggests that Medicaid participation is highest during the earliest years of practice.

Washington State licensure rules are not as restrictive as they were prior to 1985, when they were changed. This study found that almost one fifth of newly licensed dentists were foreign trained which is larger than the recent national estimate of 17 percent. The paper cites an earlier study that 17 percent of dentists who passed the NBDE Part II Nationwide between 2002 and 2005 graduated from a non-U.S. dental school. Authors report that while other States such as Maryland, Massachusetts, and California have recently implemented innovative programs that make it easier for foreign-trained dentists to obtain licensure, there are no published evaluation data on these programs, making it too difficult to compare findings. Future research and policies should be aimed at understanding how licensure policies for foreign-trained dentists can help to reduce disparities in access to dental care for vulnerable populations in the U.S., identifying the behavioral factors that drive newly licensed, foreign trained dentists to treat vulnerable populations, and elucidating the ethical implications of state dental workforce policies on the oral health of citizens in other countries.

Bates, T. and Chapman, S. (2008). *Diversity in California's Health Professions: Dentistry*. San Francisco: UCSF Center for the Health Professions.

In this issue brief authors present data describing key characteristics of the state's dentistry (DDS) labor force including age, gender, race/ethnicity and income, and trended enrollment data describing gender and race/ethnicity for first-year enrollments in California's five DDS programs. The study found that White and Asian populations were overrepresented among active dentists in California when compared with their proportional representation in the labor force in 2005/6 and Latino, African American and others were under represented.

Authors summarize the factors that contribute to recruitment of minority students to dental school from the literature. They state that an important one is a student's perception that the clinical rotation experience meaningfully enhances the "ability to care for diverse groups." This suggests that dental programs that highlight the role of cultural differences in treatment planning as part of the clinical education may be more successful in recruiting minority students. Another factor found to contribute to the successful recruitment of minority students is the presence of minority clinical faculty, which presents challenges given that the pool of available of minority faculty is directly related to the pool of minority dental students; in both cases they are comparatively small. Given the lack of minority faculty, one alternative may be well-designed mentorship programs that foster relationships between students and practicing professionals in the community.

Authors cite two efforts to address minority student representation in California's dental schools: 1) the California Dental Pipeline Program sponsored by The California Endowment and 2) the Summer Medical Dental Education (SMDEP) programs funded by the Robert Wood Johnson Foundation. The Dental Pipeline Program is a comprehensive effort to reduce racial/ethnic disparities in oral health care, which includes addressing the lack of racial/ethnic diversity in the profession of dentistry and dental education programs in California. The SMDEP program recruits freshman and sophomore college students from local and regional institutions to participate in an intensive academic preparation program each summer, hosted by UCLA's schools of medicine and dentistry. The program targets students who identify with a population group that is underrepresented in medicine or dentistry, or who come from an economically disadvantaged background, and who express interest in pursuing a career in one of these professions. There are other smaller scale efforts to broaden racial/ethnic diversity in dentistry being made by individual institutions. These are often summer enrichment programs that target high school or college students who identify with populations

underrepresented in the profession. Authors state that a diverse professional workforce may be a key strategy to addressing oral health disparities suffered by minority and low-income populations in California.

Authors conclude that while private foundations will play an important role in helping to finance these kinds of public health objectives, the scale of the effort required must have state support. They state that some mix of public and private funding will be key to engaging these wide-ranging issues.

Bolin, K.A. (2010), *Survey of Health Center Oral Health Providers*. Denver: National Network for Oral Health Access, see: www.nnoha.org.

NNOHA worked with Baylor College of Dentistry in 2009 to develop and administer a survey of Health Center dental providers. The survey sought to obtain information on salaries, provider satisfaction and recruitment and retention strategies at Health Centers throughout the U.S. The survey response rate was 51 percent for providers and 43 percent for executive directors. The survey found that 80 percent of dentists and 93 percent of hygienists planned to remain in their Health Center positions. Almost 40 percent of executive directors surveyed reported having at least one dentist vacancy and of those, 52 percent had been unfilled for more than six months. The majority had been in practice for 10 years or longer, with a high number of them coming to the health center right out of training. The authors conclude that many “intangible” factors contribute to providers’ satisfaction with their health center positions. The author found that dentists who report directly to the CEO and not the medical director stated that they: 1) had sufficient administrative and clinical support, 2) adequate facilities and equipment, and 3) were more likely to indicate that they would stay at the health center. The author summarized that “daily work environment and reporting structures” that ensure a “stronger sense of autonomy and satisfaction among providers” could improve

recruitment and retention rates in community health centers.

Brunson, W.D., Jackson, D., Sinkford, J., Valachovic, R. (2009). “Components of Effective Outreach and Recruitment Programs for Underrepresented and Low-Income Dental Students”. *Journal of Dental Education*. (74): S74 – 86.

Article describes the types of structural and organizational approaches to improve minority recruitment undertaken by fifteen US dental schools participating in the Pipeline, Profession and Practice: Community-based Dental Education Programs sponsored by the Robert Wood Johnson Foundation and The California Endowment. Successful components include high-level administrative support; alignment of goals and resources among different administrative units with a natural role to play in student recruitment, admissions and in-program support; and the coordination of both short-term and long-term outreach efforts, which included mentoring, financial assistance, and collaborative partnerships with other stakeholders (e.g. other dental schools in the region, or the medical school within the same institution).

California Dental Association (2007) *International Dental Graduates*. See: http://www.cda.org/advocacy_&_the_law/issues_&_policies/international_dental_graduates.

Describes the regulatory history of California with regards to dentists trained in other countries seeking to practice dentistry in the state. The paper states that “demographics of internationally-trained dentists residing in the state are unknown, e.g., number, country of origin, years in practice, years in U.S.” Authors describe the Welcome Back Centers, funded by the California Endowment which seek to build a bridge between the pool of internationally trained health workers living in California and the need for linguistically

and culturally competent health services in underserved communities. Centers are located in San Francisco, Los Angeles, and San Diego, and offer counseling, support, and educational programs to internationally trained physicians, nurses, and dentists. In addition to orientation and support in obtaining the appropriate professional credentials and licenses for their profession, clients are presented with alternatives to consider, for example choosing a different health occupation offered through a community college. Because the actual number of internationally-trained health care professionals living in California is not known, the centers continue to gather data to learn the number of these health professionals in California, and what have been the barriers that professionals have experienced in trying to practice their profession or enter the health care delivery sector.

Formicola, A., D'Abreu, K., Tedesco, L. (2010) “Underrepresented Minority Dental Student Recruitment and Enrollment Programs: An Overview from the Dental Pipeline Program”. *Journal of Dental Education*, 2010 (74): S67 – 73.

Article provides an overview of the experience of thirteen US dental schools who participated in the Pipeline, Profession and Practice: Community-based Dental Education Programs sponsored by the Robert Wood Johnson Foundation and The California Endowment, and their efforts to increase the enrollment of underrepresented minority students. The article notes that while schools participating in the Pipeline program were successful in dramatically increasing the number of minority student enrollments, non-participating schools have experienced almost no change in minority enrollment, despite the substantial increase in the number of minority applicants. Summer enrichment programs and post-baccalaureate programs aimed at preparing students for the academic challenges of dental school were noted as being particularly effective components of the Pipeline program.

Guthrie, D., Valachovic, R. W., Brown, J. (2009). “Impact of New Dental Schools on the Dental Workforce Through 2022”. *Journal of Dental Education* 73(12) 1353-1360.

Following a wave of dental school closures from 1986 to 2001 and a perceived shortage of dentists, three new dental schools were established between 1997 and 2003, and eight more are in various stages of planning and development to open over the next decade. Conditions are changing rapidly, and several institutions have stated intentions to open new dental schools since this analysis. This article presents a supply-side analysis of the impact of the new schools on the effective dentist to population ratio, taking into account changes in graduation rates, retirement rate, population growth, productivity, and gender ratio of the profession. Demand-side factors, including utilization, per patient expenditures, and case mix, are addressed, as well as the implications of these changes on access to care and the future of the profession. Given approximately ten new schools by 2022, an additional 8,233 graduates will have joined the workforce, or approximately three dentists per 100,000 people. Effective dentist to population ratios vary greatly depending on all of the factors addressed. Changes in productivity influence the effective ratio most significantly. Most probable scenarios for the dental workforce suggest a stable dentist to population ratio at minimum, with an increase likely given recent productivity changes. Authors state that the increase in dentists will not noticeably improve access to care for low-income and rural populations absent additional public funding to support demand for these populations and concurrent measures to effect even distribution of dentists throughout the country. They explain that effective long-term policy solutions to the access to care problem must involve practicing dentists. They say “placing this burden squarely on the shoulders of new graduates—typically saddled with upwards of \$200,000 in debt—is quixotic thinking and is as unlikely to produce success”. Authors also state that dentistry must assess how new dental schools will fit into dental education. Authors urge the profession

to support research, “since dentistry’s legitimacy as a learned profession depends on its commitment to the scientific basis of clinical practice.”

Institute of Medicine (2009). *The U.S. Oral Health Workforce in the Coming Decade – Summary of a Workshop*. Washington D.C.: National Academies Press.

A workshop was held February 9-11, 2009, jointly sponsored by the California HealthCare Foundation and the Health Resources and Services Administration to consider the current status of access to oral health services and which workforce strategies hold promise to improve access. Challenges in the education and training of the future oral health workforce include consideration of what types of students to recruit, how to train students of different professions together, and how to encourage commitment to community service. Regulatory challenges include the lack of national standards for scopes of practice, conflicts of interest in the regulation of professions, and the lack of sufficient workforce data to inform these decisions. Financial challenges include the high costs of dental care and the need to redesign the financing system around prevention and disease management. Lastly, other challenges include the lack of general standards for quality assessment and the lack of attention to appropriateness or effectiveness of care. On the topic of international workforce innovations, panelists discussed the long history of the use of dental therapists in many parts of the world, noting the evidence for both the quality and cost-effectiveness of their care. Other topics included shifts in the education and training of dental professionals in other countries to accommodate the needs of the population. Panelists then described a variety of workforce strategies to increase access to oral health services in the United States through new types of professionals, changing the roles of current professionals, or developing new systems of care. Models included the community dental health coordinator, the dental health aide therapist, the oral health practitioner, registered

dental hygienists in alternative practice, virtual dental homes, the Oral Health Impact Project, health commons, and the pediatric oral health educator. However, challenges to implementing these models include tensions between individual professions and the inability to align many of these models with current scope of practice laws and financing systems.

Knox, M., Dower, C., and O’Neil, E. (2008). *US Military and California Health Personnel: Select Comparisons*. San Francisco: UCSF Center for the Health Professions.

This report compares a select set of U.S. military health occupations with similar civilian health occupations in California, including dentistry; characteristics compared include job descriptions, education and training, legal scope of practice and certification or licensure requirements for individuals transitioning from military to civilian jobs

Mertz, E., Anderson, G., Grumbach, K., and O’Neil, E. (2004) *Evaluation of Strategies to Recruit Oral Health Care Providers To Underserved Areas of California*. San Francisco: UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

This report evaluates the impact of the multitude of programs in California to recruit and retain oral health care providers in underserved areas in California to care for underserved populations. Authors highlight the following data needs to better assess the oral health workforce:

They state that data on participants and program impact is lacking. Many questions were unanswered. They recommend collecting the following data on practice patterns of:

- Foreign Dental Graduates, International Dental Program graduates & Welcome Back Center users

- Registered Dental Hygienists in Alternative Practice and other allied providers as appropriate
- Participants of the Robert Wood Johnson Pipeline Professions & Practice Program
- Licensure by Credential Applicants
- Providers finishing a general practice residency
- Graduates of a high school mentoring, recruitment of post-baccalaureate program.

Mertz, E. & Bates, T. (2008). *Registered Dental Hygienists in California: Regional Labor Market Chart Book*. San Francisco: UCSF Center for the Health Professions.

This study provides labor market information for registered dental hygienists (RDH) in California, specifically providing a look at labor market dynamics at the regional level. Results support data showing a trend toward increased supply statewide, but regional analyses show variation at the regional level. Analyses show a wide range in the baseline supply of RDHs (20.2 to 47.9 per 100,000 population) and growth (-.4 percent - 33.6 percent between 2002 – 2005). Additionally there is variation in relational supply, supply projections and perceptions of supply. In most regions no single indicator is sufficient to understand the nature of the labor market due to contradictory indicators. The labor market contracted between 2000 and 2005 and the San Joaquin Valley, Greater Sacramento, Northern Sacramento Valley, Central Sierra, Central Coast, and Inland Empire experienced the most significant impact. Barriers to employment varied regionally including inability to find a satisfactory work environment, extended travel time (in rural areas), and inability to fill specific day needed (more common in urban regions). Increase in RDH programs and graduates has led to a decrease in out-of-state educated workers, although the Bay Area, Southern Border, Northern California East and West, and Northern Sacramento Valley continue to report higher than average out-of-state educated RDHs. Lack of consistent data on geographic distribution

of dentists and dentists' employment patterns of RDHs make it impossible to determine whether projections indicate too many, too few or enough RDHs in the future. This situation is further complicated by variations in utilization of RDHs by dentists. This variation and mismatch leads to some under-employment of RDHs, which varies by region. Across the state, many younger graduates report difficulty finding full employment when first entering the labor market. An area that may pick up this slack are non-traditional work settings (community health and public health settings) which may provide alternatives to work in traditional dental offices. The long-term effect of the economic downturn also remains to be seen for both the supply and demand of RDHs.

Pendleton, D., Graham, B. (2010). "The Role of Dental School Environment in Promoting Greater Student Diversity". *Journal of Dental Education*. 74(10): S98 – 109.

This article describes the strategic initiatives undertaken at the University of Illinois at Chicago College of Dentistry over the past ten years to promote an institutional culture that supports underrepresented minority students and faculty, and the associated challenges. These include establishing a minority faculty recruitment program and a faculty mentoring program; formation of student centers for diversity that support social, cultural and academic activities aimed at enhancing student life and reinforcing the value of cultural identity; and establishing institutional committees led by students, staff, and faculty that give voice to groups that have been historically marginalized. The article acknowledges that one of the biggest challenges faced by efforts to improve student and faculty diversity is the lack of student and faculty diversity itself.

Pourat, N., and Nicholson, G. (2009). *Distribution and Characteristics of Dentists Licensed to Practice in California*. Los Angeles: UCLA Health Policy Research Center.

California has about 14 percent of the total number of dentists nationwide—the largest percentage of any state. This fact sheet provides county-by-county estimates of the distribution and characteristics of California's more than 31,000 licensed dentists, spotlighting dental health professional shortage areas and noting key demographic trends. This fact sheet presents a snapshot of licensed and actively practicing dentists in California in the third quarter of 2008. However, authors state that changes in licensure, practice status, and reported practice location of dentists continuously occur, leading to discrepancies with data obtained in other time periods.

Price, S., Grant-Mills, D. (2009) “Effective Admissions Practices to Achieve Greater Student Diversity in Dental Schools”. *Journal of Dental Education*. (74): S87 – 97.

This article reviews the specific admissions strategies to increase the number of underrepresented minority and low-income student enrollments undertaken by schools participating in the Pipeline, Profession and Practice: Community-based Dental Education Programs sponsored by the Robert Wood Johnson Foundation and The California Endowment. These include integrating an understanding of the importance of community outreach to minority and other underserved populations into the school's mission; and emphasizing qualitative attributes of applicant candidates such as leadership experience, volunteerism, social background, overcoming challenges, and persevering despite challenges, in addition to the standard quantitative measures.

Sinkford, J., West, J., Weaver, R., Valachovic, R. (2009) .“Modeling Mentoring: Early Lessons from the W.K. Kellogg/ADEA Minority Dental Faculty Development Program”. *Journal of Dental Education*. (73): 753 – 763.

This article summarizes key lessons from the ADEA Minority Dental Faculty Development Program (MDFD) that was implemented at six participating US dental schools beginning in 2004. The program was designed to address the severe shortage of underrepresented minority faculty members at US dental schools. The authors list two factors that most contribute to the successful development of a URM candidate for an academic dental position as supporting URM candidates with a strong mentor, and a visible commitment to diversity by institutional leadership.

Wells, A., Brunson, W.D., Sinkford, J., Valachovic, R. (2011). “Working with Dental School Admissions Committees to Enroll a More Diverse Student Body”. *Journal of Dental Education*; 75(5): 685 – 695.

This article outlines the evolution of the ADEA Admissions Committee Workshop, which exists to help admissions committees at US dental schools understand the value of, and develop strategic plans to improve, student body diversity. The article includes selected student data highlighting trends in minority applications to, and enrollments in, US dental schools, and details the types of changes in admissions processes that schools have undertaken in response to the challenge of recruiting and retaining students with diverse cultural and socio-economic backgrounds.

2. Defining Shortage

Orlans, J., Mertz, E., and Grumbach, K. (2002). *Dental Health Professional Shortage Area Methodology: A Critical Review*. San Francisco: UCSF Center to Address Disparities in Children's Oral Health; UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

This report explores the history of Dental Health Professional Shortage Areas (DHPSAs), critiques the current designation criteria, and provides recommendations for the next steps in revising these criteria. DHPSA designation is currently a prerequisite for participation in a variety of state and federal programs designed to increase access to services, in particular the National Health Service Corps. These criteria should ideally be feasible for local administrators to implement and consistent with the public health goal to designate underserved populations based on unmet clinical need. The authors state that evaluating the need for dental care across California is a daunting task since there are currently no readily available statistics on disease prevalence, utilization, or productivity. They state that “the dual policy goal of generating meaningful designations while at the same time simplifying the designation process will necessitate a compromise between accuracy and feasibility given the current lack of infrastructure to collect requisite data.” The authors lay out a rational approach to revising the health shortage designation processes.

Mertz, E., Manuel-Barkin, K., Isman, B and O'Neil, E. (2000). *Improving Oral Health Care Systems in California: A Report of the California Dental Access Project, 2000*. San Francisco: UCSF Center for the Health Professions.

This report seeks to make sense of the complex issues that must be considered and addressed to improve access to oral health services in California. Authors found that the epidemic of

oral disease reported in California is caused by lack of preventive oral health care for underserved populations. Further, they state disease often goes untreated because a sizeable population cannot access dental care. There is a shortage of providers who will treat those who need it most. Authors point to research that shows the dangers of poor oral health to overall health status. The most common oral health problems they report are entirely preventable. Authors claim that fundamental shifts in the entire system are necessary to impact the epidemic of oral disease in California. Recommendations are made for tangible action steps that can be taken to manage the changes that are needed, including fostering partnerships and collaborative efforts, using resources more efficiently and instituting evidence-based models.

3. Education

Bates, T. and Chapman, S. (2007). *Tracking the Supply of Health Professions Education Programs in California*. San Francisco: UCSF Center for the Health Professions.

Information from California's professional and vocational education programs are a key link in estimating the supply of workers for individual health professions. The principal objective of this project is to map the “education link” in California's supply chain for selected health professions. This project included three main components: selecting specific health professions, identifying institutions in the state of California that train these professionals, and reporting data on the number of graduates of these training programs.

Bates, T., Chapman, S., and Dower, C. (2010). *Men of Color in California's Health Professions Education Programs.* San Francisco: UCSF Center for the Health Professions.

Authors looked specifically at participation rates of men of color in health professions education programs in California and found that the representation of African American and Latino men is significantly below what would be expected based on population rates. Representation in some professions has declined over time. The number of Latino men trained in CA dentistry and pharmacy schools did not change in the past 15 years; the number of African American men increased slightly. Authors highlight a program operating in San Diego high school health and sciences career academies identified several key challenges and critical resources required for success, including the need for parental involvement, for industry and education partnerships, the need to be more inclusive of ESL students, and to recognize the additional burden placed on teachers in terms of time and resources.

Researchers recommend that studies continue to evaluate the range of efforts to improve the outcomes for young men of color in education and in health careers and to scale up successful efforts. They point to a need to develop targeted initiatives to maximize high school completions for men of color, including reliance on health care high school pipeline programs, to provide the foundation for health care careers. They see a need to adapt basic skills preparation programs to the needs of men of color to increase success in post-secondary education and professional work. They recommend studies that explore and assess enrollment and completion rates in community colleges by health professions degree type. Further, they see a need to develop programs in specific geographic communities to establish and strengthen community colleges and educational support systems. Finally, they would like to see pilot programs in targeted communities including

collaborations between workforce investment boards, high schools and community colleges aimed at young men of color in health professions education programs.

University of California, Health Sciences Committee (2004). *Dental Education and the University of California.* Oakland, CA: UC Office of the President.

Report provides an overview of the dental health workforce and dental training programs in California in light of current problems stemming from oral health disparities. They recommend strategies to: 1) reduce barriers to access to dental care for all Californians, 2) continue educational efforts to increase diversity of oral health workers and practice choices of dentists, 3) develop and support interdisciplinary strategies with other health professional schools such as medicine and dental hygiene, and 4) undertake new faculty recruitment and retention strategies.

4. Scope of Practice/Models of Care

Mertz, E. (2008). *Registered Dental Hygienists in Alternative Practice: Increasing Access to Dental Care in California.* San Francisco: UCSF Center for the Health Professions.

Registered Dental Hygienist in Alternative Practice (RDHAP) became recognized as a new dental profession in California in 1998. The RDHAP can practice unsupervised in homes, schools, residential facilities, and in Dental Health Professional Shortage Areas. This study reports on the process of development and implementation of the RDHAP and the impact on dental care. The RDHAP workforce is drawn from and is demographically similar to the RDH workforce. Though they tend to be more educated, more diverse, work longer hours, and work in non-traditional settings caring for underserved populations. RDHAPs must contend with the challenges of building their own business while

working within the regulatory and fiscal health care environment. Professional independence and a focus on underserved populations allow RDHAPs to reach individuals and communities that may be unable to access dental care and develop collaborative practice models with dental, medical, and nursing professionals across variety of settings. RDHAPs develop data collection systems to track patient outcomes and serve to educate individuals, families, caregivers and health providers on the importance of oral health and dental hygiene. The author suggests several policy recommendations to reduce barriers to alternative dental practice. State policy makers could reform the system of reviewing and changing scope of practice and specifically expand the scope of practice for RDHAPs and other allied dental professions. Policies to enhance financing systems are recommended to allow for more flexible and appropriate billing mechanisms for RDHAPs as a business. More research can be done and policy enacted to develop better quality measures and health outcomes measures for the oral health community. The state should encourage development of new models of care delivery with attention to alternative providers such as RDHAPs. In particular, RDHAPs that work in long term care settings show the capability and need for collaborative care across various providers and settings. Finally, overall workforce development efforts should prepare them to work collaboratively with oral and medical providers across multiple settings.

Pourat, N., Roby, D.H., Wyn, R. and Marcus, M. (2005). *Is There a Shortage of Dental Hygienists and Assistants in California? Findings from the 2003 California Dental Survey*. Los Angeles: UCLA Center for Health Policy Research.

This report uses data derived from a survey of 13,600 general dentists throughout California and constructs a picture of private dental practice in California; including staffing levels, wage and benefits, patient populations, and experiences in utilizing Allied Dental Health Professionals

(ADHP). Surveyed dentists reported on the length of time to hire these ADHP, their perceptions of a shortage, and the impact of this shortage on their practice. In this report, delays in hiring dental hygienists and dental assistants are used to define a workforce shortage. The report also details various aspects of experienced shortages by examining geographic distributions where shortages may be more problematic and where efforts to alleviate shortages may be focused. Authors found that in 2003, half of dentists employed hygienists. Approximately half of those experienced delays in hiring these personnel. Shortages of dental assistance were experienced by 20 percent of all California dentists. In addition, authors reported an increased demand for dental services between 1997 and 2004. The proportion of adult Californians who visited the dentist increased by 11 percent, expenditures for dental care increased by 19 percent and the proportion of Californian's covered by dental insurance increased by 18 percent.

5. Supply Issues - Dentist Wage and Medi-Cal Reimbursement

Borchgrevink, A., Snyder, A. and Gehshan, S. (2008). *Increasing Access to Dental Care in Medicaid: Does Raising Provider Rates Work?* Washington D. C.: National Academy for State Health Policy.

This paper examines the outcome of reforms that six states undertook to increase dentists' participation in Medicaid. All of the states examined included increases in provider rates as well as other program enhancements. The authors looked at whether the efforts at better administration and outreach mattered as much as the rate increases in improving access to Medicaid dental care. The research indicates that while increases in provider payments were necessary to the success of the states' reform efforts, they were not sufficient to produce substantial gains in either dentist participation or patients' access to care.

The authors conclude that in addition to raising reimbursement rates, Medicaid agencies must also revamp their administrative procedures and build partnerships with dental societies. Authors of the paper claim that based on the states examined, dental rates need to at least cover the cost of providing service, which is estimated to be 60 to 65 percent of dentists' charges, to have an impact on Medicaid participation. They also found that working with patients and their families about how to use dental services is a core element of many state level reforms. They found that states have successfully used case management, educational brochures, and patient support provided by contractors to reduce barriers and address one of dentists' chief complaints. In the six states examined, provider participation increased by at least one-third, and sometimes more than doubled, following rate increases. Not only did the number of enrolled providers rise, but so did the number of patients treated. Authors note, however, that despite meaningful gains in provider participation and access achieved by these "front-runner" states, the portion of children receiving services is still far below the experience of privately-insured children. Data from 2004 show that 58 percent of privately insured children received dental services, while in these six states – after substantial effort and investment – 32 to 43 percent of children covered under Medicaid received dental care. Authors stress that this points to the need to explore other solutions as well.

Zuckerman, S., Williams, A. and Stockley, K. (2009). *Medi-Cal Physician and Dentist Fees: A Comparison to Other Medicaid Programs and Medicare*. Washington D.C.: The Urban Institute.

This report compares 2008 Medi-Cal dentist fees for selected procedures with fees paid by other states' Medicaid programs. The report authors found that low average Medi-Cal reimbursement extends to dental care, with fees for most procedures falling short of those for Medicaid

nationally. They report fees for adult and child cleanings were set at \$40 and \$30 which are above 95 percent of the national average. However, fees for crowns and extractions were lower, 81 and 76 percent of the national average. Fees for bitewing x-rays and periodic oral evaluation were paid the lowest at approximately 75 percent the national average fee. These comparisons contrast dramatically with New York, six of the seven dental fees surveyed were well above the national average. The average national fees still fall well below the commercial rates for the services.

6. Demand - Dental Coverage Considerations

Maiuro, L.S. (2010). *Denti-Cal Facts and Figures*. Oakland: California Health Care Foundation.

When estimating demand for dentists, the consideration of dental coverage is a factor as it affects the proportion of the population seeking and those needing dental care. Eight million Californians are covered by the Medi-Cal program for their health care. Denti-Cal is the dental coverage within Medi-Cal. The almanac covers the organization of Medi-Cal's fee-for-service dental program in 2007, how it was funded, and the demographics of the population it served. It identifies the challenges the program faces in continuing to make dental care available to children, and the potential consequences of leaving a large segment of the adult Medi-Cal population with no care at all.

Authors found the following:

- Just 25 percent of Medi-Cal beneficiaries reported a dental visit in 2007;
- Medi-Cal dental provider reimbursement rates are among the lowest in the nation, and are significantly below the fees charged by most dentists;
- Because of these low rates, as well as the elimination of adult dental benefits, only 24

percent of California's private dentists accept Medi-Cal dental reimbursement, down from 40 percent in 2003; and

- While research suggests that serious gum disease is associated with premature birth and low birth weight, only one in seven pregnant women with Medi-Cal coverage had a dental visit in 2007.

Pourat, N. (2009). *Dental Insurance in California: Scope, Structure, and Availability*. Oakland: California Health Care Foundation.

This issue brief examines the basic structure of dental insurance to illustrate how it enables Californians' access to dental care. Authors point out that unlike health insurance, there is a much smaller risk of catastrophic financial loss in the absence of dental insurance. This might be the primary reason for differences in coverage and scope of benefits between health and dental plans. The author's analysis found that approximately 61 percent of Californians have dental insurance, compared to 65 percent nationally. Among Californians with dental insurance, the great majority has it through employment. However, he found that only 34 percent of employers offer dental benefits in California. This proportion has remained relatively stable since 2003. The author states that acceptance rates of employer sponsored dental insurance are not available. He quotes estimates that 5 percent of Californians have privately purchased dental insurance. The analysis finds that private dental coverage is dominated by PPO and indemnity plans, while public plans employ extensive authorization requirements to control service use. It concludes that coverage limitations and higher levels of cost-sharing are likely to increase disparities in access to oral health services between Californians of lower socioeconomic status and those with higher incomes. The author also cautions that the new dental plan designs, such as low premium, high-deductible plans could also lead to delays of less urgent basic services allowing problems to escalate into more serious conditions that require more expensive procedures in the insured population.

CALIFORNIA'S ALLIED HEALTH WORKFORCE

National Publications

Association of Schools of Allied Health Professions, National Network of Health Career Programs in Two Year Colleges (2002). *Confronting Allied Health Education Challenges in the 21st Century.* Washington DC.

The report provides a summary from a roundtable discussion between ASAHP and NN2 around issues of allied health education. This discussion includes addressing declines in student enrollments, obstacles to developing and maintaining an adequate supply of competently prepared allied health practitioners, and ways to produce a workforce that mirrors diversity of the US population. Various obstacles and proposed solutions were addressed. Marketing strategies could be improved when targeting allied health programs and professions. Recruitment and retention remains a challenge for allied health professions. Enhanced distance learning opportunities, quality, and overall greater support is needed. Encouraging partnerships with industry and community is suggested to improve enrollment and retention. Tackling diversity issues is a key component, and specifically fostering cultural competence with regard to patient populations served. Finally, respondents look to see an evolution of allied health disciplines and development of innovative programs to better meet demand.

Committee on the Future Health Care Workforce for Older Americans, Institute of Medicine (2008) *Retooling for an Aging America: Building the Health Care Workforce. Chapter 5: The Direct-Care Workforce.* <http://www.nap.edu/catalog/12089.html> (Accessed February 22, 2011).

The chapter provides a description of the direct-care workforce – nurse aides, home health aides and

personal and home-care aides – which serves as a critical component of the formal health care deliver system for older adults. Synthesizing national data from public databases along with selected research publications, the authors highlight employment outlook, supply, demand, turnover, wage outlook, training, and recruitment/retention in providing a comprehensive look at the national direct-care workforce. Findings from the data show direct-care workers are poorly paid, obtain little to no formal training, have no discernible career ladders, and have high turnover rates. Recruitment and retention of this workforce is an ongoing challenge. With rapidly increasing demand due to the aging population, need for a sustainable direct-care workforce is reaching a crisis state. Authors provide recommendations to improve the state of this workforce including: increased pay and benefits, enhanced education and training requirements and capacity, improved work environment, increased professional recognition, developed career ladders, coordinating care across direct-care (and related) workers, increasing use of technology, and improving safety for workers.

Dower, C., O'Neil, E. (2011). *Primary care health workforce in the United States. Research synthesis report no. 22.* Princeton, NJ: Robert Wood Johnson Foundation.

This report provides a synthesis of the research available on the US primary care workforce in the US (including MDs, DOs, NPs and PAs). It and a companion issue brief can be found at www.policysynthesis.org. The report covers the profile, supply and distribution of the US primary care workforce; the national's primary care workforce needs and demands; effects of payment policies and market forces on primary care; effects of state scope of practice laws on primary care workforce supply and practice; and pressures being exerted on the primary care workforce to evolve. It concludes with policy implications for state and federal policy makers to consider.

Goodell, S., Dower, C., O'Neil, E. (2011). *Primary care workforce in the United States. The Synthesis Project. Policy Brief No. 22.* Princeton, NJ: Robert Wood Johnson Foundation.

This issue brief provides a summary of a companion report available at www.policysynthesis.org. Findings of an overview of published information on the primary care workforce (including MDs, DOs, NPs and PAs) in the US include: the maldistribution of primary care providers appears to be a more significant problem than overall shortage; state laws have increased the scope of practice of nurse practitioners and physician assistants although there is wide variation among states; and new practice models are redefining primary care.

Knox, M., Dower, C., and O'Neil, E. (2008). *US Military and California Health Personnel: Select Comparisons.* San Francisco: UCSF Center for the Health Professions.

This report compares a select set of U.S. military health occupations with similar civilian health occupations in California, including allied health; characteristics compared include job descriptions, education and training, legal scope of practice and certification or licensure requirements for individuals transitioning from military to civilian jobs

National Center for Health Workforce Analysis (2005). *The Clinical Laboratory Workforce: The Changing Picture of Supply, Demand, Education, and practice.* Washington DC: US Department of Health and Human Services <http://bhpr.hrsa.gov/healthworkforce/reports/clinical/default.htm> (Accessed February 22, 2011).

The report addresses and examines concerns of clinical lab workers, educators, professional organizations and regulatory agencies regarding the shortage of clinical lab workers nationally. Authors found somewhat conflicting data around the supply of and demand for this workforce. On the one hand, increases in salaries were thought to be an

indication of workforce shortage. However, survey data indicated that the number of the vacancies across the clinical lab workforce were decreasing. Data suggest that lateral mobility and movement among existing workers, rather than increases in the overall supply, may account for the decrease in vacancies.. An increase in enrollment in educational programs was attributed in part to the targeting of non-traditional students, displaced workers, and underrepresented minorities, as well with the opening or reopening of programs following a period of closures and declining enrollment. At the time the article was written, questions still remained around the future roles and utilization of, and demand for clinical lab workers.

Schindel, J., Cherner, D., O'Neil, E., Solomon, K., Iammartino, B. & Santimauro, J. (2006). *Workers Who Care: A Graphical Profile of the Frontline Health and Health Care Workforce.* Princeton, NJ: Robert Wood Johnson Foundation.

The report consists of a primarily graphical chartbook intended as a reference piece for national and state researchers, workforce planners, and policy-makers. The report first provides a national overview of the occupational outlook for the frontline workforce (consisting of 32 allied health occupational categories). Next it provides graphical comparisons showing occupational variation across the frontline workforce and the broader health care workforce. Finally, the report provides individual occupational profiles across each of the fifty U.S. states, highlighting occupational projections, growth, and wage data. The frontline workforce is a large and fast-growing workforce with significant demand along with critical shortages in many occupations. To address these issues, industry leaders are encouraged to create new practice models and policies, assist transition to new models through investment in care and service management technologies, create enhanced career ladders, create collaborative team-based work practice, and develop new strategic partnerships with labor and professional organizations.

Seavey, D. (2004). *The Cost of Frontline Turnover in Long-Term Care*. Washington DC: Better Jobs Better Care: Institute for the Future of Aging Services.

This report focuses on the costs of turnover in the long-term care workforce. It examines the magnitude and bottom line impact of turnover on provider finances and its overall effect on the quality of services provided to consumers of long-term care. The author proposes a framework for identifying the costs of frontline turnover by pulling out different elements that should be tracked in order to arrive at reliable cost estimates. Addressing the actual cost of turnover in this manner would have implications in three areas: provider practice, national/state policy and future research. There is a need for providers to identify the true cost of turnover and provide careful calculations of turnover rates in order to properly engage in efforts at reduction in turnover through investment in effective retention strategies. At the national and state policy level, long-term care agencies rely heavily on Medicare and Medicaid to finance operations, thus the financing structure for long-term care makes turnover a budgetary concern at the state and national level. As such it is important to develop methods at the state and national level to monitor turnover costs across all long-term care settings, and determine which policies have the greatest impact on reducing turnover, increasing retention, and reducing overall associated societal costs, leading to an overall stabilization of the direct-care workforce. Finally, improved research with statistical/fiscal measures of turnover costs is needed to examine the link between turnover and care quality, and to improve understanding of the relationship between turnover rates and other relevant variables (e.g. compensation).

California Publications

Bates, T. & Chapman, S. (2007). *Tracking the Supply of Health Professions Education Programs in California*. San Francisco: UCSF Center for the Health Professions.

The report captures data on graduates of specific health care professional and vocational programs to in order to provide data around the “educational link” in California’s supply chain for health professions. Professions profiled in the report include data from medicine, dentistry, nursing, pharmacy and allied health professions (physical therapy, respiratory therapy, clinical laboratory science, medical radiography, radiation therapy, nuclear medicine, and diagnostic medical sonography). Profiles for each profession include a summary of labor market information, maps displaying location of schools and a range of the number of graduates per year, and graphs of education trend data over time. Authors conclude with a summary of key themes that emerge from the supply data. Changes in regulatory environment play a key role in shaping the supply of graduates from health professions educational programs. Educational opportunities are clustered in the Bay Area and/or Los Angeles area for many of the profiled health professions. For most of the profiled professions, the ratio of professionals per general population in California is smaller than it is nationally. Median wages are higher for professionals in California than nationally for most of the profiled professions. With a few exceptions, the rates of projected growth in employment for California and the US are similar for the profiled professions. Workforce data for allied health professionals are sometimes unattainable, or aggregated or collapsed into more general occupational categories. Finally, authors found that educational data for allied health professions is generally not well reported.

Bates, T. & Chapman, S. (2008). *Diversity in California's Health Professions: Physical Therapy*. San Francisco: UCSF Center for the Health Professions.

This issue brief presents key demographic characteristics of California's physical therapist workforce. California's increasingly diverse population, with 90 percent of population growth projected to occur among Latino and Asian populations, underscores a need for a more racially and ethnically diverse healthcare workforce. Data from 2005-2006 show that females outnumber males by nearly 2 to 1; and the physical therapist workforce is predominantly White (65%) and Asian (21%) compared to just 57 percent of the general workforce. The Hispanic/Latino population is underrepresented, at 8.5 percent of physical therapist labor force (compared to 34 percent of general labor force) as is the African American population (2.7 percent of the physical therapist labor force compared to 6 percent of the general labor force). Native American, Native Hawaiian and Pacific Islanders and multiracial physical therapists are represented in proportions roughly equal to their representation in the general labor force. Despite the underrepresentation of some minority groups, however, the California physical therapist workforce is substantially more diverse compared to the physical therapist workforce nationally. In terms of educational demographics, the gender breakdown among graduates increasingly favored females and showed decline in the percentage of male graduates. Data suggest that as educational programs eliminated the BA degree, the proportion of male physical therapists declined. With some proportional fluctuations, data show the overall level of racial/ethnic diversity in graduates is increasing over time, with Asian students showing the biggest gain in the past 10 years, doubling graduate numbers. Achieving a diverse physical therapy workforce is a national policy focus (through the American Physical Therapy Association), but no current initiatives or policies appear to exist specific to California. The

authors suggest the creation of student enrichment programs to support students planning to enter health professions, such as physical therapy, with specific focus on mentorship and other pre-professional guidance to assist in building a diverse workforce.

Bates, T. & Chapman, S. (2009). *The Utilization of Medical Assistants in California's Licensed Community Clinics*. San Francisco: UCSF Center for the Health Professions.

This issue brief examines the patterns in community clinic utilization of medical assistants from 2005 – 2007. Licensed community clinic sites have grown significantly in number and patient volume in the past several years. Data showed that urban clinic numbers have increased significantly and patient volume has grown rapidly as well. The overall number of rural clinic sites has remained stable, but patient volume has grown. As numbers of clinics and volume of patients has grown, the use of medical assistants in community clinics has increased. Utilization of medical assistants varies across clinic sizes and locations. A greater proportion of rural clinic sites consistently report the use of medical assistants, relative to urban clinics. The statewide total of full-time employed medical assistants increased 30 percent from 2005-2007, with medical assistants representing half of all clinical support staff utilized by licensed primary care clinics. Rural clinic sites are more likely to have reported use of medical assistants, but they also reported fewer medical assistants per primary care provider. However, data showed that beyond a certain patient volume, the utilization of medical assistants diminished relative to primary care providers.

Bates, T., Hailer, L. and Chapman, S. (2008). *Diversity in California's Health Professions: Current Status and Emerging Trends.* Oakland, CA. Berkeley, CA: The Public Health Institute, the UC Berkeley School of Public Health, and The California Endowment (Los Angeles).

The report provides a current picture of diversity in the health workforce, educational pipeline, using current and projected population as a benchmark to measure diversity in the health workforce through collection and organization of publicly available data. The authors highlight trends and implications for meeting California's current and future health workforce needs. The report provides available data for physician/surgeons, registered nurses, dentists, pharmacists, psychologists, social workers, radiologic technologists, and respiratory therapists. The authors recommend an increased state-wide investment in coordinated and maintained data collection systems that would lead to enhanced knowledge about the health care workforce, students in the health care workforce pipeline and state and regional populations. The state should require all licensing boards to regularly maintain current databases that capture race/ethnicity, practice location, locale and patient population details. Consistent race/ethnicity categories must be used across data collection efforts to ensure meaningful comparisons. Health professions schools should a) provide better tracking of race/ethnicity for applicants, enrollees, graduates and non-completers; b) conduct targeted research on underrepresented students in terms of application, enrollment, graduation and successful entry into workforce, and c) track employment of program graduates, especially where multiple career tracks are possible. Finally, there should be efforts across the health care industry to collect and report demographic data in a coordinated manner

Briggance, B. (2003). *Chiropractic Care in California.* San Francisco: UCSF Center for the Health Professions.

This research brief provides an overview of the chiropractic workforce in California. Many chiropractors consider the profession to be within the scope of "primary care" yet others consider it as complementary or alternative medicine, and there continues to be a debate within and around the practice. Chiropractors work primarily in isolation, not in collaboration with other professions. The number of licensed chiropractors tripled in last thirty years, although California has seen falling enrollment in the last decade. The demand outlook for this workforce is more difficult to assess. The use of services appears to be by slightly skewed toward older (50 and up) individuals, thus demand could rise with the aging population. However there is no clear data to predict this. Geographically, this workforce tends to cluster in rural and suburban areas rather than urban.. One study found that chiropractic practices located in rural health care shortage had higher patient volumes than those outside those areas. This workforce is severely lacking in diversity, with 80 percent of the workforce male and almost exclusively White. The population currently enrolled in chiropractic colleges is slightly more diverse with 35 percent minority and 35 percent female student enrollment. Graduates must attend an accredited chiropractic college. Curriculum and structure are similar and standardized across institutions. To practice, licensure is required through the State Board of Chiropractic Examiners, and licenses must be renewed annually with additional hours of Continuing Education required. The scope of practice for chiropractic practice is clearly delineated in the Board's *Laws and Regulations Related to the Practice of Chiropractic*. This occupation faces a few challenges primarily around status and scope of practice. There is an ongoing debate whether educational requirements should be six-years (thus not requiring a four-year BA degree) or eight-years as it currently stands. There

are internal issues around the identity of the field, specifically whether it is equivalent to “primary care” or considered a more specific health service. There has been some legislative debate whether physical therapists’ scope of practice should be expanded to include some chiropractic-related spinal adjustments, with the chiropractic workforce looking to maintain a more strict scope of practice. There is also ongoing dialogue and debate around the overall cost-effectiveness of chiropractic care

California HealthCare Foundation (2011).
California’s Clinical Laboratory Scientists and Technicians. Oakland, CA.

This almanac quick reference guide provides graphical summaries of occupational data on clinical laboratory scientists from the Bureau of Labor Statistics and licensure candidates from the California Department of Public Health, Laboratory Health Services. In California, the growth of clinical laboratory scientists between 2001 and 2009 is lower than the national average (1.1 percent in California, 14.8 percent nationally), while the growth for medical/clinical technicians is much higher than the national average (14 percent in California, 3.7 percent nationally). Wages for clinical lab scientists/technicians are higher in California, though the disparity and growth is more prominent for clinical laboratory scientists than for technicians. Licensure candidates have declined overall in the past 25 years, through 2005. There has been a slow rise in licensure nationally since 2000, but very minimal growth in California.

California HealthCare Foundation. (2011).
California’s Imaging Professionals. Oakland, CA.

This almanac quick reference guide provides graphical summaries of occupational data on diagnostic imaging professionals (focused on diagnostic medical sonographers, nuclear medicine technologists, radiation therapists, and radiologic technologists) from the Bureau of Labor Statistics, IPEDS and the American Registry of Radiologic

Technologists. Radiologic technologists show the most significant growth across these occupations nationally between 2001 and 2009. However, in California, diagnostic medical sonographers and radiation therapists showed the most significant growth., although their overall numbers are relatively small. Wages for all diagnostic imaging professionals are higher in California than for the rest of the nation. The numbers of first time licensing exam candidates doubled for radiologic technologists and nuclear medicine technologists between 2001 and 2009.

California HealthCare Foundation. (2011).
California’s Health Diagnostic Treatment Therapists. Oakland, CA.

This almanac quick reference guide provides graphical summaries of occupational data on occupational therapists, physical therapists, respiratory therapists and speech-language pathologists from the Bureau of Labor Statistics, IPEDS and Department of Consumer Affairs. Physical therapists show the most significant growth nationally, while respiratory therapists and speech-language pathologists showed more significant growth in California relative to the rest of the nation. Between 1999 and 2009, the BA degree in both occupational therapy and physical therapy was phased out, resulting in an increase in MA and Doctoral degrees. This resulted in an overall decrease in degrees awarded for occupational therapists. For physical therapists however, there was a decrease in MA degrees and a significant increase in doctoral degrees, resulting in an increase in overall degrees awarded. Degrees awarded in respiratory therapy have doubled in this timeframe, with degrees from for-profit schools tripling since 1999. Degrees in speech-language pathology increased slightly. Wages for these occupations are higher in California relative to national wages. These occupations show a range of diversity with speech-language pathologists the least diverse and respiratory therapists the most diverse of health diagnostic treatment therapists.

California HealthCare Foundation. (2011). *California's Pharmacists and Pharmacy Technicians*. Oakland, CA.

This almanac quick reference guide provides graphical summaries of occupational data on pharmacists and pharmacy technicians from the Bureau of Labor Statistics and IPEDS database. Growth in the pharmacist profession between 2001 and 2009 has been lower in California (7.3%) than nationally (19.8%). The pharmacy technician workforce has shown immense growth both nationally (60.2%) and in California (53.7%). Attendance in pharmacy schools shows a decline in California and an increase nationally. The number of pharmacy and pharmacy technician schools has grown since 1999, with the number of for-profit pharmacy technician schools tripling. Wages for both occupations are higher in California than they are nationally. Demographic breakdowns of graduates show that pharmacy graduates are predominantly Asian (64%) and White (20%). Pharmacy technicians are much more diverse however (34 percent Latino, 22 percent African American, 20 percent White, 10 percent Native American, and 13 percent Other). Work setting is unique for these healthcare professionals, with 55 percent of pharmacists and 67 percent of pharmacy technicians practicing in retail settings, and the remainder primarily in hospitals.

California HealthCare Foundation. (2011). *California's Physician Assistants*. Oakland, CA.

This almanac quick reference guide provides graphical summaries of occupational data on physician assistants from the Bureau of Labor Statistics, IPEDS, California EDD Industry-Occupation Matrix and the Physician Assistant Committee Medical Board of California. The growth of physician assistants in California between 2001 and 2009 has more than doubled (61.7%) and is significantly higher than growth nationwide (36.8%). Median wages have grown slightly less in California relative to the rest of the nation,

although median wages in California remain higher than the rest of the nation. The vast majority of physician assistants work in ambulatory care services (85%), with the remainder in hospitals (14%) and government (1%). There appears to be some clustering of physician assistants in more rural areas, with greater numbers per 100,000 people relative to more urban areas. The physician assistant population shows some diversity, with White, Asian, and African American workers just slightly overrepresented compared to the total California population and Latino workers still underrepresented (White 43 percent, Latino 21 percent, Asian 17 percent, African American 7 percent, and Other 11 percent).

California Hospital Association (2009). *Allied Health: Hidden Health Care Workforce*. Sacramento, CA.

Results from a survey of hospital and health systems members reveal two allied health professions (excluding nurses) currently have the greatest impact on access to care and on hospital efficiencies when vacancies exist: clinical lab scientists and medical imaging professionals. Key issues and barriers to supply for these occupations include insufficient number of accredited educational programs in California, faculty shortages and inadequate numbers of clinical training sites. Additionally these occupations face limited programs in rural areas, limited distance learning opportunities across allied health occupations, and a lack of visibility and awareness of allied health professions among young people. The authors provide the following recommendations: a) preserve and protect funding for California institutions of higher education, b) incentivize public-private partnerships specifically around education and training for the allied health workforce, c) eliminate geographic barriers so statewide shortages can be addressed, and finally, d) ensure clear educational pathways with adequate support to ensure students move toward degree completion and on to certification and/or licensure.

California Hospital Association. (2011). *Critical Roles: California's Allied Health Workforce California Hospital Association Allied Health Workforce Survey*. Sacramento, CA.

This report consists of findings from a web-based survey targeting California Hospital Association member hospitals. The survey focused on obtaining information on vacancies, impact of vacancies, changes in employment status, hiring freezes, workforce age and expected retirements, and long-term concerns about workforce supply. The survey found the five largest non-nursing FTE professions were: respiratory therapist, pharmacist, pharmacy technician, radiological technologist, and clinical lab scientist. Respondents reported the occupation whose vacancies had the most significant impact was pharmacists. Following this in importance were physical therapists, respiratory therapists, and lab technicians (clinical lab scientists, nuclear medicine technologists, ultrasound technologists, MRI technologists, radiological technologists and CT technologists). Respondents' top concerns regarding supply of allied health occupations were the aging workforce and the unknown impact of health care reform. The authors provide the following recommendations: a) preserve and protect state funding for California's public institutions for higher education, b) protect funding for California's community college workforce preparation programs, c) provide better alignment of programs with industry demand, d) standardize prerequisite courses across health sciences to allow ease of transfer from one college to another, e) improve articulation between California's institutions of higher education, f) develop innovative models for educating and training allied health professionals, and finally, g) streamline processes to alleviate any unnecessary barriers to clinical training.

Chapman, S., Bates, T., O'Neil, E., Chan, M. and Donini-Lenhoff, F. (2008). *Teaching Cultural Competence in Allied Health Professions in California*. San Francisco: UCSF Center for the Health Professions.

This research brief is aimed at assessing the availability of cultural competence curricula in allied health programs in California. While the Allied Health Education Programs (CAAHEP) require cultural competence be included in curriculum, there is little information to determine compliance, or assess content of courses. Data gathered from the American Medical Association Health Professions Career and Educational Directory (2005) was analyzed, focusing on data from 342 allied health programs in California. Of these programs, 37.5 percent reported having some cultural competence curriculum in their programs (the report further provides a breakdown by occupation). There was a great deal of variation in the number and the types of courses available across programs and institutions. This data did not allow for analysis of program content, but subsequent research could focus on details around course content and an assessment for how well these programs are doing to meet cultural competency needs.

Chapman, S., Chan, M. & Bates, T (2010). *Medical Assistants in Community Clinics: Perspectives on Innovation in Role Development*. San Francisco: UCSF Center for the Health Professions.

The research brief presents findings from interviews with individuals from ten community clinics across California that were characterized as using medical assistants in innovative and expanded roles. There was consensus among respondents that most medical assistant education programs do not adequately prepare students for the actual roles and responsibilities they take on in community clinics. Respondents reported two primary types of expanded roles medical assistants were increasingly

taking on in clinics. The first sees medical assistants in expanded roles as experts in chronic disease and patient management, taking on patient-centered preparation, education, and management tasks before, during and after visits (e.g. immunization specialist, referral coordinator, panel coordinator, health educator, diabetes follow-up coordinator, family planning specialist). A second expanded role involved promoting individuals into medical assistant roles with greater responsibilities such as a lead medical assistant, team coordinator, medical assistant trainer, electronic health record “super user,” and emergency preparedness coordinator. Respondents were encouraged by the outcomes of adopting innovative medical assistant roles, yet there is work to be done to get clarity on the limitations, opportunities, preparation and oversight needed for these expanded roles.

Chapman, S., Marks, A. & Chan, M. (2010). *The Increasing Role of Medical Assistants in Small Primary Care Physician Practice: Key Issues and Policy Implications.* San Francisco: UCSF Center for the Health Professions.

This research brief highlights the evolving role of medical assistants in solo/small primary care practices. The research summarizes the background, training, and certification of medical assistants and assesses gaps in training, highlighting the impact gaps may have on quality of care. Findings indicate that numbers of medical assistants are rapidly growing, and demand rising, as provider practices contend with an aging population. Yet there is very little regulation or standardization of education and certification of medical assistants. Medical assistants are a critical part of solo/small offices but high turnover impacts the success of practices. Despite their crucial role, little attention is paid to recruitment and retention of these workers. While medical assisting is one of most ethnically and racially diverse healthcare occupations, there are few career advancement opportunities for medical assistants.

Authors recommend several steps to address the needs of this workforce. It is important to improve the quality of and access to affordable medical assistant educational programs. Additionally, improvements must be made to the health care career ladders for medical assistants, while also helping to improve diversity in other health professions. Efforts should be made to develop, encourage and support on-the-job training opportunities. Better information can be provided to solo and small practices about the role and scope of practice for medical assistants. Physicians and medical assistants should jointly be educated on the breadth and importance of culturally competent care. Efforts could be made to establish a regional mechanism for solo and small practice physicians to access and share information about the best ways for reducing medical assistant turnover. The medical assistant's role can be enhanced to improve practice performance. Finally, there is an opportunity to engage medical assistants as partners in pay-for-performance activities in solo and small practices to further integrate and incentivize them in providing high quality and efficient care.

Christian, S. & Chapman, S. (2009). *Career Programs for California's Pipeline of Secondary Students: An Opportunity to Address the State's Workforce Shortages.* San Francisco: UCSF Center for the Health Professions.

The research brief explores different types of health career programs accessible to secondary students in California. The report examines current data on the availability, funding and impact of Career Technical Education (CTE) health programs resulting in identification of opportunities to target this potential pipeline of students in order to alleviate future health workforce shortages. Key findings center on the fact that in order to effectively increase California health workforce supply through high school health career programs, CTE objectives must be clearer at the programmatic level, progress toward objectives must be clearly tracked, and efforts must be coordinated so that successful CTE models can be replicated.

Christian, S. & Dower, C (2009). *Comparative Snapshot of Four Allied Health Occupations in California: Community Health Workers, Medical Assistants, Certified Nurse Assistants, and Home Health Aides.* San Francisco: UCSF Center for the Health Professions.

This research brief examines the similarities and differences among education, training and practice tasks of four key occupations in the allied health workforce: community health workers, medical assistants, certified nurse assistants, and home health aides. These occupations are critical as almost half of the allied health workforce consists of these four occupational groups, which are among the state's most highly demanded and largest allied health groups. These occupations have modest entry requirements, low pay, high part-time employment, high turnover, limited to no health insurance, and high physical and emotional demands. None of these occupations requires a high school diploma and none are licensed professions in California. Summaries of each profession's occupational outlook are provided and comparisons are made across occupations from publicly available data. Despite limited career paths, low wages and high turnover, these occupations are in high demand and rapidly growing due in large part to an aging population. With relatively few regulations around training and practice, and very low educational barriers to entry, there are many opportunities to increase supply. There is clear transferable knowledge across these occupations, which indicate opportunities for expedient training for interchangeable duties and skills. Finally, the authors recommend more innovative recruitment, training and retention strategies to meet the drastically rising demand.

Cowles, E., Sutherland, S., Eggers, R., & Small, M. (2007). *California Respiratory Care Practitioner Workforce Study.* Sacramento, CA: California State University, Sacramento, Institute for Social Research.

This report provides a comprehensive source of data on the respiratory care workforce, and insights into issues around workforce needs aimed at informing future decision-making. Data was gathered through three research tasks. First, surveys from three major stakeholder groups – Respiratory Care Practitioners, Respiratory Care Employers, and Respiratory Care Education programs – were completed and analyzed. Second, existing databases with data on California population and healthcare workforce data were examined and analyzed. Finally, using information from the above two tasks, a comprehensive supply and demand model was developed to forecast supply and demand outlook for respiratory care professions.

Dower, C. (2003). *Acupuncture in California.* San Francisco: UCSF Center for the Health Professions.

This issue brief provides information on workforce outlook and regulation of acupuncturists in California. California accounts for 1/3 of the total national acupuncture workforce. Practitioners are clustered in the thirteen largest urban counties (primarily Bay Area and Los Angeles) with 40 percent of the workforce practicing in Los Angeles County alone. There is no demographic information on gender or race/ethnicity of licensed acupuncturists available at the state level. In addition to licensed acupuncturists, California physicians may perform acupuncture within the scope of their medical license, but estimates of those that practice are difficult as it within scope of practice and not independently tracked. The demand for acupuncture services is thought to be growing, though California-specific demand rates are unknown. Additionally, data on fees charged and salaries are unavailable. Most acupuncturists

are self-employed and earnings likely vary widely. Across the California workforce, 65 percent of licensed acupuncturists in California identify as general practice, 15 percent report focusing on pain management, 4 percent on substance abuse rehabilitation, HIV/AIDS, hepatitis, paralysis or other, and 16 percent provided no response. The Standard California Acupuncture Licensing Examination covers five content areas of practice: Patient Assessment, Developing Diagnostic Impression, Providing Acupuncture Treatment, Prescribing Herbal Medicinals, Regulation for Public Health and Safety. To become licensed, practitioners must graduate from a California Acupuncture Board approved school, completing minimum education and training hours. The curriculum contains courses in basic sciences, clinical sciences, western pharmacology, oriental medicine and acupuncture, oriental herbology and clinical instruction and practice. There are also several medical schools (UCLA, USC) that offer courses for medical doctors. Licensure is required and regulated by the Acupuncture Board within Department of Consumer Affairs. Licenses must be renewed every two years and documented completion of CE hours. Most acupuncture services are not covered by insurance and must be paid out of pocket, though efforts have been made to pass legislation to mandate insurance coverage, particularly for Medicare and Medi-Cal. There are limited comprehensive studies on efficacy of acupuncture (though smaller studies exist). There are some scope of practice battles in which acupuncturists seek to maintain full training standards and limit other professions adding on acupuncture as a modality. There is an overall lack of a clear job market and desire to have acupuncturist participate more fully within healthcare system and workforce. California does not recognize out-of-state licensing which significantly limits interstate mobility of practitioners and potentially inhibits access to providers.

Dower, C., Christian, S., & O'Neil, E. (2007). *Promising Scope of Practice Models for the Health Professions*. San Francisco: UCSF Center for the Health Professions.

The research brief provides a review on legal scope of practice for selected health professions. The authors highlight a few specific cases of interstate variations in the legal scopes of practice for certain health professions (nurse practitioners, physical therapists, physician assistants and paramedics). Inefficiencies can occur when health care practitioners are not utilized to their full capacity in terms of their education, training, and competence. This can result in higher costs, limited access to care, and concerns over quality and safety. Comparison of scope of practice for the four occupations across states shows wide variation in SOP laws despite relatively standard education, training and certification programs. Comparisons also reveal opportunities for ways some practitioners can be used more productively without any decrease in patient safety or quality of care. Examples where SOP could be expanded include nurse practitioners and independent practice, physical therapists and the authority to refer and diagnose, physician assistants and the prescription of controlled substances and paramedics and the administration of intravenous infusions. Authors posit that uniform, broad scopes of practice may be optimal and SOP laws that define practitioners as providers of general categories of services are preferable to those that define each separate task that a practitioner may provide to patients. Overall, states that provide policymakers with unbiased professional analysis to help make complex, technical decisions on public health issues are making headway as the SOP process becomes increasingly de-politicized.

Dower C., Knox, M., Lindler V., and O'Neil, E. (2006). *Advancing Community Health Worker Practice and Utilization: The Focus on Financing*. San Francisco, CA: National Fund for Medical Education.

There is a growing interest in the use of community health workers (CHWs) in various roles in the US health care system. These workers go by various titles and names—including promotorá and community health advisor—but all assist members of the communities they serve. These job categories are becoming more accepted in the health care realm, especially as they are presumed to help lower costs while enhancing quality of care for underserved communities. Many public and private sector organizations have taken the lead on committing support to community health workers and the services they provide.

While published research on the outcomes and effectiveness of CHWs is limited, a small number of well-designed randomized-control trial studies have documented significant positive impacts for some interventions in some populations.

The publication provides a number of “best practices” case studies from across the nation. The authors conclude that CHWs may be a valuable addition to the health care workforce, but that third-party reimbursement for their services is still an issue. While some have speculated that more standardized role definition, training, and certification would result in payor recognition of the value of these roles, this has not yet been evident in Ohio and Texas, two states that have mandated CHW certification. Nonetheless, the authors note that competency assessment for CHWs may be reasonable and desirable. Finally, they note that additional research on the effectiveness of these interventions would be helpful in making the case for reimbursement of CHW programs and effectiveness.

Dower, C., McRee, T., Briggance, B., Vance, J. & O'Neil, E. (2002). *California's Open Door Providers: Ten Case Studies of the Health Care Workforce*. San Francisco: California Workforce Initiative at the UCSF Center for the Health Professions.

This report provides a definition of and characteristics of open door/safety net providers in California and highlights healthcare workforce issues across safety net delivery sites. “Safety net” or “open door provider” institutions provide the majority of care for one in five Californians. They house three-quarters of the Level I trauma centers and half of the burn beds in California. They often provide the only access to health care for rural, low-income or uninsured individuals. They provide a disproportionately high percentage of care to Medi-Cal patients. They provide training facilities for physicians and other health workers. Despite their critical role in serving vast numbers of Californians, funding sources are limited and unstable and like other health care delivery sites, safety net sites face challenges with workforce shortages (especially acute in rural areas), rising staffing cost, decreased satisfaction among workers, and a lack in diversity of health care professionals. Ten case studies were conducted to explore challenges, issues and solutions. In addition to challenges faced across all health care delivery systems, open door providers faced some nuanced obstacles particular to their sites of care. These include finding physicians who accept referrals for Medi-Cal or uninsured patients, dentistry workforce shortages, public health nurse shortages, and hiring and retaining clerical workers. Additional challenges include lower salaries, increased bureaucracy and competition, and unattractive reputations. Some characteristics mitigate challenges, such as a clear service mission, comprehensive clinical services, strong benefits, and stability. Recommendations to improve recruitment and retention of open door staff include sharing best practices, building on centers of excellence, creating collaborative partnerships, streamlining bureaucracy, adopting innovative practice and

professional delivery models, improving leadership and management resources, creating career ladders, improving data collection and tracking capabilities, ensuring adequate funding and financial management, adapting to changing work values and shifting demographics, and implementing plans to better inform policymakers and the public about the critical role open door providers play in health care delivery in California.

Franks, P., Chapman, S., Nowicki, M. & Mukherjea, A. (2002). *Trends, Issues and Projections of Supply and Demand for Nursing Aides and Home Health Care Aides: California Fieldwork.* San Francisco: UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

This report identifies and assesses the accuracy, timeliness, and adequacy of state and national data sources on the supply and demand of Certified Nurse Assistants (CNAs) and Home Health Aides (HHAs). This report provides an overview of CNA and HHA workers and their work settings and highlight gaps in data needed to guide workforce planning and policy. In addition to examination of publicly available data, key informant interviews were conducted with state and local government agency representatives, along with a review of state and national reports. Overall, the authors found significant problems and significant gaps in available data on supply and demand for CNAs and HHAs in California.

This results in significant discrepancies in shortage estimates and projected supply and demand estimates and makes workforce planning difficult. Better data is needed to address the looming long-term care crisis in California. The research was conducted during a time when California had taken steps to respond to the long-term care crisis through various large-scale initiatives, leading to some improvements in workforce planning. Opportunities exist to build on this to further coordinate and align workforce data needs and

strategic efforts to improve workforce planning for the long-term care workforce.

Franks, P., Kocher, N. & Chapman, S. (2003). *Emergency Medical Technicians and Paramedics in California.* San Francisco: UCSF Center for the Health Professions.

This research brief provides an overview of emergency medical technicians (EMTs) and paramedics, highlighting occupational growth, education, training, regulation, certification, demographics, wages, and policy concerns. The number of EMTs and paramedics is expected to rise in the next decade due to population increases, aging of the population, increasing urbanization with homelessness, an increasing number of uninsured, and falling numbers of volunteer EMTs. Most of the occupational growth is projected to occur in hospital and private ambulance services. There are four types of Emergency Medical Responders (First Responders, EMT-I, EMT-II, EMT-Paramedic) with varied training, scope of practice and certification requirements. The EMT and paramedic workforce is still a male-dominated field with national data estimates showing the workforce is 69 percent male and predominantly White with only 15 percent minority professionals. The workforce faces high rates of turnover due to burnout, lower wages and lack of professional recognition. Burnout from exposure to trauma can be particularly debilitating, as well as long and irregular work hours. Rural areas are especially affected and struggle with workforce shortages of EMTs and paramedics. Factors include difficulty in recruitment, more volunteer workers with less education, and less likelihood of advancing to become paramedics. EMTs are increasingly moving into new roles in critical care units of hospitals because of existing training in acute care and life-saving tasks. Efforts to improve coordination among public health, health care, EMS, and protective service systems at all levels will be critical to ensure that EMTs and paramedics have the capacity and numbers to meet routine emergency needs as well as large-scale events.

Gabriner, R. Blash, L. Schiorring, E. & Waldron, G. (2006). *Promising Practices, Promoting Diversity in California Community College Health Occupation Programs.* Berkeley: The Center for Student Success.

This report utilizes quantitative data and qualitative case studies to identify, review, and document promising practices that community college health occupation programs have developed to increase the recruitment and retention of underrepresented minority (URM) students. Quantitative data from the California Colleges Chancellor's Office was used to identify programs that served highly diverse student populations and maintained high pass rates on tests over the past 10-15 years. Qualitative case studies were conducted with education programs to identify interventions that developed awareness and interest in health care careers among URM students, prepared URM students for entry into health occupation training programs and enrolled and retained URM students within these programs. Findings from the study show that developing interest still remains a challenge in some programs, specifically psychiatric technology, respiratory therapy, and medical assisting. Interventions that focus on preparation for health occupation training programs are especially helpful in difficult entry programs (due to prerequisites) such as radiologic technology, dental hygiene, registered nursing, and, to lesser degree, respiratory therapy and psychiatric technology. Finally, the authors noted that the costs of interventions aimed at retention are high, but the most successful programs do invest in this aspect of training path, to the extent possible.

Hargreaves, R., Cherner, D., O'Neil, E., Solomon, K. & Semerdjian, J. (2007). *Closing the Health Workforce Gap in California: The Education Imperative.* Los Angeles: The Campaign for College Opportunity.

This report provides a comprehensive analysis of factors affecting demand and supply of allied health professions in California, reviews policies

designed to address health workforce development, and proposes policy recommendations. California shows significant shortages in supply across many allied health professions. Workforce shortages were found in nine out of 12 allied health professions examined (where data was available). However, authors note that inadequate data collection across allied health occupations impedes workforce planning and effective policy making. Many factors affect supply of allied health workers, including retention problems, limited awareness of allied professions, and, most significantly, limited educational capacity across allied health educational programs. Allied health workforce demand will be driven by population growth, an aging population, an aging workforce, a need for a more diverse workforce to serve an increasingly diverse population, geographical variation, changing regulations, migration in and out of states, and an increase in technology innovation. To address these issues of supply and demand, authors recommend attention should be focused on overall improvement in college preparation, access, and success. Specific recommendations include efforts toward increased funding, strategic programs, education/employer partnerships, and enhanced career ladders all aimed at providing the educational capacity needed to supply and retain a well-trained allied health workforce.

Keane, D., Nielsen, C. and Dower, C. (2004). *Community Health Workers and Promotores in California.* San Francisco: UCSF Center for the Health Professions.

This brief provides an overview of an emerging and unique workforce in California. Community health workers (CHWs) and promotores are public health professionals who carry out a variety of health promotion, case management, and service delivery activities at the community level. They are seen as particularly effective because they are generally from the communities they work in, which allows them to serve as a bridge between the community and the health care profession. Some promotores work

specifically in rural and agricultural areas because of the need for outreach among migrant workers in particular. However, it is difficult to define the work of CHWs and promotores because their work falls under some 35 different job titles. Some are clinic-based, and some are community based. Some are volunteers, and some are paid.

There are probably 400-500 promotores/CHWs in the San Diego area alone, but there is not definitive census due to the number of job titles under which these workers fall. Studies have indicated that these workers are primarily non-White. Most are bilingual in order to reach out to the communities in which they work.

While there are five CHW training programs in California community colleges that provide certification, certification is not required and most training is probably on-the-job. There is debate about whether or not greater definition and standardization of roles is necessary, and whether credentialing should be mandated.

Kocher, N., Chapman, S. & Dronsky, M. (2003). *Respiratory Care Practitioners in California*. San Francisco: UCSF Center for the Health Professions.

This research brief provides an overview of the respiratory care profession highlighting occupational growth, education/training, regulation/certification, demographics, wages, and policy concerns. This workforce has grown significantly in the past twenty years. Demand is expected to increase due to an increasingly aging population, which is expected to reflect an increased prevalence of cardiopulmonary disease and respiratory ailments. Additionally technological advances in treatment of heart attacks, accident victims, and premature infants will increase demand, and practitioners with advanced cardiopulmonary and neonatal skills are expected to have the most optimal employment opportunities. Nationally, the respiratory care

workforce is predominantly female (62.2%) and predominantly White (81.8%) though data for California was unavailable. Practitioners must graduate with a minimum Associate degree from a respiratory therapy education program and must successfully complete the Registered Respiratory Therapist examination. Licensure and certification are required, and following licensure, practitioners must complete additional hours of Continuing Education to renew their license. The workforce is not large and shortages have impacted the workforce. Lack of professional recognition, lower wages (relative to nurses and some related allied professions), and competing educational opportunities all contribute to difficulties in recruitment and retention. Opportunities exist to enhance the visibility and attractiveness of the profession as it moves toward advanced practice across acute care, emergent care, and management of chronic pulmonary and respiratory conditions.

Lindler, V., & Chapman S. (2003). *The Clinical Laboratory Workforce in California*. San Francisco: UCSF Center for the Health Professions.

This research brief provides an overview of the clinical laboratory workforce. Occupations profiled include phlebotomists, medical laboratory technicians, clinical laboratory scientists/medical technologists, histotechnicians, histotechnologists, and cytotechnologists. Much of the data on the clinical laboratory workforce is difficult to delineate by specific occupation. Nationally, the workforce is predominantly female (79%) and predominantly White (71%). Data for California workers are unavailable. In terms of education, technologist occupations have the most education and training and technicians require less education and training. To become a medical technologist/clinical laboratory scientist (MT/CLS), a BA degree and additional year of specialized training or on the job experience is required. For a medical laboratory technician (MLT), an AA degree or certificate, plus up to a year of specialized training

or on-the-job experience is required. In California, clinical laboratory workers are regulated by Laboratory Field Services, through the Division of Laboratory Science at the Department of Health Services. Certification is not required for licensing of MT/CLS in the state. Licensure of these workers requires BA degree, one year training and completion of state licensure exam. It is expected that California will eventually accept professional certification in lieu of the state licensure exam. California also implemented new regulations for certification of phlebotomists which states that all phlebotomists must pass the exam or quit working. Significant shortages across the clinical laboratory workforce have been reported, due in large part to program closures throughout the state. In order to address workforce challenges, the authors provide several recommendations. Promoting professional commitment through membership association affiliation and activities could enhance the professions. Marketing laboratory careers and providing more financial support could have a positive impact on supply of students into the workforce. Additionally, some laboratories are implementing a “grow our own” approach in which laboratories are partnering with educational programs to create a pipeline of students. And finally creating enhanced distance learning opportunities would provide access to additional pools of potential students.

Lindler, V., Woo, L. & Chapman, S. (2003). *Diagnostic Imaging Professionals in California*. San Francisco: UCSF Center for the Health Professions.

This research brief provides an occupational outlook on the diagnostic imaging workforce, which includes radiographers, diagnostic medical sonographers, cardiovascular technologists and nuclear medicine technologists. This workforce consists of several related professions that have evolved and continue to grow as medical diagnostic technologies increase and an overall aging population contributes to greater need

for diagnostic imaging services. There is some confusion around diagnostic imaging professionals due to multiple education entry points. Diagnostic medical sonographers and cardio technologists can practice with one year of formal education and training. Nuclear medicine technologists must have an AA degree plus one year of professional training. Certification is voluntary for nuclear medicine technologists, diagnostic medical sonographers, and cardiovascular technologists, but radiology technologists require certification. Shortages have been reported similar to other laboratory technicians and there are fewer graduates per capita in California than in other states. Other issues facing the workforce included job burnout and some risk of injury (primarily from lifting patients for imaging). Efforts can be made to improve the workforce in several ways. Improving standardization criteria for entry into the profession is being addressed through a bill that would mandate all states to impose licensing requirements and minimum standards for all imaging professionals. To effectively address workforce shortages a focus on retention, not just recruitment (through reward incentives, multiple/advanced registries with higher pay) is necessary. Addressing burnout can be accomplished effectively through workshops and other interventions from internal managers.

Little Hoover Commission. (2004). *Regulation of Acupuncture: A Complementary Therapy Framework*. Sacramento, CA.

In 2002, the Little Hoover Commission was asked by the California governor and legislature to examine issues relating to the regulation of acupuncture in the state. The Commission contracted the Rand Corporation; the University of California, San Francisco; and California State University, Sacramento; to assist in this process. The Commission made a series of recommendations based on these analyses. The Commission found that in 2004, the scope of practice of acupuncturists was poorly defined—relating only to modalities

practitioners could employ and failing to clearly define what conditions they could treat, or their authority to diagnose patients. The trend towards blending Eastern and Western medicine further complicated the situation. The Commission recommended that the state work to clarify the role and scope of the acupuncturist. The Commission concurred the (recently increased) number of required educational hours for entry-level practitioners were sufficient to protect the public safety. It recommended that schools of acupuncture educate within scope, delegating education in physiology, chemistry, biology, and other sciences to universities accredited in these subjects. It recommended further focus on patient safety and coordinating with Western medicine practitioners. However, the Commission found that increasing educational requirements create different levels of competency amongst practitioners licensed at different times, creating some confusion about the competency and training of practitioners. This led the Commission to recommend a re-allocation of continuing education hours required of currently licensed practitioners. The Commission found that California's current licensing exam was more robust than the national exam, and recommended that the state continue using its own exam until such a time as a national exam was acceptable. However, it recommended that the state use a national organization, the Accreditation Commission of Acupuncture and Oriental Medicine, rather than the California Acupuncture Board, to approve schools of acupuncture, noting that the former's process of accreditation was more rigorous and more focused on patient safety and ongoing review. It found that the California Board of Acupuncture needed to strengthen its commitment to patient safety and education in order to become a strong advocate for patients.

Lok, V. & Chapman, S. (2009). *The Mental Health Workforce in California: Trends in Employment, Education, and Diversity*. San Francisco: UCSF Center for the Health Professions.

This research report utilizes public data sources to present workforce projections, needs, and educational data for mental health professions in California. The report focused on the following mental health occupations: psychiatrists, psychologists, marriage and family therapists, advanced practitioner nurses in psych/mental health, social workers, psychiatric technicians, and various mental health counselors. Current data show significant shortages across the mental health workforce, with vacancy rates for mental health providers at 20-25 percent in 2008, with numbers higher in rural areas. Looking across the workforce, mental health and substance abuse social workers represent the largest sector of providers in California's mental health workforce with an estimated current employment of 14,010. The fastest growing mental health profession in California is substance abuse and behavioral disorder counselors with an expected job growth of 35 percent. Marriage and family therapists are the largest group of licensed mental health professionals in California comprising 37 percent. Data show additional mental health workers will be needed to care for a growing, aging, and increasingly diverse population. There appear to be increases in some mental health professions but shortages in others. In order to develop and maintain a sustainable workforce, there must be an increase in awareness of careers among younger students and older workers transitioning careers. Additionally, efforts to increase diversity across mental health educational programs and workforce will be necessary to effectively meet the needs of a diverse population.

Lok, V. and Dower, C. (2008). *Respiratory Care and Imaging Technology in California: Education's Response to Workforce Shortages*. San Francisco: UCSF Center for the Health Professions.

This report focuses on findings from qualitative in-depth interviews with over 30 educational program directors/leaders at service sites in respiratory care and radiologic technology, highlighting their understanding of and responses to labor market supply of and demand for this workforce. Authors report on capacity and challenges adapting program size and content to changing employer and patient needs. Most educational programs in the study were at enrollment capacity. Several programs were new or reported expanding recently, though very few programs plan to expand in the near future. The majority of respiratory care program directors perceive ongoing workforce shortages in their geographic area and/or nationally. The majority of radiologic technology program directors reported that workforce shortages have ended or eased significantly in their areas. Should educational directors want to expand their programs, several limitations to doing so were cited. Respondents felt limitations around available clinical training positions, faculty supply, space and facility resources and funding may prove to be obstacles in developing an optimal supply of workers. In addition to workforce supply and demand, respondents pointed to other pressing professional issues such as the need to update curricula, better prepare students for employment as clinicians and educators, and continue to bring regulations and accreditation standards up to date.

McRee, T. (2003). *Pharmacy Technicians in California: A Snapshot of an Emerging Profession*. San Francisco: UCSF Center for the Health Professions.

This research brief looks at the emerging occupational outlook for pharmacy technicians in California. Projected as one of the fastest growing

occupations by the Bureau of Labor Statistics, pharmacy technicians play an increasingly important role in pharmacist settings that have been experiencing significant shortages. At the time the research brief was written, there were no analyses on the pharmacy technician workforce in California, therefore assessments of potential shortages were not possible. Additionally demographics for this profession were unavailable for California. In 2004, requirements for pharmacy technicians included an AA degree or degree from accredited training program, eligibility for the state pharmacists exam, or national certification by the Pharmacy Technician Certification Board (PTCB). This was a change from prior times when on-the-job training with sufficient hours was an acceptable avenue for employment. There was no centralized source of enrollment or graduation data for pharmacy technicians in California. Certification is optional, yet has been growing in the profession and is required in some states. Pharmacy technicians are regulated through the California Business & Professions Code and must register with the Board of Pharmacy. Scope of practice in California outlines work of technicians, separate from other pharmacy support positions, and sets ratios of technicians to pharmacists (1:1 if one pharmacist, and no more than 2:1 if two pharmacists are present). Legislation is being proposed to liberalize this to allow pharmacists to supervise up to four support staff, based on their discretion and particular needs. Policy concerns for this profession largely center on capabilities of technicians to “check” (Tech-Check-Tech) other technicians in filling unit dose medication in inpatient settings. Some estimate this could significantly free up pharmacist time to provide enhanced direct patient care services and physician consultations, yet there is some concern that in retail settings there are not enough check-points for technician work to ensure accuracy and reduce errors.

Spetz, J. (2008). *Health Workforce Needs in California and the Role of Community Colleges*. San Francisco: UCSF Center for the Health Professions. Presentation for California Colleges Economic Development Program Advisory Committee Strategic Review and Advance Subcommittee.

This presentation was delivered to the California Community Colleges Economic and Workforce Development Program Advisory Committee. It examines health workforce education in the community colleges, delineating which categories of health workers are educated in the community colleges. The presentation reflects an examination of the data and research on California's health industry and health workforce trends, specifically looking at the workforce outlook in the next five to ten years. The presentation uses examples from several allied health occupations, including dental hygienists, dental assistants, pharmacy technicians, and respiratory therapists to examine issues around supply and demand. The author notes challenges in selecting accurate, comprehensive statistical models for projecting demand and supply, and the prevalence of conflicting and inconsistent data about these occupations. The presentation focuses on a discussion of opportunities for community colleges to address future needs through program expansion, program refocusing, and targeted strategies aimed at adequate training and upward mobility.

Taché, S., & Chapman, S. (2004). *Medical Assistants in California*. San Francisco: UCSF Center for the Health Professions.

This research brief provides an overview of the medical assistant workforce, focusing on growth, education/training, regulation/certification, demographics, wages and policy concerns. Significant job growth is expected for medical assistants due to a growing aging population requiring health services. In particular, needs are expected to increase in solo and group practices,

clinics and other healthcare facilities needing increased support personnel. The demand for medical assistants extends to both clinical and administrative duties. Medical assistants practice directly under a physician so specifics around duties performed and skills needed are very difficult to delineate, as scope of practice varies across offices. In smaller offices medical assistants are typically "generalists" in their duties and tasks, but in larger practices and facilities they may specialize. Accredited medical assistants educational programs exist throughout California, but graduation from such programs is not necessary for employment. Certification is available but voluntary. Advantages can be potential higher salary and assurance of competence in skill sets, though only approximately 12.5 percent of the workforce is certified. There is no licensure for this occupation. As such there is no enforcement body for quality control of medical assistants and supervision and oversight occurs solely at physician level. This occupation contends with high turnover rates, which contribute to additional resources needed for training. As physician practices increase and the complexity of practices expands, greater numbers of medical assistants will be required, which poses a potential issue with supply. Recruiting medical assistants is difficult, especially in rural counties. There is an overall lack of consistency in training requirements. Additionally, a lack of regulation and certification requirements leads to industry and market forces determining training level, hiring, and retention of medical assistants. Medical assistants face an overall lack of career advancement opportunities as their only option for advancement is moving into other fields such as nursing.

UCSF Center for the Health Professions (2005). *Consumer's Guide: Occupational Therapists*. San Francisco.

This consumer guide provides basic occupational information for Occupational Therapists. Occupational therapists assist individuals in maintaining health and maximizing independence

as they contend with mental, physical, developmental or emotional impairments. They provide comprehensive home and job site evaluations with adaptation recommendations. To practice, occupational therapists must graduate from an accredited occupational therapy program with a BA, MA or Doctorate degree. In 2007, an MA or higher will be the minimum degree requirement to practice in California. All occupational therapists must be licensed by the California Board of Occupational Therapy.

WORKFORCE DIVERSITY AND LANGUAGE ACCESS

Some of the references listed below are referenced elsewhere in the bibliographic section of the report. They are also listed here because they are relevant to workforce diversity and/or language access, with specific attention to California, although some national studies are included. This is not an all inclusive list of the references available for these topics.

National Publications

Bureau of Health Professions, Health Resources and Services Administration. (2006). *Evaluations of Pipeline Development Programs Designed to Increase Diversity in the Health Professions: An Annotated Bibliography*. Washington D.C.: U.S. Department of Health and Human Services.

This document describes in detail a number of evaluation studies of pipeline educational programs intended to increase diversity in the health professions. This document briefly describes each intervention and study, documenting outcomes. It is useful in providing background for educational strategies that could be utilized to enhance workforce diversity.

Bureau of Health Professions, Health Resources and Services Administration. (2006). *The Rationale for Diversity in the Health Professions: A Review of the Evidence*. Washington D.C.: U.S. Department of Health and Human Services.

The authors developed a framework to review publicly available evidence addressing the idea that diversity in the health professions improves public health. The authors conducted a comprehensive literature review from which they selected a total of 55 relevant articles from a pool of 606 of potentially relevant sources.

They found a total of 17 studies addressing physician and dentist service patterns. The studies consistently upheld the theory that minority health professionals are more likely to serve minority and underserved populations than were other health professionals. Even minority professionals graduating from elite institutions were more likely than non-minorities to choose to work with the underserved. The authors found that race/ethnicity was a stronger predictor of this choice than was coming from a socioeconomically disadvantaged background or participating in the National Health Services Corps loan repayment program

The authors found a total of 36 studies addressing the effects of racial, ethnic, and/or language concordance on health care access, quality, and outcomes. In general, racial concordance did not seem to impact utilization for medical care, but it did seem, in some studies, to impact utilization and persistence with mental and behavioral health services. Racial/ethnic concordance seemed to have a positive impact on patients' rating of interpersonal care. The evidence was less clear in the area of clinical outcomes. The evidence on practitioner/patient language concordance was more consistent, showing generally positive impacts on access, utilization and quality of care. However, language concordance did not show consistent impacts on clinical health outcomes.

While the authors had hypothesized that more diversity in the health professions would lead to greater trust in health care by disadvantaged populations, and greater advocacy on behalf of these populations, they could find little empirical evidence to this effect.

Bureau of Health Professions, Health Resources and Services Administration. (2009). *Pipeline Programs to Improve Racial and Ethnic Diversity in the Health Professions: An Inventory of Federal Programs, Assessment of Evaluation Approaches, and Critical Review of the Research Literature*. Washington D.C.: U.S. Department of Health and Human Services.

This report examines programs intended to enhance diversity in the health professions and the health sciences by intervening in the educational pipeline. It provides summaries of evaluations of each of a large number of programs.

The authors find that there are many Health and Human Service pipeline programs intended to enhance opportunities for racial and ethnic minorities and disadvantaged students, but that they could be better coordinated across agencies. Most evaluations of the effectiveness of these programs have been process evaluations, which examine accountability in use of funds. More outcomes evaluations would be useful, but they are expensive and difficult to conduct. Developing more uniform data sets for program reporting would allow for more efficient tracking of students over time and allow for better links with external evaluators. Evaluation projects face tension between providing performance feedback to those implementing the program, and evaluating outcomes in a way that would allow the sponsor to decide whether or not the program should continue to receive funding. Overall, a review of 24 scientifically rigorous evaluation studies of programs funded by HHS suggests that these pipeline programs produce a positive impact for racial/ethnic minorities and disadvantaged students. This suggests that HHS should establish more rigorous standards for program evaluations and provide the guidance and infrastructure to facilitate such work.

Bureau of Health Professions and Office of Minority Health, Health Resources and Services Administration. (2009). *Evaluating Programs to Recruit Minorities into the Health Professions: Report of Two Evaluation Studies*. Washington D.C.: U.S. Department of Health and Human Services.

The report presents findings from two evaluation studies. The overall finding of this report is that various college enrichment programs sponsored by HRSA and others did seem to be resulting in a) better utilization of campus resources by disadvantaged students, b) better college academic performance among at-risk college student participants, and c) facilitating entry into medical or dental school.

The first study found that participation in enrichment programs such as the HRSA-funded Health Careers Opportunity Program (HCOP) was associated with a significantly higher GPA than would have been expected. The students recruited for these programs had lower scores on college admission and proficiency exams than other students, and yet were as likely to achieve a GPA of B or better. Second, the researchers found that the program participants were significantly more likely than other students to participate in a range of enrichment activities such as faculty tutoring and advising, and test-taking training.

The second study examined the feasibility of tracking longer term educational outcomes for HCOP and Centers of Excellence (COE) programs. The researchers looked at whether they could link various enrichment program data sets associated with these programs to national medical and dental databases to find out which former program participants successfully matriculated into medical or dental school. The researchers were successful in linking the data sets and determined that HCOP and COE programs were achieving a "reasonable yield" since about a third of students who had participated in 2006 and 2007 and expressed an interest in medicine had matriculated into medical school by 2008.

Karliner, L.S., Jacobs, E.A., Chen, A.H. and Mutha, S. (2007). “Do Professional Interpreters Improve Clinical Care for Patients with Limited English Proficiency? A Systematic Review of the Literature.” *Health Services Research*. 42(2): 727-754

The authors reviewed the literature on health care interpreters and evaluated a total of 28 articles for the effect of interpreter use on four quality-of-care outcomes often impacted by, or reflective of, health care disparities. These included communication, utilization, clinical outcomes, and patient satisfaction. In all four areas, the authors found positive outcomes associated with language concordance between physicians and patients with limited English proficiency.

Morgan, Rachel. (2010). *Summary of the Health Workforce Provisions in the Patient Protection and Affordable Care Act: H.R. 3590*. Washington, D.C.: National Conference of the State Legislatures.

This document includes a detailed breakdown on workforce provisions in the ACA. Starting on page nine, the report details provisions for health professions diversity and diversity education. These strategies include authorizing increases in the allowable scholarships and loan repayments for individuals willing to commit to working in underserved areas, authorizing increases to educational assistance programs for individuals from disadvantaged backgrounds, and re-authorizing the Centers for Excellence programs encouraging collaboration across institutions to recruit and retain minority students interested in health careers.

California Publications

Alznauer, A. Barnett, K. Esser, P., Hopkins, C. C., Jackson, K., Linden, R.R., Matsuda, D., McField, E., Powers, M., and Sanchez, S. (2008). *Profiles in Leadership: A Review of Exemplary Practices to Increase Health Professions Workforce Diversity in California*. Berkeley, CA: The Public Health Institute, the UC Berkeley School of Public Health, and The California Endowment (Los Angeles).

This report documents 33 exemplary practices in areas such as investment in the health care workforce pipeline, admissions, institutional climate, faculty recruitment and retention, and reducing financial barriers. Researchers utilized the expertise of a Statewide Advisory Committee, over 60 key informant interviews, and an environmental scan of the available literature and grants made by California funders to identify potential cases. They looked for sustainable programs with institutional commitment, clear policies, accountability mechanisms in place, and documented impacts.

While most initiatives listed are driven by academic institutions, a number are implemented by employer organizations or workforce development organizations. Most efforts focus on educational initiatives for high school, undergraduate and graduate level students, although some initiatives target foreign-trained professionals, displaced workers, or incumbent employees (Kaiser Permanente, Jewish Vocational Services, Welcome Back).

Each short case study profiles a program intended to enhance diversity, including a description of the factors leading to the institution of the program, program description, partnerships, impacts of the program to date, challenges, and lessons learned. Each case study also includes a description of how the program aligns with the Institute of Medicine/Sullivan Commission Recommendations.

Authors provide suggestions, gleaned from the case studies, to enhance the success of these initiatives.

Bates, T. and Chapman, S. (2008). *Diversity in California's Health Professions: Pharmacy*. San Francisco: UCSF Center for the Health Professions.

In this brief, authors present data describing key characteristics of the state's pharmacist labor force including income, age, gender, race/ethnicity, and trended enrollment data describing gender and race/ethnicity for students in California's seven Doctor of Pharmacy programs. Overall, the authors report that 93 percent of California's active pharmacists are either White or Asian, compared with just 57 percent of California's general labor force. Asians represent nearly half of active pharmacists in California, but just 13 percent of the general labor force, Latinos 3.3 vs. 34 percent of the general labor force, and African Americans 2.4 percent vs. 6 percent of the general labor force. There are disparities between different Asian ethnicities and their representation in the pharmacy workforce. In regards to gender, however, active pharmacists mirror the state's workforce.

In regards to the education pipeline, underrepresented minorities (URMs) have consistently made up less than 10% of those enrolled in PharmD programs from 2001-2007. The authors point to the need for further outreach to underrepresented minority communities to boost the number of URMs in PharmD programs, and eventually in the ranks of practicing pharmacists.

Bates, T. & Chapman, S. (2008). *Diversity in California's Health Professions: Physical Therapy*. San Francisco: UCSF Center for the Health Professions.

This issue brief presents key demographic characteristics of California's physical therapist workforce. California's increasingly diverse population, with 90 percent of population growth projected to occur among Latino and Asian populations, underscores a need for a more racially and ethnically diverse healthcare workforce. Data

from 2005-2006 show that females outnumber males by nearly 2 to 1; and the physical therapist workforce is predominantly White (65%) and Asian (21%) compared to just 57 percent of the general workforce. The Hispanic/Latino population is underrepresented, at 8.5 percent of physical therapist labor force (compared to 34 percent of general labor force) as is the African American population (2.7 percent of the physical therapist labor force compared to 6 percent of the general labor force). Native American, Native Hawaiian and Pacific Islanders and multiracial physical therapists are represented in proportions roughly equal to their representation in the general labor force. Despite the underrepresentation of some minority groups, however, the California physical therapist workforce is substantially more diverse compared to the physical therapist workforce nationally. In terms of educational demographics, the gender breakdown among graduates increasingly favored females and showed decline in the percentage of male graduates. Data suggest that as educational programs eliminated the BA degree, the proportion of male physical therapists declined. With some proportional fluctuations, data show the overall level of racial/ethnic diversity in graduates is increasing over time, with Asian students showing the biggest gain in the past 10 years, doubling graduate numbers. Achieving a diverse physical therapy workforce is a national policy focus (through the American Physical Therapy Association), but no current initiatives or policies appear to exist specific to California. The authors suggest the creation of student enrichment programs to support students planning to enter health professions, such as physical therapy, with specific focus on mentorship and other pre-professional guidance to assist in building a diverse workforce.

Bates, T. and Chapman, S. (2008). *Diversity in California's Health Professions: Physicians*. San Francisco: UCSF Center for the Health Professions.

In this brief, the authors present data describing key characteristics of the state's physician workforce including age, gender, race/ethnicity and income, and trended enrollment data describing gender and race/ethnicity for first-year enrollments in California's eight MD programs. The authors utilize data from the California Medical Board Survey and the Association of American Medical Colleges to investigate trends in diversity. Overall, Latino's and African Americans are underrepresented in the state's physician workforce, with Latinos making up just 5 percent of physicians and 36 percent of the general population, while African Americans make up 3 percent of physicians and 6 percent of the general population.

African American enrollments in the state's medical schools have declined over time, and Latino enrollment rates, although growing, have remained low. The state's medical schools appeared to have reached overall gender parity by 2006.

While the authors note a number of efforts at increasing physician diversity, these efforts are hindered by the state's training capacity. California ranks near the bottom of all states in terms of capacity to produce physicians, and has relatively few medical school slots or medical residencies relative to the state's population.

Bates, T. and Chapman, S. (2008). *Increasing Diversity in California's Medical Schools*. San Francisco: UCSF Center for the Health Professions.

A racially and ethnically diverse physician workforce is widely seen as a key component in the effort to address health disparities related to race, ethnicity, and socioeconomic status. Program directors, faculty, and medical students all share the

perception that a diverse student body significantly enhances the experience of medical school and advances the effort to develop a culturally competent physician workforce. However, neither the current make-up of California's physician workforce nor those enrolling in its medical schools come near to reflecting the state's racial and ethnic diversity. This brief presents background information on the lack of diversity in California medical schools and discusses steps being taken to address the disparities.

Bates, T., Chapman, S., and Dower, C. (2010). *Men of Color in California's Health Professions Education Programs*. San Francisco: UCSF Center for the Health Professions.

Authors looked specifically at participation rates of men of color in health professions education programs in California and found that the representation of African American and Latino men is significantly below what would be expected based on population rates. Representation in some professions has declined over time. The number of Latino men trained in CA dentistry and pharmacy schools did not change in the past 15 years; the number of African American men increased slightly. Authors highlight a program operating in San Diego high school health and sciences career academies identified several key challenges and critical resources required for success, including the need for parental involvement, for industry and education partnerships, the need to be more inclusive of ESL students, and to recognize the additional burden placed on teachers in terms of time and resources.

Researchers recommend that studies continue to evaluate the range of efforts to improve the outcomes for young men of color in education and in health careers and to scale up successful efforts. They point to a need to develop targeted initiatives to maximize high school completions for men of color, including reliance on health care high school pipeline programs, to provide

the foundation for health care careers. They see a need to adapt basic skills preparation programs to the needs of men of color to increase success in post-secondary education and professional work. They recommend studies that explore and assess enrollment and completion rates in community colleges by health professions degree type. Further, they see a need to develop programs in specific geographic communities to establish and strengthen community colleges and educational support systems. Finally, they would like to see pilot programs in targeted communities including collaborations between workforce investment boards, high schools and community colleges aimed at young men of color in health professions education programs.

Bates, T. and Dower, C. (2010), *California Nurses Facts and Figures*. Oakland, CA: California HealthCare Foundation.

Published as part of the California Health Care Foundation Health Care Almanac, *California Nurses Facts and Figures* examines California's nursing workforce, including supply, education, and demographics. The publication presents current and historical data from multiple national and state sources in 27 charts and graphs.

Although this publication provides an overview of statistics, Pages 7-10 of this report explore statistics from the Board of Registered Nursing and the American Community Survey Public Use Microdata file of 2008 to profile diversity in the profession. Authors note that the percent of male registered nurses has increased from 6 percent to 14 percent between 1993 and 2008. The profession has also grown more racially and ethnically diverse, declining from 77 percent White in 1990 to 59 percent White in 2008. However, disparities persist with an overrepresentation of White nurses (59 percent of RNs vs. 42 percent of the population), and Filipino nurses (18 percent vs. 3 percent); and a corresponding underrepresentation of Latino nurses (8 percent of RNs vs. 37 percent of the

population). While the percent of nursing students who were White decreased from 2001-2008, diversification was largely driven by increases in Asian and Filipino students.

Bates, T., Hailer, L. and Chapman, S. (2008). *Diversity in California's Health Professions: Current Status & Emerging Trends*. Oakland, CA: Public Health Institute.

The objective of this analysis is to provide a current picture of diversity in the health professions workforce and educational pipeline in a number of health professions. This inquiry also presents current and projected population data as a benchmark against which to measure diversity in the health professions. It also provides a picture of emerging trends and their implications for meeting California's current and future health workforce needs. The analyses in the report were based on publicly available data on population, workforce, and educational pipeline. Wage data were included so that differences in income across the professions as well as within professions could be examined along with workforce diversity measures. Wide variations were found in the racial and ethnic composition of the selected professions. Whites and Asians represent the largest portion of the workforce for professions with high barriers to entry. Current estimates indicate that roughly nine out every ten physicians, dentists, and pharmacists in California are either White or Asian. The workforce is increasingly diverse in those professions with low barriers to entry. Among healthcare support occupations, where opportunity is greatest, one in three workers is Hispanic or Latino and proportional representation of African Americans is nearly twice its size in the working age population. In comparing wage data across the professions with workforce diversity, it is evident that the highest paid health occupations are the least racially and ethnically diverse while the lowest paid health occupations are the most racially and ethnically diverse.

Regarding findings on the RN workforce, the report states that the more racially and ethnically diverse regions of the state are represented by a more racially and ethnically diverse RN workforce. Authors summarize that labor markets for RNs are localized and training opportunities are more widely distributed with fewer barriers to entry. They also found that younger RNs are more racially/ethnically diverse than older RNs. Authors found that employment opportunity for RNs is projected to grow at a rate far above average.

The report details the increase in the number of qualified applicants denied entrance to nursing programs. Qualified applicants increased 183 percent between 2001 and 2006. In 2001, almost six out of ten qualified applicants were accepted while in 2006, the number accepted decreased to four out of every ten qualified applicants.

Pre-license RN education programs cover the entire state. The size of the student body increased dramatically between 2001 and 2006, by 43 percent. The associate degree programs have greater diversity than do bachelor's programs or entry-level masters programs. Across all pre-license programs between 2001 and 2006, the proportion of White non-Hispanic students declined slightly and the proportion of Filipino students increased slightly. The proportion of Hispanic/Latino students, African American students and Asian students remains fairly consistent throughout this period. The number of Native American students pursuing pre-license RN education remains very small, representing well under 1 percent of the student body. Change in proportional representation over the past six years has been small at the state-level and in most regions. Although groups of non-White RN students in most regions of the state are growing more rapidly than the group of White students, the proportional effect is small because of the difference in absolute size. In 2001, every region of the state with the exception of the Los Angeles area had a RN student body that was predominantly White; and White students have continued to pursue RN education in large numbers.

Brelvi, Saba. (2005). *Reflections on Increasing Diversity in the Health Professions*. 7(20). Woodland Hills, CA: The California Wellness Foundation.

This report reflects on The California Wellness Foundation's grant-making experience in the area of diversity in the health professions. The author notes that while one-third of the state's population is Latino, only 4 percent of doctors, 6 percent of dentists, and 4 percent of registered nurses are Latino. There are a number of studies documenting the positive benefits of a diverse health care workforce, including studies that suggest that racial and ethnic concordance between clinicians and patients improves patient care, and that diversity in educational settings benefits *all* students. Finally, increasing diversity is an important workforce strategy that helps individuals and communities attain economic viability. However, there are still barriers to increasing diversity in the health professions. In education, public hostility towards ethnicity-based criteria in educational institutions, fee increases in California's public universities, and reductions in federal grants for education create roadblocks for many disadvantaged students trying to enter the health professions. Increasing hostility towards collecting data on race and ethnicity makes it difficult to document health disparities, or validate interventions intended to help address them. Even though there is an undersupply of health professionals, efforts to adequately reach out to and educate California's growing underrepresented minority population are inadequate to recruit and retain these students, who often face enormous social, economic, and educational challenges.

The California Wellness Foundation has provided considerable funding (\$45 million) to researchers studying these issues, and to groups implementing programs to end barriers to diversity. The report provides a number of short case studies of best practices, from pipeline programs to interest youth in health careers, to research on strategies to recruit and retain trainee nurses and physicians, to work on

convening advocates together to promote diversity. The report is useful in laying out the challenges in the state, and providing examples of successful efforts to address many of the challenges listed.

The California Endowment. (2008). *Connecting the Dots: California Initiative to Increase Health Professions Workforce Diversity*. Webpage: <http://www.calendow.org/Article.aspx?id=2290>. Retrieved 2011-08-08.

This website is the result of a 2006 grant from the California Endowment to the UC Berkeley School of Public Health and the Public Health Institute. The two organizations were tasked with investigating strategies to diversify the health professions in California, disseminating these strategies, and providing statewide assistance to regional and statewide coalitions invested in this goal. The research focused primarily on the goals of medicine, dentistry, nursing, and public health.

This initiative resulted in seven reports on the current status of the health care workforce, including a quantitative assessment of California's health care workforce (see *Diversity in California's Health Professions: Current Status & Emerging Trends* listed above), exemplary practices in health professions training programs, the k-12 education infrastructure to support health care training, a qualitative assessment of the benefits of diversity in the educational environment, key informant interviews with thought leaders, and an annotated bibliography and literature review.

The California Wellness Foundation. (2007). *Most Californians Believe There Are Insufficient Number of Health Professionals in Predominantly Ethnic Communities*. Press Release: http://www.calwellness.org/pdf_docs/events/ca_voters_poll.pdf. Retrieved 2011-08-09.

This document is a detailed press release on the results of a survey conducted by the Field Research Corporation for The California Wellness

Foundation. Primary findings indicate that the majority (60%) of voters believe that it is important for California's health care workforce to reflect the racial and ethnic diversity of the patients they are serving. Two thirds (67%) would support increasing government funding to the state's public medical schools, universities, and colleges to enhance diversity, and 69 percent would support more state-sponsored scholarships to help students from underrepresented minority backgrounds pursue careers in the health professions. Overall the report demonstrates that California voters are aware of shortages of health professionals in the state, particularly in areas with underrepresented minority populations, and willing to support measures to enhance diversity by funding education programs.

Chapman, S., Waneka, R., and Bates, T. (2008). *Diversity in California's Health Professions: Registered Nursing*. San Francisco: UCSF Center for the Health Professions.

In this brief the authors present data describing key demographic characteristics of the state's Registered Nursing (RN) workforce including age, gender, and race/ethnicity; and trended enrollment data describing race/ethnicity for first-year enrollments in California's pre-licensure RN programs. The authors note that California's population is projected to grow by roughly 12 million people, and that over 90 percent of this growth is projected to occur among California's Latino and Asian populations. While Whites are still largely overrepresented amongst practicing nurses, nursing students, and nursing faculty, this picture is slowly changing due to California's changing population and concerted efforts to diversify the nursing workforce. While the population of nurses under 35 is more reflective of the state's population than is the population of older nurses, Latinos are still particularly underrepresented (10 percent of nurses under 35 are Latino vs. 37% of the general population.)

Programs to address the nursing shortage have largely focused on increasing the number of training slots available for nurses and not increasing diversity in the profession. The authors recommend investment in strategies that enhance diversity and address barriers to completion. One such effort, the California Nurse Workforce Initiative, found that “individual case management, academic support, and services such as child care and transportation contributed to student success.” They also recommend developing and defining career ladders within the profession so that nurses can advance within the profession.

ConnectED: The California Center for College and Career. (2007). *A Profile of the California Partnership Academies 2004-2005*. Berkeley, CA: UC Berkeley.

This report is a profile of California's Partnership Academies, unique learning groups instituted within comprehensive high schools. Career academies offer team teaching and career-based instruction focusing on different career fields. Female and non-White student enrollment in CPAs is higher than state averages. CPAs tend to be in schools with lower Academic Performance Index ratings. Underrepresented minority students in these programs tend to excel above state averages for students from the same background in the statewide population of high school students. URM students in these programs also tend to have higher graduation rates than comparable students in the statewide population, and most intend to attend college. The field of health sciences and medical technology is represented in 51 percent of Career Partnership Academy programs. These factors explain their relevance to the field of health care workforce diversity. CPAs have been described as a successful early pipeline strategy for addressing diversity in the health care workforce.

Christian, S. & Chapman, S. (2009). *Career Programs for California's Pipeline of Secondary Students: An Opportunity to Address the State's Workforce Shortages*. San Francisco: UCSF Center for the Health Professions.

The research brief explores different types of health career programs accessible to secondary students in California. The report examines current data on availability, funding and impact of Career Technical Education (CTE) health programs resulting in identification of opportunities to target this potential pipeline of students in order to alleviate future health workforce shortages. Key findings center on the fact that in order to effectively increase California health workforce supply through high school health career programs, CTE objectives must be clearer at the programmatic level, progress toward objectives must be clearly tracked, and efforts must be coordinated so that successful CTE models can be replicated. While this publication addresses an overview of this topic, it does include some data about diversity in enrollment in the California Partnership Academies in public high schools.

Christian, S. & Dower, C (2009). *Comparative Snapshot of Four Allied Health Occupations in California: Community Health Workers, Medical Assistants, Certified Nurse Assistants, and Home Health Aides*. San Francisco: UCSF Center for the Health Professions.

This research brief examines the similarities and differences among education, training and practice tasks of four key occupations in allied health workforce: community health workers, medical assistants, certified nurse assistants and home health aides. While this report is primarily an overview of these occupations and their similarities and differences, there is discussion, particularly on page three, of diversity issues related to community health workers and medical assistants. Both of these professions tend to require workers to serve as community liaisons between underserved patient

populations and providers. The largest proportion of the state's medical assisting workforce is female and Latino.

Dower, C. (2003). *Health Care Interpreters in California*. San Francisco: UCSF Center for the Health Professions.

California has a considerable and increasing need for interpretive services in health care. Currently one in every five Californians, over 6 million people, qualify as Limited English Proficient (LEP) and could be expected to benefit directly from improved interpretive services and the attendant cultural competence of native and/or well-trained speakers. This issue brief looks at the emerging profession of Health Care Interpreters in California and examines the significance and complexity of the issues it faces in addressing the significant language needs of the state.

Very little is known about the health care interpreter workforce, with estimates of their numbers in the state ranging from 500-1,890. Education and training for interpreters varies in length and depth. Health care workers in California are not certified. Federal law requires any federally funded health care program (Medi-Cal and Medicare) to include interpretation services. California state law requires that general acute care hospitals must provide language assistance programs.

Because of growing demand and the small size of the workforce, the authors conclude that the state's growing need for interpretation should be supplemented by utilizing bilingual providers and communications media to allow access to offsite interpretation services.

Dower, C. (2003). *Health Care Providers' Language Assistance Responsibilities: Major Federal and California Requirements*. San Francisco: UCSF Center for the Health Professions.

A number of federal and state laws address the need to provide health care in a language that the patient understands. This two-page overview of major California and Federal lists requirements for health care providers to provide language assistance to patients who require these services. The document offers key aspects of the laws and references for more information.

Dower, C. (2005). *Bilingual Proficiency among California's Health Care Professionals*. San Francisco: UCSF Center for the Health Professions.

Californians speak a multitude of languages. In 2000, California ranked first in the U.S. in percent of the population speaking English less than "very well". With 20 percent of the general population and 25 percent of school-age children of limited English proficiency, concerns are rising that many Californians may not be receiving optimal health care. This brief explores policy options for encouraging and measuring second-language competence among our medical practitioners. In developing education and certification programs to better equip California's health care workers with linguistic skills, policy makers will have to struggle with the challenge of setting standards high enough to meet Californians' needs while not so high that training time and costs are unreasonable.

Dower, C., and Kaiser, J. (2007). *Improving Language Access in California Hospitals*. San Francisco: UCSF Center for the Health Professions.

The move toward "cultural competence" that responds to the diversity of California's population is reflected in efforts of California hospitals to

provide linguistically appropriate care for their patients who have limited English proficiency. Legal mandates underscore this need. Health care providers do not always speak languages their patients understand, and research has confirmed that miscommunications can risk harm to patients. In 2007, the Center for the Health Professions interviewed representatives of 20 hospitals throughout California that are instituting interpretive language services to learn what services are being provided, the costs and benefits of the services, and the process by which they were established. The responses both provide information on what is being done and offer models for others to integrate into their own institutions.

Dower, C. and Kaiser, J. (2008). *Considering Language Access Services for California Hospitals*. San Francisco: UCSF Center for the Health Professions.

This brief is based on the 2007 report, *Improving Language Access in California Hospitals*, listed above.

Grumbach, K., Coffman, J., Gándara, P., Muñoz, C., Rosenoff, E., and Supulveda, E. (2003) *Strategies for Improving the Diversity of the Health Professions*. Woodland Hills, CA: The California Endowment.

This report provides a review of the research literature and assessment of the many programs intended to increase the participation of underrepresented minorities in the health professions. The authors note that African Americans, Latinos, and Native Americans remain underrepresented in the health professions and the schools that prepare future health professionals. Lack of educational and financial opportunity hinder the efforts of underrepresented minorities (URMs) to succeed in primary education and proceed to higher levels of education prior to even enrolling in a health professions school or course of study. Financial barriers continue to impede the progress of even those URM students who achieve

success in enrolling in and completing an education in the health professions. Hence, funders struggle to prioritize the focus of their funding between initiatives meant to improve primary education for URMs and specific initiatives to improve opportunities for URMs in health professions education. The majority of health professions programs in secondary and post-secondary education focus on medicine and biomedical research. There is a paucity of research and evaluation studies on the many programs meant to enhance the participation of URMs in the health professions. However, it does appear that many programs have a positive impact.

Grumbach, K., Odom, K., Moreno, G., Chen, E., Vercammen-Grandjean, C. and Mertz, E. (2008) *Physician Diversity in California: New Findings from the California Board Survey*. San Francisco: UCSF Center for California Health Workforce Studies. (Available at: futurehealth.ucsf.edu).

The report presents findings from an analysis of survey responses from 61,861 physicians who are active in patient care in California and no longer in training. Key findings include: 1) the underrepresentation of Latinos and African Americans among California physicians remains dire. 2) California has very few physicians of Samoan, Cambodian, and Hmong/Laotian ethnicity, and these ethnic groups should also be recognized as underrepresented in medicine and more actively recruited into the profession. 3) minority physicians in California play a key role in underserved communities. Minority physicians in California are much more likely than White physicians to practice in Medically Underserved Areas, Health Professions Shortage Areas, communities with high proportions of minority populations, and low income communities. The authors conclude that the California Medical Board survey represents a major step forward in the ability of the state to have reasonably accurate and complete data on key characteristics of California

physicians, and is a valuable resource for physician workforce analysis and planning in the state.

Jacobs E., Chen AH, Karliner L, Fortier JP, Mutha S. (2004). “Legal and regulatory obligations to provide culturally and linguistically appropriate emergency department services”. *Clinical Pediatric Emergency Medicine*. 5(2): 85-92

The authors examine culturally appropriate care issues as they related to emergency department issues. They explain the array of federal and state laws as well as professional and accreditation standards that have been developed to ensure that health care organizations provide culturally and linguistically appropriate care. They note that federal law explicitly requires that recipients of federal financial assistance such as Medicare, Medicaid and SCHIP provide accommodation for limited English proficient individuals. State laws vary, with some states having no provisions for linguistically appropriate services, and others, such as California, having many. Because many organizations are confused about how to comply with these laws, the authors provide some suggestions on how to comply with these laws, noting that failure to do may result in errors in patient care and possible malpractice lawsuits. The authors recommend that hospitals conduct staff training on how to use interpreters and interpretation services. They also discuss conditions under which hospitals might consider hiring onsite interpreters, which might include staff who are trained as dual-role interpreters, using agency interpreters, or for less commonly used languages and late hours, a language line.

Lok, V. & Chapman, S. (2009). *The Mental Health Workforce in California: Trends in Employment, Education, and Diversity*. San Francisco: UCSF Center for the Health Professions.

This research report utilizes public data sources to present workforce projections, needs and

educational data for mental health professions in California. The report focused on the following mental health occupations: psychiatrists, psychologists, marriage and family therapists, advanced practitioner nurses in psych/mental health, social workers, psychiatric technicians, and various mental health counselors. Current data show significant shortage across mental health workforce, with vacancy rates for mental health providers at 20-25 percent in 2008, with higher numbers in rural areas.

The authors note that California is one of the most racially and ethnically diverse states in the country, and that it is projected to become even more so in the coming decades. Population projections suggest that by the year 2030, 66 percent of the state's population will be non-White, with much of the state's population growth projected to occur among California's Latinos, and secondarily, Asians. However, the mental health workforce is not reflective of the state's population and most of the behavioral and mental health workforce appears to be White. Less than 5 percent of the state's psychiatrists are Latino compared to 37 percent of the overall population. Marriage and family counselors are growing more diverse as a group—Latinos made up only 7 percent of those graduating with an MFT degree in 1997, and 21 percent by 2006. Latinos have also made some slow and steady progress in the field of social work, comprising slightly more than 30 percent of those receiving MSW degrees in 2006. Graduates of substance abuse and rehabilitation counseling programs were primarily White, with a slowly growing and substantial minority of Latino graduates. Psychiatric technicians were perhaps the most diverse group, with Whites, Latinos, Asians and African Americans fluctuating between 20-30 percent of graduates each, although the proportion of Whites and African Americans has decreased over time. Overall, the higher paying professions with greater educational requirements were less diverse.

Mertz, E. & Bates, T. (2008). *Registered Dental Hygienists in California: Regional Labor Market Chart Book*. San Francisco: UCSF Center for the Health Professions.

This study provides labor market information for registered dental hygienists (RDH) in California, specifically providing a look at labor market dynamics at the regional level. Results support data showing a trend toward increased supply statewide, but regional analyses show variation at the regional level.

While this report provides an overview of the profession, it provides key statistics on race/ethnicity and language use among RDHs statewide and by region. Overall, the authors note that “the gender, racial and ethnic diversity of the hygiene workforce does not match the population, with only 2.5% of active RDHs being male, and 76.6% of active RDHs being White.” However, this picture varies by region, with some regions exhibiting very little diversity, and others experiencing increasing diversity, especially among RDHs under 35.

Moreno, M.R., Otero-Sabogal, R., and Newman, J. (2007). “Assessing Dual-Role Staff-Interpreter Linguistic Competency in an Integrated Healthcare System”. *Journal of General Internal Medicine*. 2007 November; 22(Suppl 2): 331–335.

Increasing linguistic diversity in the US population has increased the demand for interpretation services in medical practices. However, the demand for interpretation services outstrips the supply of trained interpreters. Many practices have depended upon informal means of interpretation and translation, generally calling upon bilingual staff (medical assistants, administrative assistants and clinical staff) to provide these services, without any assessment of staff's linguistic competence. The authors designed a study to assess the linguistic competency of 840 dual-role interpreters in a

large health care organization in California. A total of 840 dual-role staff interpreters were tested for Spanish, Chinese and Russian competence. Researchers found that approximately 1 in 5 dual-role staff interpreters had insufficient skills to serve as interpreters in a medical encounter. The authors recommend more consistent and standardized assessment of the skills of dual-role interpreters.

Moreno, G., Walker K.O., and Grumbach, K. “Self-reported fluency in non-English languages among physicians practicing in California”. *Family Medicine*. 2010; 42(6): 414-420

Language barriers between patients and clinicians are believed to have an adverse affect on access to care. This is of particular concern in California, an increasingly diverse state with a large immigrant population in which many individuals have limited English proficiency. Using California Medical Board data, the authors of this article compared physicians' fluency in languages other than English by physician race/ethnicity and the location of their medical school education. They found that 42 percent of physicians reported fluency in non-English languages, although this was more prevalent among international medical graduates than US medical graduates. The majority of physicians with fluency in Spanish are not Latino. However, Asian language fluency is largely restricted to physicians who are of Asian race/ethnicity. Overall, international medical school graduates constitute one-quarter of practicing physicians in the United States and make a significant contribution to language access.

Moreno G., Walker K.O., Morales, L.S., and Grumbach, K. “Do physicians with self-reported non-English fluency practice in linguistically disadvantaged communities?” *Journal of General Internal Medicine*. 2010; Dec 1 [Epub ahead of print]

The authors note that language concordance between physicians and patients may reduce barriers faced by individuals with limited English proficiency. They determined to investigate whether physicians fluent in languages other than English were actually practicing in areas with large concentrations of people with LEP. Using California Medical Board Physician Licensure data, the researchers geocoded physician practice zip codes and examined the relationship between language capacity and location, controlling for age, gender, and race/ethnicity, medical specialty, and location of medical school. Overall, they found that physicians who reported fluency in Spanish or an Asian language are more likely to locate their practice in areas with large populations of patients that speak the non-English language in which the physician is fluent. However, Latino or Asian race/ethnicity had the strongest effect on practice location. Non-Hispanic White Spanish-speakers were the least likely of those studied to locate their practices in linguistically disadvantaged areas compared to other physicians with Spanish fluency.

Spetz, J., Keane, D. and Herrera, C. (2009). *2008 Survey of Registered Nurses*. Sacramento: California Board of Registered Nurses.

The 2008 Survey of California Registered Nurses is the sixth in a series of surveys designed to describe licensed nurses in California and to examine changes over time. Other studies were completed in 1990, 1993, 1997, 2004, and 2006. While this publication provides a broad overview of the nursing profession in California, it addresses diversity in the workforce, primarily in pages 33-37.

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