THE HEALTHCARE WORKFORCE LANDSCAPE IN COUNTY MEDICAL SERVICES PROGRAM (CMSP) & RURAL COUNTY REPRESENTATIVES OF CALIFORNIA (RCRC) COUNTIES

Janet Coffman, PhD, MPP
Kyoko Peterson, MPH

December 11, 2023

Contents

EXECUTIVE SUMMARY

Health professional shortages in rural California have been a persistent concern for many years and have become more acute in recent years due to the COVID-19 pandemic and the aging of the health care workforce. Despite these concerns, most previous analyses of the health workforce in rural California have only examined large, multi-county regions that often combine rural and urban counties. Sensing a need to understand the dynamics, barriers, and opportunities affecting the availability of the health care workers at a more granular level, the County Medical Services Program (CMSP) Governing Board contracted with Healthforce Center at UCSF to produce this report, which presents findings from analyses of publicly available data at both county and regional levels for the 35 counties that participate in CMSP and the 40 counties that participate in the Regional County Representatives of California (RCRC).

Findings from these analyses indicate that collectively CMSP and RCRC counties have lower supplies of health professionals when compared to the state overall. Gaps between supplies in rural and urban counties are most pronounced for physicians, dentists, and licensed vocational nurses. Rural areas with smaller populations that are farther from urban centers often have the lowest supplies of health professionals per capita. Some small rural counties have no physicians in essential specialties, such as cardiology and obstetrics/gynecology.

The report also presents findings that show the availability of health professions education in CMSP and RCRC counties varies widely across professions. People who reside in CMSP and RCRC counties have more access to shorter educational programs that have fewer entry requirements, such as certificate and associate's degree programs at community colleges, than they do to programs for health professions that require a graduate degree. There is significant variation in the availability of educational programs across different counties, and the counties that have health professions education programs have larger populations and/or are closer to urban areas.

Addressing the health workforce needs of CMSP and RCRC counties calls for a multi-faceted strategy that incorporates initiatives that span investments in K-12, undergraduate, and graduate education, and in currently practicing health professionals. In the near term, investment in currently practicing health professionals is critical to meet immediate recruitment and retention needs. In the longer term, investments supporting all three levels of education are needed to create pipelines of future rural health professionals.

With respect to the currently practicing health professionals, county policy makers, including Boards of Supervisors and leaders of county health care agencies, need to assess the competitiveness of current wages and benefits paid to health professionals employed by counties and providers with which they contract. This assessment will help local policy makers determine what adjustments, if any, are needed to assure competitive compensation in the local health care marketplace, which includes hospitals, clinics, private medical offices and other public agencies, including school districts.

County policy makers will also need to look for opportunities to partner with other health care employers in their counties to jointly identify their counties' most pressing recruitment and retention needs. One opportunity would be for county leaders to join with other health care employers and with local higher education institutions to chart a path for expanding health professions and pre-health professions education in their communities. Toward this same end, county, other local employer, and higher education leaders will need to develop collaborative approaches to advocating for increased state and federal funding for health professions education in rural communities and for scholarship and loan repayment programs for health professionals who practice in rural areas.

BACKGROUND

Limited access to health professions in rural areas of California is a longstanding concern[1] which has been exacerbated by the COVID-19 pandemic and the increase in the number of health professionals at or near retirement age. Multiple previous reports on California's health workforce have grouped the state's counties into regions.[2] While this approach is useful for identifying differences in supply across major parts of the state, it often lumps together rural and urban counties and rural counties whose populations and proximity to urban areas differs.

Sensing a need to understand access to health professionals at a more granular level, the County Medical Services Program (CMSP) Governing Board contracted with Healthforce Center at UCSF to conduct research on the health workforce and health professions education in the 35 counties that participate in CMSP and the 40 counties that belong to RCRC. (A complete list of CMSP and RCRC counties can be found in Appendix A.) The Governing Board, in collaboration with RCRC, sought to develop an understanding of the dynamics, barriers and opportunities affecting the availability of health care workers to provide behavioral health, medical, nursing, and dental care in participating counties. This report presents major findings from that research.

This report uses counties as our main unit of analysis because County Boards of Supervisors and county health care officials are the primary audiences for this report. In California, county governments are responsible for providing medical and behavioral health services to indigent persons either through county facilities or contracts with private providers. Counties also play a large role in administering the Medi-Cal program. This report also examines multi-county sub-regions of CMSP and RCRC counties to identify clusters of counties that might benefit from working collaboratively to address health workforce and health professions education needs.

This report presents information about the following health professions:

- Behavioral health (licensed marriage and family therapists, licensed clinical social workers, licensed professional clinical counselors, psychologists, psychiatrists
- Medicine (MDs and DOs, physician assistants, nurse practitioners)
- Nursing (licensed vocational nurses, registered nurses, advanced practice registered nurses)
- Dental (dentists, registered dental assistants, dental hygienists)

As shown in the Table of Contents, the main sections of this report are the Background, Methods, Findings, Conclusions, Recommendations and Appendices. Within the Findings section, the content is organized by the types of professions listed above. Within each subsection, findings regarding current supply are presented first, followed by findings regarding availability of educational programs.

[1] Coffman J, Bates T, Geyn I, Spetz J (2018). California's Current and Future Behavioral Health Workforce. San Francisco, CA: UCSF Healthforce Center; Coffman J, Quinn B, Brown T, Scheffler R (2004). Is There A Doctor in the House? An Examination of the Physician Workforce in California over the Past 25 Years. Berkeley, CA: UC-Berkeley Petris Center on Health Care Markets and Consumer Welfare; Mertz E, Grumbach K, MacIntosh L, Coffman J (2000). Geographic Distribution of Dentists in California. San Francisco: UCSF Center for California Health Workforce Studies.

[2] See for example, Coffman J, Fix M, Ko. M (2018). California Physician Supply and Distribution: Headed for a Drought? Oakland, CA: California Health Care Foundation; Spetz J (2018). Forecasts of the Registered Nurse Workforce in the Northern Region of California. San Francisco, CA: UCSF Healthforce Center.

METHODS

Data from the California Department of Consumer Affairs, California's umbrella agency for professional licensing boards, and the Medical Board of California were analyzed to describe the supply and distribution of licensed behavioral health, medical, nursing, and dental professionals in CMSP and RCRC counties. Data from the California County Behavioral Health Directors Association Survey was analyzed to understand retention and recruitment challenges for behavioral health professionals. Data from the National Resident Matching Program, the American Dental Association – Commission on Dental Accreditation, and the Integrated Postsecondary Education Data System were examined to identify educational programs in CMSP and RCRC counties that prepare behavioral health, medical, nursing, and dental professionals. Information about each of these data sources can be found in Appendix C.

Ratios of health professionals per 100,000 population were calculated to create a standardized metric to compare supplies of health professionals across CMSP and RCRC counties. This standardized metric was created because the populations of CMSP and RCRC counties vary widely, ranging from a low of 1,204 in Alpine County to a high of 488,863 in Sonoma County in 2020. Data from the 2020 United States Census were used to calculate these ratios.

Three levels of geographic units were used in these analyses. First, supplies of health professionals in all CMSP and RCRC counties were compared to California overall to determine whether supplies of health professionals per capita differ between CMSP and RCRC counties and the state overall. Second, data were tabulated at the county level to assess variation in supply across CMSP and RCRC counties. Third, to contextualize the analysis, CMSP and RCRC counties were grouped into sub-regions for this report to identify clusters of counties with the lowest supplies of health professionals per capita. A complete list of these sub-regions and the counties therein is shown in Table 1 below. Maps of CMSP and RCRC counties combined with healthcare facility locations can be found in Figures 2 and 3 in Appendix C.

Table 1: Sub-Region Designations of CMSP and RCRC Counties

Sub-Region	Counties
Bay Area	Marin, Napa, Solano, Sonoma
Central Coast	Monterey, San Benito, San Luis Obispo, Santa Barbara
Eastern Sierra	Alpine, Inyo, Mono
Gold Country	Amador, Calaveras, Mariposa, Tuolumne
Imperial Valley	Imperial
North Central	Butte, Colusa, Glenn, Tehama
North Central Coast	Lake, Mendocino
North Coast	Del Norte, Humboldt, Trinity
North East	Lassen, Modoc, Shasta, Siskiyou
Sacramento Adjacent	Sutter, Yolo, Yuba
San Joaquin Valley	Kings, Madera, Merced, Tulare
Sierra	El Dorado, Nevada, Placer, Plumas, Sierra

FINDINGS

Several major findings emerge across all of the health professions included in this report.

- In most cases, supplies of professionals per capita are lower in CMSP and RCRC counties than in California overall.
- Supplies vary widely across CMSP and RCRC counties; in general, remote counties with small populations have the lowest supplies of health professionals per capita.
- There are fewer training programs for health professionals in CMSP and RCRC counties than in urban counties.

Below, findings are presented separately for each of the four major types of health professions addressed in this report: behavioral health, medical, nursing, and dental. For each group of professions, findings regarding supply and distribution in CMSP and RCRC counties are presented first, followed by findings regarding the availability of educational programs CMSP and RCRC counties. For behavioral health professions, additional findings are presented regarding recruitment and retention challenges faced by county behavioral health agencies and the community-based organizations with which they contract.

Appendix C contains maps (Figures 2 and 3) that display the distribution of hospitals and clinics in CMSP and RCRC counties. These maps provide insights into the distribution of health professionals in these counties because most health professionals practice in hospitals or clinics or in other facilities in close proximity to hospitals and clinics (e.g., physician practices, long-term care facilities). Maps that display locations of educational institution CMSP and RCRC counties that provide health professions education can be found in Appendix D as Figures 4 and 5.

BEHAVIORAL HEALTH

Supply and Distribution of Behavioral Health Professionals

For most types of behavioral health professionals, the supply in CMSP and RCRC counties is either equal to or slightly lower than in California overall. The main outlier is psychiatric technicians, which are significantly more common in CMSP and RCRC counties than in the state overall.

- ***There is significant variation in the ratios of behavioral health professionals per capita across CMSP and RCRC counties.*** Generally, counties with smaller populations that are farther from urban centers have the lowest ratios of behavioral health professionals per capita. Counties that have educational programs that prepare behavioral health professionals within their borders or in nearby counties have higher ratios of behavioral health professionals per capita than counties that do not.
- In most CMSP and RCRC counties, LMFTs and LCSWs account for the largest numbers of behavioral health professionals, followed by psychologists and psychiatrists. This pattern is consistent with urban counties in California.
- There is substantial variation in the portion of the workforce that consists of psychiatric technicians. In a small number of counties—specifically, Kings, Napa, San Luis Obispo, Solano, Tulare—psychiatric technicians are the most common behavioral health professionals.
    - This variation can be partially explained by the fact that psychiatric technicians are more commonly employed by institutions such as prisons and state hospitals. San Luis Obispo

County has a state hospital (Atascadero State Hospital) and a prison (California Men's Colony). Kings County has three state prisons and Solano County has two. Napa County is home to Napa State Hospital.

- Findings regarding supplies of psychiatrists and master's level behavioral health clinicians (licensed clinical social workers, licensed marriage and family therapists, licensed professional clinical counselors) are discussed in greater detail due to their key roles in the behavioral health workforce. Psychiatrists are one of the few types of professionals who can prescribe medications used to treat behavioral health conditions, and master's level clinicians constitute the largest share of licensed behavioral health professionals and are the primary providers of psychotherapy.

Psychiatrist Supply

- ***The ratio of psychiatrists per 100,000 is slightly lower across RCRC counties (12 per 100,000 population), when compared to the state overall, where the ratio per 100,000 population was 15. When calculated across CMSP counties, the ratio is the same as the state overall.[3]***

- Counties in the Bay Area (Marin, Napa, Solano, Sonoma) and Central Coast (Monterey, San Benito, San Luis Obispo, Santa Barbara) sub-regions have much higher ratios of psychiatrists per capita than all other regions.
- No psychiatrists have practice addresses in six counties (Alpine, Glenn, Modoc, Mono, Sierra, and Yuba).
- Low supplies of psychiatrists per capita are especially concerning in the Eastern Sierra (Alpine, Inyo, Mono), North Coast (Del Norte, Humboldt, Trinity), and North East (Lassen, Modoc, Shasta, Siskiyou) sub-regions due to the long distances people need to travel for appointments with psychiatrists in other counties.

Limited local supplies of psychiatrists are especially challenging for people who need medication to treat their mental health condition. Three other options exist for providing access to health professionals authorized to prescribe medications for these conditions but are not perfect substitutes for having psychiatrists in rural communities. First, telepsychiatry is an effective alternative to in-person care but is only available to persons who have access to reliable internet services and are able to interact with a psychiatrist online. Second, psychiatric mental health nurse practitioners (PMHNPs) are trained to prescribe medications used to treat mental health conditions, but data regarding their numbers and distribution across CMSP and RCRC counties is not available. Third, primary care providers are authorized to prescribe medications for mental health conditions but have less expertise than psychiatrists and PMHNPs. In addition, many CMSP and RCRC counties have low supplies of primary care providers which limits their capacity to substitute for psychiatrists.

[3] This finding reflects Marin County's participation in CMSP but not RCRC. Marin has one of the largest ratios of psychiatrists per capita in the state and its inclusion among CMSP counties skews the ratio for CMSP counties to the ratio for California overall.

Supplies of Master's Level Clinicians (LCSWs, LMFTs, LPCCs, ASWs, AMFTs, APCCs)

- ***Across RCRC counties, the ratio for licensed clinical social workers (LCSW) per 100,000 population was slightly lower than in the state overall [57 vs. 66]. The ratio for CMSP counties were equal to the state.*** Meanwhile, for licensed marriage and family therapists (LMFTs) [103 vs. 101] and licensed professional clinical counselors (LPCCs) [5 vs. 5] the RCRC ratios were essentially equal to California overall. However, the CMSP ratio for LMFTs was higher than the state overall [119 vs. 101] primarily due to a high ratio of LMFTs in Marin County (337).
- When considering all three types of master's level clinicians and both fully licensed and associate clinicians,[4]
    - The Bay Area (Marin, Napa, Solano, Sonoma) and Central Coast (Monterey, San Benito, San Luis Obispo, Santa Barbara) sub-regions have the highest ratios of master's level clinicians per capita.
    - The Imperial Valley (Imperial) and the San Joaquin Valley (Kings, Madera, Merced, Tulare) sub-regions have the lowest ratios of master's level clinicians per capita.
- Looking solely at regions can mask substantial variation in supplies of master's level clinicians across counties within regions.
    - The widest variation across counties within regions is in the North Central sub-region (Butte, Colusa, Glenn, Tehama), where the combined supply of all types of master's level clinicians ranged from 87 per 100,000 population in Colusa County to 318 per 100,000 population in Butte County.
    - Other sub-regions with wide variation across counties within regions include the Central Coast (Monterey, San Benito, San Luis Obispo, Santa Barbara), North Coast (Del Norte, Humboldt, Trinity), and Sacramento Adjacent (Sutter, Yolo, Yuba) sub-regions.

There are two important limitations to the data about social workers. First, the data only capture people with a master's degree in social work (MSW) who are licensed as LCSWs. Some MSWs work in positions in behavioral health agencies for which licensure is not required. Second, some LCSWs work in settings other than behavioral health agencies, such as hospitals, hospices, child welfare, and adult protective services.

Recruitment and Retention of Behavioral Health Professionals

Data from the County Behavioral Health Directors Association of California survey for the 2021 *Building the Future Behavioral Health Workforce* (BFBHW) report were analyzed to identify reported recruitment and retention challenges faced by county behavioral health agencies and the community-based organizations (CBOs) with which they contract to provide services. Key challenges reported in that survey include:

- ***Lengthy hiring process was the most frequently cited barrier to the recruitment of both mental health and substance use disorder (SUD) professionals,*** followed closely by inability to offer competitive pay. Other frequently cited barriers included location (i.e., people prefer to live in other parts of the state), high cost of living, and student loan debt.

[4] Associate clinicians are persons who have completed a master's degree program approved by the California Board of Behavioral Sciences but have not yet completed supervised clinical practice and examinations required for licensure.

- Barriers mentioned in free-text responses were competition with other institutions and counties, reluctance to offer alternative schedules and remote work, and lack of employment for spouses.
- The finding that counties struggle with competition from other employers is consistent with findings from focus groups with leaders of county behavioral health agencies and CBOs that were conducted for the BFBHW report. These conversations with focus group members suggest that there are three major sources of competition: Private sector employers, other public sector employers, such as school districts and prisons, and county behavioral health agencies in adjacent counties that pay higher salaries.
- Additional recruitment barriers mentioned in free-text responses for SUD professionals were limited knowledge regarding mental health and challenges associated with passing a background check for persons previously involved with the criminal justice system.

- ***Inability to offer competitive pay was cited as the most common barrier to the retention of mental health and SUD professionals.*** This was followed by large caseloads, extensive documentation requirements, and complexity of patients.
  - Barriers to retention of mental health professionals cited in free-text responses were competition with other institutions and counties that were able to offer better benefits and salaries, and lack of remote work options.
  - Barriers to retention of SUD professionals mentioned in free-text responses were that staff retired and that agencies could not offer promotional opportunities due to existing staff not having necessary educational credentials.
  - Findings regarding difficulties providing promotional opportunities are consistent with findings from focus groups with leaders of county behavioral health agencies and CBOs that were conducted for the BFBHW report. Many SUD counselors have only an associate degree or certificate level training and cannot be promoted into positions that require a bachelor's or master's degree. Opportunities to pursue further education are also limited in many rural counties.

"OTHER AGENCIES (LIKE SCHOOL DISTRICT) AND NEIGHBORING COUNTIES OFFER GREATER PAY WITH BETTER/CHEAPER-COST BENEFITS."

- *A county behavioral health director, on retention barriers*

Behavioral Health Professions Education

There are fewer behavioral health education programs in CMSP or RCRC counties than in urban areas of California. At present there is only one psychiatry residency program and one doctoral program in psychology in the CMSP and RCRC counties. SUD counseling education is more widely available than education in other behavioral health professions, but even in this profession there are several regions that do not have any training programs. With some exceptions, CMSP or RCRC counties that have behavioral health education programs within their borders or nearby have higher numbers of the corresponding professionals than those that do not.

The data presented in this section do not include online or distance education programs[5] that are not based at colleges or universities in CMSP or RCRC counties. Such programs offer additional educational options for people living in rural areas.

Psychiatry Residency Programs

Psychiatrists are physicians who complete medical school and at least a four-year residency program in general psychiatry. Some complete additional fellowship training in specialties such as child and adolescent psychiatry and geriatric psychiatry.

- At present, there are no medical schools in CMSP or RCRC counties.
- At present, Tulare County is the only RCRC county that has a psychiatry residency program. No CMSP county has a psychiatry residency program.
- Healthy Rural California is actively recruiting applicants for a general psychiatry residency program that will open in summer 2024 and provide clinical training in Butte, Colusa, Glenn, Sacramento, Sutter, Tehama, Yolo, and Yuba Counties.[6] This will be the first psychiatry residency program in California north of Sacramento.

Social Work Programs

A Master in Social Work (MSW) degree prepares persons to become a Licensed Clinical Social Worker (LCSW).

- ***There are three MSW programs at California State Universities in CMSP or RCRC counties—Chico, Humboldt, and Monterey Bay—which graduated a total of 188 students in 2021*** (latest year for which data are available).
- There are five MSW programs in nearby counties — two in Fresno County, two in Sacramento County, and one in Stanislaus County — that may enroll students from CMSP or RCRC counties.
- The locations of the MSW programs do not correspond with the supply of LCSWs in CMSP and RCRC counties. While the MSW programs are located in Butte, Humboldt, and Monterey counties, the largest numbers of LCSWs can be found in Sonoma, Solano, and Placer counties.

Marriage and Family Therapy and Professional Clinical Counseling Programs

Multiple kinds of master's degree programs can lead to licensure as a marriage and family therapist (LMFT) or professional clinical counselor (LPCC). Examples of the degrees that can lead to licensure as a LMFT or LPCC include master of clinical psychology, master of counseling psychology, master of marriage and family therapy, and master of mental health counseling.

- ***Ten programs in CMSP or RCRC counties are approved by the California Board of Behavioral Sciences to meet the educational requirements for licensure as either a LMFT***

[5] The term "distance education" refers to programs in which students complete a combination of on campus courses and online courses. Students in these programs also often complete clinical training in their home communities.

[6] Healthy Rural California is an organization, founded in Northern California, that aims to address rural health care needs. The leadership includes staff from the Butte-Glenn Medical Society, among other organizations. https://healthyruralca.org/community-psychiatry-residency-program/

or a LPCC. Four of these programs are at California State University campuses, four are at private, not-for-profit universities, and two are at private, for-profit universities. These programs collectively graduated 171 students in 2021 and are located in the regions of North Central, North Coast, Bay Area, Sierra, Central Coast, and North East.

- There are seven master's programs in neighboring counties, such as CSU-Fresno, CSU-Bakersfield, and University of the Pacific, which may enroll students from CMSP or RCRC counties.

- For LMFTs and LPCCs, the education data generally corresponds with the supply data. The highest numbers of LMFTs and LPCCs are in Sonoma, Santa Barbara, and Placer counties, all of which have master in psychology degree programs.

Psychology Programs

A doctoral degree (PhD or PsyD) from an accredited program is required for licensure as a psychologist.

- ***There is only one clinical psychology PhD program approved by the American Psychological Association (APA) in a CMSP or RCRC county*** – Fielding Graduate University in Santa Barbara County.

- However, there are five programs in neighboring counties — Fresno, Sacramento, San Joaquin, Ventura — that may enroll students from CMSP or RCRC counties.

Psychiatric Technician Programs

Either a certificate program or an associate degree can lead to a position as a Psychiatric Technician.

- ***In CMSP and RCRC counties, there are four certificate programs and two associate degree programs for psychiatric technicians at community colleges in CMSP and RCRC counties, and these programs graduated a total of 112 students in 2021***. The programs were located in Napa, San Luis Obispo, Tulare, and Yuba counties.

- Two community colleges in two San Joaquin Valley counties (Fresno and San Joaquin Counties) have psychiatric technician programs.

- The locations of the psychiatric technician programs correspond generally with the supply of psychiatric technicians in CMSP and RCRC counties. The highest numbers of psychiatric technicians can be found in San Luis Obispo, Tulare, Solano, and Kings counties.

Substance Use Disorder (SUD) Counselor Programs

Either a certificate program or an associate degree can lead to a position as a Substance Abuse Counselor.

- ***In CMSP and RCRC counties, there are 14 certificate programs and 10 associate degree programs, and these programs graduated a total of 113 students in 2021.*** Thirteen of the certificate programs and nine of the associate degree programs are at community colleges. A private, for-profit college operates one certificate program and one associate degree program.

- Eight sub-regions have at least one SUD counselor program
- Four sub-regions had no program, including the Eastern Sierra (Alpine, Inyo, Mono), Gold Country (Amador, Calaveras, Mariposa, Tuolumne), North Central (Butte, Colusa, Glenn, Tehama), and San Joaquin Valley (Kings, Madera, Merced, Tulare) sub-regions.
- Three community colleges in the San Joaquin Valley counties (Fresno, San Joaquin, Stanislaus) have SUD counseling programs.

MEDICINE

Supply and Distribution of Physicians and Physician Assistants

Physicians

Physicians complete four years of education at an allopathic (MD) or osteopathic (DO) medical school plus a residency program in a specialty, which typically lasts from three to five years and, in some cases, a subspecialty fellowship.

The supply of physicians (MDs plus DOs) is lower in CMSP and RCRC counties compared to the state overall. ***The ratios for CMSP and RCRC were 202 and 194, respectively, while the ratio for California overall was 236.***

- ***Most of this gap is due to numbers of MDs in rural counties—the supply of DOs in CMSP and RCRC counties is almost identical to the supply in the state overall.***
    - In the state overall, the MD:DO ratio is 7.4:1, while in the CMSP and RCRC counties, the MD:DO ratios are 6.5:1 and 6.2:1, respectively.
    - This is consistent with previously established findings that DOs make-up a vital portion of the rural physician workforce.[7]
- All counties have at least one physician with a registered address in their county.
- There is significant variation in the ratios of physicians per capita across CMSP and RCRC regions and counties.
    - The Eastern Sierra (Alpine, Inyo, Mono) and the Bay Area (Marin, Napa, Solano, Sonoma) sub-regions have the highest ratios of physicians per capita—both over 200 physicians per 100,000 population—while the Imperial Valley (Imperial) and North Central (Butte, Colusa, Glenn, Tehama) sub-regions had the lowest ratios of physicians per capita.
        - However, the ratio for Eastern Sierra must be contextualized by the remoteness and small population of this subregion. Small fluctuations in the number of physicians will have a significant impact on the ratio.
    - The Imperial Valley and North Central sub-regions have the lowest ratios of MDs per capita and the Central Coast (Monterey, San Benito, San Luis Obispo, Santa Barbara) and Imperial Valley sub-regions have the lowest ratios of DOs per capita.
    - A few counties had very low numbers of MDs—Alpine has one, Sierra has two, Trinity has four, and Glenn has seven. Sierra County had no DOs and Alpine and Glenn each had one DO.

[7] Osteopathic Medical Profession Report 2022. American Osteopathic Association. Link: https://osteopathic.org/about/aoa-statistics/.

MD Hours of Patient Care Per Week

- Across the CMSP and RCRC counties, most active MDs are performing 20+ hours of patient care per week. This is consistent with trends for the state overall.
- The percent of active MDs who perform 20+ hours of patient care per week (# MDs 20+ hours per week/# MDs 1+ hours per week) ranges from 0% (Alpine County, where there is only one MD), to 100% (Glenn County, where there are 7 MDs). The median percentage across both CMSP and RCRC counties was 86%. These findings should be interpreted with caution due to the small numbers of MDs in these counties.
- Data on hours of patient care provided per week are not available for DOs.

MD Specialties

- We examined ratios of MDs per capita for 12 specialties—cardiology, emergency medicine, endocrinology, family medicine, gastroenterology, general surgery, hematology-oncology, internal medicines, obstetrics-gynecology, orthopedic surgery, pediatrics, and vascular surgery—and also calculated ratios for all other medical specialties and all other surgical specialties.
- DOs were not included because data on their specialties were not available.
- ***Across most physician specialties, the ratios of MD physicians per 100,000 population are lower in CMSP and RCRC counties than in California overall.***
    - ***This difference is most striking in Internal Medicine—the CMSP and RCRC counties have ratios of Internal Medicine MDs per 100,000 population of 21 and 20, respectively, whereas California overall has 28 Internal Medicine MDs per 100,000 population.***
- Family Medicine is the only specialty where the CMSP and RCRC counties have higher ratios of MDs per 100,000 population than the state overall—26 and 25, respectively, compared to 20 for California overall.
- Bay Area sub-region counties have higher ratios of MDs per capita than other sub-regions in medical specialties and surgical specialties other than the 12 examined in depth, perhaps because they have large populations that can support specialists who care for narrow subsets of the population.
- Mono County has a much higher ratio of MD orthopedic surgeons per capita than any other county.
- However, ratios of MDs per 100,000 population are less informative than numbers of MDs for many medical and surgical specialties due to the small number of MDs in each specialty in most counties. Table 2 below calls out which counties lack MDs in certain specialties.

Table 2: Counties without MDs in Specialty

Specialty	County without MDs in Specialty
Obstetrician-gynecologists	Alpine, Glenn, Mariposa, Modoc, Sierra, Trinity
Pediatricians	Alpine, Colusa, Mariposa, Modoc, Plumas, Sierra, and Trinity
Cardiologists	Alpine, Calaveras, Colusa, Del Norte, Glenn, Inyo, Mariposa, Modoc, Mono, Plumas, Sierra, Trinity
Endocrinologists	Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Glenn, Inyo, Lake, Lassen, Mariposa, Mendocino, Modoc, Mono, Nevada, Plumas, Sierra, Siskiyou, Tehama, Trinity, Yuba
Gastroenterologists	Alpine, Calaveras, Colusa, Del Norte, Glenn, Inyo, Lake, Lassen, Mariposa, Modoc, Plumas, San Benito, Sierra, Siskiyou, Tehama, Trinity, Yuba
Oncologists or Hematologists	Alpine, Colusa, Del Norte, Glenn, Inyo, Lassen, Mariposa, Modoc, Mono, Plumas, San Benito, Sierra, Siskiyou, Tehama, Trinity
General Surgeons	Alpine, Glenn, Inyo, Lake, Mariposa, Modoc, Sierra, Trinity

- All sub-regions have at least one MD with a practice zip code in the region in all of the specialties assessed, ***except for the Eastern Sierra sub-region (Alpine, Inyo, Mono) which has no cardiologists, endocrinologists, hematologists, or oncologists.***
- Most counties that do not have MDs in the specialties listed above have populations of less than 30,000 and may not have the facilities and equipment necessary to provide some of the procedures that MDs in these specialties perform (e.g., cardiac catheterization laboratories, infusion centers).
- In some counties without MD medical specialists or surgeons, these services may be provided by MDs whose primary practice location is in another county. For example, a cardiologist whose practice is based in Butte County might travel to Colusa or Glenn County once a week or once a month to provide care. People in these counties may also be able to use telehealth to obtain some types of specialty care.
- These findings may overstate the lack of availability of specialists because we do not have data on the specialties of DOs. Although DOs are more likely to be primary care physicians than MDs, some are specialists. [8]

Supply and Distribution of Physicians Relative to NPs and PAs

Due to the substantial overlap in the scopes of practice of physicians, NPs, and PAs, we compared supplies of physicians (DOs and MDs) to supplies of NPs and PAs in CMSP and RCRC counties.

- Many CMSP and RCRC counties with low supplies of MDs and DOs per capita also had low supplies of NPs and PAs per capita.
- However, the ratio of physicians to NPs and PAs varies substantially across counties, ranging from 0.4 MDs/DOs per 1 NP/PA in Sierra and Trinity Counties to 3.1 MDs/DOs per 1 NP/PA in Amador County. At the regional level, the Bay Area region had the highest ratios of MDs/DOs

[8] Osteopathic Medical Profession Report 2022. American Osteopathic Association. Link: https://osteopathic.org/about/aoa-statistics/.

per NPs/PAs and the Imperial Valley and North Central regions had the lowest ratios of MDs/DOs per NPs/PAs.

Physician Assistants

The supply of physician assistants (PAs) in CMSP and RCRC counties overall is similar to the supply in the state overall—36 per 100,000 population for California and 34 and 36 per 100,000 population for CMSP and RCRC, respectively.

- Across sub-regions, the North Coast (Del Norte, Humboldt, Trinity) and North East (Lassen, Modoc, Shasta, Siskiyou) sub-regions have the highest ratios of PAs per capita, while Imperial Valley and Gold Country (Amador, Calaveras, Mariposa, Tuolumne) sub-regions have the lowest ratios of PAs per capita.
- No PAs have addresses in Alpine and Sierra Counties. Plumas, Colusa, and Mariposa Counties all had less than five PAs each.

Supply and Distribution of PAs Relative to NPs

The training, experience, and scope of practice of PAs has similarities to that of NPs. However, the regional distribution of PAs did not match the regional distribution of NPs.

- The highest ratio of PAs per capita is in the North East (Lassen, Modoc, Shasta, Siskiyou) sub-region, while the highest ratio of NPs is the Sierra (El Dorado, Nevada, Placer, Plumas, Sierra) sub-region.
- The lowest ratio of PAs per capita is in Imperial Valley, while the lowest ratio of NPs is in the North Central (Butte, Colusa, Glenn, Tehama) sub-region.

Physician and Physician Assistant Education

Physician Education

- ***There is currently only one medical school in any CMSP or RCRC county: Touro University's College of Osteopathic Medicine in Solano County.***[9]
- The University of California has three programs in that prepare graduates for practice in rural areas of the state.
  - A new partnership between the University of California, San Francisco (UCSF), UCSF-Fresno, and the University of California, Merced will establish the San Joaquin Valley PRIME+ program, a multi-campus baccalaureate/MD program, and will enroll its first freshmen students in fall 2024.[10]
  - The University of California, San Francisco's San Joaquin Valley PRIME enrolls 12 UCSF medical students who complete their first 18 months of medical school in San Francisco and the remaining 30 months of medical school at the UCSF-Fresno Campus.
  - The University of California, Davis's RURAL PRIME program enrolls eight students per year who spend at least six months during their third year of medical school in a rural community. In 2021-2022, rural clerkship sites were located in Amador, Humboldt, Inyo, Mendocino, Monterey, Nevada, Plumas, Shasta, Siskiyou, and Tulare Counties.

[9] Although the main campus one university with a medical school – the University of California, Davis – is located in a CMSP and RCRC county (Yolo County), its health sciences education programs are based at its campus in Sacramento County.

[10] https://meded.ucsf.edu/san-joaquin-valley-prime-plus

- ***There are 27 medical residency or fellowship programs in CMSP or RCRC counties***, and at least one program in all regions except Eastern Sierra (Alpine, Inyo, Mono) and Imperial Valley (Imperial) sub-regions. For comparison, there are 201 programs in the same 12 residency specialties in other California counties as well as multiple programs in other specialties.
- ***The most common specialty in CMSP and RCRC counties is Family Medicine (16 programs), followed by Internal Medicine (four).*** Notably, there is only one Obstetrics-Gynecology program and only two Pediatrics programs.
- ***Across all residency programs in CMSP and RCRC counties, there were 193 first-year residents in 2023***, and 46% of these residents were in a Family Medicine program and 13% were in an Internal Medicine program. For comparison there were 3,001 first-year residents in the same 12 specialties in other California counties as well as additional first-year residents in other specialties.
- Generally, the numbers of residency or fellowship programs correspond to the supply of MDs and DOs. For example, there are three programs in CMSP and RCRC counties in the Bay Area, which also has higher numbers of MDs and DOs per capita when compared to the other regions in this analysis.
- However, in some cases, the number of programs does not appear to be keeping pace with regional population. For example, there are five residency or fellowship programs in CMSP and RCRC counties in the San Joaquin Valley (Kings, Madera, Merced, Tulare) sub-region, but the sub-region has lower ratios of MDs and DOs than other rural regions.

Physician Assistant Education

There are three Physician Assistant programs in CMSP or RCRC counties – Marin, Monterey, and Solano. In 2021, they graduated a total of 73 students.

- The majority of PA programs in California are in urban counties in Southern California.
- There are two programs in Sacramento County—University of California, Davis and University of the Pacific that may educate PAs from adjacent CMSP and RCRC counties.
- The locations of PA programs do not appear to correspond exactly with the locations of licensed PAs. Two out of three of the programs are located in the Bay Area, but the highest concentrations of licensed PAs are in the North Coast (Del Norte, Humboldt, Trinity) and North East (Lassen, Modoc, Shasta, Siskiyou) sub-regions.

NURSING

There are three distinct types of nurses who have different levels of education and scopes of practice. Licensed vocational nurses (LVNs) typically have a certificate or associate degree and perform basic nursing services, such as taking vital signs and administering oral medications, under the supervision of a registered nurse (RN) or a physician. RNs have an associate or bachelor's degree and perform a wider range of nursing services, including assessing patients' conditions, reporting abnormal findings to physicians, and implementing treatment in accordance with standardized protocols. Advanced practice registered nurses (APRNs) are RNs who have graduate level education that prepares them to practice as clinical nurse specialists, nurse anesthetists, nurse midwives, or nurse practitioners.

Supply and Distribution of the Nursing Workforce

Nursing Professionals Overall

Registered nurses (RNs) are the largest health profession in CMSP and RCRC counties by a significant margin, followed by licensed vocational nurses (LVNs) and then advanced practice registered nurses (APRNs), which is consistent with supplies in urban counties.

- ***In both CMSP and RCRC counties, the ratios of Licensed Vocational Nurses (LVNs) per 100,000 population were significantly lower than in the state overall*** (229 in CMSP counties vs. 227 in RCRC counties vs. 260 in California overall).
- ***In contrast, the ratios of RNs per 100,000 population were significantly higher in both CMSP and RCRC counties than in the state overall*** (990 in CMSP counties vs. 971 in RCRC counties vs. 917 in California overall.
- Findings for Advanced Practice Registered Nurses (APRNs) per 100,000 population differed between CMSP and RCRC counties. The ratio of APRNs per 100,000 population in CMSP counties is equal to the state overall (88 vs. 88), whereas the ratio in RCRC counties is lower than the ratio in the California overall (79 vs. 88).
- There is significant variation in the ratios of nursing professionals (LVNs, RNs, and APRNs combined) per capita across CMSP and RCRC counties.
    - The Bay Area (Marin, Napa, Solano, Sonoma) and Sierra (El Dorado, Nevada, Placer, Plumas, Sierra) sub-regions had the highest ratios of nursing professionals per capita, with average ratios of nurses per 100,000 of 1654 and 1449, respectively. In contrast, Imperial Valley (Imperial) and North Central (Butte, Colusa, Glenn, Tehama) sub-regions had the lowest ratios, at 868 and 899, respectively.
    - Colusa County has the lowest ratio of nursing professionals per capita across all CMSP and RCRC counties by a significant margin—it has a ratio of 453 per 100,000 population, while the next lowest ratio is in the 600s.

LVNs

- The North East (Lassen, Modoc, Shasta, Siskiyou) and San Joaquin Valley (Kings, Madera, Merced, Tulare) sub-regions had the highest ratios of LVNs per capita, at 358 and 274, respectively. These are also sub-regions where the ratios of RNs are low, which suggests that LVNs may be substituting for some RNs in these sub-regions (i.e., providing nursing services within their scope of practice that are provided by RNs in other sub-regions).
- The Eastern Sierra (Alpine, Inyo, Mono) and the Bay Area (Marin, Napa, Solano, Sonoma) sub-regions had the lowest ratios of LVNs per capita—127 and 195. Both sub-regions had higher ratios of RNs relative to other regions, further supporting the hypothesis that in some places, RNs may be employed instead of LVNs, and vice versa to provide services that are within both professions' scopes of practice.
    - However, as previously noted with regard to physicians, the ratios for Eastern Sierra must be contextualized by the remoteness and small population of this subregion. Small fluctuations in the number of nurses will have a significant impact on the ratios.
- While there were no counties with no LVNs, some had very low numbers—one in Alpine, six in Sierra, and eleven in Mono.

- There is also a significant amount of variation in ratios of LVNs per capita within sub-regions—in the Eastern Sierra sub-region, Alpine County had a LVN ratio of 83 per 100,000, while Inyo County had a LVN ratio of 216.[11]

RNs

- The Bay Area (Marin, Napa, Solano, Sonoma) sub-region had a significantly higher ratio of RNs per capita than any other sub-region, and the state overall.
- The Imperial Valley (Imperial), North Central (Butte, Colusa, Glenn, Tehama), and the San Joaquin Valley (Kings, Madera, Merced, Tulare) sub-regions had the lowest ratios of RNs per capita in the state.
- However, there is a significant amount of variation within sub-regions. For example, within the North Central sub-region, Colusa County had a RN ratio of 243 per 100,000, while Butte County had a ratio of 1130 per 100,000.

APRNs

- Nurse practitioners (NPs) were the most numerous APRNs in CMSP and RCRC counties and in California overall, by a significant margin, followed by nurse anesthetists, clinical nurse specialists, and then nurse midwives.
- For the nurse practitioners:
    - The supply of nurse practitioners per capita in CMSP and RCRC counties was similar to the state overall.
    - However, there was regional variation in the supply—the highest ratios per capita were in the Sierra (El Dorado, Nevada, Placer, Plumas, Sierra) and Bay Area (Marin, Napa, Solano, Sonoma) sub-regions, while the lowest ratios were in the North Central (Butte, Colusa, Glenn, Tehama) and Sacramento Adjacent (Sutter, Yolo, Yuba) sub-regions.
    - The region level ratios mask some variation across counties within regions. Most notably, within the Sierra (El Dorado, Nevada, Placer, Plumas, Sierra) sub-region, Sierra County had five NPs, while Plumas County had thirteen NPs.
- For the other APRNs:
    - ***The numbers of nurse anesthetists, clinical nurse specialists, and nurse midwives are low in CMSP and RCRC counties. Across these counties, there was a total of 238 clinical nurse specialists, 240 nurse anesthetists, and 201 nurse midwives.***
    - Specific types of APRNs tended to be clustered in specific regions. The majority of clinical nurse specialists were located in just three sub-regions—Bay Area (Marin, Napa, Solano, Sonoma), Central Coast (Monterey, San Benito, San Luis Obispo, Santa Barbara), and Sierra (El Dorado, Nevada, Placer, Plumas, Sierra). Similarly, most nurse anesthetists were located in either the Bay Area or Sierra sub-regions, while most nurse midwives were in the Bay Area.

Nursing Education

There are a substantial number of LVN and RN educational programs in CMSP and RCRC counties, which may explain why these counties have relatively robust supplies of LVNs and RNs. In contrast, there are only two NP programs and no other APRN programs in CMSP and RCRC counties, which may partially explain the low numbers of APRNS in these counties. As noted previously in the section

[11] These ratios should be interpreted with caution due to the small populations of counties in the Eastern Sierra region.

on behavioral health professions education, the nursing education data do not include online educational programs, which are an important option in rural counties. Online programs include RN programs—which do produce new RNs—and RN to BSN programs and APRNs programs—which enhance knowledge and skills, but do not produce new RNs.

LVN Education Programs

- ***There are 17 LVN Certificate programs and 15 Associate Degree LVN programs at 17 colleges in CMSP and RCRC counties. In 2021, these programs graduated 430 students***.
    - Twenty-eight of these programs are at community colleges and four are at private, for-profit colleges.
    - All regions have either a certificate program or an associate degree program except the Eastern Sierra (Alpine, Inyo, Mono), Gold Country (Amador, Calaveras, Mariposa, Tuolumne), North Central Coast (Lake, Mendocino), and Sacramento Adjacent (Sutter, Yolo, Yuba) sub-regions.

RN Education Programs

- ***There are 24 associate degree programs for RNs in CMSP or RCRC counties, which graduated a total of 1198 students in 2021***.
    - Twenty-two of these programs are at community colleges, one is at a private not-for-profit college, and one is at a private, for-profit college.

- ***There are 8 bachelor's degree programs for RNs (BSN) in CMSP or RCRC counties. Overall, 456 students graduated with a bachelor's degree in a CMSP or RCRC county in 2021.***
    - Four BSN programs are at California State University campuses and four are at private, not-for-profit universities.
    - It is important to note that this includes both programs that offer a BSN that prepares students for licensure as an RN and RN to BSN programs that enroll licensed RNs who have previously obtain an associate degree in nursing.[12] This means that some bachelor's degree students may already be RNs when they begin their programs.[13]

1654 REGISTERED NURSING STUDENTS GRADUATED FROM **32** PROGRAMS IN CMSP AND RCRC COUNTIES IN 2021

- All of the sub-regions have either a bachelor's degree program or associate degree program except Eastern Sierra (Alpine, Inyo, Mono) and Gold Country (Amador, Calaveras, Mariposa, Tuolumne).

[12] One university only offers pre-licensure BSN programs, three only offer an RN to BSN program, and three offer both a pre-licensure BSN program and an RN to BSN program.

[13] The IPEDS data do not disaggregate graduates of pre-licensure BSN programs from graduates of RN to BSN programs.

APRN Education Programs

- ***There are three nurse practitioner education programs in CMSP or RCRC counties***—two at Sonoma State University and one at Touro University in Solano County. ***A total of 30 students graduated from these programs in 2021.***
    - Three California State University campuses in San Joaquin Valley — Bakersfield, Fresno, and Stanislaus — have family nurse practitioner programs that may enroll students from adjacent CMSP or RCRC counties.
    - Family nurse practitioner programs at California State University – Channel Islands and the University of California, Davis[14] may also enroll students from adjacent CMSP or RCRC counties.
    - The locations of the NP programs correspond somewhat with the supply of NPs in CMSP and RCRC counties. While the highest numbers of NPs are in Placer County (430 NPs), a county without any NP educational program, the second highest numbers are in Sonoma County (391 NPs), where there are two NP programs at Sonoma State University.

- ***There are no Clinical Nurse Specialist, Nurse Anesthetist, or Nurse Midwife educational programs in CMSP or RCRC counties.***
    - The only nurse midwifery programs in California are located in Orange County and the City and County of San Francisco.
    - There is one nurse anesthetist program at a private university in Fresno County which may enroll students from adjacent CMSP or RCRC counties; all other nurse anesthetist programs are at private universities in urban counties in the Bay Area or Southern California.

DENTAL

Most dental care is provided by three types of professionals: dentists, dental hygienists, and registered dental assistants (RDAs). Dental hygienists primarily provide preventive services, such as oral hygiene education, teeth cleaning, and early identification of dental problems. Dentists primarily provide restorative services, such as extractions, fillings, and root canals, and are assisted by RDAs.

Supply and Distribution of the Dental Workforce

Dental Professionals Overall

- ***CMSP and RCRC counties had significantly lower ratios of dentists per 100,000 population than the state overall.*** For RCRC counties the ratio for dentists was 60 per 100,000, and for CMSP counties the ratio was 59 per 100,000. The overall ratio for California was 80 per 100,000 population. ***Conversely, the CMSP and RCRC counties had significantly higher ratio of RDAs and dental hygienists than the state overall.***
- This pattern might be explained by several factors.
    - CMSP and RCRC counties may have more general dentistry practices relative to specialty dental practices (e.g., endodontics, periodontics) which may need fewer dentists relative to dental hygienists and RDAs than specialty dental practices.

[14] Health sciences programs at UC-Davis are based at its campus in Sacramento County and not at its campus in Yolo County.

  - ***There are no dental schools in CMSP and RCRC counties.***
  - Some CMSP and RCRC counties have high rates of poverty which limit the number of people who have dental insurance or can afford to pay for dental care out of pocket.

- There was significant variation in the ratios of dental professionals (i.e., dentists, dental hygienists, and RDAs combined) per capita across CMSP and RCRC counties.
  - The Eastern Sierra (Alpine, Inyo, Mono) and Imperial Valley (Imperial) sub-regions had the lowest ratios of dental professionals per capita, while the Bay Area (Marin, Napa, Solano, Sonoma) and Sierra (El Dorado, Nevada, Placer, Plumas, Sierra) sub-regions had the highest ratios.

Dentists

- Across sub-regions, the Bay Area (Marin, Napa, Solano, Sonoma) and Sierra (El Dorado, Nevada, Placer, Plumas, Sierra) had the highest ratios of dentists per capita. However, there was significant variation within these sub-regions – in the Sierra sub-region, Placer County had a ratio of 117 dentists per 100,000 population, while there are no dentists with mailing addresses in Sierra County.
- The Eastern Sierra (Alpine, Inyo, Mono) and Imperial Valley sub-regions had lowest ratios of dentists per capita.
- Licensing board records indicate that there are no dentists in Alpine and Sierra Counties. Inyo, Mono, Mariposa, Colusa, Glenn, Trinity, Modoc, and Yuba all had less than 10 dentists each.

Dental Hygienists

- The Sierra sub-region (El Dorado, Nevada, Placer, Plumas, Sierra) had the highest ratio of dental hygienists per capita. Two of the counties in the sub-region, Placer and El Dorado, had the highest ratios of dental hygienists per capita in the entire state.
- In contrast, the Imperial Valley (Imperial) and North Coast (Del Norte, Humboldt, Trinity) sub-regions had the lowest ratios per capita.
- There are no dental hygienists with a registered address in Alpine.

Registered Dental Assistants

- The North Central sub-region had a high ratio of RDAs per capita when compared to other regions—97 per 100,000 population—despite having average ratios of dentists and dental hygienists.
- The Imperial Valley and Eastern Sierra sub-regions had the lowest ratios of RDAs per capita. There are only eight RDAs with registered addresses in the Eastern Sierra sub-region.
- There are no RDAs with a registered address in Alpine County.

Dental Education

Dentist Education Programs

- ***None of the seven dental schools in California are in CMSP or RCRC counties.*** California Northstate University College of Dental Medicine is located in Sacramento County, a county adjacent to several CMSP and RCRC counties.

- ***There are three dental residency programs in CMSP or RCRC counties – all in Solano County.*** Two are sponsored by the Travis Air Force Base and the other by the Veterans Affairs Northern California Healthcare System. ***In 2021, there were 13 graduates across these three programs*** (latest year for which data are available).
    - In California overall, there were 64 residency programs that graduated 229 dental residents in 2021.

Dental Hygiene Education Programs

- ***There are five Dental Hygienist programs in CMSP or RCRC counties, specifically Sonoma, Shasta, and Tulare counties. They graduated a total of 69 students in 2021.*** Three of these programs are at community colleges (one certificate program plus two associate degree programs) and two are at a private, for-profit college (associate degree and bachelor's degree programs).
- It is important to note that this education data does not include online educational programs, which are an important option in rural counties.

RDA Education Programs

- ***There are ten Dental Assisting certificate programs and four Dental Assisting associate degree programs in CMSP or RCRC counties.*** These programs are located in the Bay Area, Central Coast, North Central, North Coast, and San Joaquin Valley sub-regions. ***In 2021, those programs graduated a total of 288 students.*** Ten of these programs offered by community colleges and four are offered by private for-profit colleges.
- It is important to note that this education data does not include online educational programs, which are an important option in rural counties.

CONCLUSIONS

Overall, there are lower supplies of health professionals and lower numbers of health professions education and residency programs in CMSP and RCRC counties. However, there is also substantial variation in supply across professions, counties, and regions.

Supply and Distribution

Key Findings Across Professions

Across all the professions catalogued for this report, the ***most notable shortages in CMSP and RCRC counties*** when compared to California overall are among ***physicians, licensed vocational nurses, and dentists.***

Physician and dentist shortages deserve particular attention because their training is complex and lengthy and only a few other professions have overlapping scopes of practice. The most pronounced challenges concern access to specialist physicians. Whereas coastal urban areas of California have abundant supplies of physicians in most specialties, ***many CMSP and RCRC counties have low supplies of cardiologists, endocrinologists, gastroenterologists, and other specialists.***

However, the gaps between rural counties and the state overall do not necessarily tell the whole story. For example, the supply of behavioral health professionals in CMSP and RCRC counties is similar to the supply in the state overall, but there are shortages of behavioral health professionals in urban areas as well.

Key Findings Across Counties

When looking across counties, certain patterns in supply of professionals emerge. These patterns are worth cataloguing because addressing health workforce needs in different types of counties might require different approaches.

In general, supplies of health professionals per capita are higher in counties adjacent to urban areas, such as Sonoma and Placer counties, and lower in counties with small populations that are far from urban centers, such as Sierra or Alpine counties.

Certain counties, such as Marin County, have similar concentrations of health professionals compared to the state overall. Other counties, such as Amador County, have mixed supplies – for some professions, their supplies per capita are similar to California overall, while for other professions, their supplies are low. Finally, there is a third category of counties—such as Imperial County—that have low supplies per capita across all health professions.

Key Findings Across Regions

Examining health workforce at the sub-regional level is also important for distinguishing counties with small supplies of health professionals per capita that are adjacent to counties with larger supplies per capita with whom they may be able to partner to expand capacity in their sub regions.

We identified certain sub-regions that have persistently low supplies of health professionals across professions. Those sub-regions are often those that have lower populations and are farther from urban centers. One example is Eastern Sierra, which is made up Alpine, Inyo, and Mono, and has a total population of 33,415—the least populated sub-region in this analysis. Eastern Sierra is

also separated from much of the rest of the state by the Sierra Nevada mountains. Another example is Imperial Valley, which in our analysis consists of one county, Imperial. While Imperial County does not have a small population (the population was 179,702 in 2020), it is isolated from large urban areas by a variety of factors, including the US-Mexico border and the Colorado desert.

Educational Programs

CMSP and RCRC counties have fewer educational programs for health professionals than urban counties but there is considerable variation across counties and professions.

Key Findings Across Professions

People who reside in CMSP and RCRC counties have more access to educational programs that are shorter and have fewer entry requirements, such as certificate and associate's degree programs at community colleges, than to advanced degree programs. For example, there are 14 certificate programs and 10 associate degree programs in substance use counseling across the CMSP and RCRC counties, but no medical schools. There are more programs for nursing than for any other profession—17 certificate and 15 associate's degree LVN programs, and 24 associate's and 8 bachelor's degree RN programs. In contrast, there are few medical residency programs in CMSP and RCRC counties relative to urban counties. The lack of residency programs in essential specialties such as internal medicine, obstetrics/gynecology, and pediatrics Is especially concerning.

Key Findings Across Counties

There is significant variation in the availability of educational programs across different counties. Generally, the counties that have health education programs have larger populations and/or are closer to urban areas—such as Butte, Monterey, San Luis Obispo, Santa Barbara, Sonoma, and Tulare counties. Major public universities in CMSP and RCRC counties include Sonoma State University, CSU Chico, Cal Poly Humboldt, and CSU Monterey Bay. There are also several health education programs in Fresno and Sacramento counties that are likely to enroll students form adjacent CMSP and RCRC counties. In contrast, there are no education programs for licensed health professions in the Eastern Sierra (Alpine, Inyo, Mono) and Gold Country (Amador, Calaveras, Mariposa, Tuolumne) regions and several regions only offer community college programs in nursing and SUD counseling.

Limitations of Data

The data analyzed for this report have several important limitations. First, at present the only publicly available data for most licensed health professionals in California are the addresses they report to their licensing boards. No information is available to determine whether these addresses are practice addresses or home addresses. In counties in which many health professionals commute outside the county for work, use of these addresses may overstate the number of health professionals working in these counties. At present, there are also no publicly available data at the county level to determine which professionals are providing patient care, the number of hours they work, their specialties, their practice settings, or their demographic characteristics.

The availability of data on California's health professionals should improve within the next several years. Assembly Bill 133, enacted in 2021, requires all licensing boards that regulate healing arts licensees in California to administer a survey of licensees at the time of licensure renewal that requests information regarding professional activities, practice characteristics, specialties, and demographic characteristics, and to share survey responses with the California Department of Health Care Access

(HCAI) and Information's Health Workforce Research Data Center. The licensing boards began administering the surveys in July 2022. Because most licensing boards require licensees to renew their licenses every two years, data on the full complement of persons renewing their licenses will be complete in June 2024. However, the extent to which HCAI will release data at the county level is unknown.

A second limitation concerns data regarding educational programs that prepare health professionals. Publicly available data sources identify graduates of individual educational programs based on the address of the college, university, or residency program. The numbers of graduates of these programs may overstate the number of new graduates available to work in a county, because some graduates may not choose to remain in the county in which they were educated following graduation. Conversely, use of institutional addresses may understate the number of new graduates because some persons living in a county may complete in-person or online educational programs offered by educational institutions in other counties or states.

RECOMMENDATIONS

Addressing the health workforce needs of CMSP and RCRC counties calls for a multi-faceted strategy that incorporates initiatives that span investments in K-12, undergraduate, and graduate education and in currently practicing health professionals. In the near term, investment in currently practicing health professionals is critical to meet immediate recruitment and retention needs. In the longer term, investments at all three levels of education are needed to create pipelines of future rural health professionals because health professionals who grow up in rural areas are more likely to practice in rural areas.

Figure 1 presents examples of initiatives that should be considered at each of these levels. Below we recommend actions that county boards of supervisors and leaders of county health care agencies in CMSP and RCRC counties could take to facilitate health workforce development.

Figure 1. Continuum of Initiatives to Increase Health Professionals in Rural Areas

K-12 Education	Undergraduate Education	Graduate Education	Practicing Professionals
Career exploration	Health professions education	Health professions education	Competitive wages
Courses required for CSU/UC admission	Academic, psychosocial, and financial support	Academic, psychosocial, and financial support	Loan repayment
Dual enrollment	Advising re transfer and professional school admissions	Rural clerkships	Supportive workplace and community
	Paid internships	Rural residency programs and tracks	Telehealth

Provide Competitive Compensation for Practicing Professionals

County health care agencies in CMSP and RCRC counties and the organizations with which they contract to provide services compete with other local employers for the limited supplies of health professionals in their counties. These employers include both private employers and public employers, such as prisons and school districts. Competition with school districts has increased in the last several years because California's Children and Youth Behavioral Health Initiative has substantially increased funding for school-based services and increased job opportunities for behavioral health professionals with expertise in serving children and adolescents. County Boards of Supervisors need to ensure that county health care agencies can offer competitive wages and benefits to health professionals and remove other barriers that constrain competition with other employers, such as personnel policies and procedures that make it difficult for county agencies to make job offers to qualified candidates in a timely fashion. Organizations with which counties contract to provide health care services also need to be positioned to offer competitive compensation.

Identify Local Health Workforce Development Priorities

Leaders in CMSP and RCRC counties should use this report and other sources of information to educate themselves about local supplies of health professionals and health care needs in their counties. They should engage health care employers in their counties to identify their most pressing recruitment and retention needs. County leaders and health care employers should also assess the feasibility of meeting these needs through telehealth or through partnerships with employers in other counties. For example, small hospitals in adjacent counties might jointly hire specialist physicians to provide services that they cannot afford to offer independently.

Partner with Employers and Educational Institutions to Address Workforce Needs

County leaders in CMSP and RCRC counties should work with local health care employers and local educational institutions to chart a path for expanding access to health professions and pre-health professions education in their communities. Priorities at the K-12 level could include:

- Advocating for local school districts to offer dual enrollment programs with local community colleges that enable students to graduate from high school with some or all of the credits needed to obtain a certificate or associate degree in a health profession.
- Advocating for school districts to offer the courses required for admission to the California State University (CSU) and the University of California (UC) so that students who aspire to careers in health professions that require a bachelor's degree or more have the opportunity to enroll in these universities.
- Encouraging local colleges and universities to expand enrollment in existing health professions education programs and open new programs, and provide academic, financial, and psychosocial support to health professions and pre-health professions students, and to advise them regarding requirements for transfer from community college to CSU or UC and for admission to health professions schools.

County leaders in CMSP and RCRC counties should also work with employers and medical and dental schools to build consensus for opening new residency programs and expanding existing programs.

County leaders in CMSP and RCRC counties need to engage health care employers in educational initiatives at all levels, because educational institutions cannot expand enrollment or open new programs unless they can provide students with sufficient opportunities for clinical education. While the need for clinical education is most evident at the undergraduate and graduate level, access to clinical sites is also important for career exploration for K-12 students, especially in fields such as behavioral health with which they may be less familiar than medicine or nursing.

Advocate for Health Workforce Development Resources

County, health care employer, and education leaders in CMSP and RCRC counties should also collaborate to advocate for additional state and federal funding for scholarship and loan repayment programs for health professionals who practice in rural areas. Many aspiring health professionals from rural areas are from families of modest means. Scholarships can help them cover educational expenses and loan repayment programs provide an incentive to practice in a rural area following graduation. Rural leaders should also seek additional funding for state and federal programs that provide grants to educational institutions to increase the numbers of students or residents they enroll or to open new programs. Finally, rural leaders should advocate for state and federal resources for faculty development because educational institutions struggle to recruit and retain faculty in professions such as nursing in which professionals can earn substantially more in clinical practice than in academia.

APPENDIX A. Counties Included in this Report.

Table A1. Counties Participating in the County Medical Services Program and the Rural County Representatives of California

County	County Medical Services Program Member	Rural County Representatives of California Member
Alpine	X	X
Amador	X	X
Butte	X	X
Calaveras	X	X
Colusa	X	X
Del Norte	X	X
El Dorado	X	X
Glenn	X	X
Humboldt	X	X
Imperial	X	X
Inyo	X	X
Kings	X	X
Lake	X	X
Lassen	X	X
Madera	X	X
Marin	X	
Mariposa	X	X
Mendocino	X	X
Merced		X
Modoc	X	X
Mono	X	X
Monterey		X
Napa	X	X
Nevada	X	X
Placer		X
Plumas	X	X
San Benito	X	X
San Luis Obispo		X
Santa Barbara		X
Shasta	X	X
Sierra	X	X
Siskiyou	X	X
Solano	X	X
Sonoma	X	X
Sutter	X	X
Tehama	X	X
Trinity	X	X
Tulare		X
Tuolumne	X	X
Yolo	X	X
Yuba	X	X

APPENDIX B. Data Sources

This report draws upon the following sources of data.

Medical Board of California

Data on allopathic physicians (MDs) were obtained from the Medical Board of California's master file of licensees and from responses to a mandatory survey that the Medical Board administers to physicians when they renew their licenses every two years. Responses to the mandatory survey were used to identify MDs who provide patient care and to determine their specialty and practice location. The mandatory survey asks MDs to report the zip code of their primary practice location. A zip code-county crosswalk file produced by the U.S. Department of Housing and Urban Development was used to match zip codes to counties. For the psychiatrists, the numbers who had 1+ hours of patient care per week were used.[15]

California Department of Consumer Affairs

For all other professions, data were obtained from the California Department of Consumer Affairs (DCA), the umbrella agency for professional licensing boards. DCA maintains datasets that contains addresses for persons with over 150 types of professional licenses. The datasets contain a variable that indicates the county associated with a licensee's address.

An important limitation of the DCA datasets is that they do not indicate whether the addresses reported are practice or home addresses. To the extent that DCA records contain home addresses, our analyses may over or underestimate supplies of health professionals working in CMSP and RCRC counties. This is especially likely in counties in or near metropolitan areas in which a large share of the workforce commutes to work across county lines (e.g., Placer County, Sonoma County).

Another important limitation of the DCA datasets is that they do not indicate whether health professionals with active licenses are providing patient care. Some licensed health professionals are retirees who maintain their licenses so that they can volunteer to provide health care services. Others work in administrative, teaching, or research positions in which they provide little to no patient care. Still others work outside the health care sector.

There are also two important limitations to the DCA data about social workers. The data only capture people with a master's degree in social work (MSW) who are licensed as LCSWs. Some MSWs work in positions in behavioral health agencies for which licensure is not required. In addition, some LCSWs work in settings other than behavioral health agencies, such as hospitals, hospices, child welfare, and adult protective services.

California County Behavioral Health Directors Association Survey

To identify recruitment and retention challenges faced by safety net behavioral health agencies, we analyzed responses from county behavioral health agencies in the 33 CMSP counties and 38 RCRC

[15] As noted in the limitations section, in July 2022, all licensing boards that regulate healing arts licensees in California began administering a survey to licensees at the time of licensure renewal that requests information regarding hours spent providing direct patient care, practice location, practice type, specialty, and demographic characteristics. Collection of these data for the full complement of persons renewing their licenses will not be complete until June 2024 because most licensing boards require licensees to renew their licenses every two years.

counties that completed a survey in 2021 for the *Building the Future Behavioral Health Workforce* (BFBHW) report, which was prepared for County Behavioral Health Directors Association of California. The survey was distributed to California's 57 county behavioral health agencies and two city behavioral health agencies to elicit leaders' perceptions of their recruitment and retention needs (response rate = 98 percent). Del Norte and Modoc counties are not included in the findings because they did not participate in the survey.

Survey respondents reviewed lists of potential barriers to the recruitment and retention of mental health and substance use professionals and identified the top three barriers in their counties. The response options were generated based on input received during virtual meetings with staff of county behavioral health agencies, community-based organizations (CBOs) that contract with counties, and other stakeholders. If respondents selected "other" as a barrier, they were asked to fill out a free-text response field.[16]

National Resident Matching Program

Data on educational and residency programs was compiled from the most recent year available. Medical residency information was obtained from the National Resident Matching Program (NRMP) for 2023.

American Dental Association – Commission on Dental Accreditation

Dental residency information was obtained from the American Dental Association – Commission on Dental Accreditation (CODA) for 2022.

Integrated Postsecondary Education Data System

The Integrated Postsecondary Education Data System (IPEDS) is one of many survey data collection tools administered by the National Center for Education Statistics, which is part of the U.S. Department of Education. IPEDS consists of a battery of annual surveys that collect a wide range of data describing postsecondary education, including enrollments, completions, and institutional characteristics from all institutions that participate in federal student aid programming. The universe of participating institutions includes more than 7,500 liberal arts colleges, research universities, community colleges, and technical/vocational schools. For this report, the authors used data from the Completions Survey, which provides information about the characteristics of students graduating from specific types of postsecondary education programs. Additional information about IPEDS and access to public data sets can be found here. These programs are organized using the Classification of Instructional Programming (CIP) code system, which defines education and training programs according to their content. Additional technical information about the CIP code system can be found here.

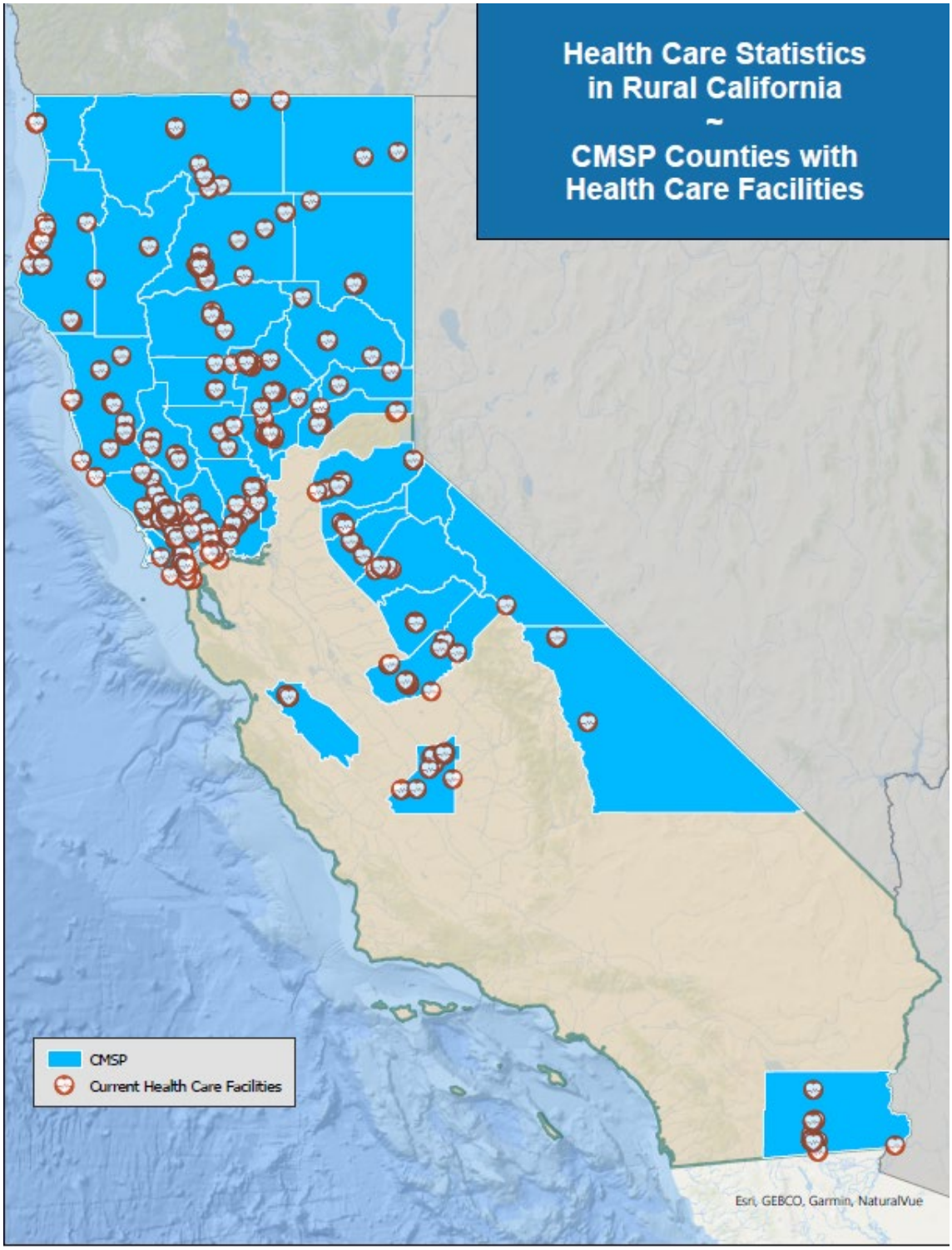
Population Estimates

Estimates of the population of California overall and the populations of CMSP and RCRC counties were obtained from the 2020 United States Census. Base estimates of the populations of states and counties on April 1. 2020, were used to calculate ratios of health professionals per capita.

[16] We report all free-text responses and note that in some cases they overlap with forced-choice response options.

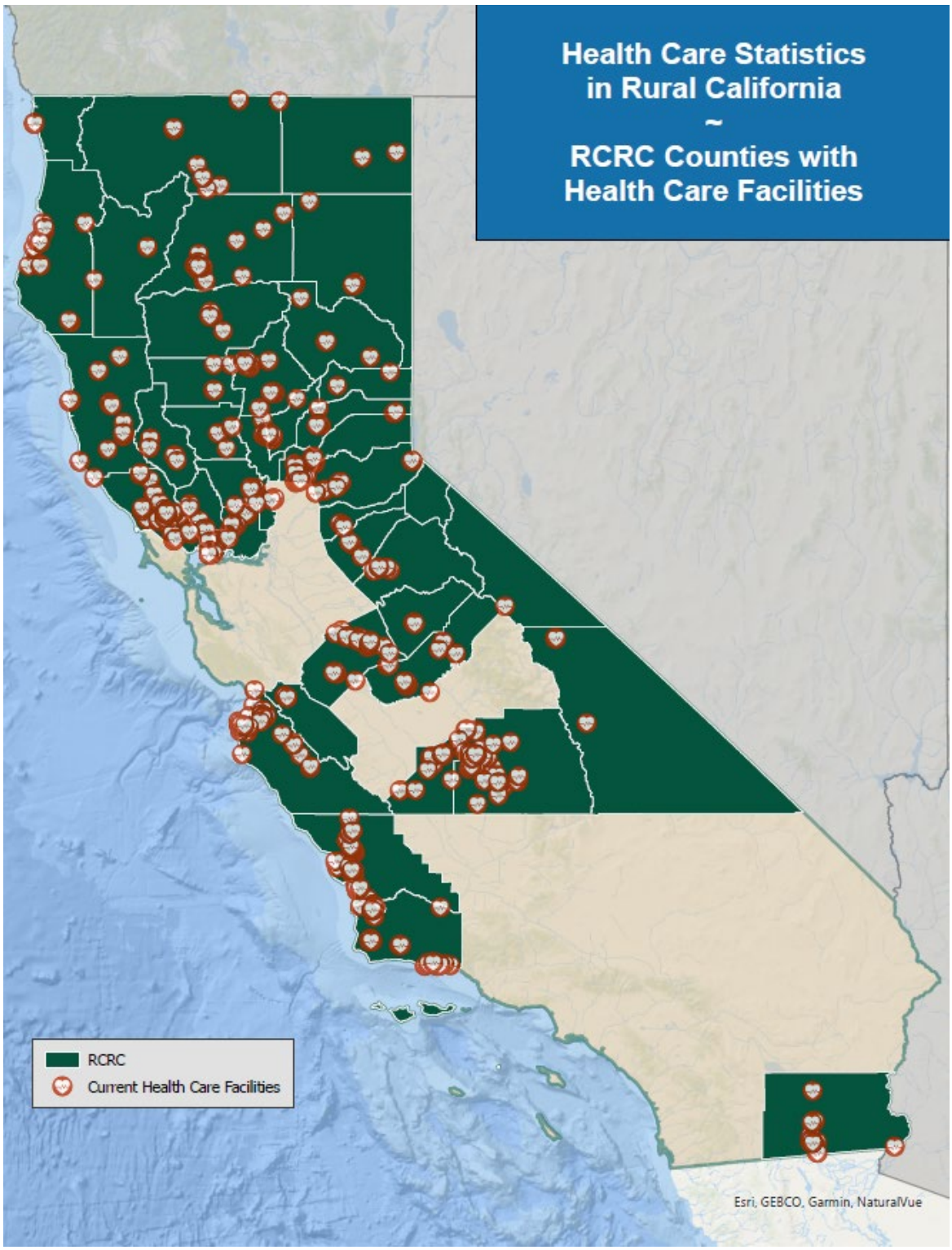
APPENDIX C. Health Care Facility Maps

Figure 2: CMSP Counties with Health Care Facilities[17]



[17] This map shows health care facilities that are in CMSP counties.

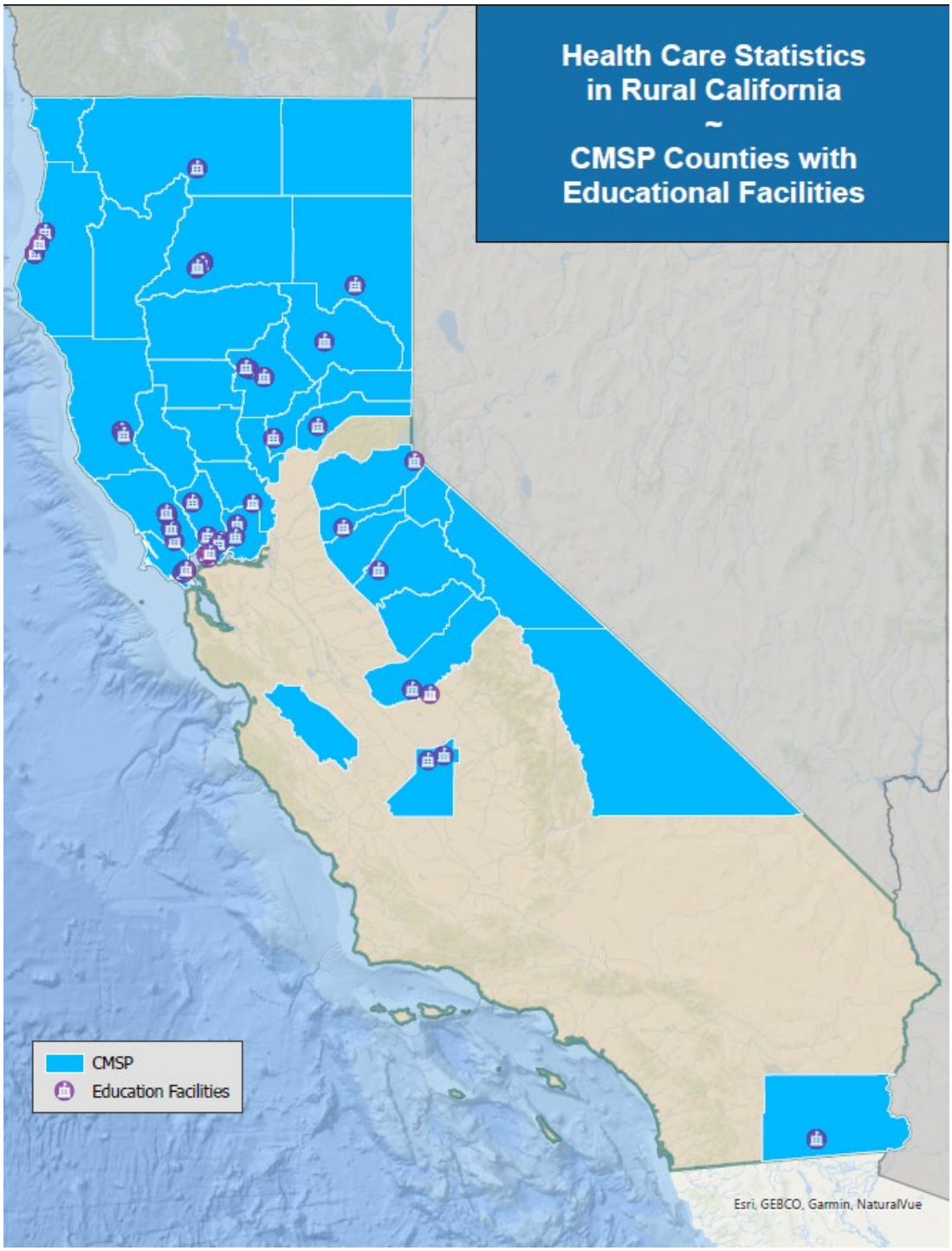
Figure 3: RCRC Counties with Health Care Facilities[18]



[18] This map shows health care facilities in RCRC counties.

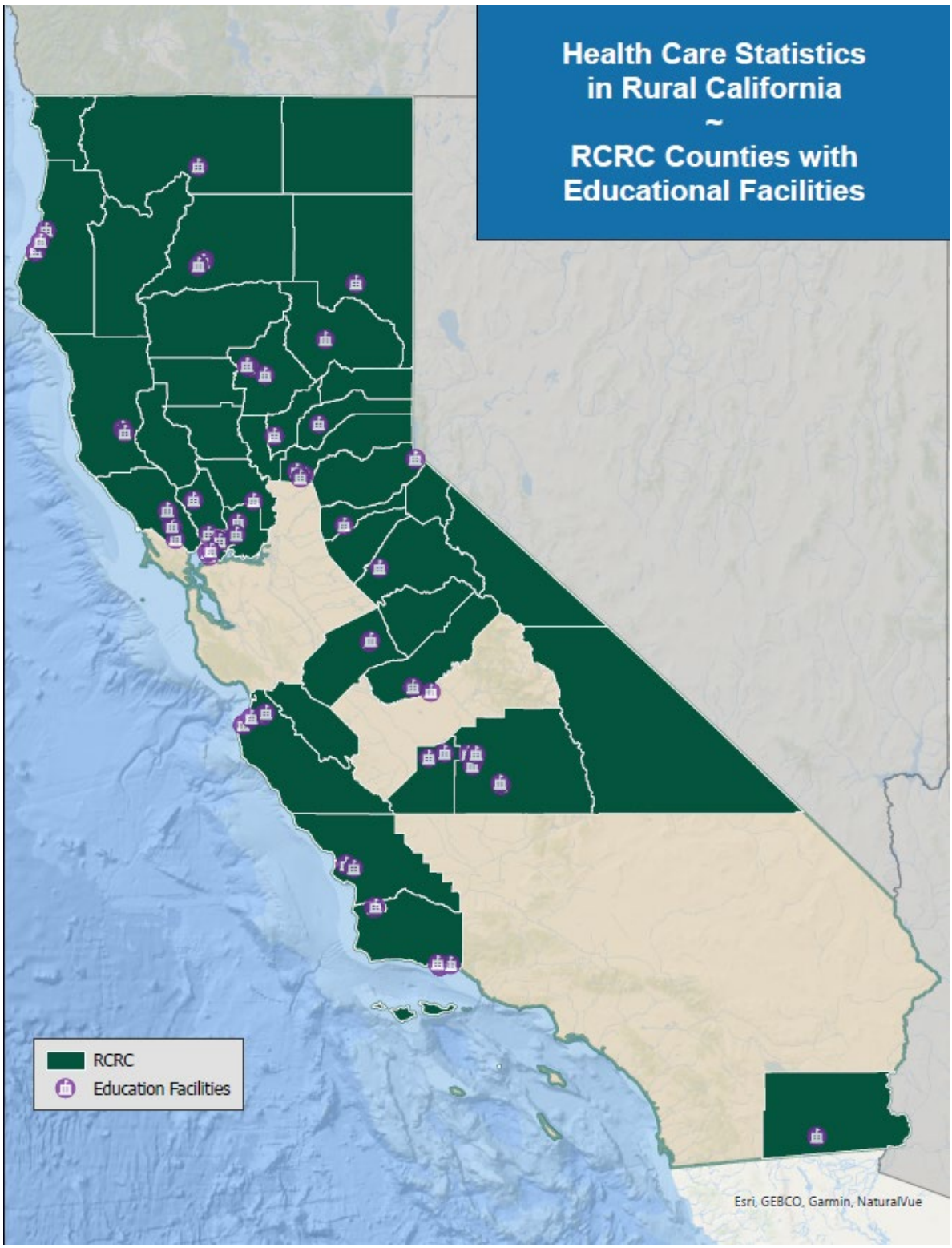
APPENDIX D. Educational Institutions Maps

Figure 4: CMSP Counties with Educational Institutions[19]



[19] This map shows the educational institutions for selected professions in CMSP counties.

Figure 5: RCRC Counties with Educational Institutions[20]



[20] This map shows the educational institutions for selected professions in RCRC counties.