



Office of Statewide Health
Planning and Development

Healthcare Workforce Clearinghouse: Annual Report to the Legislature September 2018



Executive Summary

Health and Safety Code §128050 (Senate Bill 139, Chapter 522, Statutes of 2007) requires the Office of Statewide Health Planning and Development (OSHPD) to establish the healthcare workforce clearinghouse (Clearinghouse) to serve as the central source of healthcare workforce and educational data in the state. OSHPD works with various state departments to collect and make public Clearinghouse data. The statute requires OSHPD to prepare an annual report to the Legislature that:

- Identifies healthcare professions education and employment trends.
- Reports on the current supply and demand for healthcare workers in California and gaps in the education pipeline.
- Recommends state policy needed to address workforce shortage and distribution issues.

This report highlights OSHPD's annual progress in meeting these requirements and introduces the Healthcare Workforce Research Agenda, which articulates OSHPD's healthcare workforce research priorities. Consistent with the intent of Health and Safety Code §128050 and in the context of improving access to culturally and linguistically appropriate care, the Research Agenda focuses on analyzing education and employment trends, assessing the supply and demand of healthcare workers, and identifying gaps in the educational pipeline.

In 2017, OSHPD began addressing Research Agenda questions related to primary care. Over time, OSHPD hopes to gain a comprehensive understanding of the supply of and demand for the major healthcare disciplines.

This report highlights OSHPD's progress in meeting these requirements in 2017 and summarizes:

- OSHPD's healthcare workforce supply, demand, and education data that support the Clearinghouse.
- Clearinghouse data that OSHPD contributes to California Health and Human Services Agency's (CHHS) Open Data Portal.
- Fact Sheets that display healthcare professions education and employment trends.
- Papers that support the Research Agenda:
 - Parallels in Science Education and Physician Shortages (Attachment A)
 - Identifying Primary Care Shortage Areas with a Unified Provider Ratio (Attachment B)

The papers address the following Research Agenda questions:

- What is the volume of students applying for, entering into, and completing advanced placement (AP) science courses in high school?
- What is the racial and ethnic mix of students applying for, entering into, and completing AP science courses in high school?
- How should primary care shortages be defined given the team approach to medicine?
- What geographic areas demonstrate a lack of access to primary care providers throughout the state?

OSHPD's Healthcare Workforce Supply, Demand, and Education Data

Supply Data

The Department of Consumer Affairs (DCA) serves as the main source of Clearinghouse healthcare workforce supply data. DCA provides OSHPD with data related to licensee demographics, practice site, and educational background. OSHPD makes DCA data available to the public via the Clearinghouse and incorporates these data into Fact Sheets, highlighting the supply of healthcare workforce in California.

OSHPD has access to data from the following healing arts boards:

- Board of Registered Nursing
- Board of Vocational Nurses and Psychiatric Technicians
- Dental Board of California
- Dental Hygiene Committee of California
- Medical Board of California
- Osteopathic Medical Board of California
- Physician Assistant Board
- Respiratory Care Board

Demand Data

The Employment Development Department (EDD) – Labor Market Information Division (LMID) provides healthcare workforce demand data to the Clearinghouse. EDD-LMID provides the Clearinghouse with the federal Department of Labor's Bureau of Labor Statistics Occupational Employment Statistics survey data. The data provides information about healthcare workforce wages, employment trends, and staffing patterns by occupation and industry.

EDD-LMID data represent 101 Standard Occupational Classifications. The Standard Occupational Classifications provide a uniform way of capturing and reporting occupational data. OSHPD makes these data available to the public from the Clearinghouse, and incorporates these data into Fact Sheets, highlighting the demand for the healthcare workforce in California.

Education Data

OSHPD entered into a data sharing agreement with the California Community Colleges Chancellor's Office (CCCCO) in June 2017. The data sharing agreement expands the Clearinghouse to include specific data on California community college student demographics, enrollment in health-related degree courses, and graduates from health degree programs. In 2017, OSHPD received CCCCCO data for the academic year 2016. This data will help to inform the Clearinghouse of educational trends, and the supply of healthcare workers in the educational pipeline.

CHHS Open Data Portal

CHHS launched the Open Data Portal in 2015 as a platform for sharing CHHS departments' non-confidential data. The public can freely download and analyze standardized datasets through the Open Data Portal.

OSHPD has provided the following datasets based on Clearinghouse data to the Open Data Portal:

- California Community Colleges Student Records (aggregated by college name)
- Physicians and Surgeons by Gender and Practice Location
- Physicians and Surgeons by Foreign Languages Spoken and Practice Location
- Physicians and Surgeons by Race/Ethnicity and Practice Location
- Physician Assistants by Gender and Practice Location

In 2017, OSHPD updated the California Community College Student Records dataset on the Open Data Portal. This data is a subset of the CCCCCO data described in the *Education Data* section of this report. OSHPD created an interactive dashboard to display community colleges sorted by the highest number of students enrolled in health-related programs by gender.

Fact Sheets

OSHPD published six Fact Sheets in 2017 summarizing healthcare workforce supply and demand data, as well as demographic data on California's population. Data include, but are not limited to, foreign language proficiency, cultural background, gender, postgraduate training, age, annual job openings, wages, projected occupational growth, where providers reside, and where providers practice.

The following [Fact Sheets](#) are published on OSHPD's website:

- Doctors of Osteopathy
- Physician Assistants
- Physicians and Surgeons
- Registered Dental Assistants
- Registered Dental Hygienists
- Registered Nurses

OSHPD Healthcare Workforce Research Agenda

OSHPD's Healthcare Workforce Research Agenda articulates its research priorities in support of the Clearinghouse statute and OSHPD's mission to "advance safe, quality healthcare environments through innovative and responsive services and information." Core to safe, quality healthcare environments is the workforce providing care. OSHPD's Research Agenda lays out a framework that guides its investigation into whether California's healthcare workforce is adequate to meet the cultural and linguistic needs of the population.

Over time, OSHPD will address the following Research Agenda questions related to education and practice of various healthcare workforce disciplines:

- What is the volume of students applying for, entering into, and completing science courses or majors in elementary school? Middle-school? High school? Junior college?
- What is the racial and ethnic mix of students applying for, entering into, and completing science courses or majors in elementary school? Middle-school? High School? Junior college?
- What is the capacity of the education pipeline and the volume of students applying for, entering into, and graduating college in majors that lead to health careers? Advanced education by discipline?
- What is the racial and ethnic mix of students applying for, entering into, and graduating college in majors that lead to health careers? Advanced education by discipline?
- How should primary care shortages be defined given the team approach to medicine and accessibility through telemedicine?
- What geographic areas demonstrate a lack of access to primary care providers, or unmet healthcare need, throughout the state?
- Do providers reflect the racial and ethnic diversity of the populations they serve?
- Do providers serve populations at-risk of not having access to care? Medicare? Medicaid? Uninsured?

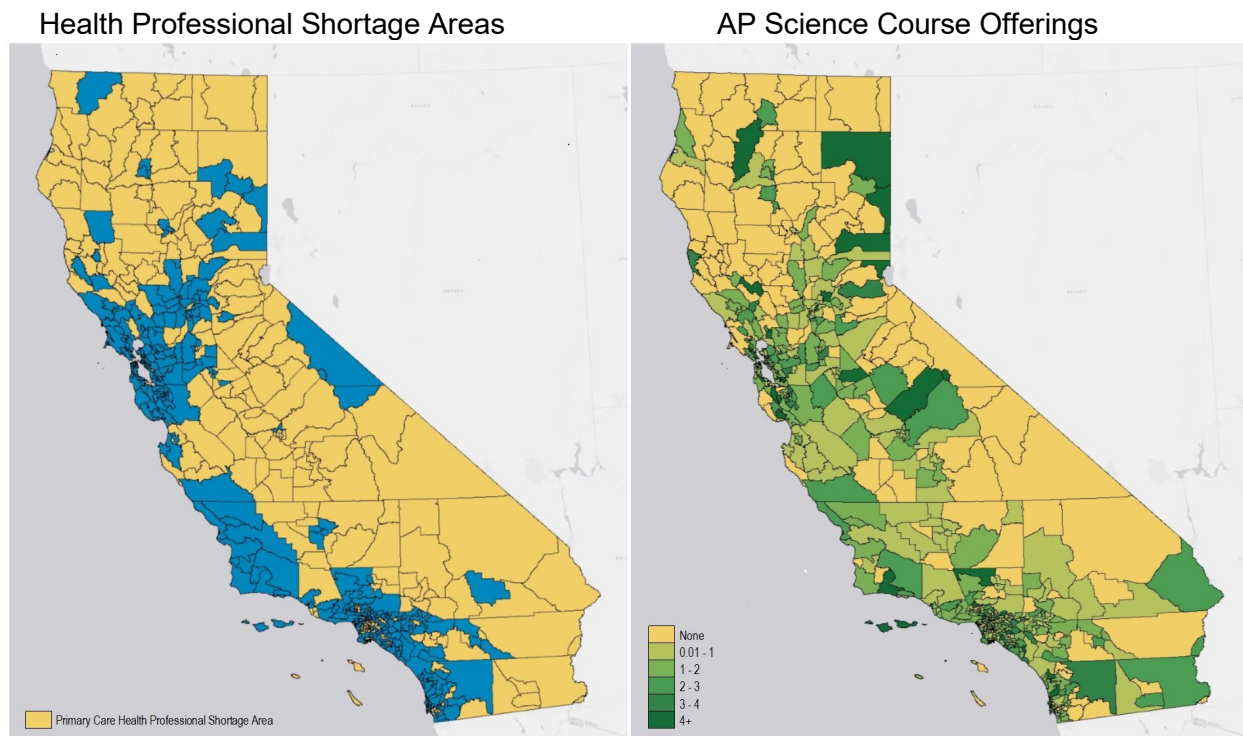
In the last year, OSHPD published two papers related to its Research Agenda, which are summarized below and included in their entirety as Attachments A and B.

1. Parallels in Science Education and Physician Shortages

The federal Health Resources and Services Administration projects a continued shortage of primary care physicians and highlights the maldistribution and lack of diversity in the existing workforce. While some California communities have an abundance of primary care physicians, others have persistent shortages. A holistic understanding of the origins of these primary care shortages may lead to new and more effective policy solutions. Research shows that two of the strongest predictors of a physician's likelihood to care for the underserved are having a rural background and being a member of an underrepresented group. *Parallels in Science Education and Physician Shortages* explores educational opportunity and engagement of children in these areas, with the understanding that education plays a significant role in their career choices.

OSHPD analyzed California's K-12 public education system science course data and found limited access to AP science coursework in rural and high poverty urban areas, where 99 percent of physician shortage areas are concentrated. Additionally, researchers found that minorities underrepresented in science classrooms are also historically underrepresented in medicine. Parallels between physician shortages and science education are important because children most likely to become physicians that care for the underserved have demonstrably less educational opportunity and an arguably more challenging pathway to licensure. Further interdisciplinary research and cooperation between traditionally siloed sectors, health care and education, may result in novel, mutually beneficial solutions. Policies that expand science education may ultimately lead to a more evenly distributed and diverse primary care workforce.

The maps below represent a visual display of parallels between the lack of AP science course offerings and primary care shortages. In the Health Professionals Shortage Areas map, the gold communities represent areas which are designated as Primary Care Shortage Areas. In the AP Science Course Offerings map, the gold areas represent areas that lack advanced placement science course offerings.



See Attachment A for the Parallels in Science Education and Physician Shortages research paper.

2. Identifying Primary Care Shortage Areas with a Unified Provider Ratio

OSHPD administers several grant programs with the aim of increasing access to primary care services throughout California. OSHPD utilizes a “primary care ratio” as a tool to identify Primary Care Shortage Areas (PCSA) throughout the state. Currently, OSHPD defines PCSA as a combination of the poverty rate and the number of primary care physicians practicing in an area relative to the population. Together, these variables determine areas designated as PCSAs. Where poverty may represent a measure of demand, the physician ratio represents a measure of supply of primary care services.

This research explored alternative methods to determine an adequate “primary care ratio.” The modern healthcare system delivers primary care services through several professions: physicians, nurse practitioners (NP), and physician assistants (PA). Because the responsibilities of these three professions overlap, the presence of one affects the need for another. Consequently, a unified provider ratio may be more appropriate for the definition of a shortage area than the current physician-only ratio.

To create an accurate estimate of access to care, OSHPD staff weighted the relative contribution of each profession providing primary care services (physicians, NPs, and PAs).

OSHPD staff utilized Medicare's "work relative value unit," which provides a value to each type of service based on skill, judgment, and stress involved, to determine appropriate weighting.

Preliminary calculations of a unified provider ratio resulted in a median primary care full-time-equivalent (FTE) increase of 34.9 percent compared to the current physician-only count. Where the existing PCSA methodology identified 100 primary care FTE from physicians, the unified provider ratio identified, on average, an additional 35 primary care FTE from NPs and PAs practicing in the same area. The existing physician-only methodology may underestimate the supply of primary care providers in California. As a result, some areas may be designated as shortage areas when there are sufficient providers serving the area. Replacing the physician ratio with the unified provider ratio in a mock PCSA scoring resulted in 58 fewer designations.

See Attachment B for the research paper regarding Identifying Primary Care Shortage Areas with a Unified Provider Ratio.

Next Steps

In the coming year, OSHPD will continue to make data available through the Clearinghouse and the Open Data Portal. These data are available to researchers and the public curious about California's healthcare workforce. OSHPD will continue to produce Fact Sheets, summarizing healthcare workforce data and make available on OSHPD's web site.

Since March 2017, OSHPD has used these data to conduct research to explore education and primary care provider topics related to the Research Agenda. In 2018, OSHPD will explore Research Agenda topics related to providers in the public mental health system.

Attachment A

Parallels in Science Education and Physician Shortages

Introduction

OSHPD encourages healthcare providers to work in areas of unmet need and underrepresented groups to pursue healthcare careers. Areas of unmet need, or underserved areas, generally refer to geographic areas and populations with a lack of access to primary care services. The Song-Brown program, a program administered by OSHPD that provides grants to qualifying residency and training programs, defines underrepresented minorities as racial and ethnic populations that are underrepresented in the health professions relative to their numbers in the total population. The Association of American Medical Colleges uses the same definition, that historically has referred to Black, Hispanic or Latino, and American Indian or Alaskan Native populations.

Alongside programs that help place existing physicians in underserved areas, the department continues to research additional and/or alternative approaches to improving healthcare access and diversity. One of these complementary approaches focuses on inspiring the youth in underserved areas to become providers themselves. If career choices are decided by a combination of the individual and the environment, it's worth examining the environment to see if all school-age children are on equal footing.

Rabinowitz et al¹ in 2000 and Wayne et al² in 2010 surveyed physicians to find predictors that could identify physicians likely to care for the underserved. In both studies, two consistently strong variables emerged as independent predictors: having a rural background and being a member of an underrepresented minority group. In 2010, Maltese and Tai³ published a study of career scientists in which 65 percent of participants reported that their interest in science started before middle school. Previous work from Tai et al⁴ also indicated that eighth grade students expressing interest in science careers were significantly more likely to obtain college degrees in science than classmates that did not show similar interest.

While a degree in science does not necessarily mean a career in medicine, the path to medicine requires an interest in science. A lack of rigorous K-12 science education in an underserved area may reduce the number of providers produced by that area and, by extension, the number of providers likely to return to that area to provide care. Similarly, a disparity in the demographics of students in the available pipeline may selectively encourage only certain populations towards healthcare careers. By acknowledging disparities, interested parties can better focus efforts to affect change.

In addition to highlighting existing literature on this topic, this paper discusses OSHPD's analysis of public school enrollment data from the California Department of Education (CDE) to quantify access to and interest in advanced placement (AP) science courses in communities across the state and compares those findings to areas known to have a shortage of providers.

Literature Review

In 2015, Ganon et al⁵ published an analysis of nationwide education data from the federal Office for Civil Rights. The study found rural students, defined as a territory outside an urban cluster or urbanized area, are far less likely to take AP coursework than urban or suburban students. Most notably, they found that approximately 47 percent of rural districts had zero AP enrollment, compared with 3 percent of urban districts. The study also found that rural districts, smaller districts, and districts farther from urbanized areas had particularly poor access.

In the College Board's 10th Annual AP Report to the Nation⁶, the organization summarizes participation in the AP Program by the graduating class of 2013. Amongst other things, the report highlights the equity gap in participation for minority students, who are traditionally underserved. Comparing the percent of the graduating class to the percent of AP exam takers, the organization found that California's graduating class had an equity gap in Black/African-American students (6.2 vs 3.7 percent), Hispanic/Latino students (43.8 vs 38.3 percent), American Indian/Alaska Native students (0.8 vs 0.5 percent), and low-income students (54.1 vs 42.3 percent). Participation data for Asian/Asian American/Pacific Islander students, who are not traditionally underrepresented in medicine, did not show the same gap (15.0 vs 23.0 percent).

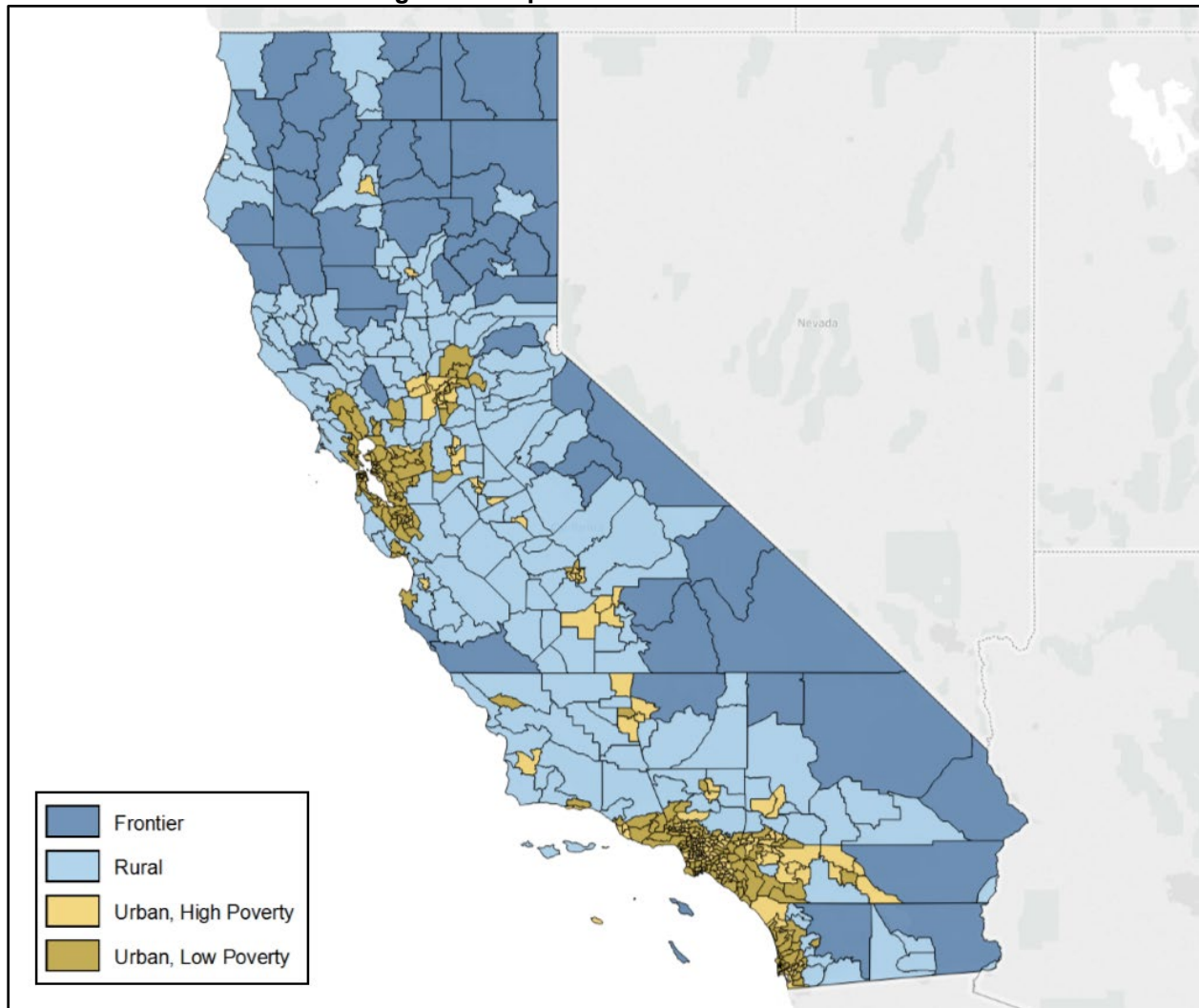
Methods

OSHPD's healthcare workforce research is based on rational service areas called Medical Service Study Areas (MSSA), which are specialized geographies that reflect areas where residents obtain most of their primary care. MSSAs are updated every 10 years, consist of one or more complete census tracts, and do not cross county lines. There are currently 542 MSSAs categorized by three definitions: Frontier (n=54), Rural (n=173), and Urban (n=315). Frontier and Rural MSSAs have population densities of less than 11 or 250 persons per square mile, respectively. Urban MSSAs generally have a population range of 75,000 to 125,000 and contain populations with similar demographic and socio-economic characteristics.

To allow more granular study of urban areas, researchers further divided these MSSAs into two categories based on the percentage of the population living below 200 percent of the federal poverty level. MSSAs above the median urban value are referred to as Urban, High Poverty (n=157), and those below are referred to as Urban, Low Poverty (n=158) (Figure 1).

While MSSA boundaries do not dictate where a student goes to school, the size, quantity, and neighborhood focus of MSSAs allow for a reasonable degree of accuracy. This study intends to start discussion about general trends and discrepancies amongst populations, not to draw conclusions about individual communities.

Figure 1. Map of MSSAs in California.



This study uses the 2014-15 Course Enrollment dataset from CDE Staff Data Files, which contains a record for every class, section, grade, and gender that has a student enrolled on “information day,” a single day in the fall. This study excludes district records and records from schools that were exclusively or primarily virtual, and unless otherwise noted, focuses on subjects specifically listed as prerequisites for medical school: biology, physics, and chemistry^{7,8}. This study does not include private or homeschooled students, estimated at 7.5 percent⁹ and 3 percent¹⁰ of the school-age population, respectively, as comparable datasets for these populations were unavailable. Researchers merged the enrollment dataset with course detail and school location datasets also available from the CDE, as well poverty and population estimates from the American Community Survey (ACS) 5-year estimates for the same time and regions.

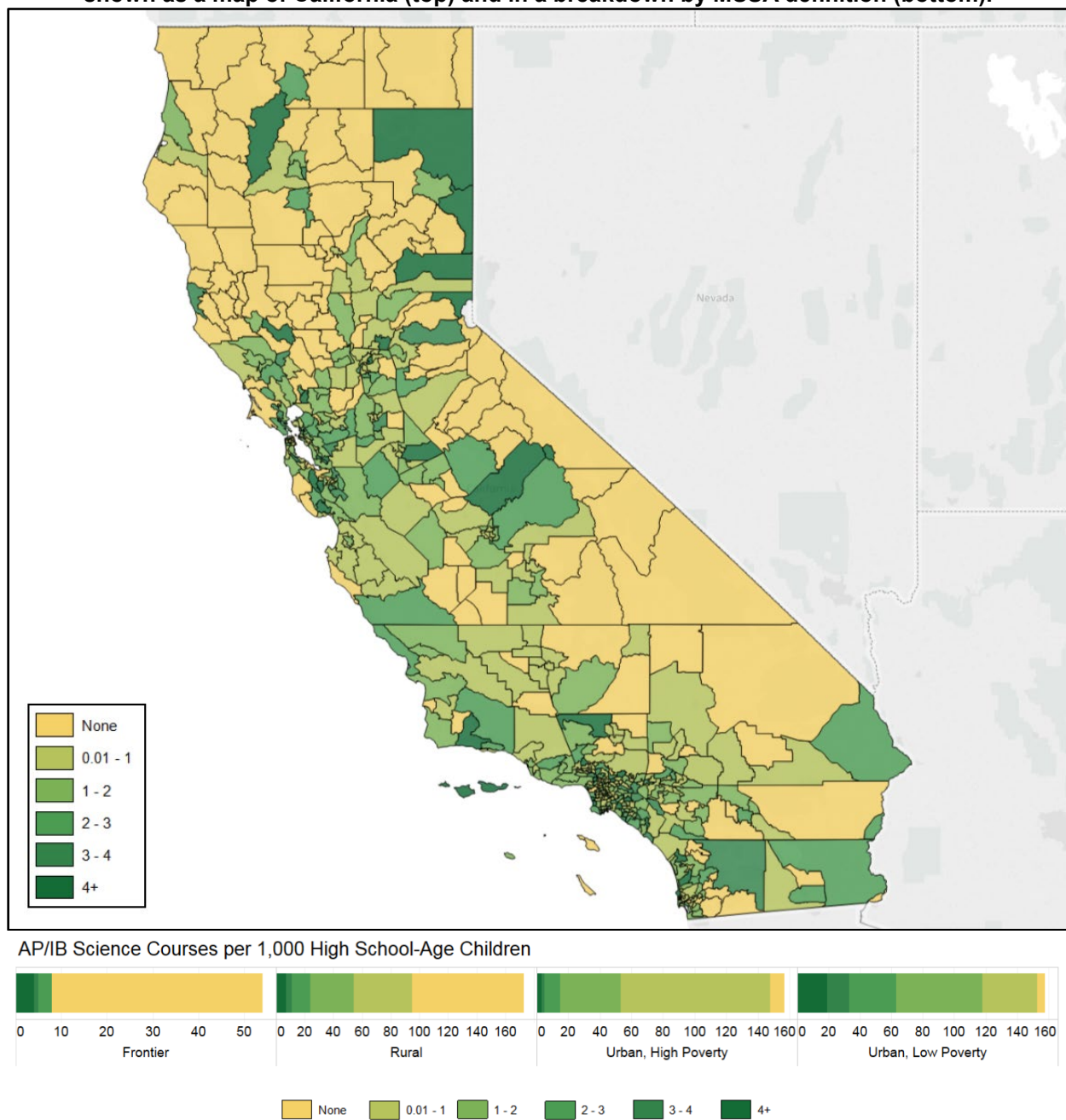
For the purposes of this paper, the term “young adult” refers to high school-age people between the ages of 15 and 19, and references to a race refers to self-identifying populations that do not also identify as Hispanic or Latino. “Asian” for example, refers to people who self-identify as Asian, but not Hispanic.

Researchers assigned schools to MSSAs by plotting the latitude and longitude of each school on a map of California MSSAs using the same geographic projection in ArcGIS.

Results

In each MSSA, researchers tallied the number of distinct AP or International Baccalaureate (IB)* courses and expressed the number per 1,000 young adults in the corresponding area (Figure 2).

Figure 2. The number of AP/IB science courses offered per 1,000 young adults in each MSSA shown as a map of California (top) and in a breakdown by MSSA definition (bottom).

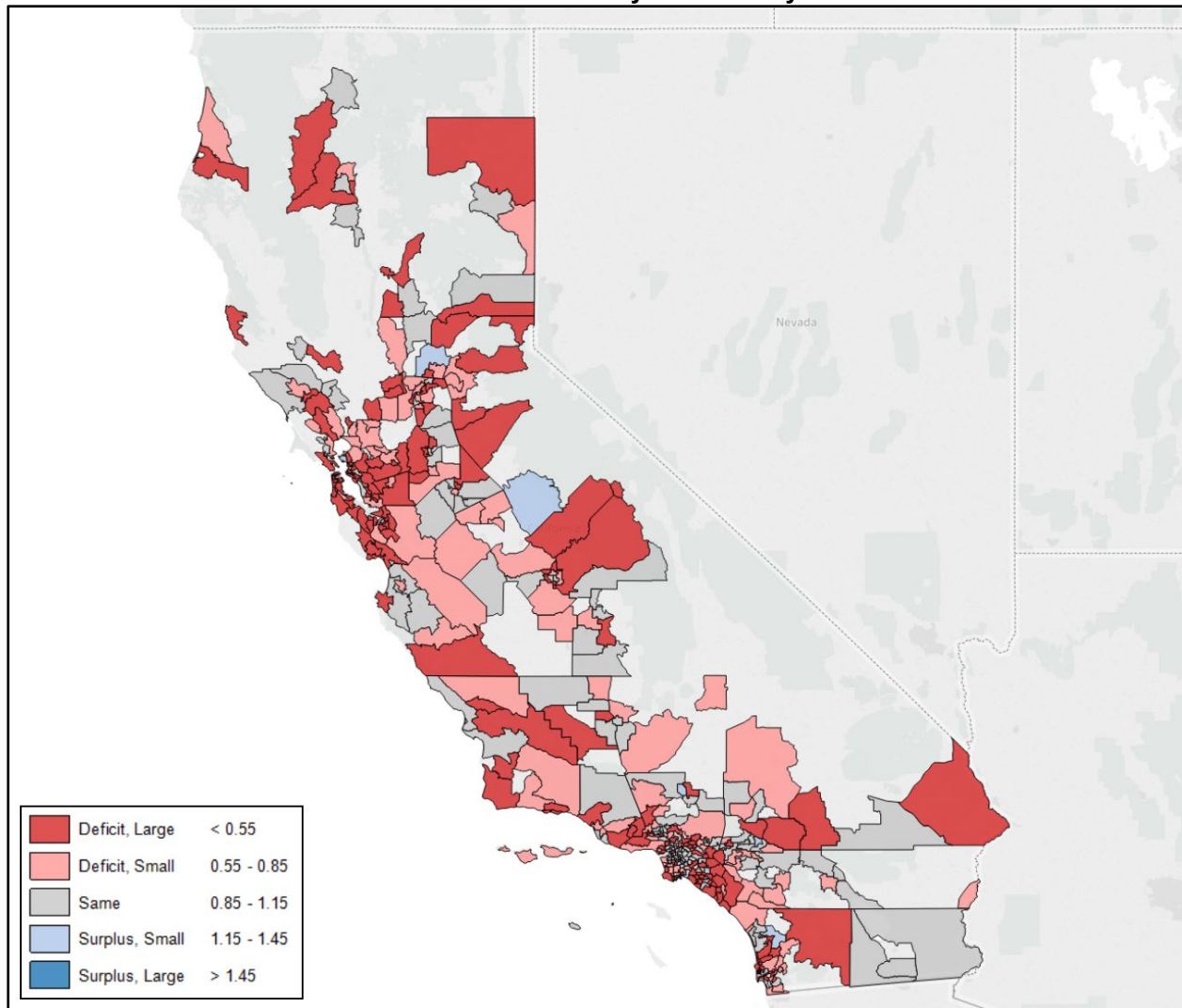


Shown in yellow, approximately 85 percent of frontier MSSAs and 45 percent of rural MSSAs did not offer AP/IB science courses. Of the 138 MSSAs not offering AP/IB science courses, 99 are federally designated as Primary Care Health Professional Shortage Areas (PC-HPSA), or 72 percent. In contrast, 124 of the 404 MSSAs that do offer AP/IB coursework are designated as PC-HPSAs, or 31 percent.

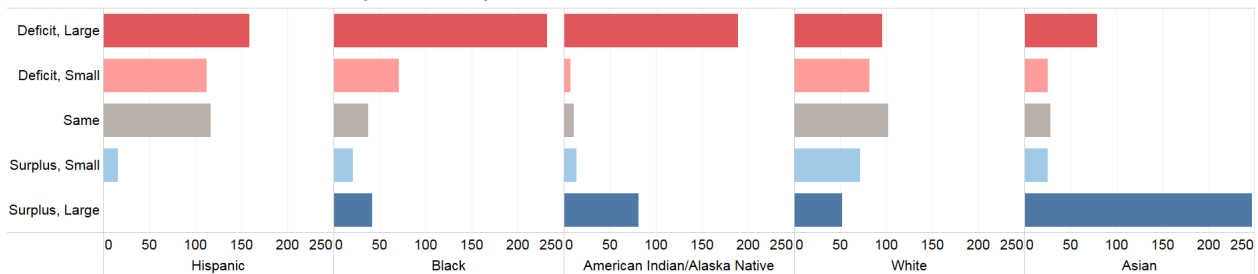
Both high and low poverty urban MSSAs have very few areas that do not offer AP/IB science courses, but low poverty urban MSSAs offer significantly more courses overall. Aggregated together, low poverty urban areas have twice the AP/IB science courses per 1,000 young adults as high poverty urban areas (2.06 vs 1.01).

Researchers further analyzed the demographic makeup of the AP/IB course enrollment. In each MSSA, researchers totaled the AP/IB enrollment counts for each race/ethnicity, calculated them as a percent of the total enrollment, and expressed that number as a ratio against the percent of the total young adult population of the same race/ethnicity. A ratio below 1, referred to in this study as a deficit, indicates a smaller proportion of a race/ethnicity in the classroom than in the community. Inversely, a ratio above 1, referred to as a surplus, indicates a larger proportion in the classroom than in the community (Figure 3).

Figure 3. (Top) Map of MSSAs comparing the Hispanic portion of AP/IB science classrooms to the Hispanic portion of the community in general. (Bottom) Number of MSSAs in each ratio category for each race/ethnicity in this study.



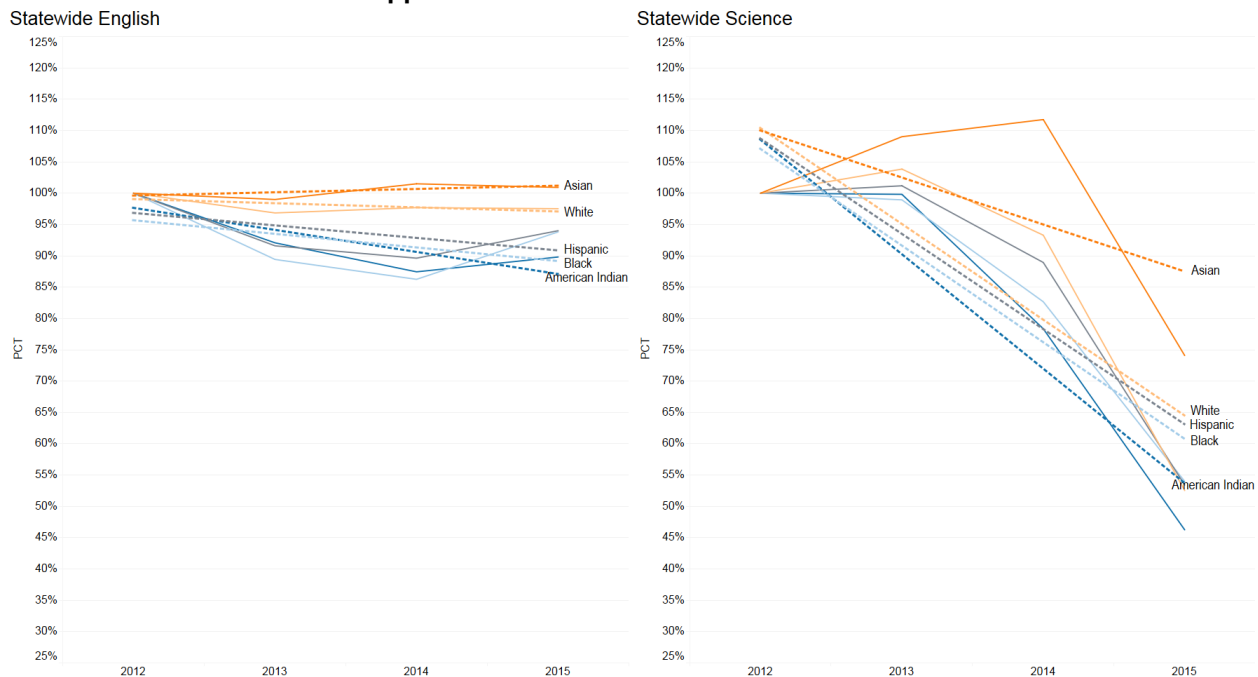
AP/IB Science Enrollment Ratio of MSSAs by Race/Ethnicity



Hispanic populations are underrepresented in the majority of AP/IB science classrooms, with 67 percent of MSSAs showing a deficit and only 4 percent showing a surplus. Black and American Indian/Native Alaskan populations are similarly underrepresented, with 75 and 65 percent of MSSAs showing a deficit, respectively. In contrast, Asian populations are overrepresented in the majority of AP/IB science classrooms, with 67 percent of MSSAs showing a surplus.

Researchers also analyzed enrollment data over time, beginning with ninth grade students in 2012 and following them through graduation in 2015. Analysis included science courses of any type or level, and included parallel analysis of all English language arts courses for comparison. Researchers expressed enrollments of each race/ethnicity in each year as a percentage of the corresponding enrollment in 2012 (Figure 4).

Figure 4. Enrollment over time for the same population across 4 years. Trendlines for each race appear as dotted lines of the same color.



After four years, enrollment counts for English courses ranged from 90 to 101 percent of their 2012 numbers, resulting in relatively flat trendlines, while enrollment counts for science courses ranged from 46 to 74 percent of their 2012 numbers, resulting in downward trendlines.

Discussion

The data show that young adults in less populated areas and in poor urban areas of California have less access to AP/IB coursework than young adults in affluent urban areas. This result mirrors the nationwide findings from Gagnon et al, despite the different geographies used in the studies. Whereas many of the courses in K-12 education are required for graduation, AP/IB courses are entirely elective and therefore represent opportunity and choice. The access disparities shown here mean that children in frontier, rural, and high poverty urban areas in California have less opportunity to make the choice, regardless of whether the decision is driven by a specific interest in the subject, a general interest in higher education, or even by the cost of the exam.

Additionally, of the 223 MSSAs currently designated as PC-HPSAs, 220 are in frontier, rural, or high poverty urban areas. While the PC-HPSA designation process is more complicated than a simple provider-to-population ratio, it does indicate that the populations in these areas are underserved. Studies have shown that physicians from underserved populations are likely to serve these populations, but the potential physicians from these areas, the children, have demonstrably less educational opportunity and arguably a more challenging pathway to licensure.

Another mission of OSHPD is to encourage underrepresented groups to pursue healthcare careers. California is a large and diverse state, and its residents deserve a quality, culturally competent workforce that is equally as diverse. OSHPD's demographic analysis of AP/IB science courses found that the majority of MSSAs underrepresented Hispanic, Black, and American Indian/Native Alaskan populations, and overrepresented Asian ones. This finding is consistent with The College Board's report of an equity gap in minority student AP participation. Interestingly, the underrepresented minorities are the same as the populations traditionally underrepresented in medicine.

In the longitudinal study, the graphs show that enrollment in English language arts courses remains relatively constant throughout high school. In science courses, however, there is a precipitous drop in enrollment over time, especially after 10th grade. This decline in enrollment may be explained by California's minimum high school graduation requirements, which require two years of science and three years of English courses. University of California and California State University admission requirements increase the English requirement to four years, but keep the science requirement at two years. While science enrollment decreases over time across all populations, the extent of the drop-off differs between race/ethnicities, which suggests that some populations choose to persist in science more than others. Asian young adults displayed the smallest drop-off and were the only population to show increasing enrollment through 11th grade. Conversely, Hispanic, Black, and American Indian/Native Alaskan populations showed the sharpest declines in science enrollment over time. Perhaps not coincidentally, these same three populations are historically underrepresented in medicine and in health care professions in general.

This research posits that the parallels between educational opportunity/participation and physician shortages are too suggestive to ignore. Improving access to science curriculum in underserved areas and encouraging participation in science, especially by underrepresented minorities, may result in significant long-term gains towards OSHPD's mission to increase the number of providers caring for the underserved. To maximize impact, this study further

suggests efforts to improve the healthcare education pipeline, i.e. the education pathway leading to a career in healthcare, may be more effective before high school, while children are still bright-eyed and exploratory. Approaching physician shortages holistically, from early education to residency locations and beyond, places organizations like OSHPD in a better position to succeed. And with more data-driven research, programs can better focus their resources to specific communities with the most need.

References

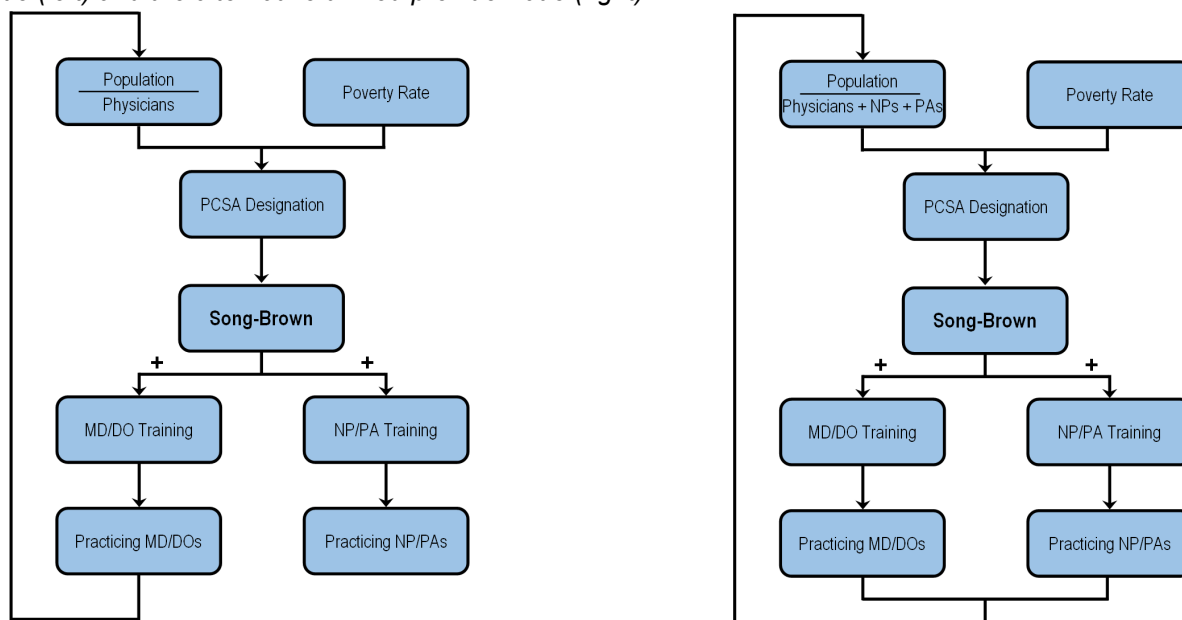
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Attachment B

Identifying Primary Care Shortage Areas with a Unified Provider Ratio

The Song-Brown program aims to increase access to primary care services. California statute requires the California Healthcare Workforce Policy Commission (Commission) to “identify specific areas of the state where unmet priority needs for primary care family physicians...exist.” Since 2006, the Commission has defined the “need for physicians” as a combination of the poverty rate and the number of primary care physicians practicing in an area relative to the population. Together, these variables determine areas designated as Primary Care Shortage Areas (PCSA). Where poverty may represent a measure of demand, the physician ratio represents a measure of supply of primary care services. The modern healthcare system, however, delivers primary care services through several professions: physicians, nurse practitioners (NP), and physician assistants (PA). Though the Song-Brown program supports training for all three of these professions, only one currently contributes to its measure of access to primary care. Because the responsibilities of these three professions overlap, the presence of one affects the need for another. Consequently, a unified provider ratio may be more appropriate for the definition of “need for physicians” than the current physician-only ratio (Figure 1).

Figure 1. Diagrams illustrating the Song-Brown program’s relationship with the current physician-only ratio (left) and the alternative unified provider ratio (right).



According to recent U.S. Department of Health and Human Services (HHS) National Ambulatory Medical Care Surveys, approximately 50 percent of physicians nationwide work with at least one nurse practitioner, certified nurse midwife, or physician assistant. The percentage is even higher in primary care specialties and rural areas.¹ In California specifically, HHS recently estimated that NPs and PAs together accounted for 23 percent of the primary care clinician workforce in 2013. By 2025, HHS projects that this percentage will increase to nearly 40 percent.² NPs and PAs are prevalent in the modern primary care system, with forecasts displaying an even greater role in healthcare delivery.

Their omission from Song-Brown's measure of access to care decreases the program's ability to accurately target resources to areas with greatest unmet need.

While creating a separate NP/PA ratio would account for all the primary care professions, this solution necessitates maintaining another shortage area, and, more importantly, duplicates the core challenge with the physician-only ratio: the ratios are not independent of each other. An area served by an abundance of physicians has less need for NPs or PAs, and vice versa. Maintaining separate targets for each profession effectively imposes an ideal that every provider type is present in every community at a fixed proportion. Many combinations of provider types can serve a community, and an "ideal" composition of provider types does not exist and would likely be different for every community.

To create an accurate estimate of access to care, OSHPD must establish a way to weight the relative contribution of each profession providing primary care services. The Physicians Foundation published a 2009 report to Congress estimating that "nurse practitioners and physician assistants are capable of providing 70 percent or more of the [primary] care required for adults and 90 percent in pediatrics."³ Medicare provides additional perspective and precedent on the relative contribution of these professions through its Physician Fee Schedule (PFS), which pays NPs and PAs 85 percent of the physician amount for the same service. A closer look at Medicare's PFS shows that every service has an associated value, known as a work relative value unit (wRVU), that accounts for the time, skill, judgement, and stress involved. In 2015, for example, this system valued a relatively routine office visit at 0.97 wRVU and a highly complex office visit at 2.11 wRVU. Regardless of who provided the service, the wRVU remains the same.

Many modern incentive-based compensation models use wRVU as an approximation for productivity. A provider, for example, that billed for 10 relatively routine office visits at 0.97 wRVU each would have produced 9.7 wRVU that day. In a nationwide 2016 survey of compensation and productivity, the median annual wRVU for a family medicine physician was 4,908, the median for a primary care NP was 3,327, and the median for a primary care PA was 3,733.^{4,5} Using the highest value as a standard, the median relative contribution of family medicine physicians becomes 1.0 and the contributions of primary care NPs and PAs become 0.67 and 0.76, respectively.

In 2011, a negotiated rulemaking committee of 28 experts convened to examine the current methods for identifying federal areas of unmet need and propose appropriate revisions. Regarding provider counts, the final report asserted "the significant expansion of the past decade in the numbers of NPs, PAs, and certified nurse midwives practicing in primary care settings has made their inclusion in the counts of primary care clinicians essential to the validity of a revised designation process..." and continues to specifically recommend applying a 0.75 weighting to NPs and PAs relative to primary care physicians.⁶ While the committee had 90 percent support for the decision, it ultimately failed to reach unanimity and the recommendation was not adopted. OSHPD's research is consistent with the rulemaking committee's findings, and supports adoption of the recommended weighting for NPs and PAs (Figure 2).

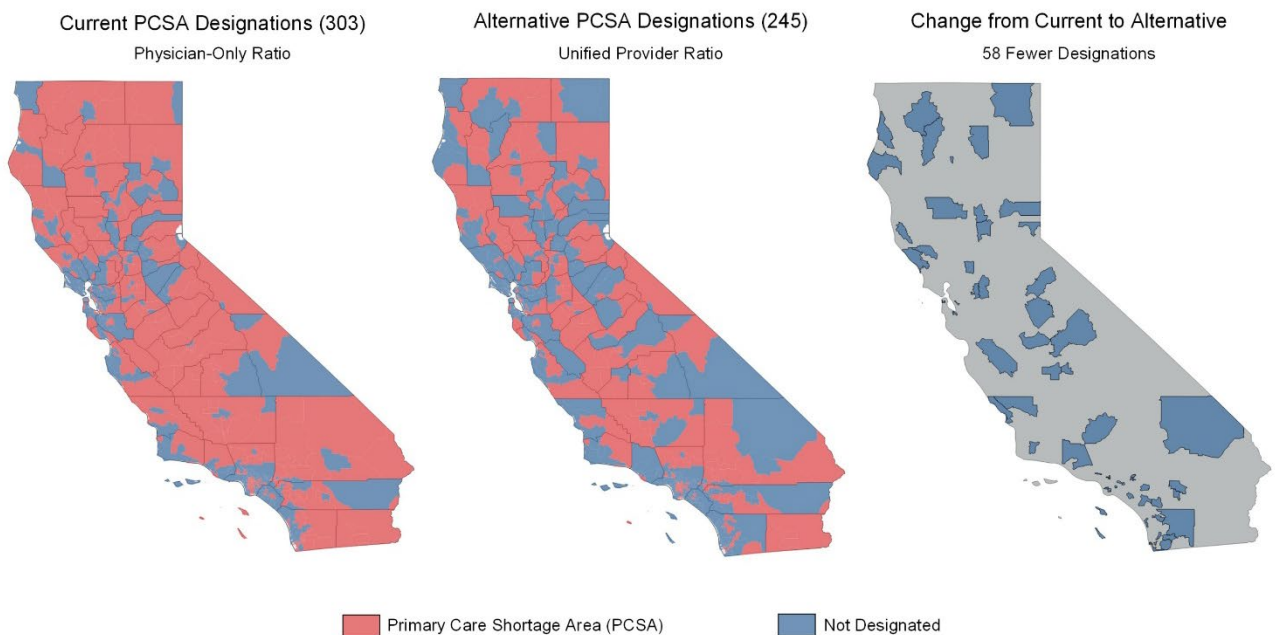
Figure 2. *Proposed calculation of a unified primary care provider ratio. In the Song-Brown program, primary care refers to Family Medicine, Internal Medicine, OB/GYN, and Pediatric specialties.*

Unified Provider Ratio	=	$\frac{\text{Civilian Population}}{\text{Physicians}(1.0) + \text{NPs}(0.75) + \text{PAs}(0.75)}$
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The data surrounding physicians has matured to be relatively detailed and reliable, and the process of quantifying the number practicing in each community is largely the same as it was when the Commission first implemented the methodology in 2006. Physician data even contains reasonable approximations of the time spent on patient care, or full time equivalent (FTE). The process of quantifying primary care NPs is largely the same as it is for physicians, albeit with less specificity. Specialty reporting, for example, does not capture sub-specializations, and the process of isolating NPs from other registered nurses can be laborious. Currently, there is no central source of specialty data for PAs available on the individual level, so the best available method of identifying primary care specialists assumes that a fixed percentage of all PAs in an area work in primary care. Recent surveys and projections estimate that approximately one third of PAs practice primary care.⁷ In the absence of FTE estimates for either NPs or PAs, researchers assume that each provider is one FTE. With time and effort, these datasets will become more robust, increasing the specificity and reliability of provider specialty, location, and time reporting.

Preliminary calculations of a unified provider ratio for each Medical Service Study Area (MSSA)* in California resulted in a median primary care FTE increase of 34.9 percent compared to the current physician-only count. Where the existing PCSA methodology identified 100 primary care FTE from physicians, the unified provider ratio identified, on average, an additional 35 primary care FTE from NPs and PAs practicing in the same area. This increase, however, is not uniform across California. While some MSSAs have enough NPs and PAs working in an area to increase the primary care supply by as much as 670 percent, other MSSAs saw an increase of 0 percent. Despite this maldistribution, the existing physician-only methodology consistently underestimates the supply of primary care providers in California. As a result, some MSSAs may be designated as shortage areas when there are enough providers serving the area. Replacing the physician ratio with the unified provider ratio in a mock PCSA scoring resulted in 58 fewer designations, suggesting that only 245 of the current 303 MSSAs are actually areas of unmet need (Figure 3).

Figure 3. Maps of California MSSAs showing PCSA designations under the existing methodology (left) and the alternative methodology (middle). Adopting the alternative methodology, which adds NPs and PAs to the count of primary care providers, would result in 58 fewer shortage designations (right), 33 of which are in rural/frontier areas.



Another OSHPD research project titled “Alternatives to Identifying Primary Care Shortage Areas” proposes an alternate method of identifying PCSAs in California, focusing on factors that influence health outcomes. Although, on its own, more primary care physicians was minimally associated with better health outcomes, this parallel research recommends continued use of a physician-to-population ratio as an initial check for unmet need. Because the unified provider ratio exhibits a similar relationship with health outcomes as the physician-only ratio, the unified provider ratio could be implemented in this alternative method without significantly altering the statistical basis for the scoring.

A comprehensive measure of access that includes all primary care professions aligns closely with the realities of how modern primary care is delivered. The Song-Brown Health Care Workforce Training Act recognizes the importance of all three professions, asserting that their collective training will “lead to an improved health care delivery system in California.” By accounting for the contribution of NPs and PAs to California’s health, a unified provider ratio more accurately represents the availability of primary care services. Combined with other data-driven approaches of defining unmet need, the unified provider ratio can greatly improve the PCSA methodology’s ability to accurately identify areas of unmet need. The more accurate Song-Brown’s measures are, the better targeted its funds will be.

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