Needed: Sy(STEM)ic Response

How California's Public Colleges and Universities are Key to Strengthening the Science, Technology, Engineering, and Math (STEM) and Health Workforce

The Campaign for College Opportunity

Increasing college graduates to strengthen California

June 2016

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How California's Public Colleges and Universities are Key to Strengthening the Science, Technology, Engineering, and Math (STEM) and Health Workforce

California's economy is changing. A generation of highly educated workers, the Baby Boomers, is approaching retirement and will leave a huge void in the workforce. This is particularly true for fields like nursing, where nearly half of registered nurses are 50 years old or older.[1] More than ever, California will need to rely on highly educated citizens to fill that void and meet the workforce demands of a 21st century economy that requires higher levels of education. Yet, 25-29 year olds in California are no more likely to have a college degree than older Baby Boomers, and the percent of adults in California with at least a bachelor's degree is predicted to change little by 2030.[2, 3]

Some of the fastest growing job sectors in California's economy are in Science, Technology, Engineering, and Math (STEM) and health related fields. **California currently ranks first in the nation in terms of the total number of STEM entry-level positions available, and health sector jobs grew the fastest—by more than 300,000 between 2010 and 2014.**[4, 5] Within the next decade, California will need a total of one million STEM workers and more than 450,000 additional health care related workers to meet the needs of the economy. [6, 7]

But California is facing a harsh reality. In order to fill these positions—the vast majority of which will require postsecondary education or training—the state needs significantly more college graduates.[8, 9] Of the more than one million STEM jobs California will need, nearly 75 percent will require a bachelor's degree or higher.[10] Yet only 33 percent of California's working-age population (25-65 years old) have college degrees that serve as a prerequisite for the vast majority of STEM and health jobs.

Having a college degree, particularly in STEM and health fields, can provide financial security for Californians when facing tough economic conditions. Since the 1970s, low- to middle-skilled workers have seen their wages decrease while wages have increased for high-skilled workers.[11] Today, one out of every three workers in California earns low wages.[12] Simultaneously, the cost of living has dramatically increased with home prices in California now 150 percent higher than the national average .[13] Since the Great Recession, the top one percent of income earners in the state captured 135 percent of all income growth between 2009 and 2012.[14] With growing economic inequality and the rising cost of living in California, STEM jobs—which pay on average 26 percent more than non-STEM jobs—offer a pathway to better paying careers and a higher quality of life for a large portion of the state's population.

Colleges and universities play a critical role in preparing future STEM and health workers. The good news is that California enrolls more college students than any other state. Specifically, California's public higher education system—which includes California Community College, California State University and University of California systems—enrolls nearly three million students and nine out of every 10 undergraduate students in the state.[15]

Despite the size of California's public higher education system, it is not currently producing, and is not projected to produce, the educated workforce needed to fill these positions. Compared to other states, California is underperforming in the rate of bachelor's degree completions for the college-aged (18-24) population[16] in popular STEM fields.[17] For computer science and engineering, California ranks 38th in computer science and 37th in engineering.[18] And with California currently ranking 48th in the country[19] in health related degree completion, California is not on track to meet the 450,000 additional healthcare workers needed by 2030.[20]

This report provides data on the current state of California's STEM and health workforce, identifies the challenges to meeting both STEM and health workforce needs, and recommends steps California leaders can take to ensure that our public colleges and universities are producing the diverse educated STEM and health workers needed to meet future economic demands.

Key findings from the report include:

- California is ranked toward the bottom of the country for bachelor's degree completion in health (48th), engineering (37th), and computer science (38th).
- California ranks near the bottom of the country in associate degree production in health (49th), computer science (47th) and engineering (49th).
- Among the ten states with the largest Latino populations, California ranks at or near the bottom for bachelor's degree completion for Latinos in health (9th), computer science (10th) and engineering (10th).
- Despite being twice the size of the University of California system, the California State University system produces an almost equal number of bachelor's degrees in engineering and computer science.
- Only 33 percent of CSU students who start in a STEM major graduate with a STEM degree within six years.
- The low number of bachelor's degree nursing programs in the public university systems hinders the state's ability to meet workforce demands.
- Only five percent of all Associate Degrees for Transfer awarded by the California Community Colleges in 2013-14 were in STEM majors.

If California is to produce the educated workforce needed to meet future economic demands in the STEM and health sectors, investing in California's public higher education system is critical, as is ensuring greater access to four-year universities and better student success rates in STEM and health majors.

"It is unacceptable for California to be ranked toward the bottom of the country for bachelor's degree completion in health, engineering, and computer science. If we are to remain globally competitive as a state and a nation, it is imperative that California's public institutions of higher education produce graduates that are ready to enter into some of the most in-demand jobs driving our economy today, such as technology and health care."

CATHY MARTIN
VICE PRESIDENT, WORKFORCE POLICY
CALIFORNIA HOSPITAL ASSOCIATION

California's Population

Table 1: California's Population is Getting Older.

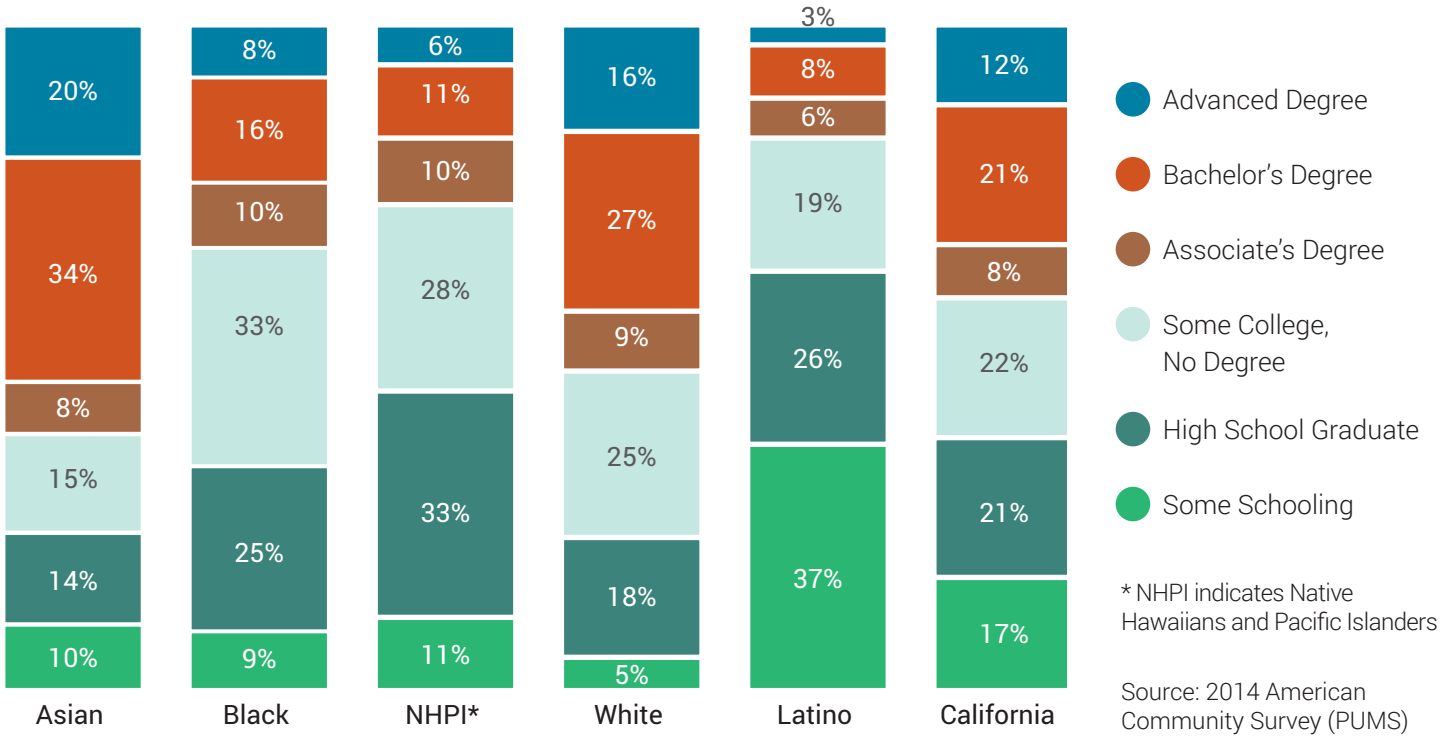
Projected Change in California Population, 2016 - 2030

	Change from 2016-2030
0-18 Age Population	516,410
19-37 Age Population	-18,900
38-56 Age Population	791,082
57-75 Age Population	**2,017,200**
76-94 Age Population	**1,493,809**

Source: California Department of Finance[21]

Figure 1: Only 11 Percent of Latinos and 33 Percent of all California Adults Have a Bachelor's Degree or Higher.

Educational Attainment for Californians by Race, Ages 25-65

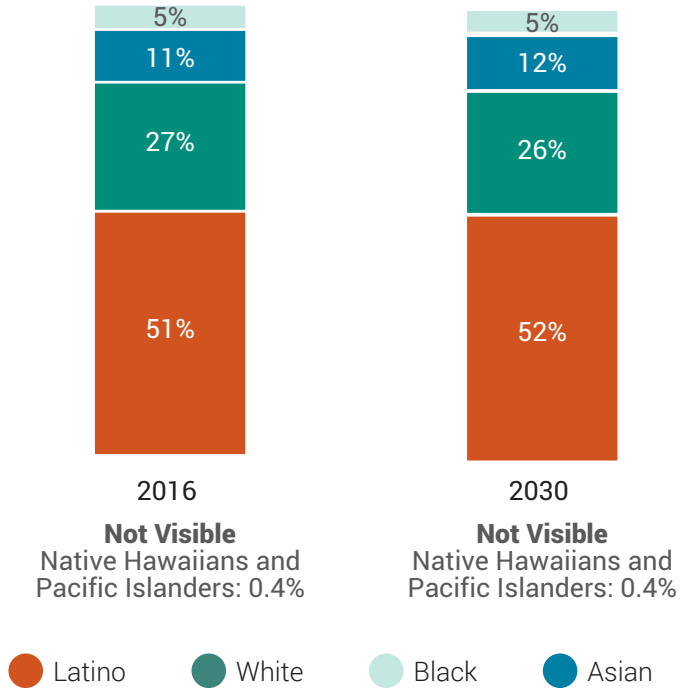


* NHPI indicates Native Hawaiians and Pacific Islanders

Source: 2014 American Community Survey (PUMS)

Figure 2: Latinos, Blacks, and Asian American, Native Hawaiian, and Pacific Islanders—California's New Majority—Will Represent Almost 70 Percent of the Youth Population by 2030.

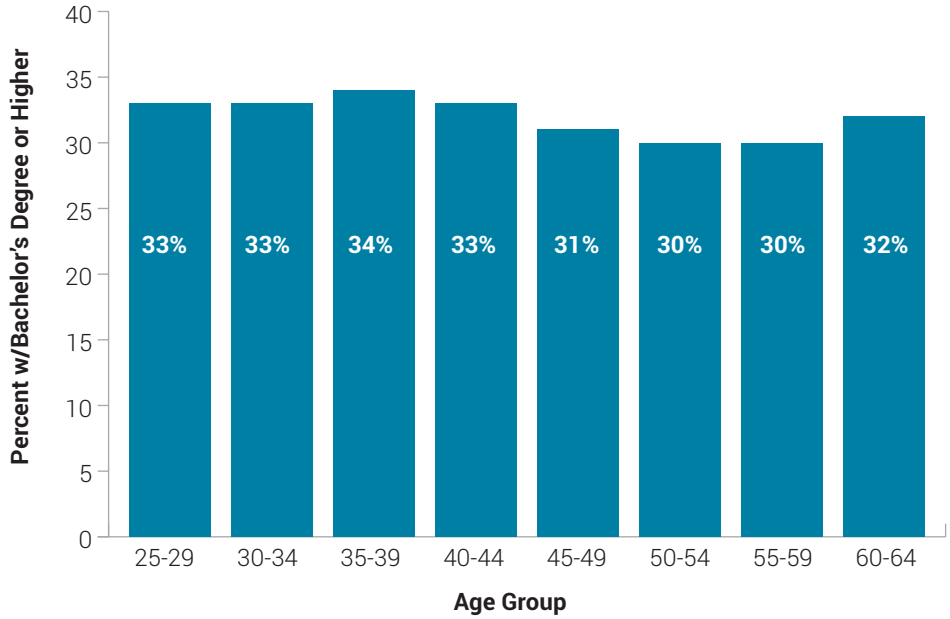
California's Under 18 Population by Race, 2016-2030



Note: Data does not equal 100 percent as multi-race is not shown. Source: California Department of Finance[22]

Figure 3: In Spite of the Growing Demand for More Educated Workers, Younger Californians Are Not Significantly More Educated Than Older Ones.

Educational Attainment for Californians by Age Group



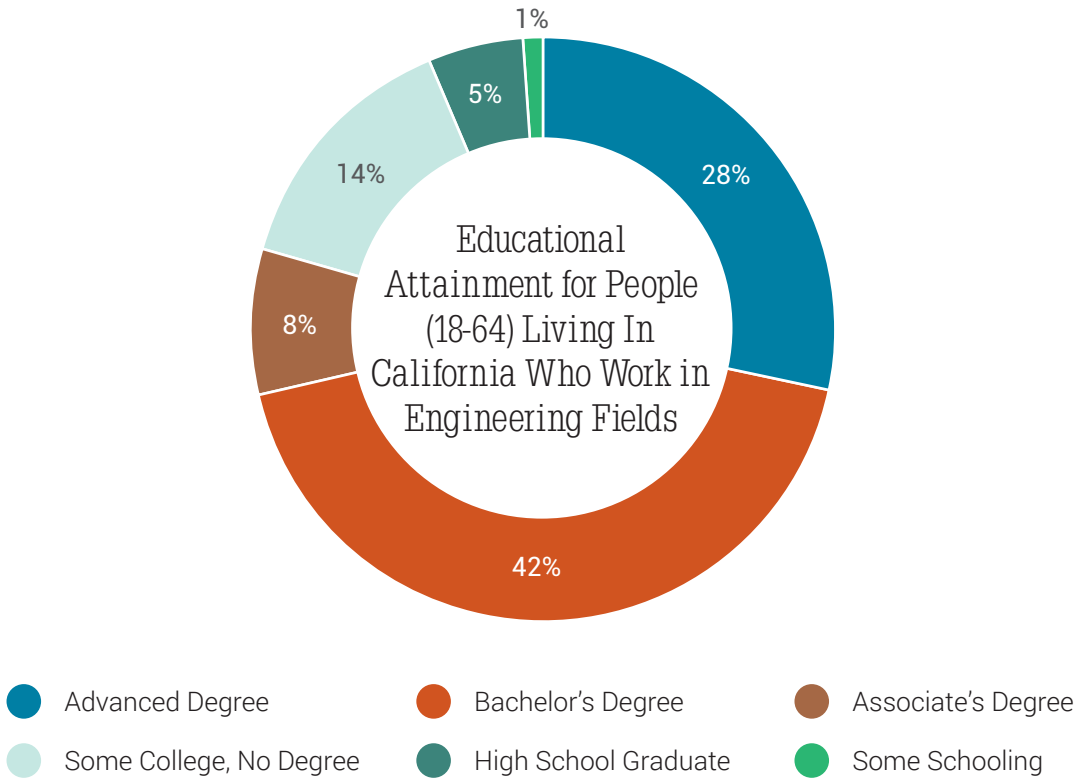
Source: 2014 American Community Survey (PUMS)

California's STEM Workforce

By 2018 the California economy will demand 1.1 million STEM jobs.[24] Almost 80 percent of these jobs will be in computer science or engineering.[25] Nine out of every 10 STEM jobs in California will require postsecondary education or training,[26] with the vast majority of the fastest growing STEM jobs requiring a bachelor's degree (see table 2).

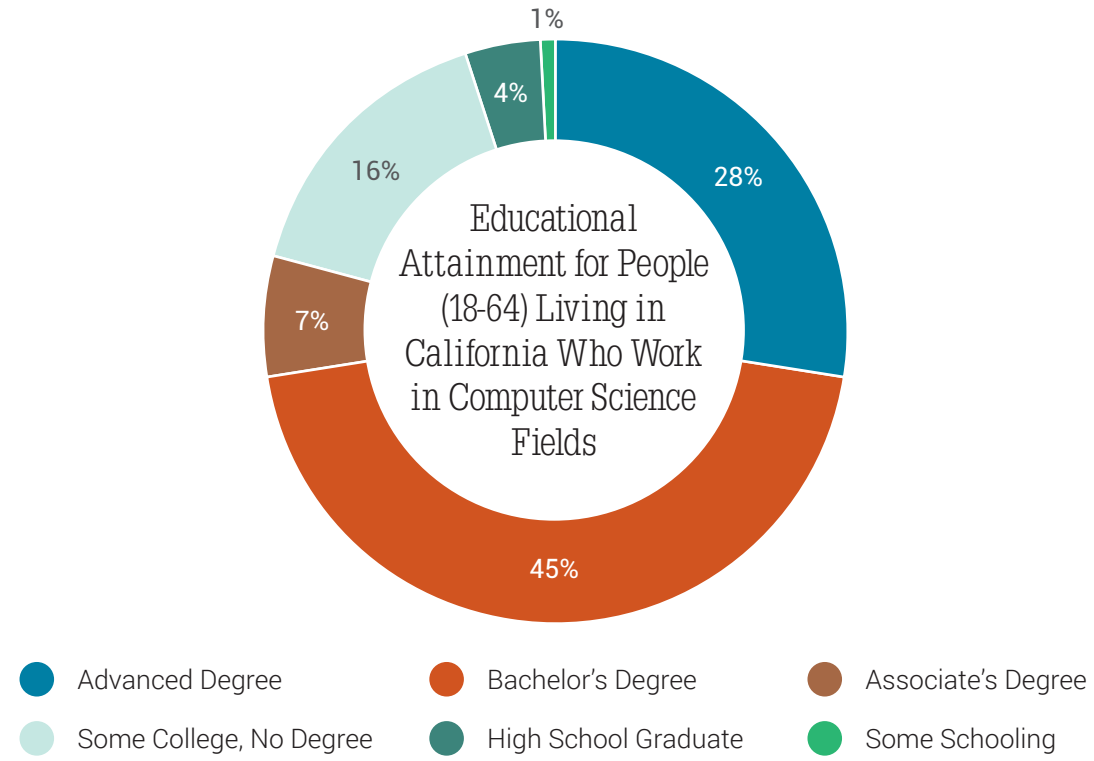
California's current STEM workforce is more highly educated but less diverse than the general population of the state. Although only 33 percent of California adults (aged 25-65) have a bachelor's degree or higher, around 70 percent of engineering and computer science professionals have a bachelor's degree or higher (see figures 4 and 5). And unlike the general population of California, which is incredibly diverse at nearly half Black and Latino, engineering and computer science workers are less than 20 percent Black and Latino (see figure 6). The demand for more STEM graduates and the increasing diversity of younger Californians makes it clear that one of the most effective ways to ensure an adequately prepared workforce is to significantly increase the number of young Californians who enter these fields in college and stay the course through graduation. This means state funding for public higher education should articulate a priority in meeting workforce needs and colleges and universities must be focused and accountable in serving students and closing racial gaps that persist. This is the surest way to keep our state as a national leader.

Figure 4: 70 Percent of Californians Working in Engineering Professions Have Completed a Bachelor's Degree or Higher.



Source: 2014 American Community Survey (PUMS)

Figure 5: 73 Percent of Californians Working in Computer Science Professions Have Completed a Bachelor's Degree or Higher.



Source: 2014 American Community Survey (PUMS)

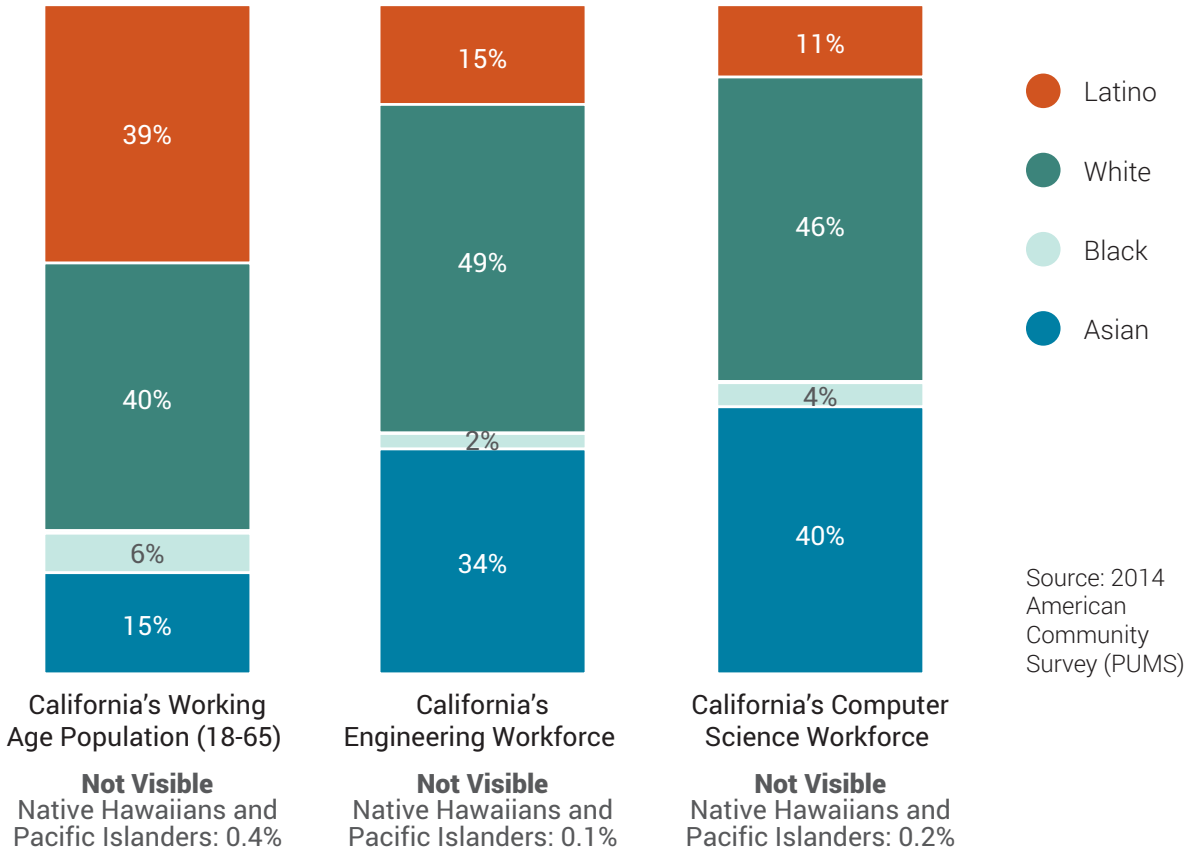
Table 2: Six of the Seven Fastest Growing STEM Occupations in California Require at Least a Bachelor's Degree.

Occupation	Numeric Change in Employment 2012-2022	Percent Change in Employment 2012-2022	Median Annual Salary	Entry Level Education
Software Developers, Applications	28,000	29%	$109,134	Bachelor's Degree
Computer Systems Analysts	17,500	27%	$89,112	Bachelor's Degree
Civil Engineers	7,200	18%	$97,064	Bachelor's Degree
Web Developers	6,800	32%	$72,874	Associate Degree
Computer Hardware Engineers	3,500	14%	$116,317	Bachelor's Degree
Information Security Analysts	3,300	40%	$102,183	Bachelor's Degree
Biomedical Engineers	2,300	43%	$101,708	Bachelor's Degree

Source: California Employment Development Department[30]

Figure 6: Despite Representing Nearly 40 Percent of the Working Age California Population, Latinos Represent Less Than 15 Percent of the Engineering and Computer Science Workforce.

Race/Ethnicity of California's STEM Workforce Aged 18-64



Source: 2014 American Community Survey (PUMS)

"California's colleges and universities are key to keeping the state's workforce competitive and closing the skills gap. This report shines a light on the need to improve student outcomes and increase equity in STEM and health fields to make the promise of opportunity a reality for more students."

SARAH E. BOHN, Ph.D.
RESEARCH FELLOW
PUBLIC POLICY INSTITUTE OF CALIFORNIA

Where Does California Rank For Latino and Black STEM Degree Completion?

Among the ten states with the largest Latino populations, California is producing the most engineering and computer science degrees for Latinos. However, California is producing engineering and computer science degrees at the lowest rate of all of the ten states when the total size of the college-aged Latino population is taken into account (see table 3).

Table 3: State Level Rankings for Engineering and Computer Science Bachelor's Degree Completions Among Latinos.

State	Engineering Degree Completion Rank	Computer Science Degree Completion Rank
Arizona	9	9
Colorado	4	5
Florida	2	2
Georgia	3	3
Illinois	8	6
New Jersey	5	4
New Mexico	1	8
New York	7	1
Texas	6	7
CALIFORNIA	10	10

Note: Data includes public and private not-for-profit institutions. This analysis was conducted for the ten states with the highest concentration of Latinos by total number.[32]
Source: IPEDS and the 2014 American Community Survey (PUMS)

In terms of both total number of bachelor's degrees and the rate of bachelor's degree production within the Black college-aged population, California ranks at or near the bottom of the country for engineering and computer science fields (see table 4).

Table 4: State Level Rankings for Engineering and Computer Science Bachelor's Degree Completions Among Blacks.

State	Engineering Degree Completion Rank	Computer Science Degree Completion Rank
Florida	8	6
Georgia	9	3
Illinois	10	9
Maryland	5	1
New York	6	4
North Carolina	2	2
Ohio	4	7
Texas	3	8
Virginia	1	5
CALIFORNIA	7	10

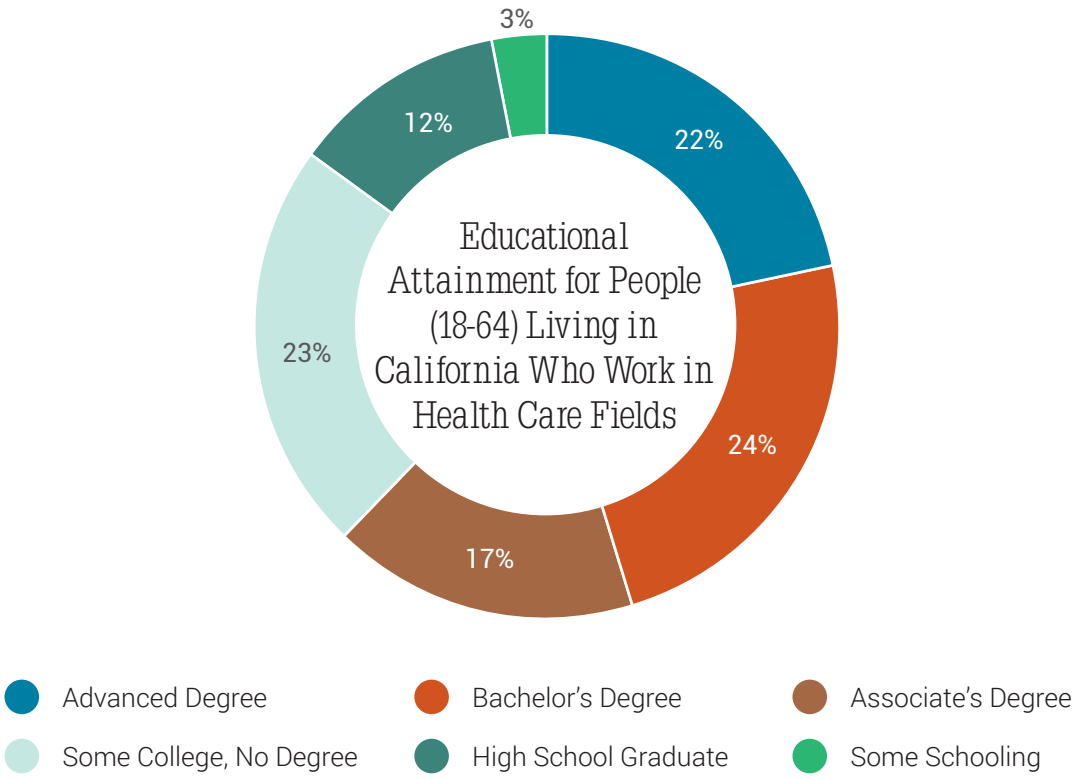
Note: Data includes public and private not-for-profit institutions. This analysis was conducted for the ten states with the highest concentration of Blacks by total number.[31]
Source: IPEDS and the 2014 American Community Survey (PUMS)

California's Health Workforce

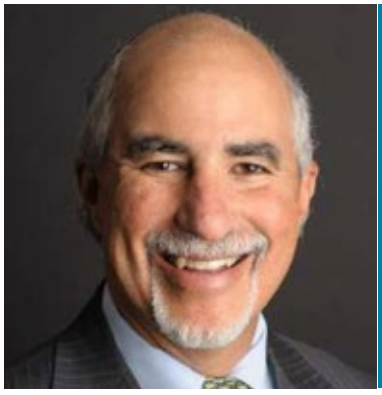
Almost one in ten workers in California is employed in the health care sector.[31] And, nearly 90 percent of those workers have some level of postsecondary education. **Unlike California's STEM workforce, in which a bachelor's degree is needed for most entry level positions, many well paying positions in health require only an associate's degree or some type of certificate (see Figure 7).**

Although the health workforce is more diverse than the STEM workforce, disparities remain. **While Latinos represent nearly 40 percent of California's working-age population and are the largest ethnic group in the state, they represent only 25 percent of California's health workforce (see Figure 8).** The lack of a diverse health workforce creates significant barriers for California's health care sector to serve its diverse population as cultural competency is critical to providing quality care.[103]

Figure 7: 86 Percent of Californians Working in the Health Care Sector Have at Least Some Postsecondary Education.



Source: 2014 American Community Survey (PUMS)

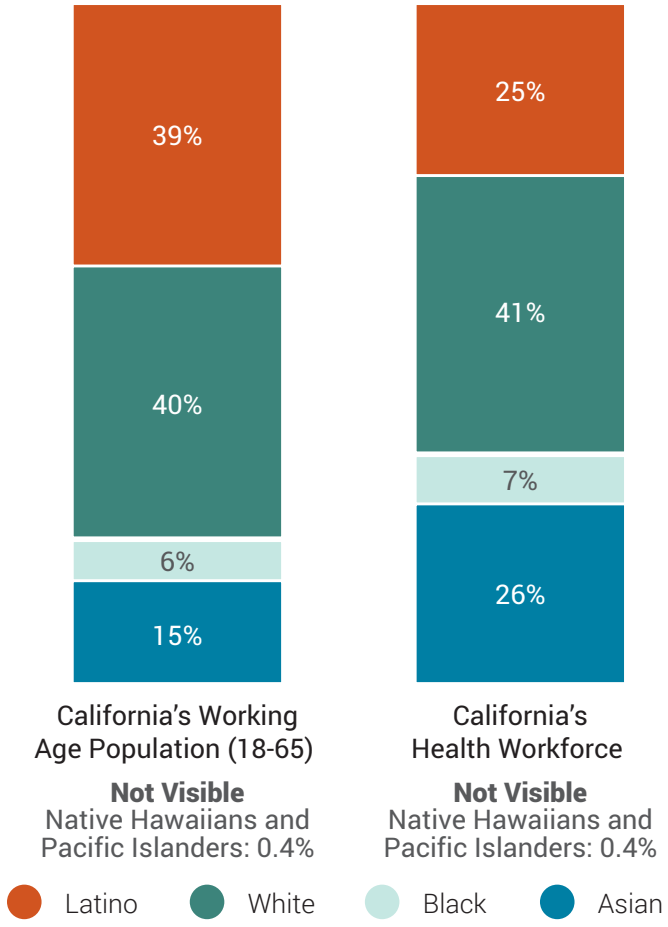


"This report is very timely and lays out practical action steps for us to move forward on now to meet our future health workforce needs."

JEFF OXENDINE, MBA, MPH
ASSOCIATE DEAN, CENTER FOR PUBLIC HEALTH PRACTICE
UNIVERSITY OF CALIFORNIA, BERKELEY

Figure 8: Despite Representing Almost 40 Percent of the State's Working Age Population, Latinos Represent Only 25 Percent of California's Health Workforce.

Race/Ethnicity of California's Health Workforce Aged 18-64



Source: 2014 American Community Survey (PUMS)

Table 5: Many of the Fastest Growing Health Occupations in California Require Less Than a Bachelor's Degree, but Some Postsecondary Training.

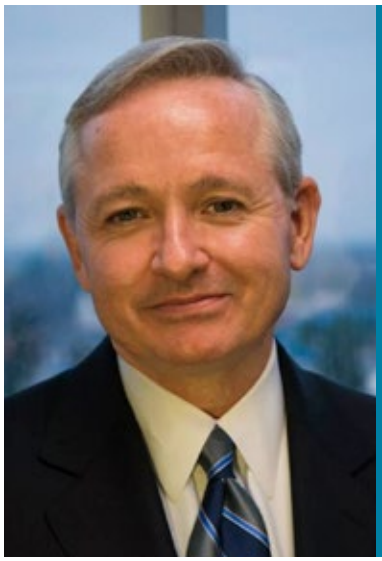
Occupation	Numeric Change in Employment 2012-2022	Percent Change in Employment 2012-2022	Median Annual Salary	Entry Level Education
Registered Nurses	42,900	17%	$95,415	Associate Degree
Nursing Assistants	23,200	24%	$28,462	Postsecondary, No Degree
Licensed Nurse Practitioners and Licensed Vocational Nurses	15,600	26%	$52,225	Postsecondary, No Degree
Dental Hygienists	5,100	23%	$100,312	Associate Degree
Diagnostic Medical Sonographers	2,000	43%	$87,018	Associate Degree
Medical and Health Services Managers	6,200	22%	$112,180	Bachelor's Degree
Health Specialties Teachers, Postsecondary	4,400	37%	$80,573	Doctoral Degree

Source: California Employment Development Department[37]

Figure 9: Job Opportunities for Different Levels of Nursing Education.

DOCTORATE	
Doctor of Nursing Practice (DNP)	Nurse Practitioner Postsecondary Teacher Researcher
MASTER'S	
Master of Science in Nursing (MSN)	Advanced Practice Registered Nurse Nurse Practitioner Specialist (e.g., oncology or pediatrics)
BACHELOR'S	
Bachelor of Science in Nursing (BSN)	Eligible for nealy 9 out of 10 available nursing jobs
ASSOCIATE	
Associate Degree in Nursing (ASN)	Licensed Practical Nurse (LPN) Registered Nurse (RN) Eligible for only 4 out of every 10 available nursing jobs

Source: Nurse Journal: Social Community for Nurses Worldwide[38]



"California needs a bold new vision for public higher education to support the future success of our economy. Health care is one of the fastest growing area of employment in the state and California needs a crash course in more bachelor degrees, especially in the areas of STEM and health professions. We urgently need an action plan that supports those industries driving California's economic growth with the regional talent needed to fill those jobs."

ROB LAPSLEY
PRESIDENT, CALIFORNIA BUSINESS ROUNDTABLE

Nearly 80 Percent of Californians Live in an Area Experiencing a Shortage of Registered Nurses.[39]

A nursing shortage can negatively impact the quality of care received by Californians. Southern California and the Central Valley are among the regions with the highest concentration of Registered Nursing Shortage Areas (RNSA), which are characterized as having higher patient demand than nurse availability.[39] This is particularly troubling as the Central Valley and the Inland Empire are projected to grow at a faster rate than are coastal areas of California. If California is to meet current and future needs for registered nurses, and especially in these heavily populated areas of the state, it must focus on increasing access and preparation for nurses through our public community colleges and universities. These regions are also home to a diverse population, which highlights the importance of ensuring equal opportunity, as well as preparation and success, for students across race, ethnicity and region.

Figure 10: 2013 California Map of Designated Registered Nurse Shortage Areas (RNSA).

Taken from *Workforce Development in Healthcare Part II: An Overview of California*[39]

Where Does California Rank For Latino and Black Health Degree Completion?

Among the ten states with the largest Latino populations, California is only behind Texas in the number of Latino health degree graduates. However, when you take into account the total size of the college-age Latino population, California is performing poorly — producing Latino health degree graduates second to last among these ten states (see table 6).

Table 6: State Level Rankings for Health Bachelor's Degree Completions Among Latinos.

State	Health Degree Completion Rank
Florida	1
New York	2
New Mexico	3
Texas	4
New Jersey	5
Illinois	6
Colorado	7
Georgia	8
CALIFORNIA	9
Arizona	10

Note: Date includes public and private not-for-profit institutions. This analysis was conducted for the ten states with the highest concentration of Latinos by total number.[32]
Source: IPEDS and 2014 American Community Survey (PUMS)

In terms of both total number of bachelor's degrees and the rate of bachelor's degree production within the Black college-aged population, California ranks at the bottom of the country for health fields (see table 7).

Table 7: State Level Rankings for Health Bachelor's Degree Completions Among Blacks.

State	Health Degree Completion Rank
New York	1
Florida	2
Texas	3
Maryland	4
Ohio	5
North Carolina	6
Virginia	7
Illinois	8
Georgia	9
CALIFORNIA	10

Note: Data includes public and private not-for-profit institutions. This analysis was conducted for the ten states with the highest concentration of Blacks by total number.[31]
Source: IPEDS and 2014 American Community Survey (PUMS)

Why Does California Have a STEM and Health Degree Completion Problem?

By almost every measure, California ranks in the bottom of the country for producing bachelor's degrees in STEM and health fields among the college-aged population, including 48th in health related fields, 38th in computer science, and 37th in engineering. Considering that California has the largest public four-year university system in the country[47] (the CSU), the premier public research university system in the country (the UC), and the largest community college system in the country (the California Community Colleges),[48] the natural question then becomes: Why is California performing so poorly relative to other states? Seven factors emerge as primary contributors to California's low completion rates in STEM and health:

1) limited enrollment capacity of the four-year public university system,

2) insufficient state funding for enrollment growth,

3) a community college transfer process that needs strengthening,

4) low bachelor's degree completion rates in the CSU system,

5) low rates of associate degree production in the community college system,

6) limited availability of health degree programs in our public colleges and universities, and

7) racial inequities in access and success in STEM and health education.

California's Four-Year Sector is Too Small to Serve the College-Aged Population

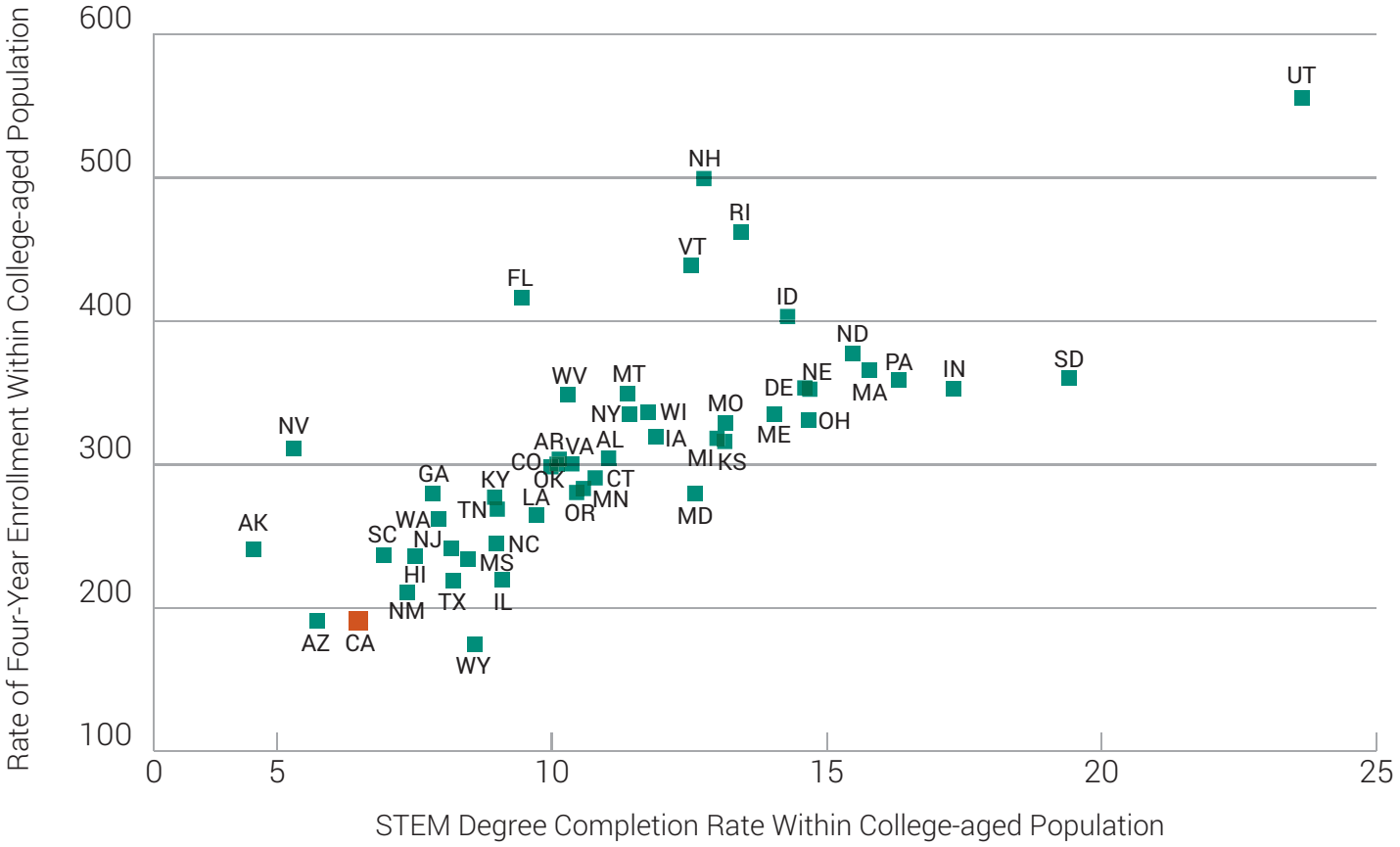
An unavoidable reason why California ranks at the bottom of the nation for bachelor's degree completion is the small size of the four-year public higher education system relative to the size of the state's college-aged population.[49] According to California's 1960 Master Plan for Higher Education, the UC draws its applicant pool from the top 12.5 percent of the public high school graduating class and the CSU draws its applicant pool from the top 33.3 percent of the public high school graduating class. As such, all students who do not fall in the top 33.3 percent of high school graduates are directed to the California Community Colleges--which has resulted in 70 percent of all undergraduate students in California attending a community college (see our 2015 report, *Access Denied* for additional details).[50] In terms of the total number of students, the nearly 1.6 million undergraduate students enrolled at California Community Colleges in the fall of 2015 dwarfs the approximately 418,000 and 199,000 undergraduate students enrolled during the same semester at the CSU and UC, respectively.[47, 48, 49, 50]

The overwhelming majority of undergraduate students attending a community college creates a predicament for the state of California: Although California is creating access to higher education for hundreds of thousands of new students each year through its community college system, evidence suggests that states that send more students directly to four-year institutions have better bachelor's degree completion rates.[49] In fact, we find that the rate at which a state enrolls its college-aged population in four-year universities is strongly correlated with the rate of STEM/health bachelor's degree completion within a state's college-aged population.[54] As shown in figure 11, California is one of the worst performing states on this metric. Too few Californians are enrolled in a four-year university, and this makes California less competitive when compared with other states in terms of producing the STEM and health graduates California needs to meet current and future economic needs. **Therefore, by design, the Master Plan is funneling students into community colleges and leaving California behind other states in bachelor's degree production in general and in particular for STEM and health degrees.**

Decreased State Funding for Higher Education Leads to a More Competitive Admissions Environment For Students

In addition to California's four-year sector being too small, the state of California has not kept its commitment to its public higher education sector by providing adequate funding. Since 2007-08, state appropriations are down 26 percent and 25 percent respectively for the UC and CSU systems.[50] However, the effects of decreased support for higher education are most visible in the California Community College system. If state appropriations for the California Community Colleges had stayed at 2008-09 levels through the 2011-12 fiscal year, California would have served 600,000 additional community college students during that timeframe.[50] Decreased funding for enrollment growth means fewer students enrolled in STEM and health fields at a time when they are critical for the future success of the California economy.

Figure 11: States that Enroll More Students in Four-Year Universities Tend to Have Higher Bachelor's Degree Completions in STEM and Health Fields.



Sources: 2013-14 IPEDS enrollment and completions data and the 2014 American Community Survey (PUMS)

In the UC and CSU systems, a direct product and consequence of the insufficient state funding has been increased admissions standards. For the UC system, the leading producer of STEM degrees in the state, heightened admissions standards have translated to a 25 percent drop in admit rates for California resident freshmen, the lowest since 1994.[56,57,102] Although all racial groups experienced dramatic decreases in freshmen admit rates over this time period, Latino and Black students were hit especially hard since those populations already had significantly lower admit rates than White students.[57] Given that Latino and Black students, who make up more than half of California's youth population, are currently underrepresented in STEM majors in the UC system, additional barriers to gaining admission will only exacerbate California's challenges in meeting its future workforce needs.[102]

For the CSU system, the state funding challenges have contributed to almost 140,000 eligible undergraduate students being denied admission to the CSU system between the fall of 2009 and fall of 2014.[56] **Not only has insufficient funding played a significant role in the decision of six CSU campuses to increase admissions standards for all students, but a total of 11 of the 23 CSU campuses have STEM programs that are more selective, meaning students must meet higher admissions standards .e., higher high school GPA and higher SAT/ACT scores) than students not applying to those majors.**[56]

Beyond the problem of accessing the CSU system more generally, a particularly challenging CSU campus to access is California Polytechnic State University-San Luis Obispo (Cal Poly-SLO), one of the specialized institutions for STEM degrees

in the CSU system. Cal Poly-SLO prides itself on preparing its students for today's scientific and technical world,[61, 68] and is ranked in the top 20 nationally for undergraduate engineering enrollment and degrees awarded.[62] Although Cal Poly-SLO enrolls almost 21,000 undergraduate students, it is one of the most difficult CSU campuses to get into and among the least diverse among the 23 CSU campuses.[63] The campus has highly competitive admissions, as evidenced by their acceptance rate of 28 percent (well below the 51 percent systemwide average)[64, 65] and an average high school GPA for admitted freshmen of almost 3.9 (well above the average of any other CSU campus).[64]

And when it comes to diversity at Cal Poly-SLO, Black students do not even make up one percent of the California resident students enrolled and Latino students make up only 17 percent, despite representing nearly 6 percent and 39 percent of California's working-age population, respectively.[67] **Although Black and Latino underrepresentation at Cal Poly-SLO is just one example, it is emblematic of the Black and Latino underrepresentation in STEM that is pervasive across the entire system.**[65] For a leading state and national university in undergraduate STEM education, it is important that diversity remain a top priority for Cal Poly-SLO, and all other state universities, if California is to produce the diverse STEM workforce that the state's economy so desperately needs.

Strengthening Transfer

The Master Plan was explicit that the transfer pathway from a community college to a four-year university is an essential component of ensuring access to a bachelor's degree for Californians.[70] Unfortunately, many efforts to reform transfer pathways over the years have not been successful and today, only four percent of all community college students transfer to a four-year university annually.[71]

One key way California could improve bachelor's degree completion rates is to provide a stronger pathway for community college students seeking to transfer to a four-year university. Fortunately, in 2010, the Campaign led legislative efforts to pass SB 1440 (Padilla) which created an Associate Degree for Transfer—a seamless 120-unit transfer pathway for community college students seeking to enroll in the California State University.

Today, over 38,000 community college students have obtained an Associate Degree for Transfer and over 6,000 of them have enrolled in the CSU system on the Associate Degree for Transfer pathway. However, of all the Associate Degrees for Transfer awarded in 2013-14, only five percent were in STEM disciplines.[69] Furthermore, of the 32 majors available through the Associate Degree for Transfer program, only 11 are in STEM disciplines—none of which are in engineering or nursing.[69, 71] If STEM and health bachelor's degree production is a priority to the state of California, it is important that more attention is placed on improving access to and success in transferring from the community college to the CSU in STEM and health majors.

Lack of Health Degree Programs for Undergraduates

While estimates vary regarding how many registered nurses California will be short by 2025, most agree that California will need more registered nurses to meet the demands of our economy in general and to serve our growing senior population.[74] And, among the new community college bachelor's degree programs approved in January of 2015, none of the degrees offered are in the field of nursing.[72]

A major factor that may hinder California's efforts to fulfill future job demands in nursing is the lack of undergraduate nursing education programs within the UC system. In fact, only eight percent of all health-related bachelor's degrees are produced in the UC system, which translated to only about 900 graduates in health-related fields last year. **Only two UC campuses offer a bachelor's degree in nursing: UCLA and UC Irvine—both of which are located in the Los Angeles metropolitan area.**[75]

Complicating the nursing landscape in California is the fact that the majority of four-year nursing programs in the CSU system are extremely difficult for undergraduate students to access. Whereas only two of the nine undergraduate UC campuses have undergraduate nursing programs, 20 of the 23 CSU campuses offer nursing majors. **However, due to the financial challenges facing the CSU system, 17 of the 20 nursing programs[77] will only accept a limited number of CSU eligible applicants and will require higher admissions standards (i.e., a higher GPA and or higher SAT/ACT) for both the freshman and upper-division transfer applicants for the 2016-17 academic year.** Heightened admissions standards and the lack of nursing programs within the UC

hinders California's ability to meet our workforce demands as 70 percent of hospitals prefer to hire registered nurses with a bachelor's degree as opposed to those with an associate's degree.[74]

Within the California Community Colleges, nursing programs are experiencing capacity issues that are producing waitlists for students lasting up to six years.[79] Three of the leading causes for the long waitlists include, 1) lack of qualified faculty, 2) lack of clinical placements for students, and 3) the high cost of maintaining/expanding health programs.

Not only is it difficult for community colleges to hire nursing faculty when they can earn a significantly higher salary working in the field, but there is also a shortage of qualified master's prepared nurses to teach in nursing programs.[78] Additionally, community college nursing students must compete for a limited number of clinical placements with nursing students in four-year programs.[79, 81] And finally, the state often funds enrollment growth based on average per student costs; however, health programs are often significantly more expensive to operate than fields in the humanities, for example, so this funding structure forces institutions to take funding away from other programs if they want to increase funding for health programs.[81] These limitations work contrary to the need to produce more qualified health professionals.

Low STEM Bachelor's Degree Completion Rates in the CSU

Within California's largest public university system, the CSU, relatively few students who start in a STEM major remain and graduate in a STEM major. Only one of every three CSU students who started in a STEM major in 2008 graduated with a STEM degree within six years compared to 54 percent for students in all majors (see table 8). The rates are worse for Latino and Black students, with only two of ten Latino students and only one of ten Black students completing a STEM degree within six years. **These alarmingly low completion rates are partially responsible for the fact that the CSU system is producing approximately the same amount of STEM/health bachelor's degrees as the UC system that is half the size.**

Table 8: Only One in Every Three CSU Students Who Begin as a STEM Major Remain In a STEM Major and Graduate Within Six-Years.

Demographic group	Freshmen cohort size	Still enrolled in a STEM major after two years	Four-year STEM degree completion rate	Six-year STEM degree completion rate	Six-year degree completion rate for all majors
All	11,611	56%	8%	33%	54%
White	4,190	60%	12%	43%	62%
Black	606	42%	1%	13%	37%
Latino	3,076	51%	3%	23%	48%
Asian or Pacific Islander	2,444	60%	6%	34%	56%

Fall 2008 cohort STEM graduation rates Source: CSU Analytics Studies[84]

A major factor contributing to low STEM degree graduation rates in the CSU system is the heightened math requirements for STEM majors. For example, CSU Northridge requires high school students seeking admission to engineering programs to take or test out of entry level Mathematics Chemistry, and English classes in order to register for basic courses in the major.[85] An additional barrier prospective STEM students face is the required calculus course sequence for many STEM fields. Evidence from CSU Northridge's math department suggests that completing calculus in the first year is critical to the future success of STEM students, as over 80 percent of entering freshmen who began as a STEM major and took calculus in their first year completed a STEM degree.[86] Simply enrolling in calculus is not enough—a student must be able to pass it in order to progress in their STEM course sequence. Cal State Fullerton reports that over 30 percent of students who take Introduction to Calculus finish with a repeatable grade (i.e., C- through F or withdraw).[87] Therefore, math preparation at the high school and lower-division level are essential to the success of CSU students in STEM fields.

The Role of Associate Degrees in California's STEM/Health Degree Production

Since a little more than 10 percent of STEM jobs and about one in every four health jobs in California require an associate degree, community colleges play an important role in preparing a significant portion of the STEM and health workforce.[91] In STEM and health fields, the California Community College system is responsible for producing 44 percent of all health-related degrees, 38 percent of computer science degrees, and 16 percent of all engineering degrees in the state.[90] It is important to understand, however, that associate degrees represent only one aspect of postsecondary training at the community college level, particularly in health fields. In California, about 40 percent of all health related jobs expected to be filled within the next decade will require some college (e.g., a certificate) but no degree.[89]

Similar to the challenges facing four-year universities in California, community colleges are falling short in terms of the number of degrees produced relative to both the size of the college-aged population and the demand for educated workers in these fields. For health, engineering, and computer sciences, California is ranked at the bottom for associate degree completion rates across the country. One of the factors that may be contributing to California's low STEM completion rates within the California Community Colleges may be remediation. Fewer than 40 percent of students that are placed into a remedial math class complete a college level math class within six years.[92] Furthermore, if only 21 percent of all degrees offered in the California Community College system are in STEM fields, and less than half of those students are completing a degree within six years, the potential for community colleges to better contribute to the STEM and health workforce is limited.

Table 9: California's Ranking For STEM and Health Associate Degree Completion Rates Per 1000 in the 18-24 Year-Old Population.

Major	Where California Ranks 2013-14
Computer and Information Sciences	47th
Engineering	49th
Health	49th

Sources: 2013-14 IPEDS Completions Data and the 2014 American Community Survey (PUMS)

Race Matters to the Future of the STEM and Health Workforce

California's higher education system is not producing enough college graduates to meet STEM and health workforce needs in general, but the situation is worse for Latino students. Despite having three UC campuses among the top 25 in the nation for Latino STEM bachelor's degree completions,[93] as a state, California ranks poorly for Latino STEM and health degree completions (see tables 3 and 6). The low rate of Latino bachelor's degree production in California is particularly problematic, as national evidence suggests that a higher overall rate of STEM and health bachelor's degree production in a state is tightly linked to Latino STEM and health bachelor's degree production.[94]

On a positive note, in the CSU system, Latinos are represented in both health and engineering fields at rates near their representation within the larger CSU undergraduate student population (see table 10). However, while Latinos are doing better in terms of enrollment in key STEM majors, retention and completion rates remain a problem in the CSU. **Within the CSU system, only about half of all Latino freshmen who begin their college careers as a student in a STEM discipline continue on in a STEM discipline two years after entering the CSU.** Additionally, only 23 percent of Latino freshmen who start as STEM majors earn a bachelor's degree in a STEM major within six years.[95]

Table 10: Fall 2015 CSU Systemwide Undergraduate Enrollment for Latinos by Major.

Discipline	Number of Latino Students	Percent Latino	Percent of All Resident Undergraduates
Health Profession	8,192	**37%**	40%
Engineering	11,669	**34%**	40%

Source: CSU Analytics Studies[96]

"The mismatch between the growing availability of jobs and the educated workers to fill those jobs in the STEM and health professions is symptomatic of a larger problem in California. Our public higher education system is not set up to produce the college educated workers our 21st century economy demands. With the right leadership we can rethink the design of our public colleges and universities to more closely align with workforce needs and close racial gaps so we can all reap the benefits of a more highly educated citizenry."

MICHELE SIQUEIROS
PRESIDENT, THE CAMPAIGN FOR COLLEGE OPPORTUNITY

STEM and Health in California's Higher Education System

California Higher Education

Ninety-four percent of all undergraduates enrolled in a higher education institution in California are enrolled in a public institution.[46] California will not be able to meet STEM and health workforce demands unless it invests in college access and success for STEM and health students within the state's public colleges and universities.

California's community colleges play a vital role in producing the STEM and health graduates needed for California's workforce. In fact, California's Community Colleges produce more degrees in health and computer and information sciences than does the UC, the CSU, or the private not-for-profit sector. California's public research university system, the UC, produces more engineering degrees than does the CSU, California Community Colleges, or the private not-for-profit sector. Lastly, California's largest university system, the CSU, produces more bachelor's degrees in health fields than does the UC system or the private not-for-profit sector.

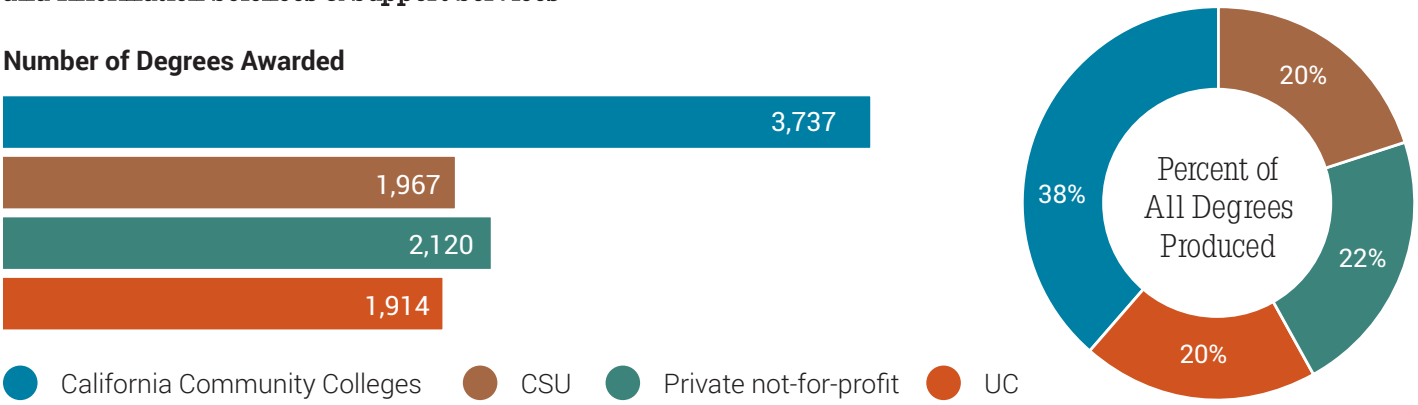
Table 11: Almost 40 Percent of all Certificates Awarded by the California Community Colleges During the 2013-14 Academic Year Were in STEM and Health Fields.

Award Type	Percent STEM/Health
All Degrees/Certificates	21%
Associate Degrees	19%
Associate Degrees for Transfer	9%
Certificates	39%

Data reflects the percentage of degrees awarded at the California Community Colleges that were in STEM and health fields, 2013-14 Academic Year.
Source: California Community Colleges Chancellor's Office[43]

Figure 12: California's Community Colleges Award Almost 40 Percent of All Computer and Information Sciences Degrees in the State.

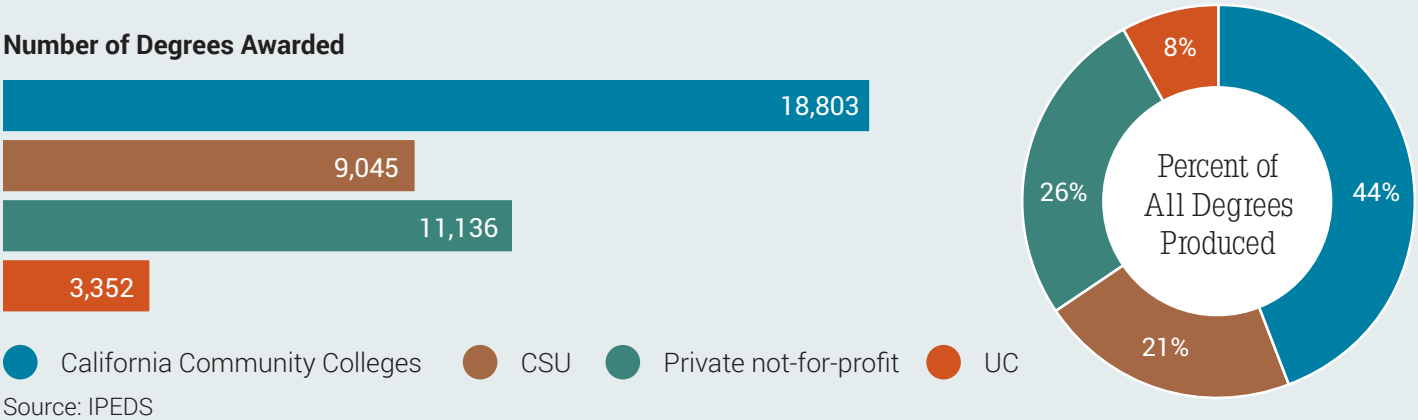
2013-14 Total Undergraduate and Graduate Degree Completion in California by Higher Education Sector—**Computer and Information Sciences & Support Services**



Source: IPEDS

Figure 13: California Community Colleges Produce Over 40 Percent of all Degrees in Health Related Professions.

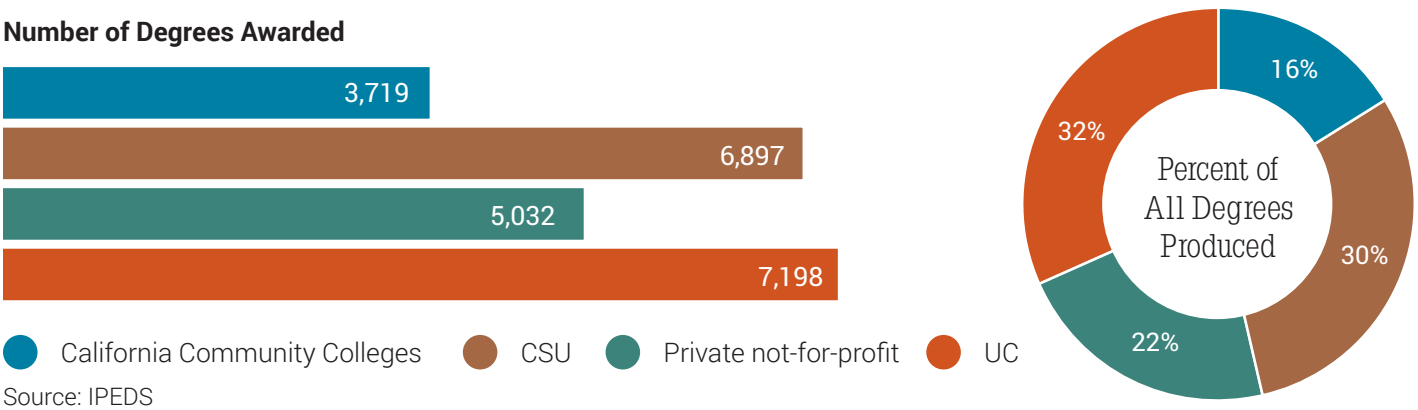
2013-14 Total Undergraduate and Graduate Degree Completion in California by Higher Education Sector—**Health Professions and Related Programs**



Source: IPEDS

Figure 14: The UC is the Top Producer of Engineering Degrees in the State.

2013-14 Total Undergraduate and Graduate Degree Completion in California by Higher Education Sector[38]—**Engineering**



Source: IPEDS

Figure 15: The CSU Awards 41 Percent of All Computer Science and Information Sciences Bachelor's Degrees in the State.

2013-14 Bachelor's Degree Completion in California by Higher Education Sector—**Computer and Information Sciences & Support Services**

Figure 16: The CSU Awards Over 60 Percent of All Health Profession Related Bachelor's Degrees.

2013-14 Bachelor's Degree Completion in California by Higher Education Sector—**Health Professions and Related Programs**

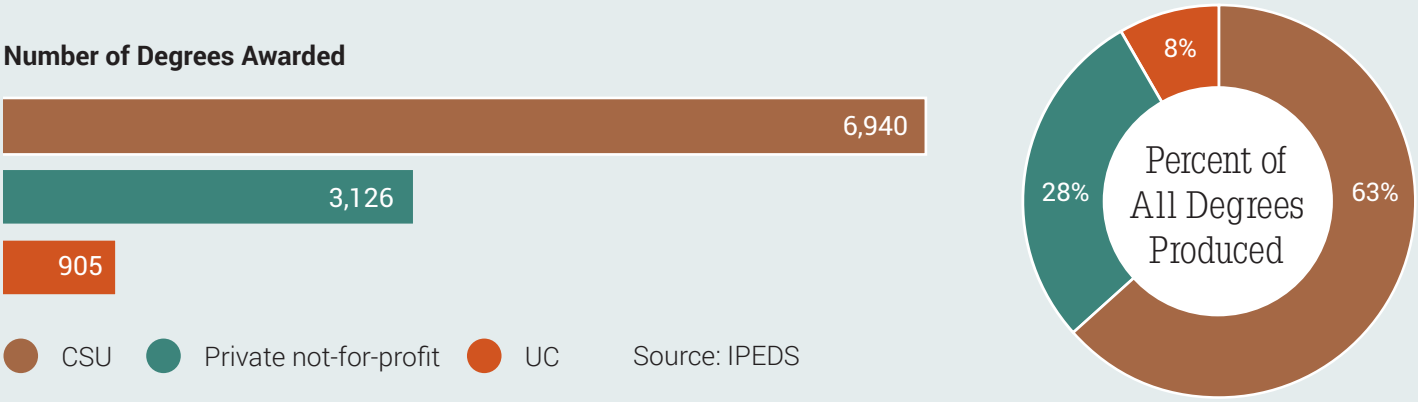
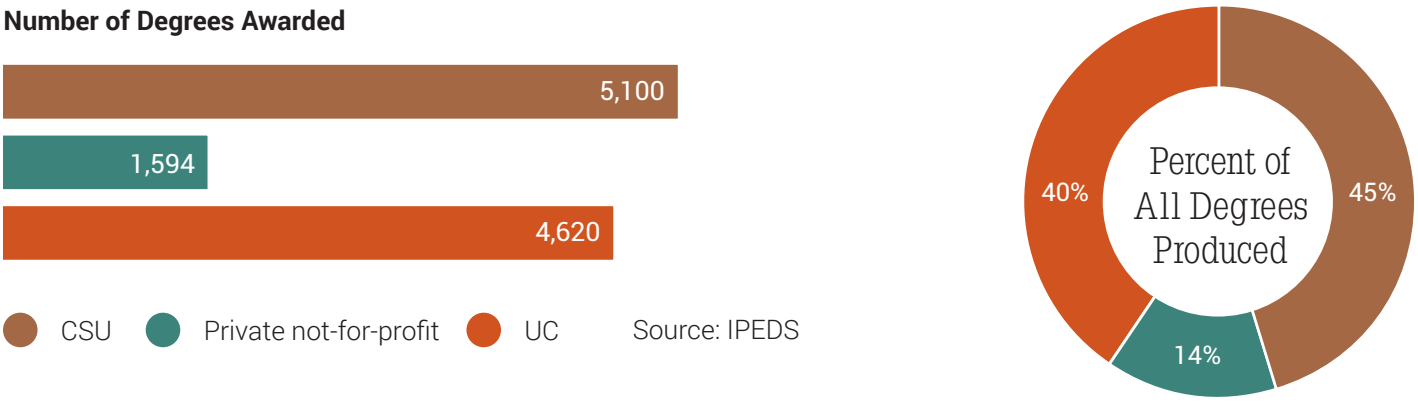


Figure 17: Despite Having Nearly Twice the Total Enrollment of the UC, the CSU and the UC are Similar in Terms of Engineering Bachelor's Degree Production.

2013-14 Bachelor's Degree Completion in California by Higher Education Sector—**Engineering**



Conclusion & Recommendations

Conclusion

California is at a crossroads in terms of STEM and health workforce development. On the one hand, California has more available entry-level STEM jobs than any other state in the country and a steadily growing health workforce, giving large segments of its population access to stable careers.[97, 98] On the other hand, California's public colleges and universities rank poorly compared to other states in terms of producing the college graduates needed to fill many of those jobs.

Several reasons contribute to California's poor performance in producing STEM and health graduates, including: 1) California sends too few of its high school graduates directly to four-year universities, 2) state funding for higher education is not sufficient to properly maintain and expand STEM and health programs, 3) transfer pathways for community colleges students seeking to major in STEM and health fields are limited, 4) STEM completion rates within the CSU system are relatively low, 5) STEM and health associate degree production within the California Community Colleges is also relatively low, 6) the availability of STEM and health programs within the public higher education system is extremely limited, and 7) racial disparities persist in access to and success in STEM and health programs.

The good news is that California is a leader in technological innovation, and has a large and diverse young population that is poised to be the next generation of STEM and health workers needed to meet the state's future economic needs. Given the challenges highlighted in this report, it is up to industry leaders, advocates, and policymakers to develop a plan to ensure that California is doing what is needed to produce the college graduates needed to maintain its status as a national leader.

Recommendations

1. Create a statewide plan for higher education

California needs a bold vision for higher education that sets tangible goals for access and success in the state's public colleges and universities. In formulating the statewide plan for higher education, leaders of California's public higher education system, policymakers, and industry leaders should work together to develop goals that will ensure that California will produce enough graduates with the skillsets needed to be successful in the STEM and health workforce.

2. Increase enrollment capacity within California's public universities

California's inability to enroll more of its high school graduates directly into four-year universities is directly related to its low STEM and health bachelor's degree rates. Policymakers in California should revise the Master Plan's enrollment targets for the public university system so that California enrolls a greater proportion of its high school graduates directly into four-year universities. Beyond general enrollment capacity issues that need to be addressed, health capacity should be expanded in the following ways:

- the UC and CSU systems should increase undergraduate enrollment capacity within nursing programs, and
- the UC system should expand enrollment of students pursuing advanced degrees in nursing in order to improve both the practical need for nurse practitioners and the academic need for more nursing instructors.

3. Invest in California's public higher education system

California will not be able to meet its future STEM and health workforce demands unless the state fully funds public higher education to serve all eligible students. In addition to general enrollment funding, efforts should be made to,

- provide California's public colleges and universities with additional funds needed to maintain and expand enrollment in costly STEM and health degree programs, and
- increase pay for health instructors in key fields such as nursing so that nurse practitioners can afford to consider a career in teaching.

4. Prioritize the development of STEM and health transfer pathways

Considering the vast majority (70 percent) of California's undergraduates are currently enrolled within the California Community Colleges and only four percent of all community college students transfer to a four-year university each year, it is imperative that community colleges improve transfer rates if California is to improve the percentage of its population with a bachelor's degree.

California's public higher education system and faculty leaders should prioritize the development and promotion of Associate Degree for Transfer pathways in STEM and health fields for community college students seeking to transfer to the CSU system. The UC should also create and align STEM and health transfer pathways with the Associate Degree for Transfer curriculum.

5. Improve college readiness and college completion in STEM for CSU students

Addressing high school math preparation/college readiness problems is key for California to be able to meet STEM workforce demands. Early success in calculus is a key factor to STEM degree completion. Therefore, the CSU system should

- improve outreach efforts with high school students to increase the likelihood that students take additional math classes in high school to better prepare themselves for college level math once they enter the CSU,
- offer or scale up summer bridge math programs so that students will be more prepared to pass math placement tests with a score high enough to enroll in calculus level math during their freshmen year at CSU, and
- use evidence-based interventions to improve passage rates in gateway courses to STEM disciplines (e.g., calculus).

6. Close equity gaps in STEM and health education

Despite having one of the largest Latino and Black populations in the country, California ranks poorly in producing STEM and health degrees for these populations. To counter this trend, California should

- improve outreach efforts to Black and Latino students to encourage them to pursue STEM and health majors, and
- set goals for closing gaps between Whites, and Blacks and Latinos in enrollment and completion within STEM and health majors.

Appendix A

CALIFORNIA'S STEM WORKFORCE

Below is the listing of the occupations included in this report for the engineering and computer science professions, drawn from the 2014 American Community Survey (PUMS) maintained by the U.S. Census Bureau.

ENGINEERING PROFESSIONS	COMPUTER SCIENCE PROFESSIONS
Architects, Except Naval	Computer And Information Research Scientists
Surveyors, Cartographers, and Photogrammetrists	Computer Systems Analysts
Aerospace Engineers	Information Security Analysts
Biomedical and Agricultural Engineers	Computer Programmers
Chemical Engineers	Software Developers, Applications and Systems Software
Civil Engineers	Web Developers
Computer Hardware Engineers	Computer Support Specialists
Electrical And Electronics Engineers	Database Administrators
Environmental Engineers	Network and Computer Systems Administrators
Industrial Engineers, Including Health And Safety	Computer Network Architects
Marine Engineers And Naval Architects	Computer Occupations, All Other
Materials Engineers	Actuaries
Mechanical Engineers	Operations Research Analysts
Petroleum, Mining And Geological Engineers, Including Mining Safety Engineers	Miscellaneous Mathematical Science Occupations, Including Mathematicians and Statisticians
Miscellaneous Engineers, Including Nuclear Engineers	
Drafters	
Engineering Technicians, Except Drafters	
Surveying And Mapping Technicians	

Source: 2014 American Community Survey Data Dictionary[23]

CALIFORNIA'S HEALTH WORKFORCE

Below is the listing of the occupations included in this report for the health professions, drawn from the 2014 American Community Survey (PUMS) maintained by the U.S. Census Bureau.

HEALTH PROFESSIONS	
Chiropractors	Diagnostic Related Technologists and Technicians
Dentists	Emergency Medical Technicians And Paramedics
Dietitians and Nutritionists	Health Practitioner Support Technologists and Technicians
Optometrists	Licensed Practical And Licensed Vocational Nurses
Pharmacists	Medical Records and Health Information Technicians
Physicians and Surgeons	Opticians, Dispensing
Physician Assistants	Miscellaneous Health Technologists and Technicians
Podiatrists	Other Healthcare Practitioners and Technical Occupations
Audiologists	Nursing, Psychiatric, and Home Health Aides
Occupational Therapists	Occupational Therapy Assistants and Aides
Physical Therapists	Physical Therapist Assistants and Aides
Radiation Therapists	Massage Therapists
Recreational Therapists	Dental Assistants
Respiratory Therapists	Medical Assistants
Speech Language Pathologists	Medical Transcriptionists
Other Therapists, Including Exercise Physiologists	Pharmacy Aides
Veterinarians	Veterinary Assistants and Laboratory Animal Caretakers
Registered Nurses	Phlebotomists
Nurse Anesthetists	Healthcare Support Workers, All Other, Including Medical Equipment Preparers
Nurse Practitioners, and Nurse Midwives	
Health Diagnosing And Treating Practitioners	
Clinical Laboratory Technologists and Technicians	
Dental Hygienists	

Source for Health Occupations: 2014 American Community Survey Data Dictionary[33]

Appendix C

Population Estimates for 18-24 year olds

State	Population
AK	83,517
AL	484,043
AR	289,603
AZ	672,184
CA	4,001,038
CO	521,584
CT	345,595
DE	92,547
FL	1,799,397
GA	1,031,068
HI	137,965
IA	319,386
ID	158,347
IL	1,259,911
IN	670,475
KS	298,963
KY	430,903
LA	471,968
MA	705,370
MD	563,128
ME	113,425
MI	1,002,294
MN	498,300
MO	594,628
MS	313,683
MT	105,060
NC	988,239
ND	94,779
NE	188,028
NH	128,973
NJ	798,211
NM	217,205
NV	258,810
NY	1,981,244
OH	1,102,144
OK	392,066
OR	362,958
PA	1,223,456
RI	118,012
SC	490,773
SD	88,122
TN	634,171
TX	2,748,818
UT	329,466
VA	836,841
VT	65,879
WA	673,614
WI	564,633
WV	171,683
WY	57,039

Source: 2014 American Community Survey (PUMS)

Appendix D

Health and Related Professions Bachelor's Degree Completion Rates Per 1000 in 18-24 year-old Population[96]

Rank	State	Population	Total Degrees	Rate per 1000
1	UT	329466	4837	14.68133
2	SD	88122	1094	12.41461
3	IN	670475	6510	9.709535
4	ME	113425	1055	9.3013
5	OH	1102144	10190	9.245616
6	NE	188028	1736	9.232668
7	ND	94779	853	8.999884
8	ID	158347	1391	8.784505
9	PA	1223456	10724	8.765333
10	DE	92547	769	8.309292
11	MO	594628	4836	8.132815
12	MA	705370	5616	7.961779
13	KS	298963	2349	7.85716
14	RI	118012	827	7.007762
15	AR	289603	1988	6.86457
16	CT	345595	2355	6.814335
17	MI	1002294	6729	6.713599
18	VT	65879	418	6.344966
19	AL	484043	2986	6.168873
20	NH	128973	792	6.14082
21	MN	498300	2990	6.000401
22	WI	564633	3342	5.918889
23	NY	1981244	11680	5.895286
24	OR	362958	2136	5.884978
25	FL	1799397	10318	5.734143
26	LA	471968	2686	5.691064
27	KY	430903	2376	5.514002
28	TN	634171	3486	5.49694
29	WV	171683	938	5.463558
30	MS	313683	1701	5.422672
31	IA	319386	1729	5.413512
32	OK	392066	2040	5.203206
33	HI	137965	696	5.044758
34	VA	836841	4157	4.967491
35	IL	1259911	6196	4.917808
36	NC	988239	4712	4.768077
37	MD	563128	2676	4.752028
38	MT	105060	490	4.664001
39	TX	2748818	12777	4.64818
40	WY	57039	262	4.593349
41	NJ	798211	3320	4.159301
42	CO	521584	2018	3.868984
43	GA	1031068	3771	3.657373
44	SC	490773	1771	3.608593
45	NM	217205	764	3.517414
46	WA	673614	2310	3.429264
47	NV	258810	828	3.199258
48	CA	4001038	10971	2.742038
49	AZ	672184	1654	2.460636
50	AK	83517	171	2.047487

Source: 2014 American Community Survey (PUMS) and IPEDS

Appendix E

Computer Science Bachelor's Degree Completion Rates Per 1000 in 18-24 year-old Population[97]

Rank	State	Population	Total Degrees	Rate per 1000
1	UT	329,466	1,797	5.45428
2	MD	563,128	2,461	4.370232
3	NE	188,028	518	2.754909
4	RI	118,012	322	2.728536
5	VT	65,879	176	2.671565
6	NH	128,973	323	2.5044
7	MA	705,370	1,757	2.490891
8	PA	1,223,456	2,974	2.430819
9	IN	670,475	1,285	1.916552
10	SD	88,122	165	1.872404
11	NY	1,981,244	3,707	1.871047
12	ID	158,347	281	1.774584
13	VA	836,841	1,475	1.762581
14	WI	564,633	983	1.740954
15	DE	92,547	158	1.707241
16	MN	498,300	840	1.685732
17	MI	1,002,294	1,652	1.648219
18	WA	673,614	1,053	1.56321
19	MO	594,628	881	1.481599
20	GA	1,031,068	1,520	1.4742
21	NC	988,239	1,322	1.337733
22	IA	319,386	423	1.324416
23	CO	521,584	680	1.303721
24	ND	94,779	122	1.287205
25	IL	1,259,911	1,514	1.201672
26	FL	1,799,397	2,150	1.194845
27	HI	137,965	157	1.13797
28	NJ	798,211	892	1.117499
29	OH	1,102,144	1,212	1.099675
30	OR	362,958	394	1.085525
31	OK	392,066	411	1.048293
32	MT	105,060	105	0.9994289
33	KS	298,963	294	0.9833993
34	AR	289,603	282	0.9737468
35	AL	484,043	466	0.9627244
36	SC	490,773	459	0.9352593
37	KY	430,903	392	0.9097175
38	CA	4,001,038	3,616	0.9037655
39	ME	113,425	99	0.8728235
40	TN	634,171	535	0.843621
41	CT	345,595	286	0.8275583
42	TX	2,748,818	2,199	0.7999802
43	AZ	672,184	493	0.7334301
44	WV	171,683	123	0.7164367
45	LA	471,968	324	0.6864872
46	NM	217,205	121	0.5570774
47	MS	313,683	155	0.4941294
48	NV	258,810	127	0.4907075
49	WY	57,039	18	0.3155735
50	AK	83,517	18	0.215525

Source: 2014 American Community Survey (PUMS) and IPEDS

Appendix F

Engineering Bachelor's Degree Completion Rates Per 1000 in 18-24 year-old Population[98]

Rank	State	Population	Total Degrees	Rate per 1000
1	MT	105,060	600	5.711022
2	IN	670,475	3,808	5.679555
3	MA	705,370	3,751	5.317777
4	ND	94,779	492	5.191023
5	IA	319,386	1,643	5.144246
6	SD	88,122	451	5.117905
7	PA	1,223,456	6,246	5.10521
8	CO	521,584	2,565	4.917712
9	MI	1,002,294	4,650	4.639357
10	DE	92,547	424	4.581456
11	OH	1,102,144	4,759	4.317947
12	KS	298,963	1,286	4.301536
13	NH	128,973	531	4.117141
14	WV	171,683	706	4.11223
15	WI	564,633	2,305	4.082298
16	AL	484,043	1,886	3.896348
17	ME	113,425	440	3.879215
18	OK	392,066	1,462	3.728964
19	ID	158,347	590	3.725994
20	RI	118,012	436	3.69454
21	WY	57,039	210	3.681691
22	NY	1,981,244	7,227	3.647708
23	VA	836,841	3,038	3.630319
24	MO	594,628	2,102	3.534983
25	VT	65,879	232	3.521608
26	UT	329,466	1,157	3.511743
27	OR	362,958	1,262	3.476986
28	MD	563,128	1,955	3.47168
29	LA	471,968	1,572	3.330734
30	NM	217,205	714	3.287217
31	CT	345,595	1,086	3.142406
32	IL	1,259,911	3,755	2.980369
33	WA	673,614	1,982	2.942338
34	NJ	798,211	2,305	2.887708
35	MN	498,300	1,437	2.883805
36	NC	988,239	2,843	2.876834
37	CA	4,001,038	11,314	2.827766
38	TX	2,748,818	7,579	2.757185
39	GA	1,031,068	2,790	2.705932
40	NE	188,028	508	2.701725
41	TN	634,171	1,689	2.66332
42	MS	313,683	800	2.550345
43	KY	430,903	1,091	2.531892
44	AZ	672,184	1,700	2.529069
45	FL	1,799,397	4,539	2.522512
46	SC	490,773	1,178	2.400295
47	AK	83,517	192	2.298933
48	AR	289,603	664	2.292794
49	NV	258,810	416	1.607357
50	HI	137,965	183	1.326423

Source: 2014 American Community Survey (PUMS) and IPEDS

Appendix G

The Integrated Postsecondary Education Data System Majors Listed Under the Field of Computer Science

Artificial Intelligence
Computer and Information Sciences and Support Services, Other

COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES

Computer and Information Sciences, Other
Computer and Information Sciences, General
Computer and Information Systems Security/Information Assurance
Computer Graphics
Computer Programming, Other
Computer Programming, Specific Applications
Computer Programming, Vendor/Product Certification
Computer Programming
Computer Programming/Programmer, General
Computer Science
Computer Software and Media Applications, Other
Computer Software and Media Applications
Computer Support Specialist
Computer Systems Analysis
Computer Systems Analysis/Analyst
Computer Systems Networking and Telecommunications
Computer/Information Technology Administration and Management
Computer/Information Technology Services Administration and Management, Other
Data Entry/Microcomputer Applications, General
Data Entry/Microcomputer Applications, Other
Data Entry/Microcomputer Applications
Data Modeling/Warehousing and Database Administration
Data Processing and Data Processing Technology/Technician
Data Processing
Informatics
Information Science/Studies
Information Technology Project Management
Information Technology
Modeling, Virtual Environments and Simulation
Network and System Administration/Administrator
System, Networking, and LAN/WAN Management/Manager
Web Page, Digital/Multimedia and Information Resources Design
Web/Multimedia Management and Webmaster
Word Processing

Appendix H

The Integrated Postsecondary Education Data System Majors Listed Under the Field of Health	
Acupuncture and Oriental Medicine	Communication Disorders Sciences and Services
Adult Health Nurse/Nursing	Communication Sciences and Disorders, General
Advanced General Dentistry	Community Health and Preventive Medicine
Advanced/Graduate Dentistry and Oral Sciences, Other	Community Health Services/Liaison/Counseling
Advanced/Graduate Dentistry and Oral Sciences	Comparative and Laboratory Animal Medicine
Allied Health and Medical Assisting Services, Other	Critical Care Nursing
Allied Health and Medical Assisting Services	Cytogenetics/Genetics/Clinical Genetics Technology/Technologist
Allied Health Diagnostic, Intervention, and Treatment Professions, Other	Cytotechnology/Cytotechnologist
Allied Health Diagnostic, Intervention, and Treatment Professions	Dance Therapy/Therapist
Alternative and Complementary Medical Support Services, Other	Dental Assisting/Assistant
Alternative and Complementary Medical Support Services	Dental Clinical Sciences, General
Alternative and Complementary Medicine and Medical Systems, General	Dental Hygiene/Hygienist
Alternative and Complementary Medicine and Medical Systems, Other	Dental Laboratory Technology/Technician
Alternative and Complementary Medicine and Medical Systems	Dental Materials
Anesthesiologist Assistant	Dental Public Health and Education
Animal-Assisted Therapy	Dental Services and Allied Professions, Other
Aromatherapy	Dental Support Services and Allied Professions
Art Therapy/Therapist	Dentistry
Asian Bodywork Therapy	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician
Assistive/Augmentative Technology and Rehabilitation Engineering	Dietetic Technician
Athletic Training/Trainer	Dietetics and Clinical Nutrition Services, Other
Audiology/Audiologist and Speech-Language Pathology/Pathologist	Dietetics and Clinical Nutrition Services
Audiology/Audiologist	Dietetics/Dietitian
Ayurvedic Medicine/Ayurveda	Dietitian Assistant
Behavioral Aspects of Health	Direct Entry Midwifery
Bioethics/Medical Ethics	Electrocardiograph Technology/Technician
Blood Bank Technology Specialist	Electroneurodiagnostic/Electroencephalographic Technology/Technologist
Cardiopulmonary Technology/Technologist	Emergency Care Attendant (EMT Ambulance)
Cardiovascular Technology/Technologist	Emergency Medical Technology/Technician (EMT Paramedic)
Chiropractic Assistant/Technician	Emergency Room/Trauma Nursing
Chiropractic	Endodontics/Endodontology
Clinical and Industrial Drug Development	Energy and Biologically Based Therapies, Other
Clinical Laboratory Science/Medical Technology/Technologist	Energy and Biologically Based Therapies
Clinical Nurse Leader	Environmental Health
Clinical Nurse Specialist	Family Practice Nurse/Nurse Practitioner
Clinical Nutrition/Nutritionist	Family Practice Nurse/Nursing
Clinical Pastoral Counseling/Patient Counseling	Gene/Genetic Therapy
Clinical Research Coordinator	Genetic Counseling/Counselor
Clinical, Hospital, and Managed Care Pharmacy	Geriatric Nurse/Nursing
Clinical/Medical Laboratory Assistant	Health Aide
Clinical/Medical Laboratory Science and Allied Professions, Other	Health Aides/Attendants/Orderlies, Other
Clinical/Medical Laboratory Science/Research and Allied Professions	Health Aides/Attendants/Orderlies
Clinical/Medical Laboratory Technician	Health and Medical Administrative Services, Other
Clinical/Medical Social Work	Health and Medical Administrative Services
Communication Disorders Sciences and Services, Other	Health and Wellness, General
	Health Information/Medical Records Administration/Administrator
	Health Information/Medical Records Technology/Technician
	Health Professions and Related Clinical Sciences, Other

Appendix H

The Integrated Postsecondary Education Data System Majors Listed Under the Field of Health

HEALTH PROFESSIONS AND RELATED PROGRAMS

Health Services Administration
Health Services/Allied Health/Health Sciences, General
Health Unit Coordinator/Ward Clerk
Health Unit Manager/Ward Supervisor
Health/Health Care Administration/Management
Health/Medical Physics
Health/Medical Claims Examiner
Health/Medical Preparatory Programs, Other
Health/Medical Preparatory Programs
Hearing Instrument Specialist
Hematology Technology/Technician
Herbalism/Herbalist
Histologic Technician
Histologic Technology/Histotechnologist
Holistic Health
Home Health Aide/Home Attendant
Homeopathic Medicine/Homeopathy
Hospital and Health Care Facilities Administration/Management
Hypnotherapy/Hypnotherapist
Industrial and Physical Pharmacy and Cosmetic Sciences
International Public Health/International Health
Kinesiotherapy/Kinesiotherapist
Lactation Consultant
Large Animal/Food Animal and Equine Surgery and Medicine
Licensed Practical/Vocational Nurse Training (LPN, LVN, Cert
Licensed Practical/Vocational Nurse Training
Long Term Care Administration/Management
Magnetic Resonance Imaging (MRI) Technology/Technician
Mammography Technician/Technology
Marriage and Family Therapy/Counseling
Massage Therapy/Therapeutic Massage
Maternal and Child Health
Maternal/Child Health and Neonatal Nurse/Nursing
Medical Administrative/Executive Assistant and Medical Secretary
Medical Clinical Sciences/Graduate Medical Studies
Medical Illustration and Informatics, Other
Medical Illustration and Informatics
Medical Illustration/Medical Illustrator
Medical Informatics
Medical Insurance Coding Specialist/Coder
Medical Insurance Specialist/Medical Biller
Medical Office Assistant/Specialist
Medical Office Computer Specialist/Assistant
Medical Office Management/Administration
Medical Radiologic Technology/Science - Radiation Therapist
Medical Reception/Receptionist
Medical Scientist
Medical Staff Services Technology/Technician
Medical Transcription/Transcriptionist
Medical/Clinical Assistant
Medical/Health Management and Clinical Assistant/Specialist
Medication Aide
Medicinal and Pharmaceutical Chemistry
Medicine
Mental and Social Health Services and Allied Professions, Other
Mental and Social Health Services and Allied Professions
Mental Health Counseling/Counselor
Movement and Mind-Body Therapies and Education, Other
Movement and Mind-Body Therapies and Education
Movement Therapy and Movement Education
Music Therapy/Therapist
Natural Products Chemistry and Pharmacognosy
Naturopathic Medicine/Naturopathy
Nuclear Medical Technology/Technologist
Nurse Anesthetist
Nurse Midwife/Nursing Midwifery
Nurse/Nursing Assistant/Aide and Patient Care Assistant
Nursing Administration (MSN, MS, PhD)
Nursing Administration
Nursing Assistant/Aide and Patient Care Assistant/Aide
Nursing Education
Nursing Practice
Nursing Science (MS, PhD)
Nursing Science
Nursing, Other
Nursing
Nursing/Registered Nurse (RN, ASN, BSN, MSN)
Occupational and Environmental Health Nursing
Occupational Health and Industrial Hygiene
Occupational Therapist Assistant
Occupational Therapy/Therapist
Ophthalmic and Optometric Support Services and Allied Professions, Other
Ophthalmic and Optometric Support Services and Allied Professions
Ophthalmic Laboratory Technology/Technician
Ophthalmic Technician/Technologist
Opticianry/Ophthalmic Dispensing Optician
Optometric Technician/Assistant
Optometry
Oral Biology and Oral and Maxillofacial Pathology
Oral/Maxillofacial Surgery
Orthodontics/Orthodontology

The Integrated Postsecondary Education Data System Majors Listed Under the Field of Health

Orthoptics/Orthoptist
Orthotist/Prosthetist
Osteopathic Medicine/Osteopathy
Osteopathic Medicine/Osteopathy
Palliative Care Nursing
Pathology/Pathologist Assistant
Pediatric Dentistry/Pedodontics
Pediatric Nurse/Nursing
Perfusion Technology/Perfusionist
Periodontics/Periodontology
Perioperative/Operating Room and Surgical Nurse/Nursing
Pharmaceutical Marketing and Management
Pharmaceutical Sciences
Pharmaceutics and Drug Design
Pharmacoeconomics/Pharmaceutical Economics
Pharmacy Administration and Pharmacy Policy and Regulatory Affairs
Pharmacy Technician/Assistant
Pharmacy, Pharmaceutical Sciences, and Administration, Other
Pharmacy, Pharmaceutical Sciences, and Administration
Pharmacy
Phlebotomy Technician/Phlebotomist
Physical Therapy Technician/Assistant
Physical Therapy/Therapist
Physician Assistant
Podiatric Medicine/Podiatry
Podiatric Medicine/Podiatry
Polarity Therapy
Polysomnography
Practical Nursing, Vocational Nursing and Nursing Assistants, Other
Practical Nursing, Vocational Nursing and Nursing Assistants
Pre-Chiropractic Studies
Pre-Dentistry Studies
Pre-Medicine/Pre-Medical Studies
Pre-Nursing Studies
Pre-Occupational Therapy Studies
Pre-Optometry Studies
Pre-Pharmacy Studies
Pre-Physical Therapy Studies
Pre-Veterinary Studies
Prosthodontics/Prosthodontology
Psychiatric/Mental Health Nurse/Nursing
Psychiatric/Mental Health Services Technician
Psychoanalysis and Psychotherapy
Public Health Education and Promotion
Public Health, General
Public Health, Other
Public Health
Public Health/Community Nurse/Nursing
Radiation Protection/Health Physics Technician
Radiologic Technology/Science - Radiographer
Radiologist Assistant
Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing, Other
Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing
Registered Nursing/Registered Nurse
Rehabilitation Aide
Rehabilitation and Therapeutic Professions, Other
Rehabilitation and Therapeutic Professions
Rehabilitation Science
Reiki
Renal/Dialysis Technologist/Technician

RESIDENCY PROGRAMS

Respiratory Care Therapy/Therapist
Respiratory Therapy Technician/Assistant
Small/Companion Animal Surgery and Medicine
Somatic Bodywork and Related Therapeutic Services, Other
Somatic Bodywork and Related Therapeutic Services
Somatic Bodywork
Speech-Language Pathology Assistant
Speech-Language Pathology/Pathologist
Sterile Processing Technology/Technician
Substance Abuse/Addiction Counseling
Surgical Technology/Technologist
Therapeutic Recreation/Recreational Therapy
Traditional Chinese Medicine and Chinese Herbology
Veterinary Anatomy
Veterinary Biomedical and Clinical Sciences, Other
Veterinary Biomedical and Clinical Sciences
Veterinary Infectious Diseases
Veterinary Medicine
Veterinary Microbiology and Immunobiology
Veterinary Pathology and Pathobiology
Veterinary Physiology
Veterinary Preventive Medicine, Epidemiology, and Public Health
Veterinary Sciences/Veterinary Clinical Sciences, General
Veterinary Toxicology and Pharmacology
Veterinary/Animal Health Technology/Technician and Veterinary Assistant
Vocational Rehabilitation Counseling/Counselor
Women's Health Nurse/Nursing
Yoga Teacher Training/Yoga Therapy

Appendix I

The Integrated Postsecondary Education Data System Majors Listed Under the Field of Engineering

Aerospace, Aeronautical and Astronautical Engineering
Aerospace, Aeronautical and Astronautical/Space Engineering
Agricultural Engineering
Architectural Engineering
Biochemical Engineering
Bioengineering and Biomedical Engineering
Biological/Biosystems Engineering
Biomedical/Medical Engineering
Ceramic Sciences and Engineering
Chemical and Biomolecular Engineering
Chemical Engineering, Other
Chemical Engineering
Civil Engineering, General
Civil Engineering, Other
Civil Engineering
Computer Engineering, General
Computer Engineering, Other
Computer Engineering
Computer Hardware Engineering
Computer Software Engineering
Construction Engineering
Electrical and Electronics Engineering *A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of electrical and electronic systems and their components, including electrical power generation systems; and the analysis of problems such as superconductor, wave propagation, energy storage and retrieval, and reception and amplification*
Electrical, Electronics and Communications Engineering, Other
Electrical, Electronics and Communications Engineering
Electromechanical Engineering
Engineering Chemistry
Engineering Design
Engineering Mechanics
Engineering Physics
Engineering Physics/Applied Physics
Engineering Science
Engineering, General
Engineering, Other

ENGINEERING

Environmental/Environmental Health Engineering
Forest Engineering
Geological/Geophysical Engineering
Geotechnical and Geoenvironmental Engineering
Industrial Engineering
Laser and Optical Engineering
Manufacturing Engineering
Materials Engineering Instructional content is defined in code 14
Materials Engineering
Materials Science
Mechanical Engineering
Mechatronics, Robotics, and Automation Engineering
Metallurgical Engineering
Mining and Mineral Engineering
Naval Architecture and Marine Engineering
Nuclear Engineering
Ocean Engineering
Operations Research
Paper Science and Engineering
Petroleum Engineering
Polymer/Plastics Engineering
Pre-Engineering
Structural Engineering
Surveying Engineering
Systems Engineering
Telecommunications Engineering
Textile Sciences and Engineering
Transportation and Highway Engineering
Water Resources Engineering

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[16] See appendix C

[17] For the purposes of this report, our STEM completion data focuses specifically on computer science and engineering. These two fields were chosen because they are both associated with higher earning potential for graduates and all the recent popular media attention around the lack of diversity in Silicon Valley other tech-related industry leaders.

[18] See appendix E and F

[19] See appendix D

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Infographic Notes and Sources

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The Campaign for College Opportunity is a broad-based, bipartisan coalition, including business, education and civil rights leaders that is dedicated to ensuring that all Californians have an equal opportunity to attend and succeed in college in order to build a vibrant workforce, economy and democracy. The Campaign works to create an environment of change and lead the state toward effective policy solutions. It is focused upon substantially increasing the number of students attending two- and four-year colleges in California so that we can produce the 2.3 million additional college graduates that our state needs.

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