INDUSTRY DEEP DIVE

HEALTH CARE SERVICES

IN THE LOS ANGELES BASIN

A HIGH-GROWTH INDUSTRY

MAY 2018

Brought to you by:
CENTER FOR A COMPETITIVE WORKFORCE

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About CCW

Center for a Competitive Workforce

Center for a Competitive Workforce (CCW) links education and workforce partners to establish high-performing regional talent development systems in California for the rapidly changing industries that will dominate our economic future. The center's work addresses the talent gaps employers face and the supply of skilled graduates to meet projected workforce demand.

CCW was founded as a Strong Workforce Program within the 19 Los Angeles County community colleges in the L.A.|O.C. Regional Consortium.

Learn more: www.ccworkforce.org

FOUNDING PARTNERS

Centers of Excellence

As grant-funded technical assistance providers, the seven Centers of Excellence across the state, located strategically to study the regional economies of California, support the community colleges by providing customized data on high growth, emerging, and economically-critical industries and occupations and their related workforce needs.

LAOCRC

The Los Angeles and Orange County Regional Consortium (LAOCRC) provides local and regional decision makers with the increased capacity to measure regional progress toward goals of efficiency and effectiveness, while also improving their access to indicators that measure student/incumbent worker progress through the educational system.

LA Area Chamber of Commerce

The Los Angeles Area Chamber of Commerce champions economic prosperity and quality of life for the Los Angeles region by being the voice of business, promoting collaboration and helping members grow.

LAEDC

The Los Angeles County Economic Development Corporation is a 501c3 non-profit dedicated to advancing opportunity and prosperity for all via objective economic research and analysis, strategic assistance to government and business, and targeted public policy. These efforts are guided and supported by the expertise and counsel of the LAEDC's business, government and education members and partners.

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The Work Cycle Model

In 2016, California embarked on a path to train one million middle-skill workers and develop workforce opportunities to provide greater overall upward economic mobility and lift residents out of poverty.

To this end, the Strong Workforce Program was established to spur career education in the state's 114 community colleges. Seven areas of student success have been targeted:

- Student success
- Career pathways
- Workforce data and outcomes
- Curriculum
- Faculty
- Regional coordination
- Funding

The purpose is to increase the number of students enrolled in career education programs that will lead to more certificates, degrees, transfers to four-year institutions and employment in high-demand, high-wage jobs.

To achieve the Strong Workforce Program's co-equal goals in the Los Angeles Basin, the Center for a Competitive Workforce proposes to structure, deploy and structurally integrate the following five-part program model:

1. ACQUIRE PERSISTENT DATA AND ANALYSIS

Conduct economic research and applied analysis to better understand the region's targeted industries, their associated labor markets, growth occupations and five-year forecasts.

2. ENGAGE INDUSTRY FOR REAL-TIME, ONGOING DATA COLLECTION AND VALIDATION

Validate and amplify the quantitative research and analysis with primary research, including survey instruments and firm-level intelligence gathered through the Los Angeles County Economic Development Corporation (LAEDC) and Los Angeles Area Chamber of Commerce industry cluster councils.

3. DISTILL DETAILED LABOR MARKET INTELLIGENCE

Distill and refine data elicited through the above processes into translatable, usable information for consumption by the community colleges.

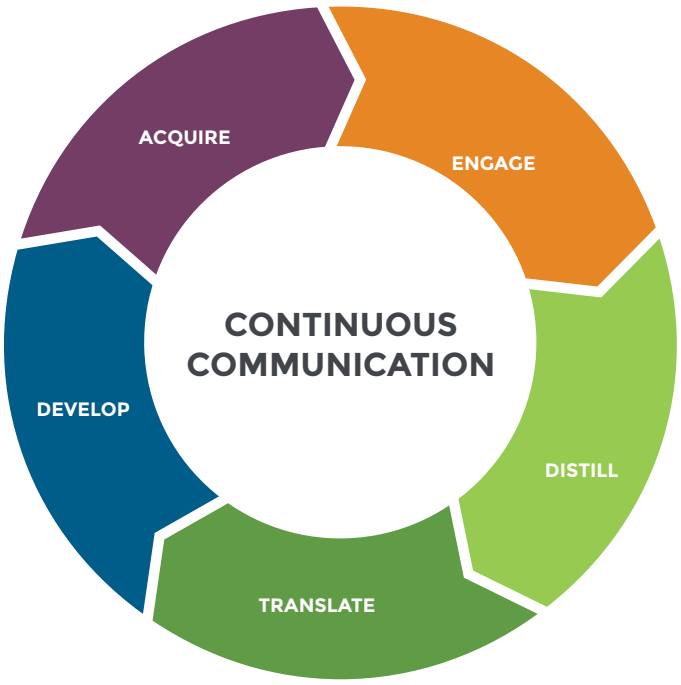
4. TRANSLATE AND COMMUNICATE DATA INTELLIGENCE TO COLLEGE COMMUNITY

Connect quantitative research/analysis, primary research and firm level intelligence to curriculum developers and other relevant decision-makers (e.g. deputy sector navigators, faculty and career education deans) at the community colleges.

5. NEW COURSES AND PROGRAMS DEVELOPED/UPDATED

Tailor new programs and courses through collaboration with industry professionals, that correct, modernize or enhance critical competencies and/or skills training gaps.

This report represents Phase 1 of the model. Phase 2 will begin almost simultaneously with this report's release.



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HEALTH CARE REPORT

Contents

Health Care Services

A High-Growth Industry

In the Center for a Competitive Workforce's baseline report "L.A. & Orange County Community Colleges: Powering Economic Opportunity" published in October 2017, the LAEDC's Institute for Applied Economics identified six target industries in the Los Angeles Basin expected to undergo significant middle-skill job growth between 2016 and 2021. Health Care Services was one of the six identified industries and the choice for the center's second "deep-dive" industry report. This and other forthcoming deep-dive industry reports are intended to establish a baseline from which the center and the region's community colleges can further build their knowledge and, working in partnership with industry, amplify their understanding about the region's labor markets and the middle-skill workforce gaps, as gauged by the difference between industry needs and community college program completions.

Health care is considered a locally-serving industry, which means it is an industry that primarily serves the resident population. With a population of 13 million in the Los Angeles Basin, health care is one of the largest employer industries in the region, with strong projections for health care occupations at almost all skill and education attainment levels over the next three to five years. For this reason, it offers significant opportunities for students attending community colleges in the region.

Health Care Services Defined

The health care services industry includes ambulatory health care services, hospitals, and nursing and residential care facilities (Exhibit 1). The Los Angeles Basin's health care industry expanded persistently even as the economy was in recession. Perhaps more than any other industry, health care establishments employ a wide range of workers by occupation, skill level, educational attainment, and experience.

The health care services industry has historically strong and stable growth with solid projections for health care occupations into the future.

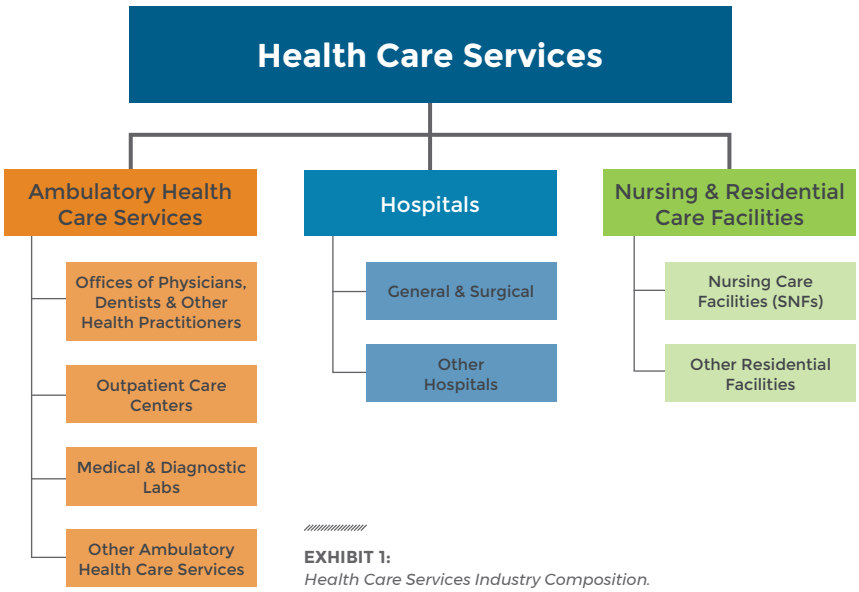


EXHIBIT 1:
Health Care Services Industry Composition.

While all three industries are involved in the provision of patient care and thus highly regulated industries, there are distinct differences including size of operations, governing (federal, state, local) compliance and regulations, and staffing patterns.

Ambulatory health care services include: offices of physicians, dentists and other health practitioners (i.e. chiropractors, optometrists and physical, occupational and speech therapists, and audiologists); outpatient care facilities; medical and diagnostic laboratories; and other ambulatory health care services, which include home health care services, ambulance services, and blood banks.

Hospitals are divided into two groups: general medical and surgical hospitals; and other hospitals. Other hospitals include psychiatric and substance abuse hospitals, and specialty hospitals, which are hospitals engaged in providing diagnostic and medical treatment to inpatients with a specific type of disease or medical condition, those providing long-term care for the chronically ill, and those providing rehabilitation, restorative, and adjustive (coping) services to physically-challenged or disabled.

Nursing and residential care facilities include: nursing care facilities (skilled nursing facilities) providing inpatient nursing and rehabilitative services for an extended period of time; residential intellectual and other residential care facilities, which comprises developmental disability, mental health, and substance abuse facilities; continuing care retirement communities and assisted living facilities for the elderly; and other residential care facilities such as group homes, halfway houses and orphanages.

The Workforce in Health Care Services

Health care services generates $140.9 billion in economic output annually in the Los Angeles Basin, accounting for 9.5 percent of the gross regional product (see appendix for full analysis). Health care is less vulnerable to fluctuations in the business cycle, making it relatively stable for workers while other industries may be shedding jobs during economic downturns. Just under 77 percent of purchases made in the industry's supply chain are made using local vendors. And the health care industry is increasingly being viewed as a partner in regional community development activities as they invest into their local communities.

About 77 percent of purchases made in the health care industry's supply chain are made at local vendors.

As in other industries, health care is feeling the effects of the aging of the population, as the skilled and highly experienced health care workers move into retirement. At the same time, the substantially-sized and aging "Baby Boomer generation" cohort represents additional demand for future services in ambulatory health care, hospitals, and residential care facilities. According to the California Department of Finance, the Los Angeles Basin's share of the population ages 65 years and over will more than double, growing from 13.4 percent in 2016 to just under 31 percent in 2030, reaching 4.5 million.

Further, health care worker attrition (due to retirements) follows on the heels of another increase in demand for health care services related to the Patient Protection and Affordable Care Act of 2010 (ACA). While the future of ACA is facing some uncertainty under the present administration, ACA has expanded health care coverage to millions of individuals here in California since its major provisions went into effect in 2014, increasing the need for patient care providers at all levels. This may be tempered somewhat by the 2017 repeal of the Individual Mandate; however, newly insured were likely to demand health care with or without being legally obligated to purchase health insurance.

ACA brought with it a federal mandate for all public and private health care providers to make the move to electronic health records (EHRs), requiring them to adopt and demonstrate "meaningful use" by January 1, 2014 to maintain existing Medicaid and Medicare reimbursement levels. This mandate necessitated the creation of new positions and the introduction of new skill sets in the field of health information management and technology (HIMT) to establish and maintain information systems specific to the health care industry and its needs. A shortage of HIMT professionals has been identified, as these jobs have the added requirement of possessing knowledge specific to health care, including medical terminology, payer guidelines for private insurance, Medicaid and Medi-Cal, and Health Insurance Portability and Accountability Act (HIPPAA) compliance to name a few. Other health care occupations are facing shortages as well, including primary care physicians, behavioral health professionals and registered nurses.

Big data is being used to predict patient demand and operational needs.

A large portion of registered nurses (RNs) will be retiring out of the industry over the next decade. As of 2016, just over a quarter of all RNs in the Los Angeles Basin were aged 55 years and above, with another 36 percent between the ages of 40 and 54 years. As this cohort separates from the industry, they are taking their decades of experience with them. As experienced specialty nurses retire, talent gaps are widening due to a shortage of nursing faculty, available clinical hours and the limited number of preceptors, all of which are negatively impacting the future talent pipeline and will exacerbate the existing shortage.

Attrition isn't the only issue; retention is another challenge. High turnover rates exist in health care as skilled workers in high demand positions are aggressively recruited and jump from employer to employer seeking out better salary and benefits packages. When workers leave, recruitment of new talent is also an issue due to staffing shortages. Recruiting challenges, once disproportionately faced by more rural communities, are creeping into more urban areas as shortages worsen over time.

Looking forward, the future of work in health care services will require individuals to be adept at quickly learning and using new and innovative cost-saving, efficiency-driving and patient outcome-improving technologies as they become available and increasingly ubiquitous. Currently, innovation being employed in the industry takes several forms, including the use of artificial intelligence (AI), automated systems, and robotics. These advancements are applied to increase precision in medical procedures, to use data analytics in predictive and prescriptive forecasting, and achieve better interoperability in HIMT.[1]

Day-to-day repetitive tasks have the potential to be automated, freeing up additional time for staff to undertake other tasks or for

[1] *Robotics perform both high-skill and low-skill tasks. Robots have been used with increased precision in delicate surgical procedures, they can disinfect using UV light, they can assist in the lifting and transporting of patients, and they can deliver and transport food and medicine to patient rooms. Smart beds record patient stats directly to their EHR in real time. Technical innovation in patient care is common in the health care industry, however, opportunity exists for technology to improve efficiencies in internal operations as well. Machine learning is a form of AI that is used in the health care sector; algorithms are being used in the analysis of big sets of data. Predictive tools are being used to help care providers determine the best treatment options for patients drawing data from compiled databases. Finally, increasingly advanced forms of medical imaging technology are being used to improve medical diagnostics, especially for myriads types of cancer.*

smaller operations to grow without increasing their overhead in the form of labor costs. Patient check-ins are being done via iPad, electronic kiosk or mounted computer terminal.

Still, most patient-facing activities have little chance of being automated in the near-term. Robotic nurses pose no threat to employment in the near term as the technology is costly, faces regulatory hurdles, and must gain acceptance from both patients and providers before adoption can become widespread enough for dis-employment to occur. Lengthy and expensive FDA approval processes disincentivizes some innovation in automated systems in the provision of health care services.

In contrast, the automation potential is much higher on the "back office" patient information, billing and management side, with a large amount of automation taking place in the HIMT part of health care. Networks need to be up and information systems operational at all times so that databases are current and doctors have access to patient electronic health records (EHRs) in real time. HIMT is more than EHRs; it is increasingly being used by other, non-service providing divisions of health care operations such as human resources. Labor management procedures are now incorporating the use of big data as a tool to predict both patient demand and subsequent staffing needs. Health tech companies specializing in HIMT solutions are offering customized services including Robotic Process Automation (RPA) which can be used in claims administration, member and provider management, health and care management, and administration.

Most automation present in the health care industry assists workers in completing their job duties.

Similarly, the Internet of Things (IoT) has made a big impact in health care, incorporating digital solutions like mobile technology and using health applications and telehealth to adjust to both patient and employee needs. But IoT has also given rise to cybersecurity concerns, as providers try to keep the medical (HIPAA) and financial information of patients protected.

In sum, most automation present in the health care industry assists workers in completing their job duties. Machines lack empathy and interpersonal skills, both valued very highly in the provision of medical care. Necessary interaction between patients and health care providers limits some threat of automation, and some environments, such as home health care, are not conducive to automation and so will it will not be a pressing threat for quite some time.

Sizing Things Up

The Industry Defined

Analysis of health care industry trends provides insights into the challenges and opportunities facing the industry's workers and employers. Understanding where the jobs are now, and in the future, is critical to tailor training and career education programs, as well as regional policies to prepare for these changes and to fill the jobs of the future with a workforce that is competitive in a fast-changing global economy.

In this section, job counts, changes in payroll employment and wages are discussed for the two counties comprising the Los Angeles Basin, Los Angeles and Orange.

TREND ANALYSIS

The health care services industry employed 588,330 public and private payroll workers in the LA Basin in 2016 (Exhibit 2), accounting for 10 percent of total regional employment.

Industry Employment

Health care workers in the region account for 36.1 percent of all health care services employment in California and nearly 4 percent (3.6 percent in 2016) of health care services employment nationwide. Ambulatory health care services industries accounted for half of total industry employment. Hospitals had the next largest share, with one-third of all industry employment (192,140 jobs) and nursing and residential care facilities accounted for the remaining 18 percent.

The composition of health care services industry employment in the two counties varies only slightly (Exhibit 3). However, the size of the industry in the two geographies is significantly different, there are 445,740 payroll employees in

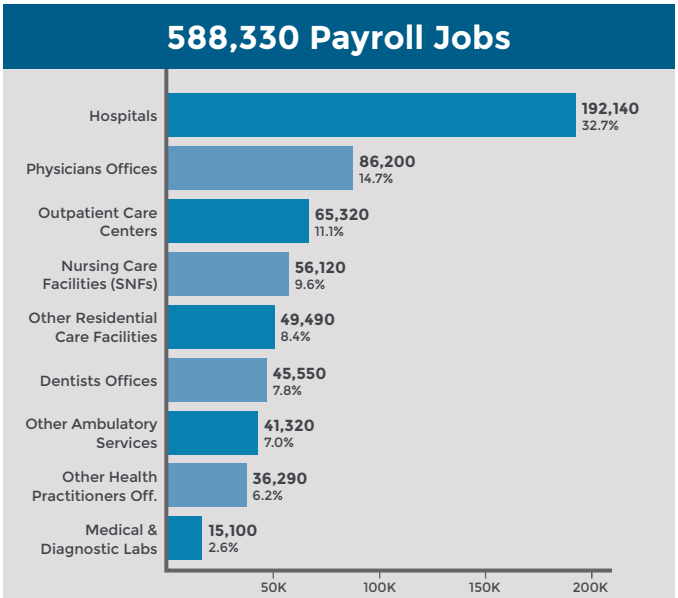


EXHIBIT 2:
Employment distribution across the health care services industry.

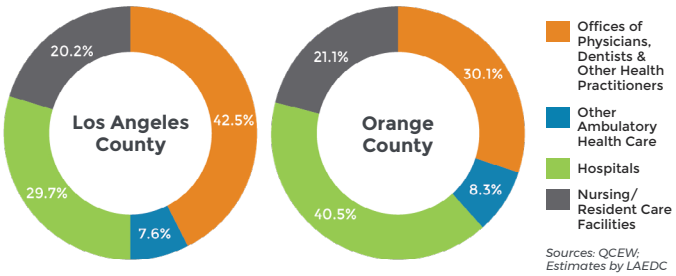


EXHIBIT 3:
Health care services employment distribution in LA and Orange counties in 2016.

health care in Los Angeles County, versus 142,600 in Orange County. Consequently, there will be differences in the number of middle-skill employment opportunities in each.

Total employment in the industry has grown continuously over the last decade, with an average annual growth rate of 2.5 percent per year. From 2006 to 2016, employment in the health care industry outpaced total payroll employment growth (4 percent) across all industries in the LA Basin, adding over 115,970 jobs, an increase of nearly 25 percent (Exhibit 4).

Much of the job growth in this industry has been led by a substantial increase in outpatient care centers, which more than tripled, adding 46,760 jobs over the period; this represents a growth rate of 252 percent. All component industries displayed solid job growth, except for psychiatric and substance abuse hospitals, which fell by 31 percent, and slight declines in offices of physicians and other ambulatory health care, which fell by 3.1 percent and 5.6 percent, respectively.

Industry Wages

Health care services industry employees typically earn higher than average wages compared to the regional economy. Overall, employees in health care earned, on average, $65,030 annually, which is more than the regional average across all industries, $59,890 annually (Exhibit 5).

Still, this is just an average across all health care services sectors, and so, some industries in health care pay significantly lower wages. For example, the nursing and residential care facilities industry pays on average $34,500 per annum.

Real wages in health care services grew overall by 4.5 percent, slightly above the growth of all industries in the Los Angeles Basin, where inflation-adjusted (real) wages increased by nearly 4 percent (Exhibit 5).

Wage growth has been fastest in hospitals, with over 13 percent growth between 2006 and 2016.

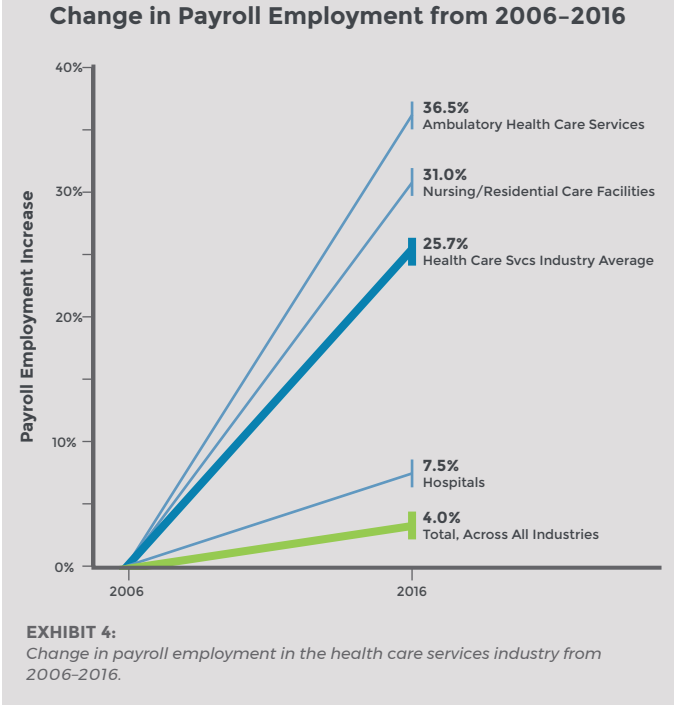


EXHIBIT 4:
Change in payroll employment in the health care services industry from 2006–2016.

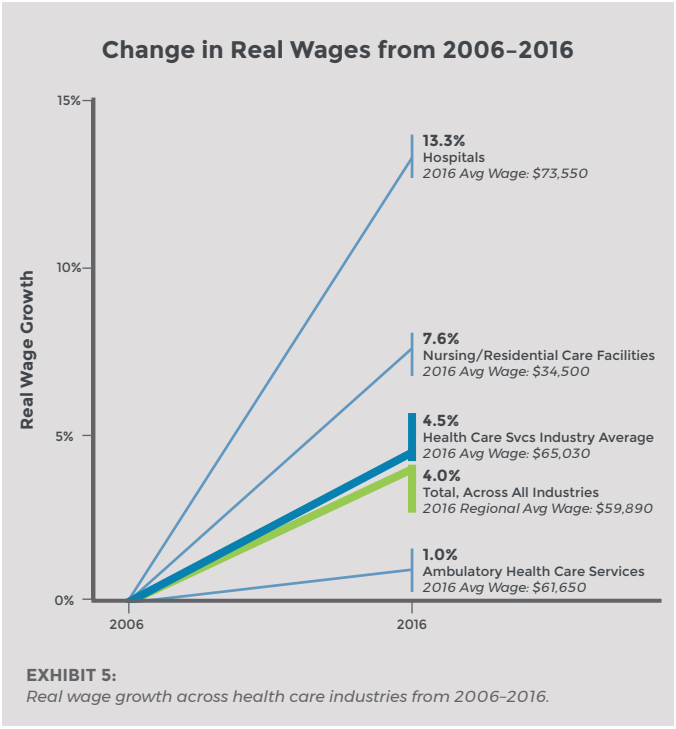


EXHIBIT 5:
Real wage growth across health care industries from 2006–2016.

Competitiveness & Regional Advantage

A region's competitiveness in an industry is a function of many factors, including: the attractiveness and value of the product(s)/service(s) produced/delivered; the costs of inputs such as labor, land and energy; the productivity of individual firms; and the geographic concentration of the industry. Industries that are highly-concentrated in a region are likely to be more competitive. Health care is considered a locally-serving industry, whose size and growth are typically dictated by the size and growth of its resident population.

Location quotients are used to measure industry competitiveness.[2] Locally-serving industries are typically associated with a location quotient close to the value of 1.0—the national concentration. Based on analysis, the region's health care industry continues to be slightly less concentrated with a location quotient of 0.8 (Exhibit 6). As this is a locally-serving industry, the concentration is, as expected, about on par with the average concentration of the health care services industry nationwide.

Changes in competitiveness over time show whether an industry in a region is gaining or losing competitive strength. In general, location quotients of the region's component industries are varied and change over time.

The Los Angeles Basin accounted for 3.6 percent of all employment in the health care industry nationwide.

The concentration of ambulatory health care services, hospitals and nursing and residential care facilities has remained virtually constant over the past decade, with very slight changes in their respective location quotients between 2006 and 2016.

The Los Angeles Basin accounted for 3.6 percent of all employment in the health care industry nationwide in 2016, rising only by 0.1 percentage point from its national share in 2006.

[2] *See appendix for location quotient definition.*

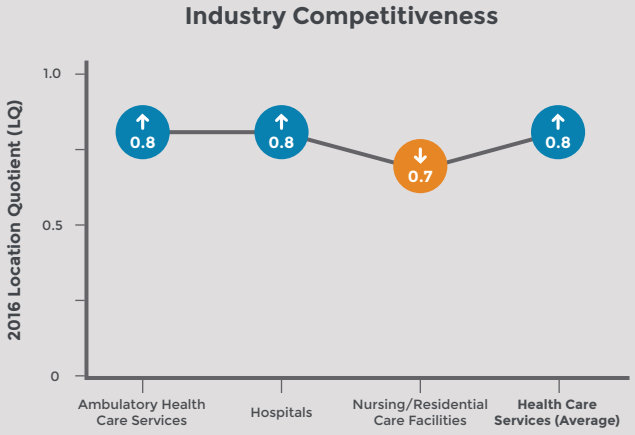


EXHIBIT 6:
Industry competitiveness as measured by location quotients, indicating change since 2006.

Demand-Side Analysis

Industry Outlook & Future Workforce Needs

To determine where the health care industry is headed, the growth of its component industries was forecasted over the next five years and used to extrapolate future workforce needs; that is, the demand for workers.

5-YR PROJECTION

Between 2016 and 2021, the health care industry is projected to grow in the Los Angeles Basin by almost 66,580 jobs (Exhibit 7)

The highest growth, by number of jobs, is forecasted to occur in the ambulatory health care and services subsector. This stands to reason since this subsector is the largest by number of jobs, accounting for almost 50 percent of the employment in the health care services industry. The highest number of jobs by proportion is forecasted to be created in the nursing and residential care facilities subsector. This prediction is in keeping with the longstanding trend of an aging population, particularly with the Baby Boomers, and the LA Basin is no exception to this national phenomenon.

The number of projected new jobs can be combined with job openings from replacements and retirements to provide an overall estimate of employer hiring needs.

Most of the job openings expected over the next five years will be due to workers changing jobs or retiring, rather than the creation of new jobs in the health care industry.

The health care industry is projected to add close to 66,600 net new jobs in the LA Basin by 2021.

Overall, 125,210 total job openings will be created in the health care industry in the Los Angeles Basin over the next five years, of which an estimated 58,630 will be replacement workers (Exhibit 8).

The highest number of openings will be in occupations related to ambulatory health care services. These are forecasted to be occupations that include medical assistants, dental hygienists, radiologic technologists, medical and clinical laboratory technicians, emergency medical technicians and paramedics, and phlebotomists.

Of all health care industry openings in the next five years, about 40 percent will require a bachelor's degree or higher (Exhibit 9) for entry. These represent jobs that are above middle-skill. Approximately 31 percent of openings will be for workers with a high school diploma or less. Nearly 30 percent of total openings will require some college or postsecondary education

Analysis of the skills classifications for total job openings over the next five years reveals that over half (60.8 percent) of projected openings will be for middle-skill occupations (Exhibit 10). This reinforces the selection of this industry as a valid target for community college programs.

Health Care Services Industry Outlook

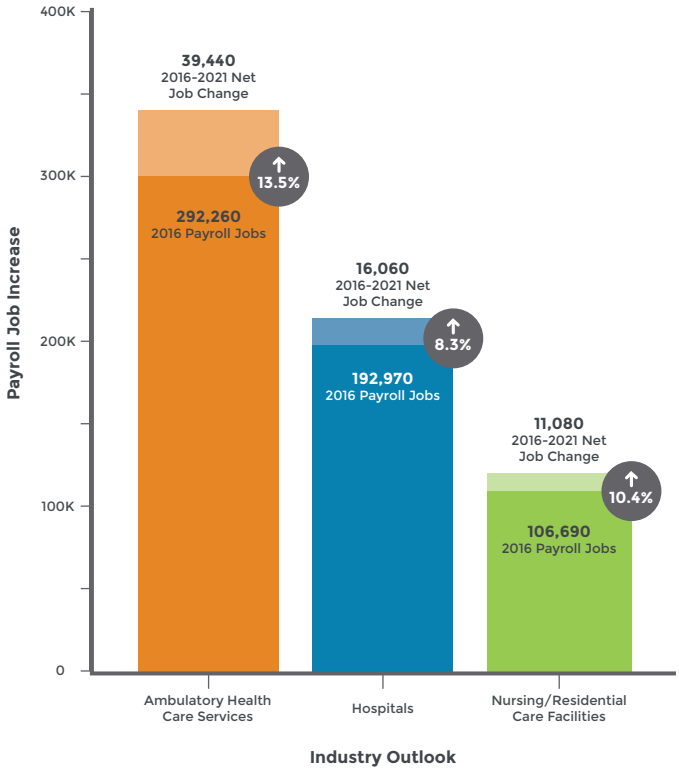


EXHIBIT 7:
Employment outlook for major component industries comprising the health care industry.

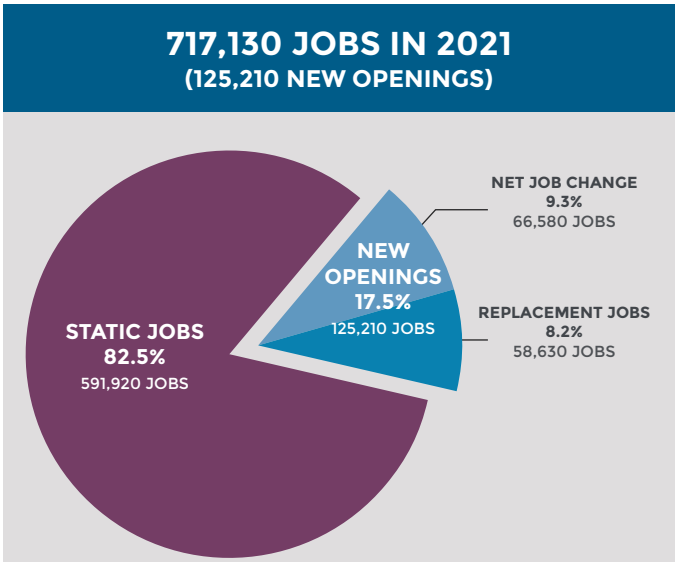


EXHIBIT 8:
Employment outlook for the health care industry.

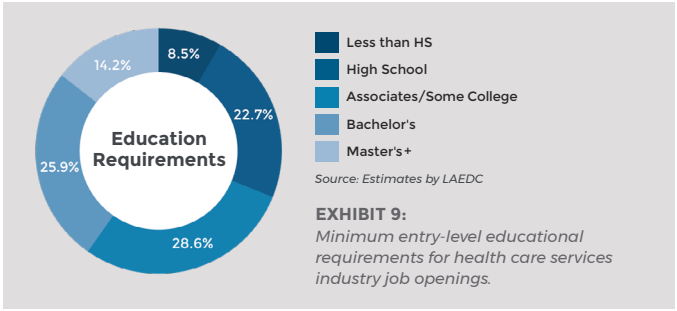


EXHIBIT 9:
Minimum entry-level educational requirements for health care services industry job openings.

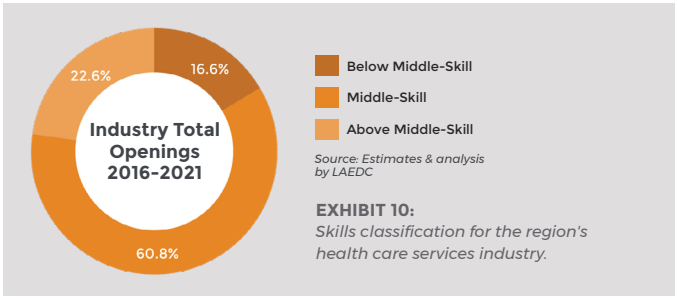


EXHIBIT 10:
Skills classification for the region's health care services industry.

Middle-skill occupations in health care are diverse, from registered nurses, who assess patient health problems and needs, to dental hygienists, phlebotomists, medical assistants, licensed vocational nurses and respiratory therapists. Job duties and core job competencies vary along with wages. Some occupations provide full-time employment, while others do not.

The health care industry has a number of middle-skill occupations that have significant employment churn and relatively higher numbers of replacement jobs annually. This is important to note, as the net change in jobs can be negative, but in occupations with a lot of movement, there can still be a high number of total openings in an occupation. For example, retention of RNs is a major issue for health care employers, resulting in a high rate of replacement as other employers recruit them. Retirements also represent additional job opportunities not related to growth. In the event that the predicted net change in jobs in this particular occupation were to slow and dip negative, the large number of openings from individuals changing jobs and retiring would still represent opportunities for job seekers.

Examples of middle-skill occupations in the health care industry with high replacement rates include RNs and licensed vocational nurses (LVNs), medical assistants and dental hygienists (Exhibit 11).

MIDDLE-SKILL OCCUPATIONS

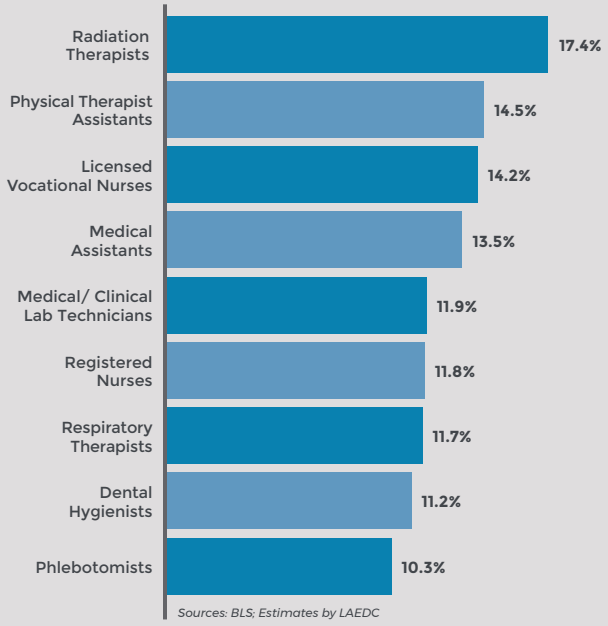


EXHIBIT 11:
Middle-skill occupations with high employment churn.

Occupational Movement in the Industry

The health care services industry has undergone significant changes over the last decade that have affected the industry's workforce. Changes in technology, legislation and government mandates have impacted the way medical services are delivered. Examples of recent influencers include the widespread adoption of electronic medical health records (EHRs) and other elements of ACA, which is tentatively secure for the time being.

Identifying health care occupations that have experienced employment change, both positive and negative, can help us to identify trends that may be transforming the industry's workforce. For this reason, we look at the employment change in detailed occupations from 2012 to 2016, along with their forecast employment, to identify those exhibiting robust growth and those that may be on the verge of becoming obsolete. Secondarily, based upon the jobs identified, we attempt to identify the underlying cause of these rates of change.

Changes in operations of an industry will effect change in its occupations. The widespread adoption of EHRs, mandated by the federal government as a part of ACA, was a significant transformation in the way the health care industry did business, across all providers of care. The change from paper to electronic records has changed the skills needed to keep medical records and, therefore, has impacted the occupational makeup of the industry (Exhibit 12).

The change from paper to electronic records has changed skills needed to keep medical records, impacting occupations in the industry.

This can most readily be seen by comparing the recent performance and occupational outlooks for medical transcriptionists and for medical records and health information technicians. Medical transcriptionists are health care documentation specialists who listen to voice recordings physicians and other health care workers make and then convert them into written reports. Employment in this occupation has been falling, and the decline is expected to continue going forward as technological advances and outsourcing increase productivity, requiring less labor. By contrast, medical records and health information technicians are health information technicians who organize and manage health information data using various classification systems to code and categorize patient information for insurance reimbursement purposes, for databases and registries, and to maintain patients' medical and treatment histories. This occupation has strong growth projections as it is technology-based and an integral part of the new model of doing business in health care.

Significant job gains in occupations can mean positive growth for other supporting occupations. For example, occupations that rely on technology-based tools for the diagnosis and treatment of medical conditions will be a growth catalyst for occupations tasked with maintenance and repair of the equipment used. As traditional diagnostic imaging, like Magnetic Resonance Imaging (MRI) and more novel methods, such as Positron Emission Tomography, are used on an increasing number of patients, more radiologic and MRI technologists will be needed, which translates into more equipment in use, thus increasing the demand for medical equipment repairers, who are tasked with the installation, maintenance, and repair of patient care equipment.

The health care industry also finds ways of handling workforce challenges through increased occupational specialization. Staffing shortages exist for registered nurses, specifically those who are highly experienced or in specialty fields. A team approach to health care is becoming more common, utilizing the skills and experience of a lead nurse, who directs the activities of multiple LVNs and certified nursing assistants (CNAs) to meet patient demands and give a higher quality of care. Registered nurses are projected to have solid growth over the next five to ten years, as do supporting roles of LVNs and CNAs. The same phenomena can be seen in high-skill jobs as well; for example, a portion of the increase in demand for physician assistants and nurse practitioners is in response to the shortage in primary care doctors

EMERGING OCCUPATIONS

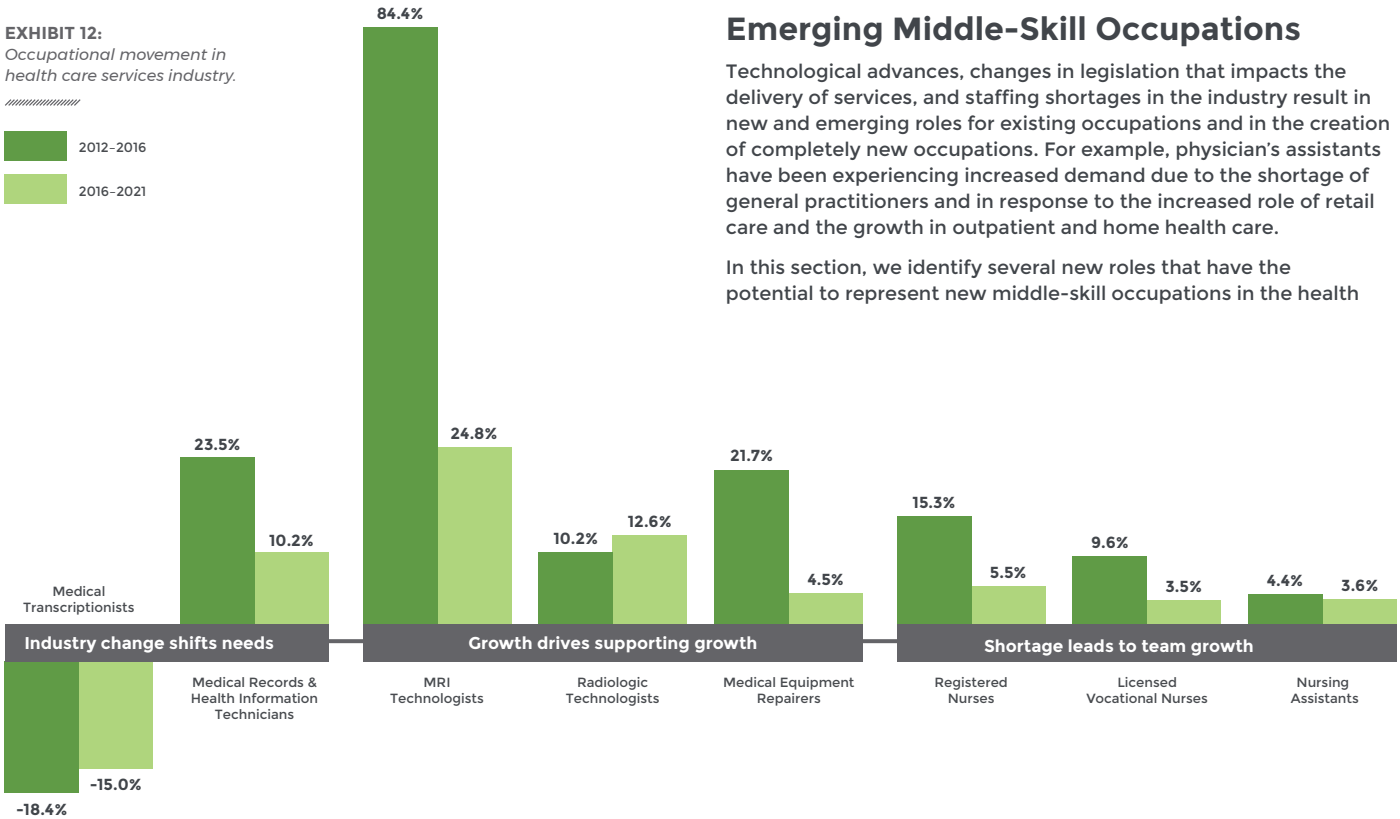
- Health Informatics
- Care Coordinators / Navigators
- Specialized Imaging Modalities
- Gerontological Nurses
- Holistic Nurses

Emerging Middle-Skill Occupations

Technological advances, changes in legislation that impacts the delivery of services, and staffing shortages in the industry result in new and emerging roles for existing occupations and in the creation of completely new occupations. For example, physician's assistants have been experiencing increased demand due to the shortage of general practitioners and in response to the increased role of retail care and the growth in outpatient and home health care.

In this section, we identify several new roles that have the potential to represent new middle-skill occupations in the health

EXHIBIT 12:
Occupational movement in health care services industry.



care industry going forward. Health care has been evolving, with increased outpatient care and a rise in home health care services replacing the acute care model of the past. Additionally, there has been a lot more attention paid to and focus on whole health and preventative health, which reflect changes in the industry, as well as with patient expectations.

Health informatics, care coordinators/navigators, holistic and gerontological nurses, and specialized imaging modalities are also identified as fast-emerging roles in health care. With the move towards EHRs, individuals who work in health informatics build and maintain information systems for the health care industry. Through these systems, health care providers can collaborate and improve efficiencies in the delivery of services and in health care management and planning. In addition to building and maintaining systems, they troubleshoot problems and provide technical support, working often as a part of a team.

Care coordinators/ navigators act as an intermediary between the patient and the health care system. They provide referrals for continuing care, find local resources for patients, and work together with providers and the patient and their family to develop overall care plans. Care coordinators work in establishments across the health care industry, including doctors' offices, hospitals and residential care facilities. It is a role typically taken on by an experienced nurse or social worker, since possessing strong soft skills is integral to this role.

Gerontological nurses specialize in the care and treatment of the elderly population. With the fast aging population, demand has increased for workers who have experience with the needs of the elderly. Job opportunities in this field are mostly concentrated in skilled nursing facilities (SNFs), assisted living and in-home health care.

Holistic nurses focus on the health of the whole patient. Overall wellness and the patient's physical, mental, emotional, spiritual and environmental factors are taken into account in health care prevention and treatment plans. Often holistic nurses will specialize in complementary, alternative or integrative forms of medicine, such as dietary advice, acupuncture, therapeutic massage and meditation therapy, to supplement their nursing practice. These individuals are predominantly found in private practice but are also employed by hospitals and work in private homes.

Specialized imaging modalities include Computed Tomography (CT), MRI, Positron Emission Tomography (PET), PET-CT, Ultrasound and X-Ray. Medical imaging technicians obtain images using these various imaging modalities, and these images are then used by other health care professionals to examine, diagnose, monitor, and treat patients. Advances in medical technology related to this field are expected to drive growth in this occupation, as is the increased demand as patients require imaging services to diagnose and treat conditions related to aging. Additional opportunities exist in this field for medical imaging equipment technologists, as for those who are trained to maintain and repair the equipment used.

In addition to these emerging occupations, there are several existing occupations identified as potentially facing future shortages and which may benefit from an increase in the number of programs. These occupations include clinical laboratory scientists, HIMT workers and specialty nurses.

Despite the actual role and specific skills of the occupation involved in the delivery of care, there are general competencies that will be required of nearly all workers moving forward. These include cross-training, adaptability, the use of technology and better soft skills, not only to interact with patients, but also other coworkers in team-based environments. Additionally, these soft skills will be invaluable in assisting patients in moving their way through the complex health care system.

Target Middle-Skill Occupations

Middle-skill occupations predicted to have significant job prospects over the next five years and that stand to benefit from investment into postsecondary non-degree and career education programs include RNs and LVNs, medical records and health information technicians, and medical and clinical laboratory technicians.

The top 15 occupations by projected total openings in the Los Angeles Basin over the next five years are shown in Exhibit 13.

SOC	OCCUPATION	NEW JOBS	REPLACEMENT JOBS	TOTAL JOB OPENINGS	MEDIAN HOURLY WAGE
29-1141	Registered Nurses	5,650	10,840	16,480	$44.59
29-2061	Licensed Vocational Nurses	990	3,420	4,410	$24.34
29-2052	Pharmacy Technicians	590	170	760	$17.33
29-2071	Medical Records and Health Information Technicians	510	690	1,200	$20.50
29-2034	Radiologic Technologists	780	570	1,350	$33.11
29-2012	Medical and Clinical Laboratory Technicians	570	780	1,350	$19.94
29-2041	Emergency Medical Technicians and Paramedics	660	480	1,140	$14.58
29-2021	Dental Hygienists	510	620	1,130	$46.55
29-1126	Respiratory Therapists	550	730	1,280	$35.94
31-9097	Phlebotomists	170	550	730	$19.24
29-2035	Magnetic Resonance Imaging Technologists	280	110	390	$37.25
29-2031	Cardiovascular Technologists and Technicians	270	150	420	$32.29
29-2055	Surgical Technologists	250	180	440	$27.57
29-2011	Medical and Clinical Laboratory Technologists	(100)	600	500	$38.55
31-2021	Physical Therapist Assistants	110	320	430	$32.49

EXHIBIT 13:
Target middle-skill occupations by total openings, 2016-2021.

Supply-Side Analysis

California's Community Colleges Talent Pool

The health care sector promises to be a significant source of good paying middle-skill jobs for the next five years. With just a few years of postsecondary education or specialized training, residents can obtain a position in the health care sector that does not necessitate a significant investment of time or finances. In the Los Angeles Basin, 26 community colleges offer a combined 20 unique certificate and degree programs related to health care.

The community college health care programs in the region that awarded the most certificates and degrees mirror the occupations with the most projected demand—registered nurses, licensed vocational nurses and radiologic technologists (Exhibit 14).

PROGRAM AWARDS

The number of awards conferred by programs training for these occupations in the 2016-17 academic year, the most recent year of available data, are below.

OCCUPATION	*AWARDS*
• Registered Nursing	1,749
• Radiologic Technology	354
• Licensed Vocational Nursing	139

Community colleges in the Los Angeles basin are producing more registered nurse certificates and degrees than any other health care program, four times the number of awards than the next largest program, radiologic technology.

Supply Gaps Examined

Nearly all the target health care occupations appear to have an undersupply of students to meet future demand. However, in some cases, completions from providers other than the community colleges in the region may be helping to meet demand.

For example, when the above data is considered it appears as if there is a looming supply gap for registered nurses, LVNs, dental hygienists and phlebotomists. To better understand this apparent undersupply of talent, other training providers including four-year colleges and universities, and proprietary schools were considered in the analyses below.

TOP FIVE COLLEGES
BY NUMBER OF COMPLETIONS

COMMUNITY COLLEGE	*COMPLETIONS*
• Saddleback	307
• Pasadena	272
• Los Angeles City	261
• East Los Angeles	253
• Mt. San Antonio	230

REGISTERED NURSES

While there are 3,300 annual openings for registered nurses, and 1,749 community college completions, there are additional completions reported by four-year colleges and proprietary schools in the region. These training providers conferred 2,018 awards during the 2015-16 academic year, the most recent year of available data. California State Universities in the region accounted for nearly half of these completions. There may be some duplication in the numbers since there have been reports that at least half of registered nursing community college students state they are currently enrolled or intend to transfer to obtain a bachelor's degree.

LICENSED VOCATIONAL NURSES

There are 880 annual job openings projected for licensed vocational nurses (LVNs) in the region. Community colleges conferred 139 awards in the 2016-17 academic year. Other training providers conferred 557 awards during the 2015-16 academic year. When these completions are taken into account, the supply gap is reduced to 184. Currently, there are only four community colleges in the region with accredited LVN programs. These programs typically require one calendar year to complete, and each community college generally accepts between 24 and 30 students each semester. Because each community college program can only accommodate a small number of students, this is believed to be contributing to the shortage of qualified LVNs. Regional Occupational Programs (ROPs) also contribute significantly to the supply of LVNs. (Completion numbers for ROPs were not included in the analysis of other training providers.)

SOC	OCCUPATIONAL GROUP	ANNUAL JOB OPENINGS	COMMUNITY COLLEGE PROGRAM	2016-2017 DEGREES	2016-2017 CERTIFICATES	2016-2017 TOTAL AWARDS
29-1141	Registered Nurses	3,300	Registered Nursing	1,538	211	1,749
29-2061	Licensed Vocational Nurses	880	Licensed Vocational Nursing	30	109	139
29-2034	Radiologic Technologists	270	Radiologic Technology	157	197	354
29-2012	Medical and Clinical Laboratory Technicians	270	Biotechnology and Biomedical Technology	12	50	62
			Electron Microscopy	1	5	6
			Laboratory Science Technology	10	8	18
			Medical Laboratory Technology	32	17	49
29-1126	Respiratory Therapists	260	Respiratory Care/Therapy	106	24	130
29-2071	Medical Records and Health Information Technicians	240	Medical Office Technology	6	63	69
			Health Information Technology	54	31	85
			Health Information Coding	-	53	53
29-2041	Emergency Medical Technicians and Paramedics	230	Emergency Medical Services	-	91	91
			Paramedic	16	118	134
29-2021	Dental Hygienists	230	Dental Hygienist	54	3	57
31-9097	Phlebotomists	150	Phlebotomy	-	2	2
29-2052	Pharmacy Technicians	150	Pharmacy Technology	22	60	82
29-2011	Medical and Clinical Laboratory Technologists	100	Electron Microscopy	1	5	6
29-2055	Surgical Technologists	90	Surgical Technician	-	-	-
31-2021	Physical Therapist Assistants	90	Physical Therapist Assistant	25	-	25
29-2035	Magnetic Resonance Imaging Technologists	80	Radiologic Technology	157	197	354
29-2031	Cardiovascular Technologists and Technicians	80	Cardiovascular Technician	21	21	42
			Electrocardiography	-	-	-

EXHIBIT 14:
Community college completions related to health care occupations in the Los Angeles Basin, 2016-17 academic year.

DENTAL HYGIENISTS

Aside from registered nurses and LVNs, another occupation that initially appears to have the largest supply gap is dental hygienists. There are expected to be 230 annual openings for this health care profession, but community colleges only conferred 57 awards during the 2016-17 academic year. Further analysis shows there is one training provider outside the community colleges that offers dental hygienist training in the region, Concorde Career College-Garden Grove, which conferred 44 awards during the 2015-16 academic year. When this is taken into consideration, a supply gap remains of 129. The region has four community colleges with dental hygienist programs accredited by the American Dental Hygienists' Association. Associate degree programs are offered by Cerritos College, Cypress College and Pasadena City College. West Los Angeles College now offers a bachelor's degree in dental hygiene.

PHLEBOTOMISTS

Only two community college completions were reported related to phlebotomists, but 150 annual openings are projected. There was only one training provider outside the community colleges reporting completions in the 2015-16 academic year. Modern Technology School conferred seven awards. In this case, supply is likely not captured by measuring completions because the requirements for this occupation can be completed through a single class.

SURGICAL TECHNOLOGIST

Surgical technologist is an occupation where supply is difficult to measure. Only two community college completions were reported in the 2016-17 academic year. There is only one community college program in the region, offered by Pasadena City College. Due to the laboratory components needed to train students to meet certification requirements, these programs can be expensive to start. In the region, 90 annual openings are projected for this occupation.

Other Supply Gaps

Several occupations appear to have smaller supply gaps based on community college completions:

- EMTs and paramedics have 134 awards, compared to 230 projected openings each year
- Respiratory care/therapy, 130 awards and 260 openings
- Medical and clinical laboratory technicians, 135 awards and 270 annual openings
- Medical and clinical laboratory technologists, six awards and 100 annual openings

It should be noted that electron microscopy programs train for both medical and clinical laboratory technicians, and medical and clinical laboratory technologists, but the number of completions is so low, only six, that this has little overall impact on the supply side.

Occupations with the smallest supply gaps based on community college completions include:

- Pharmacy technicians, 82 awards and 150 annual openings
- Physical therapist assistants, 25 awards and 90 annual openings

- Cardiovascular technologists and technicians, 42 awards and 80 annual openings
- Medical records and health information technicians, 207 awards and 240 annual openings

Community College Trends & Challenges

While the community colleges are well-positioned to be the premier source of health care talent in the region, they are not without challenges. These challenges can be addressed by stronger and more focused engagement with industry partners, workforce intermediaries and others. Some challenges facing community college health care programs include:

CLINICAL PLACEMENTS

Clinical placements are critical for providing students the chance to practice their skills in real-life workforce settings as part of the formal curriculum. Regional competition among educational providers exists for a finite number of available clinical placements. In the case of registered nurses, the industry tends to give preference to bachelor degree students, even though more than 50 percent of new registered nurse licenses in the state go to associate degree graduates. Community college graduates are more diverse and more likely to work in their communities of origin. Health care programs depend on students being able to practice in a clinical setting, and these clinical placements serve an important role as a pipeline for employers.

PRECEPTORS

This is an issue primarily affecting nursing programs, where the student works one-on-one with a preceptor to gradually assume more tasks and responsibilities providing care for patients in a health care setting. Community colleges are having a harder time finding employers willing to provide preceptorships. Part of the reason is that expert practitioners may already be assigned to train new employees and cannot take on additional trainees. Preceptorships also tend to be viewed as requiring more work, because the employee must take on an additional role, that of teacher for students.

UP-TO-DATE INSTRUCTIONAL LABS & EQUIPMENT UP-TO-DATE

Many health care courses require expensive equipment and laboratory space to adequately train students. Having equipment and materials that are current and in good repair is a particular challenge for some community colleges. Sufficient laboratory and storage space is also a challenge.

FINDING QUALIFIED FACULTY

It can be difficult identifying and recruiting qualified faculty to teach and develop programs. Comparatively low starting pay also poses challenges for recruiting faculty who can often earn more practicing their profession. Some allied health practitioners do not have the degrees to meet community colleges' minimum requirements. Community colleges in the region are looking at strategies to nurture professional connections and convince health care practitioners that teaching is a valuable way to assist their professions.

MEETING LICENSING REQUIREMENTS

While health care occupations are constantly evolving, licensing requirements do not always keep pace. Community colleges work hard to find a balance to provide students with the skills and knowledge that are most in demand by employers as well as what is needed to pass licensing exams. For example, the LVN occupation has transitioned from an acute-care setting to ambulatory care, but licensure is still based primarily on acute care. Colleges must prepare LVN students to pass the state licensing exam, but also give them clinical opportunities to reflect the current workplace.

Workforce Development Boards Talent Pool

Los Angeles County America's Job Centers, previously known as WorkSource Centers, serve over 250,000 individuals each year. These one-stop centers are operated by seven Workforce Development Boards (WDBs) responsible for providing workforce development services and programs to job seekers and employers.

Three of the seven WDBs in Los Angeles County shared data on their training programs and participant numbers for this study: Los Angeles City WDB, Los Angeles County WDB and Southeast Los Angeles County (SELACO) WDB.

The America's Job Centers (WorkSource Centers) assist clients with accessing training providers in the community. The information below does not overlap with the previously discussed data. The data included in this section should be considered a snapshot of the services provided and not a complete picture.

By including this information, this study seeks to bring attention to the WDBs as facilitators for training in the region. WDBs primarily send participants to trainings offered by ROPs, adult education providers and for-profit technical schools. Of the reported data, four participants were placed in community college programs. Usually, this training does not result in a degree or certificate, but in the completion of a number of hours of training for an occupation that typically does not require postsecondary education.

WDB programs with the most participants include certified nurse assistant/home health aide, medical assistant and phlebotomy technician (Exhibit 15).

PROGRAM	TOTAL
Certified Nurse Assistant/Home Health Aide	608
Medical Assistant	181
Phlebotomy Technician	154
Medical Biller/Coder	78
Dental Assistant	21
Pharmacy Technician	18
Vocational Nurse (LVN)	12
Emergency Medical Technician	7
Physical Therapy Aide	6
Health Information Technology	5
Health Path-Health care Customer Service Representative	5
Health care Training Program	5
EKG Technician Certification	2
Optical Technician	2
Surgical Technologist	2
Medical and Clinical Laboratory Technician	1
TOTAL	1,107

EXHIBIT 15:
Programs and participant numbers for three WDBs in the region.

Industry Forecast

To better understand where the health care industry is headed, its three component industries are quantified and growth forecasted over the next five years. This forecast is used to extrapolate future workforce needs; that is, the demand for workers.

Ambulatory Health Care Services

Sizing Things Up

Ambulatory health care services employed 292,260 payroll workers in the Los Angeles Basin in 2016, accounting for 5 percent of total regional employment and 49.4 percent of health care services employment in the region.

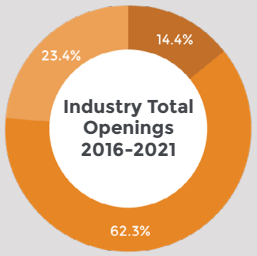
Ambulatory health care services accounted for 5 percent of all payroll jobs in the LA Basin.

Within ambulatory health services, the largest proportion of jobs come from the offices of physicians, accounting for almost 30 percent of the jobs in this subsector. Combined with the jobs from offices of dentists and outpatient care centers, these sector areas contribute 68 percent of the ambulatory health services jobs. Home health care, medical and diagnostic labs, and other ambulatory care services round out the remaining 32 percent of the jobs in this subsector.

Projections indicate that middle-skill jobs will comprise over half of all jobs in the ambulatory health care services industry by 2021 (Exhibit 16).

Industry Outlook

Between 2016 and 2021, we forecast 13.5 percent growth in ambulatory health care jobs in the Los Angeles Basin, with over 39,440 net new jobs across all skills levels. Growth is projected in six of the seven ambulatory health care subareas. The highest growth, 18.9 percent in outpatient care centers, will account for 12,460 net new jobs. In descending order of forecasted net new jobs: outpatient centers will add 12,460 net new jobs; other health practitioner officers will add 8,070 jobs; dentists' offices will add 3,920 net new jobs; home health care will add 2,610 net new jobs; and other ambulatory health care services will add 980. Only medical and diagnostic labs are projected to decline in terms of net jobs with a loss of 1,670 jobs over five years (Exhibit 17).



Source: Estimates & analysis by LAEDC

EXHIBIT 16:
Skills classification for the region's ambulatory health care services industry.

Future Workforce Need

The number of projected new jobs, combined with job openings from replacements and retirements, provide an overall estimate of employer hiring needs.

Overall, 57,320 total job openings, new and replacement, will be created in ambulatory health care services in the Los Angeles Basin over the next five years, of which an estimated 39,440 will be net new jobs and 17,880 will be replacement workers.

Analysis of the skills classifications for total job openings over the next five years reveals that nearly 35,710 of projected openings are for middle-skill occupations.

Top Unique Middle-Skill Occupations

Demand for middle-skill workers will continue to be a primary driver of future industry job growth. Among the wide range of occupations in the ambulatory health care industry, thousands of middle-skill workers will be needed to fill vacancies for RNs, LVNs, and medical records and health information technicians. As these three occupations top the middle-skills occupation list for total openings in all three subsectors of the broader health care industry in the LA basin, we have excluded them from this and the subsequent subsector details to eliminate redundancy.

Middle-skill occupations predicted to have significant job prospects over the next five years in ambulatory health care services include medical assistants, dental hygienists, and emergency medical technicians (EMTs) and paramedics.

The top six occupations by projected total openings in the Los Angeles Basin over the next five years, excluding RNs, LVNs, and medical records and health information technicians, are shown at right.

MIDDLE-SKILL OCCUPATIONS:
SIGNIFICANT JOB PROSPECTS (2021)

OCCUPATIONAL GROUP	*OPENINGS*
• Medical Assistants	2,940
• Dental Hygienists	1,180
• Radiologic Technologists	950
• Medical & Clinical Laboratory Technicians	930
• Emergency Medical Technicians & Paramedics	910
• Phlebotomists	630

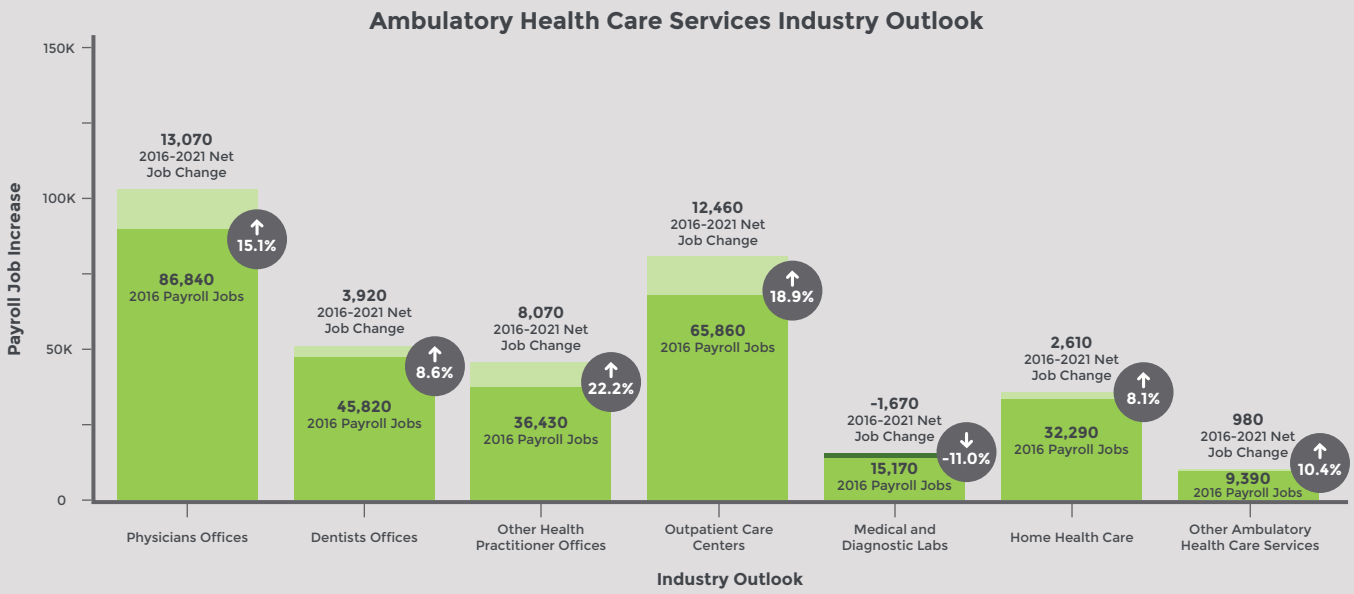


EXHIBIT 17:
Employment outlook for major component industries comprising the health care industry.

Hospitals

Sizing Things Up

Hospitals employed 192,970 payroll workers in the Los Angeles Basin in 2016, accounting for 3.3 percent of total regional employment across all industries and 37.3 percent of health care services employment in the region.

Unlike other subsectors in the health services industry, the jobs in the hospital subsector exist almost exclusively in one classification, general medical and surgical hospitals, which account for over 94 percent of all jobs in the area. The remaining employment in this area exists in psychiatric and substance abuse hospitals, and other specialty hospitals.

Projections indicate that middle-skill jobs will comprise about 63 percent of all jobs in the hospital industry by 2021 (Exhibit 18).

Industry Outlook

Between 2016 and 2021, modest growth in ambulatory health care is projected in the Los Angeles Basin, with 16,050 net new job growth estimated (or 8.3 percent) across all skills levels (Exhibit 19). Growth is projected in all three of the hospital industry subsectors, with an estimated: 13,060 net new jobs in general and surgical hospitals (7.2 percent growth); 1,270 estimated net new jobs in psychiatric and substance abuse hospitals (23.7 percent growth); and 1,720 estimated net new jobs in specialty hospitals (29.2 percent growth).

Future Workforce Needs

Overall, 29,520 total job openings will be created in hospitals in the Los Angeles Basin over the next five years, of which an estimated 16,060 will be net new jobs and 13,460 will be replacement workers.

Analysis of the skills classifications for total job openings over the next five years reveals that nearly 18,720 of projected openings are for middle-skill occupations.

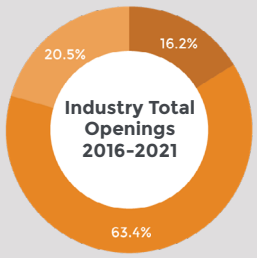
Top Unique Middle-Skill Occupations

Middle-skill occupations predicted to have significant job prospects over the next five years in hospitals include pharmacy technicians, radiologic technologists and surgical technologists.

The top six occupations, excluding RNs, LVNs, and medical records and health information technicians, by projected total openings in the Los Angeles Basin over the next five years are shown above.

MIDDLE-SKILL OCCUPATIONS:
SIGNIFICANT JOB PROSPECTS (2021)

OCCUPATIONAL GROUP	*OPENINGS*
• Respiratory Therapists	850
• Pharmacy Technicians	530
• Radiologic Technologists	460
• Medical & Clinical Laboratory Technicians	460
• Surgical Technologists	430
• Cardiovascular Technologists & Technicians	250



Source: Estimates & analysis by LAEDC

EXHIBIT 18:
Skills classification for the region's hospital industry.

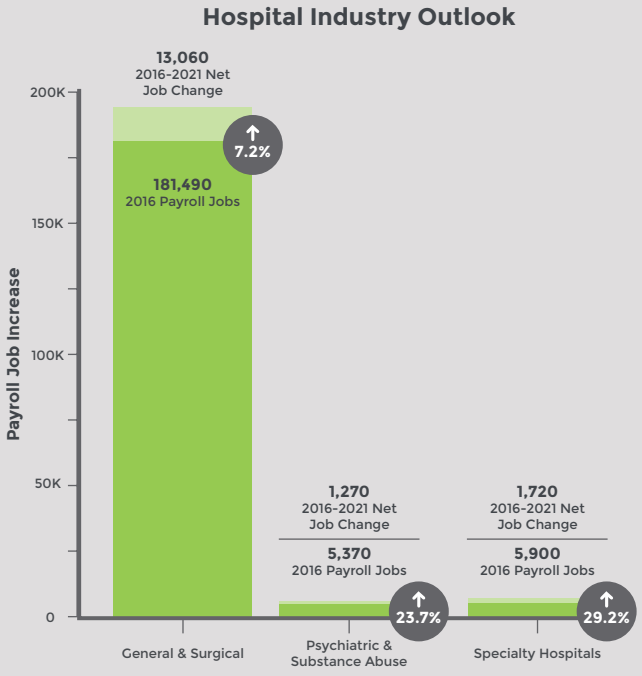


EXHIBIT 19:
Employment outlook for hospital industry.

Nursing & Residential Care Facilities

Sizing Things Up

Nursing and residential care facilities employed 106,690 payroll workers in the Los Angeles Basin in 2016, accounting for almost 2 percent of total regional employment across all industries and 18 percent of health care services employment in the region.

The preponderance of jobs in the nursing and residential care facility subsector are in nursing care facilities. Jobs in nursing care facilities account for over 56,500, or 53.1 percent, of all jobs in this subsector. The remainder of the jobs in nursing and residential care facilities are primarily found in residential mental health and continuing care facilities, accounting for roughly 18 and 23 percent of jobs in the subsector, respectively. These areas include facilities concerned with substance abuse rehabilitation.

Projections indicate that middle-skill jobs will comprise about 63 percent of all jobs in the nursing and residential care facilities industry by 2021 (Exhibit 20).

Industry Outlook

Between 2016 and 2021, modest employment growth in nursing and residential care facilities is projected in the Los Angeles Basin, with 11,080 net new job growth estimated (or 10.4 percent) across all skills levels (Exhibit 21). Within the nursing and residential care industry, the subsectors are predicted to have somewhat disparate trends. Nursing care facilities are forecasted to have a small net decline in jobs, with a net loss of 1.9 percent over five years, or almost 1,100 jobs. Conversely, other residential care facilities, such as intellectual, developmental, mental health and substance abuse facilities, are predicted to have a net increase in jobs of over 22 percent by 2021, or 11,080 jobs.

Future Workforce Needs

Overall, 24,160 total job openings, new and replacement, will be created in nursing and residential care facilities in the LA Basin over the next five years, of which an estimated 11,080 will be net new jobs and 13,080 will be replacement workers.

Analysis of the skills classifications for total job openings over the next five years reveals 15,320 projected openings are for middle-skill occupations.

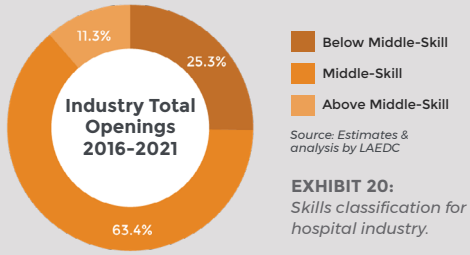
Top Unique Middle-Skill Occupations

Middle-skill occupations predicted to have significant job prospects over the next five years in nursing and residential care facilities include respiratory therapists, physical therapists and occupational therapy assistants.

The top six identified target occupations, excluding RNs, LVNs, and medical records and health information technicians, by projected total openings in the Los Angeles Basin over the next five years are shown above.

MIDDLE-SKILL OCCUPATIONS:
SIGNIFICANT JOB PROSPECTS (2021)

OCCUPATIONAL GROUP	*OPENINGS*
• Respiratory Therapists	370
• Medical Assistants	250
• Physical Therapist Assistants	190
• Occupational Therapy Assistants	110
• Dietetic Technicians	30
• Occupational Therapy Aides	20



Source: Estimates & analysis by LAEDC

EXHIBIT 20:
Skills classification for the region's hospital industry.

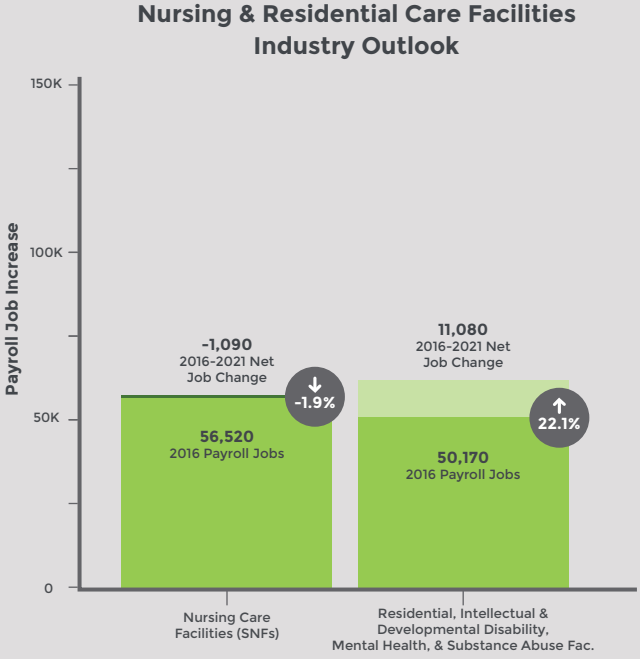


EXHIBIT 21:
Employment outlook for nursing/residential care facilities industry.

Conclusion

Challenges, Recommendations & Next Steps

In this report, we focused on middle-skill opportunities in the health care services industry. These are jobs that require more education and training than a high school diploma but less than a four-year college degree, in the form of a non-degree award, certificate program, or an Associate's degree. In 2016, about 65 percent of all jobs in the health care industry are considered middle-skill. Middle-skill jobs present in the health care services industry provide identifiable opportunities for workers to earn a living wage and well-defined "career ladders" to move up the economic opportunity chain.

Challenges for the Community College System

Community colleges are a talent pipeline for middle-skill jobs in the health care industry. Students who successfully complete their programs can find employment in diverse occupational categories, ranging from health information technology, to respiratory therapists, to LVNs and a wide variety of medical technician positions. However, the community college system faces a number of material challenges associated with providing and adapting these health care education programs to rapidly changing industry, including: high program, tool and physical space costs, especially lab and medical spaces; qualified faculty shortages and readiness, especially as new health care innovations are introduced, adopted and deployed; and dramatic changes in "back office" processes, the emergence of pioneering technologies and the advent new modalities in care and delivery. All of these present genuine hurdles to the community college system in producing qualified candidates for the health care industry.

Technology used in the health care industry is fast changing, and system wide changes in the way health care is delivered requires community colleges be constantly engaged with industry in order to keep on top of the skills required for ever evolving health care occupations. With every new technological advancement adopted in the industry, the community colleges must also invest in extremely costly equipment in order for their training to remain relevant. Due to funding limitations, the task of keeping instructional labs and equipment up to date is often a daunting one. The lack of lab space is also an issue. Health care has become more patient-centric and care is increasingly being provided using a team-based approach. As such, soft skills, such as teamwork and group interaction, have become increasingly important for a generation whose interactions are often done virtually.

Not all students entering health care programs are at the same level. Secondary schools are graduating students at myriad levels. Many struggle with science, technology, engineering, and mathematics (STEM) subjects and lack developed critical thinking, analytical, and problem solving skills; this translates into more time and resources invested by community colleges to teach these baseline competencies, especially in the programs and courses where these abilities are essential, such as pharmacology, for example.

A talent gap has been identified for nurses, with a shortage acutely felt in the field of specialty nursing. Exacerbating matters, there is a shortage of qualified nursing instructors. Faculty positions require higher levels of education and wages offered at community colleges for health care programs are not competitive compared to the compensation they would earn as practicing nurses in the industry at that level of educational attainment. And, current programs can't be expanded with existing faculty due to mandated student to teacher ratios.

CHALLENGES OVERVIEW

- High program, tool, and physical space costs, especially lab and medical spaces
- Qualified faculty shortages and readiness
- Dramatic changes in "back office" processes
- Fast-changing technological advancement
- Various levels of student readiness
- Specialty nursing talent gap

Clinical placements, where students gain invaluable on-the-job experience, are also a big hurdle in health care programs, for two reasons: other educational institutions with health care programs are competing for the same clinical hours; and there are too few preceptors available to train students in a clinical environment.

Finally, there can often be a disconnect between program curricula, which must be designed around licensing requirements, and what industry currently needs.

Recommendations

FORM STRONG INDUSTRY PARTNERSHIPS

With health care employers facing a number of worker retention, expansion and attraction challenges, including staffing shortages, high replacement rates (i.e. turnover and retirement), advances in technology requiring workers with new skill sets, and increased social awareness pushing for more diversity in the workforce, there is a strong incentive for health care employers to engage more directly in workforce development activities and to meaningfully partner with community colleges.

By partnering with industry, the community college system can be kept abreast of changes in the health care industry that directly relate to workforce, such as new technological advancements requiring the use of new tools and skills in their operation, current and predicted over-saturation or shortages for particular occupations, and legislative, regulatory, and other policy mandates that will impact employers in the industry. Building relationships with employers provides the potential for establishing new programs and work-based learning opportunities (e.g., internships, specialized study) that provide direct pathways to employment, which will not only bolster the middle-skill talent supply pipeline but satisfy the labor demand needs of the industry.

IDENTIFY, MARKET & STREAMLINE EDUCATION ATTAINMENT STRATEGIES FOR CAREER ADVANCEMENT

Deploy "next step" educational attainment strategies and broadly promote/market pathways for individuals in lower- and middle-skill occupations to up-skill and advance, such as from CNA, to LVN, to RN, to nurse practitioner. Also, determine places where movement up the education and thus the career ladder can be streamlined, taking into account increased experience for those currently employed in a clinical setting as they move from one rung to the next, and forming partnerships with four-year colleges, such as the California State University system, to share valuable clinical hours. Finally, with a large number of RNs set to retire in the coming years, there is an opportunity for the community colleges to hire retiring nurses, on a part- or full-time basis, as instructors and/or preceptors, which would increase access to more career advancing programs by expanding class offerings and adding capacity to clinical training programs at hospitals and other medical facilities.

SOLICIT NEW SOURCES OF REVENUE TO MEET UNMET INDUSTRY TRAINING NEEDS

Engage employers and health care industry associations, such as the Hospital Association of Southern California, to help identify new revenue sources or increase existing program support, supplementing public and private dollars, to provide continuing education for new employees entering the health care services industry. There is employer-perceived risk in training new graduates, as they can jump ship to other employers once the requisite experience is obtained; but if employers don't have to shoulder the high cost of making new graduates "floor ready" on their own, then employment opportunities for new graduates should increase.

NEXT STEPS

Immediate Next Steps in Activating the Report

As stated earlier, this report is the beginning of the Center for a Competitive Workforce's comprehensive program to retool the our region's career education programs for the in-demand occupations of tomorrow, in this case in the health care industry—which has experienced the some of the most steady growth and is one of the largest industries in our region.

- With the health care industry's talent being trained at community colleges throughout the LA Basin, we are poised to engage industry and partners in the next steps. Building on the labor market data and industry trends identified in this report related to supply and demand in the health care services industry, the real work begins to further validate and qualitatively expand on the report's quantitative findings. Much of this work will be conducted through the Center for a Competitive Workforce partnership and in collaboration with the LA Area of Chamber Health Care Industry Council, representing leaders from many of the biggest institutions within the health care industry.

- Guided by this report, the Health Care Industry Council will form subgroups with industry leaders and practitioners from the target occupations identified, along with their direct supervisors, as the individuals best-positioned with industry and firm-level intelligence regarding job-related changes, as well as the new competencies that are required for the candidates they interview and hire.

- By engaging industry experts in health care on behalf of the community colleges, the Center for a Competitive Workforce and Health Care Industry Council seek to garner first-hand knowledge about the essential and trending requirements for students to be prepared for current and future occupations and careers in the industry.

- Once target occupational profiles are established, the Center for a Competitive Workforce and Health Care Industry Council will facilitate and invest in developing stronger ties with employers through our key community college partners, such as Deputy Sector Navigators, curriculum development specialists, faculty and career education deans, to enhance, reconfigure and/or develop new industry-validated programs and curricula. One of our goals is the development of industry-informed and recognized "model curriculum" that colleges can adopt or adapt and that inspires more relevant student work-based learning opportunities.

- Finally, the Center for a Competitive Workforce and Health Care Industry Council will continuously communicate these findings and outcomes, primarily through its recently launched site: ccworkforce.org, to increase student access and better inform all regional stakeholder of the successes, gaps, opportunities and challenges in these rapidly involving industries, as well as the performance of the LA Basin's community colleges as they endeavor to empower their students to thrive in this incredibly dynamic space.

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Occupation Profiles

Employment Numbers & Worker Characteristics

Detailed information has been compiled for the top 15 middle-skill occupations in the health care services industries. Data from 2016, the most recent available, was used to determine wages and worker characteristics for the charts included with the profiles.

The information on top industries employing these occupations, current and projected employment, wages and demographics can be used by community colleges to tailor existing programs and guide outreach to potential students. The occupational analyses that follow may even inspire new program development or new approaches in attracting students to promising career paths.

EACH OCCUPATIONAL PROFILE CONTAINS:

- Hourly wages paid in 2016 for workers in Los Angeles and Orange counties compared to the living wage
- The distribution of workers across industry sectors in the Los Angeles Basin
- Metrics for the occupation including the number of current jobs and projected openings
- Worker characteristics, such as educational attainment, age distribution, race and ethnicity, and gender

TOP 15 OCCUPATIONS

- **Registered Nurses** (SOC 29-1141)
- **Licensed Vocational Nurses** (SOC 29-2061)
- **Pharmacy Technicians** (SOC 29-2052)
- **Medical Records and Health Information Technicians** (SOC 29-2071)
- **Radiologic Technologists** (SOC 29-2034)
- **Medical & Clinical Laboratory Technicians** (SOC 29-2012)
- **Emergency Medical Technicians & Paramedics** (SOC 29-2041)
- **Dental Hygienists** (SOC 29-2021)
- **Respiratory Therapists** (29-1126)
- **Phlebotomists** (SOC 31-9097)
- **Magnetic Resonance Imaging (MRI) Technologists** (SOC 29-2035)
- **Cardiovascular Technologists & Technicians** (SOC 29-2031)
- **Surgical Technologists** (SOC 29-2055)
- **Medical & Clinical Laboratory Technologists** (SOC 29-2011)
- **Physical Therapist Assistants** (SOC 31-2021)

Registered Nurses

(SOC 29-1141)

Assess patient health problems and needs, develop and implement nursing care plans, and maintain medical records. Administer nursing care to ill, injured, convalescent, or disabled patients. May advise patients on health maintenance and disease prevention or provide case management.

2016 HOURLY WAGES IN LA BASIN

** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

91,840 → **91.0%**

Registered Nurses employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Registered Nurses are almost exclusively employed by the Health Care industry. The three industry subsectors employing this occupation in the LA Basin are:

- Hospitals (NAICS 622)
- Ambulatory Health Care Services (NAICS 621)
- Nursing and Residential Care Facilities (NAICS 623)

5-YR PROJECTION

17,720

Total projected openings 2021 (5-Yr)

5,600 Net Job Change
12,120 5-Yr Replacements

16,480

Health Care-related projected openings 2021

4,650 Net Job Change
10,840 5-Yr Replacements

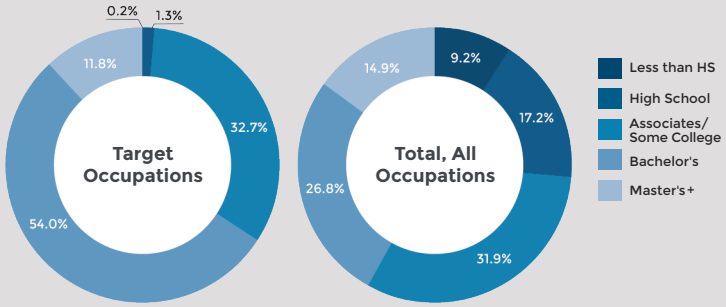
103,000

Industry jobs in LA/OC 2016

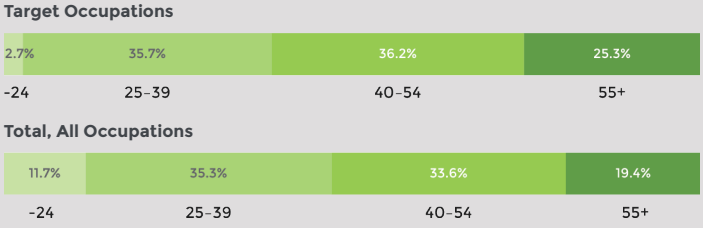
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

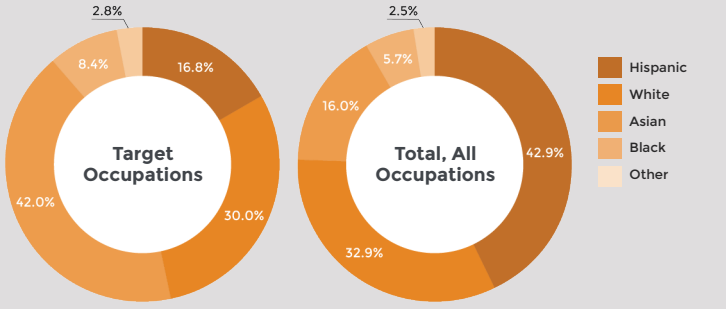
EDUCATIONAL ATTAINMENT 2016



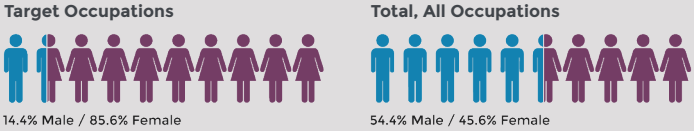
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016

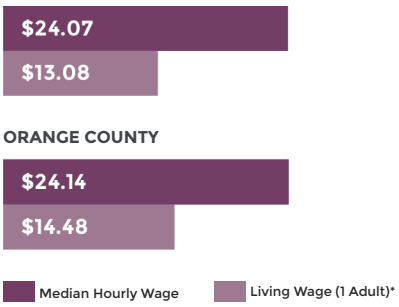


Licensed Vocational Nurses

(SOC 29-2061)

Care for ill, injured, or convalescing patients or persons with disabilities in hospitals, nursing homes, clinics, private homes, group homes, and similar institutions. May work under the supervision of a registered nurse. Licensing required.

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

24,060 → **88.0%**

Licensed Vocational Nurses employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

The vast majority of **Licensed Vocational Nurses** are employed in health care; however, some are employed in government or education. The three industry subsectors employing this occupation in the LA Basin are:

- Nursing and Residential Care Facilities (NAICS 623)
- Ambulatory Health Care Services (NAICS 621)
- Hospitals (NAICS 622)

5-YR PROJECTION

4,990

Total projected openings 2021 (5-Yr)

980 Net Job Change
4,010 5-Yr Replacements

4,410

Health Care-related projected openings 2021

990 Net Job Change
3,420 5-Yr Replacements

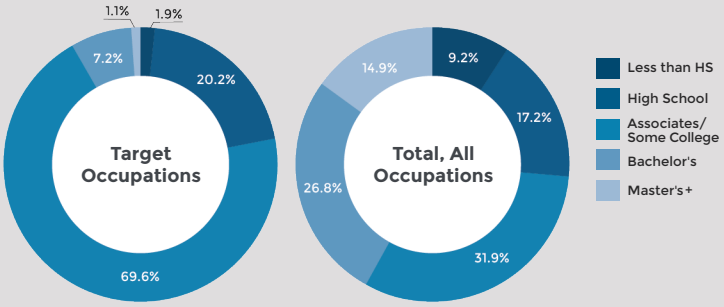
28,170

Industry jobs in LA/OC 2016

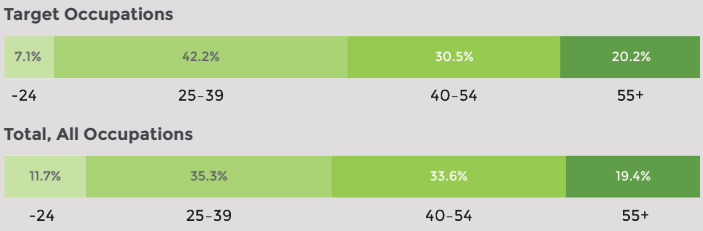
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

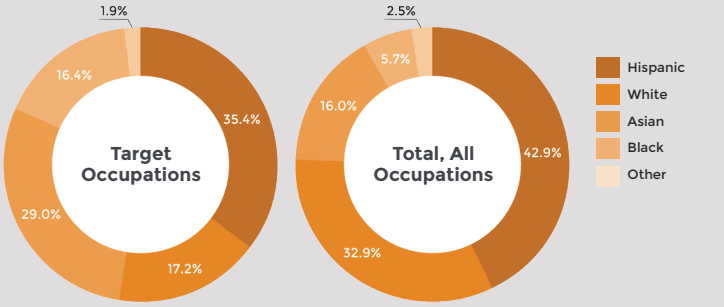
EDUCATIONAL ATTAINMENT 2016



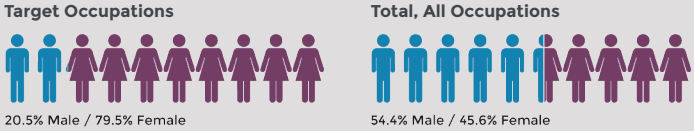
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016

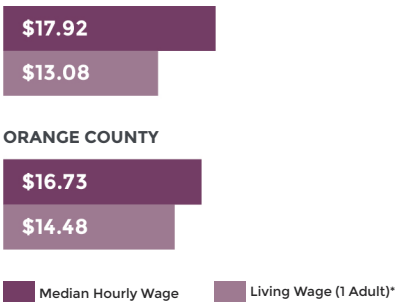


Pharmacy Technicians

(SOC 29-2052)

Prepare medications under the direction of a pharmacist. May measure, mix, count out, label, and record amounts and dosages of medications according to prescription orders.

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

3,510 → **27.0%**

Pharmacy Technicians employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Pharmacy Technicians are hired across a number of different industries. The three industry subsectors employing this occupation in the LA Basin are:

- Health and Personal Care Stores (NAICS 446)
- Hospitals (NAICS 622)
- General Merchandise Stores (NAICS 452)

5-YR PROJECTION

1,540

Total projected openings 2021 (5-Yr)

890 Net Job Change
660 5-Yr Replacements

760

Health Care-related projected openings 2021

590 Net Job Change
170 5-Yr Replacements

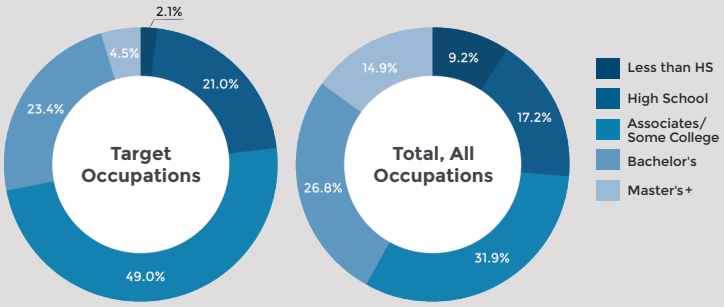
13,220

Industry jobs in LA/OC 2016

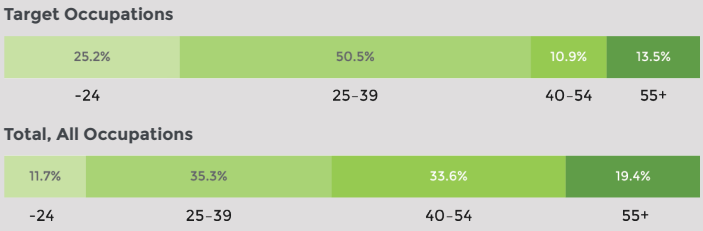
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

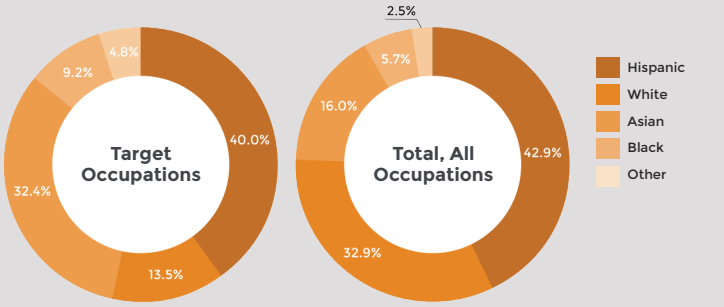
EDUCATIONAL ATTAINMENT 2016



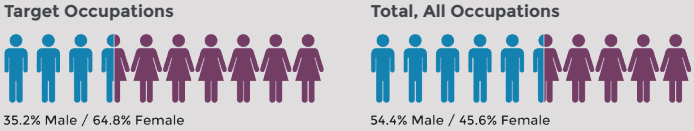
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016



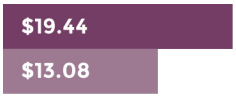
Medical Records & Health Information Technicians

(SOC 29-2071)

Compile, process, and maintain medical records of hospital and clinic patients in a manner consistent with medical, administrative, ethical, legal, and regulatory requirements of the health care system. Classify medical and health care concepts, including diagnosis, procedures, medical services, and equipment, into the health care industry's numerical coding system. Includes medical coders.

2016 HOURLY WAGES IN LA BASIN

LOS ANGELES



ORANGE COUNTY

Median Hourly Wage Living Wage (1 Adult)*

** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

6,150 → **71.0%**

Medical Records & Health Info. Tech. employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Medical Records & Health Information Technicians are hired across a number of different industries; however, a significant number are employed by the health care industry. The three industry subsectors employing this occupation in the LA Basin are:

- Hospitals (NAICS 622)
- Ambulatory health care services (NAICS 621)
- Nursing and residential care facilities (NAICS 623)

5-YR PROJECTION

1,790

Total projected openings 2021 (5-Yr)

850 Net Job Change
940 5-Yr Replacements

1,200

Health Care-related projected openings 2021

510 Net Job Change
690 5-Yr Replacements

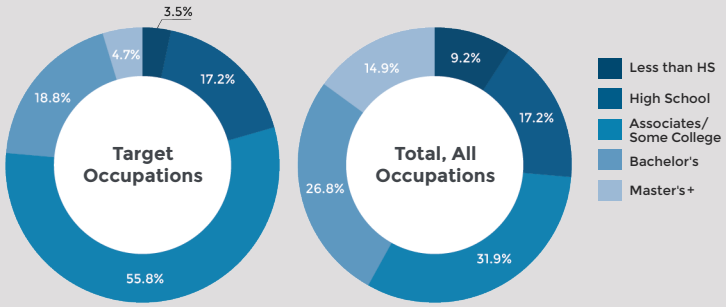
8,370

Industry jobs in LA/OC 2016

Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

EDUCATIONAL ATTAINMENT 2016

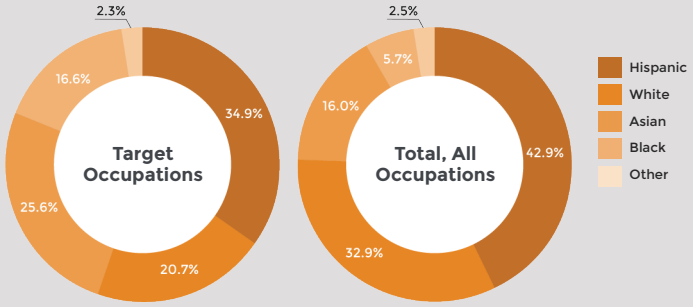


AGE DISTRIBUTION 2016

Target Occupations

Total, All Occupations

RACE & ETHNICITY 2016



GENDER 2016

Target Occupations

28.8% Male / 71.2% Female

Total, All Occupations

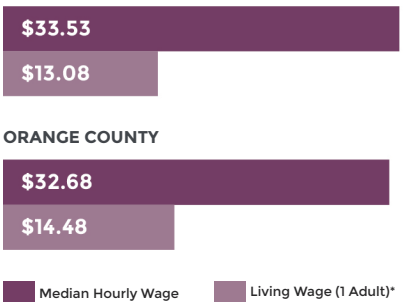
54.4% Male / 45.6% Female

Radiologic Technologists

(SOC 29-2034)

Take x-rays and CAT scans or administer nonradioactive materials into patient's bloodstream for diagnostic or research purposes. Includes radiologic technologists and technicians who specialize in other scanning modalities.

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

6,040 → **97.0%**

Radiologic Technologists employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Radiologic Technologists are hired across a number of different industries; however, a large number are hired by hospitals. The three industry subsectors employing this occupation in the LA Basin are:

- Hospitals (NAICS 622)
- Ambulatory Health Care Services (NAICS 621)
- Administrative Support Services (NAICS 561)

5-YR PROJECTION

1,370

Total projected openings 2021 (5-Yr)

780 Net Job Change
590 5-Yr Replacements

1,350

Health Care-related projected openings 2021

780 Net Job Change
570 5-Yr Replacements

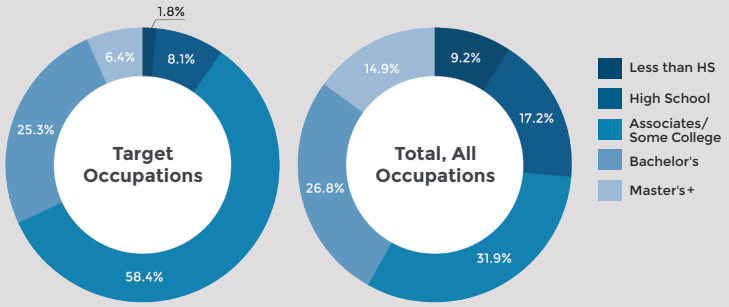
7,190

Industry jobs in LA/OC 2016

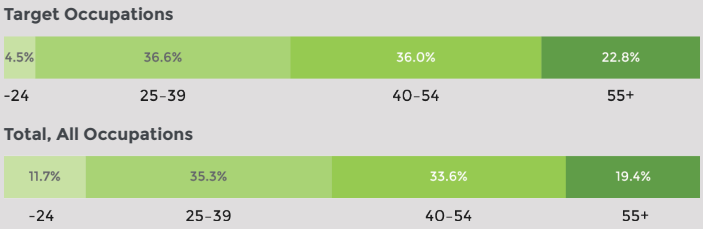
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

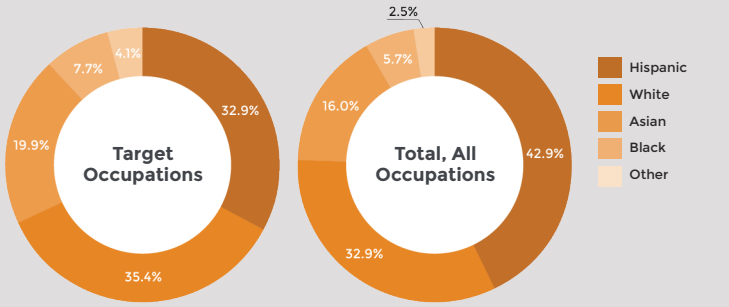
EDUCATIONAL ATTAINMENT 2016



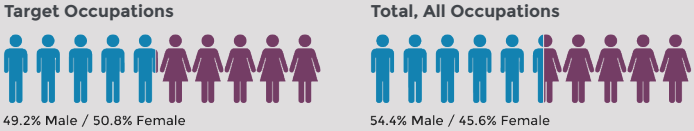
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016

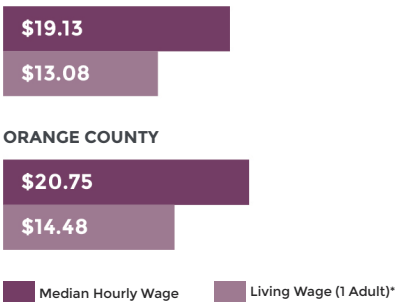


Medical & Clinical Laboratory Technicians

(SOC 29-2012)

Perform routine medical laboratory tests for the diagnosis, treatment, and prevention of disease. May work under the supervision of a medical technologist.

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

6,570 → **93.0%**

Medical & Clinical Laboratory Technicians employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Medical & Clinical Laboratory Technicians are primarily hired by the health care industry. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory Health Care Services (NAICS 621)
- Hospitals (NAICS 622)
- Administrative and support services (NAICS 561)

5-YR PROJECTION

1,480

Total projected openings 2021 (5-Yr)

620 Net Job Change
860 5-Yr Replacements

1,350

Health Care-related projected openings 2021

570 Net Job Change
780 5-Yr Replacements

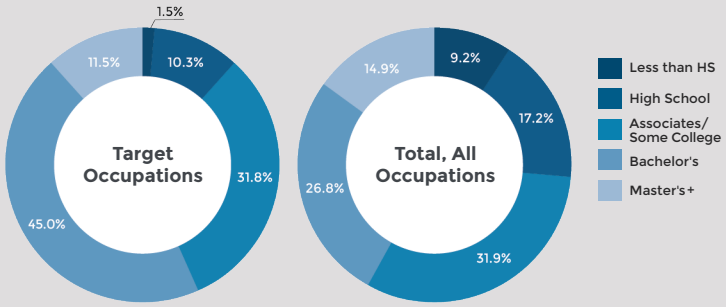
7,190

Industry jobs in LA/OC 2016

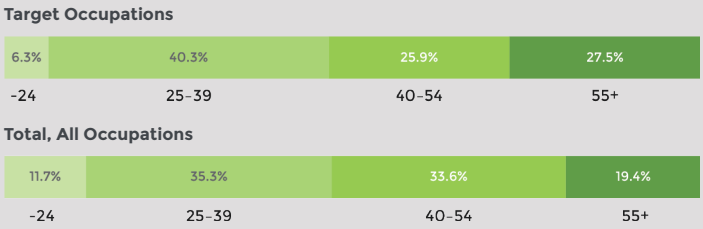
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

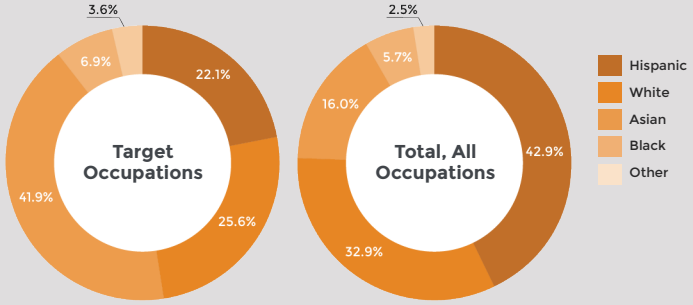
EDUCATIONAL ATTAINMENT 2016



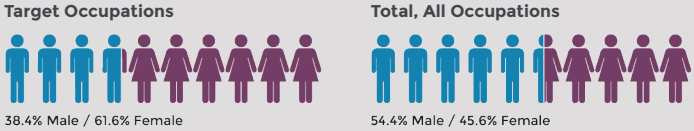
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016



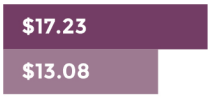
Emergency Medical Technicians & Paramedics

(SOC 29-2041)

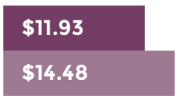
Assess injuries and illnesses and administer basic emergency medical care. May transport injured or sick persons to medical facilities.

2016 HOURLY WAGES IN LA BASIN

LOS ANGELES



ORANGE COUNTY



Median Hourly Wage | Living Wage (1 Adult)*

** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

5,860 → **95.0%**

Emergency Medical Technicians & Paramedics employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Emergency Medical Technicians & Paramedics are mostly employed by ambulatory health care services. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory Health Care Services (NAICS 621)
- Hospitals (NAICS 622)
- Local Government (NAICS 93)

5-YR PROJECTION

1,130

Total projected openings 2021 (5-Yr)
630 Net Job Change
500 5-Yr Replacements

1,140

Health Care-related projected openings 2021
660 Net Job Change
480 5-Yr Replacements

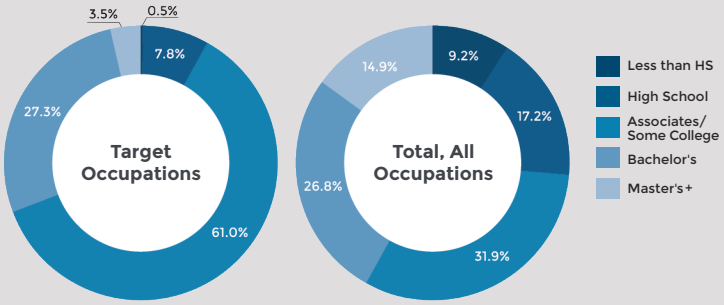
6,170

Industry jobs in LA/OC 2016

Worker Characteristics

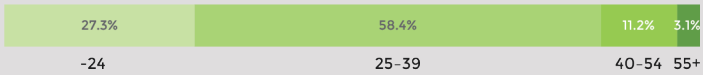
The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

EDUCATIONAL ATTAINMENT 2016



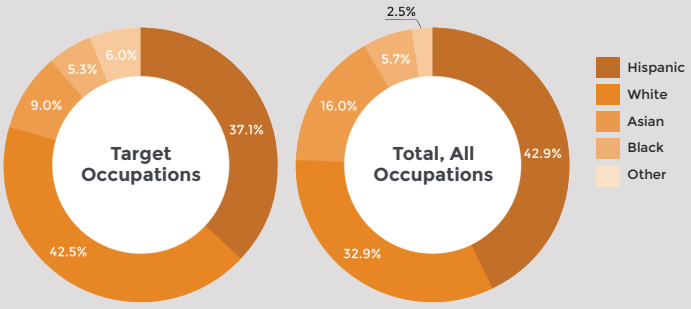
AGE DISTRIBUTION 2016

Target Occupations



Total, All Occupations

RACE & ETHNICITY 2016



GENDER 2016

Target Occupations

79.4% Male / 20.6% Female

Total, All Occupations

54.4% Male / 45.6% Female

Dental Hygienists

(SOC 29-2021)

Administer oral hygiene care to patients. Assess patient oral hygiene problems or needs and maintain health records. Advise patients on oral health maintenance and disease prevention. May provide advanced care such as providing fluoride treatment or administering topical anesthesia.

2016 HOURLY WAGES IN LA BASIN

** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

7,580 → **99.0%**

Dental Hygienists employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Dental Hygienists are virtually only hired by the health care industry. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory Health Care Services (NAICS 621)
- Educational Services (NAICS 611)
- Administrative and Support Services (NAICS 561)

5-YR PROJECTION

1,130

Total projected openings 2021 (5-Yr)

510 Net Job Change
630 5-Yr Replacements

1,130

Health Care-related projected openings 2021

510 Net Job Change
620 5-Yr Replacements

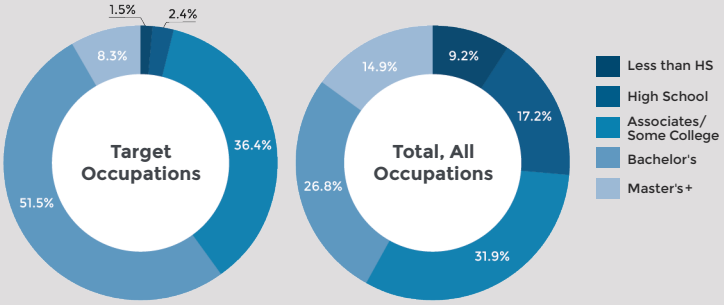
7,630

Industry jobs in LA/OC 2016

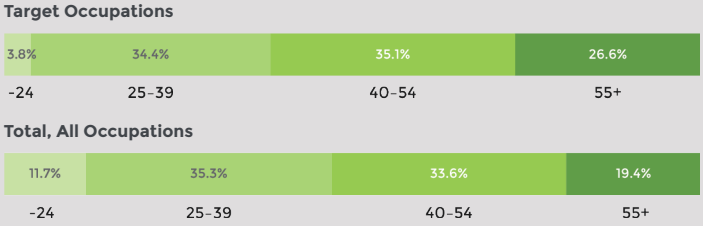
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

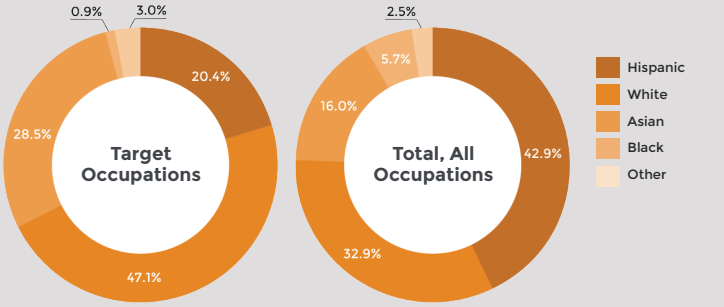
EDUCATIONAL ATTAINMENT 2016



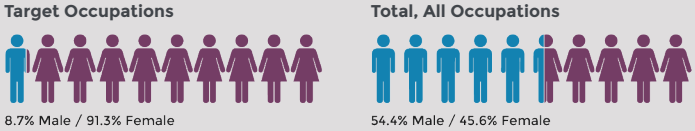
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016

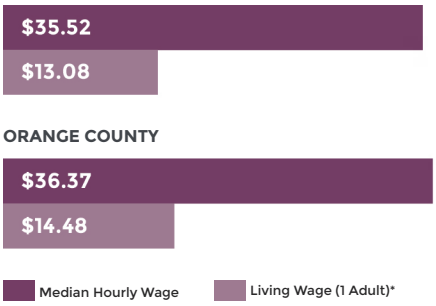


Respiratory Therapists

(SOC 29-1126)

Assess, treat, and care for patients with breathing disorders. Assume primary responsibility for all respiratory care modalities, including the supervision of respiratory therapy technicians. Initiate and conduct therapeutic procedures; maintain patient records; and select, assemble, check, and operate equipment.

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

6,210 → **95.0%**

Respiratory Therapists employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Respiratory Therapists are mostly hired by hospitals, although some are employed in other industries. The three industry subsectors employing this occupation in the LA Basin are:

- Hospitals (NAICS 622)
- Nursing and Residential Care Facilities (NAICS 623)
- Ambulatory Health Care Services (NAICS 621)

5-YR PROJECTION

1,240

Total projected openings 2021 (5-Yr)

470 Net Job Change
770 5-Yr Replacements

1,280

Health Care-related projected openings 2021

550 Net Job Change
730 5-Yr Replacements

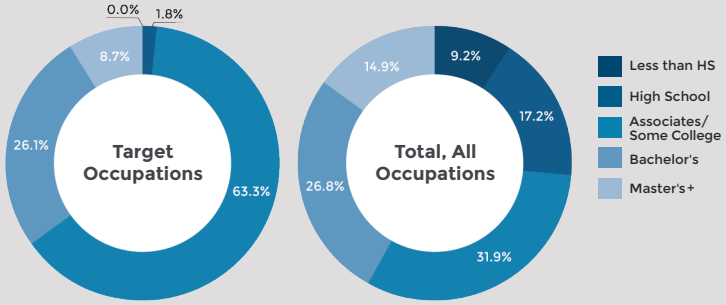
6,530

Industry jobs in LA/OC 2016

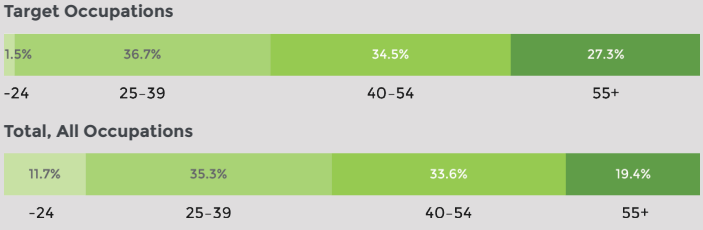
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

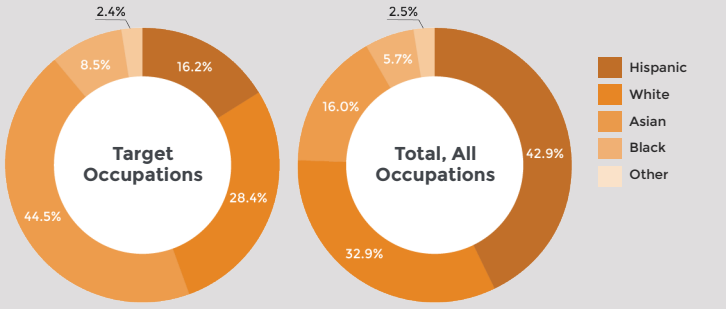
EDUCATIONAL ATTAINMENT 2016



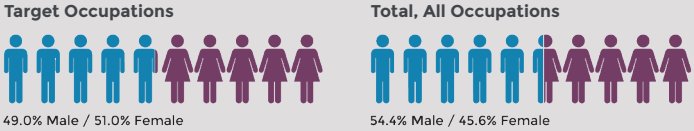
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016



Phlebotomists

(SOC 31-9097)

Draw blood for tests, transfusions, donations, or research. May explain the procedure to patients and assist in the recovery of patients with adverse reactions.

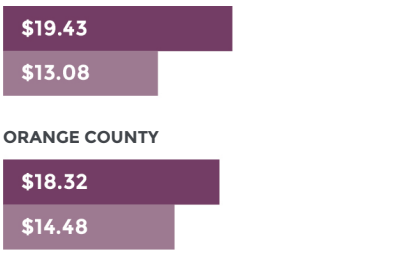
5-YR PROJECTION

850
Total projected openings 2021 (5-Yr)
260 Net Job Change
590 5-Yr Replacements

730
Health Care-related projected openings 2021
170 Net Job Change
550 5-Yr Replacements

5,620
Industry jobs in LA/OC 2016

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

5,280 → **94.0%**

Phlebotomists employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

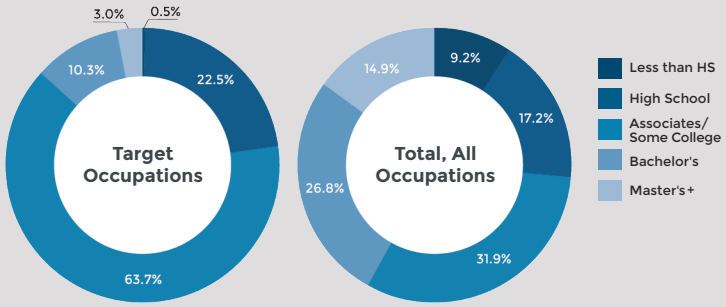
Phlebotomists are broadly employed in the health care industry. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory Health Care Services (NAICS 621)
- Hospitals (NAICS 622)
- Administrative and Support Services (NAICS 561)

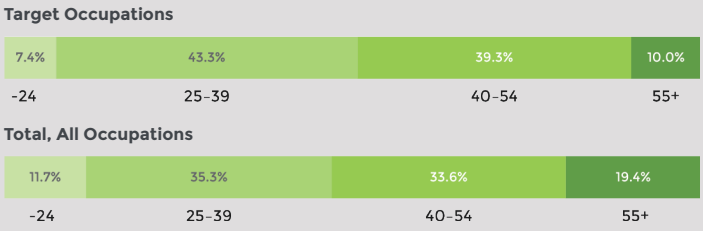
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

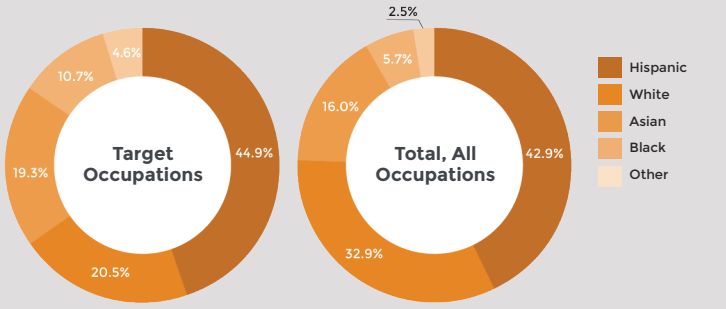
EDUCATIONAL ATTAINMENT 2016



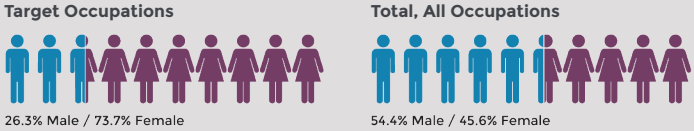
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016



Magnetic Resonance Imaging (MRI) Technologists

(SOC 29-2035)

Operate MRI scanners. Monitor patient safety and comfort, and view images of area being scanned to ensure quality of pictures. May administer gadolinium contrast dosage intravenously. May interview patient, explain MRI procedures, and position patient on examining table. May enter into the computer data such as patient history, anatomical area to be scanned, orientation specified, and position of entry.

2016 HOURLY WAGES IN LA BASIN

LOS ANGELES

ORANGE COUNTY

Median Hourly Wage Living Wage (1 Adult)*

** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

1,100 → **98.0%**

MRI Technologists employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Magnetic Resonance Imaging (MRI) Technologists are almost entirely employed in the health care industry. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory Health Care Services (NAICS 621)
- Hospitals (NAICS 622)
- Educational Services (NAICS 611)

5-YR PROJECTION

400

Total projected openings 2021 (5-Yr)

280 Net Job Change
110 5-Yr Replacements

390

Health Care-related projected openings 2021

280 Net Job Change
110 5-Yr Replacements

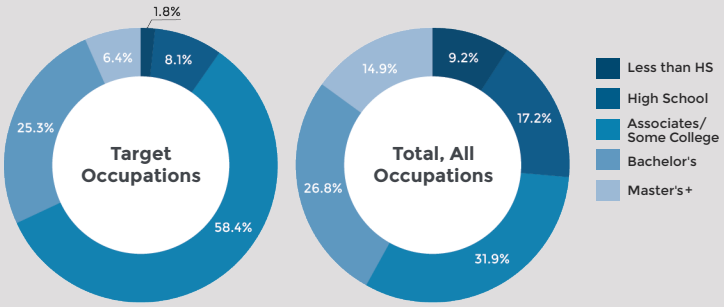
1,140

Industry jobs in LA/OC 2016

Worker Characteristics

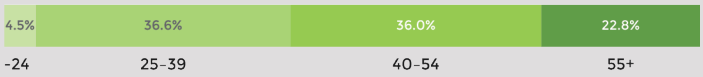
The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

EDUCATIONAL ATTAINMENT 2016



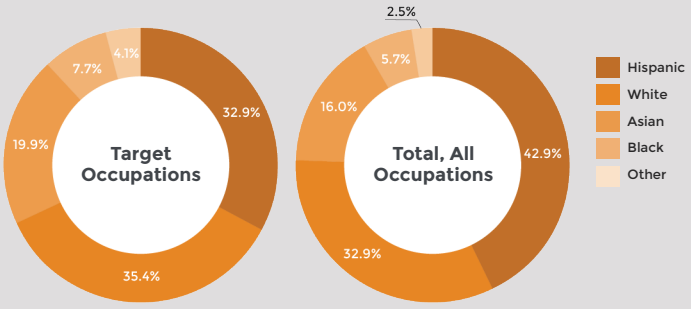
AGE DISTRIBUTION 2016

Target Occupations



Total, All Occupations

RACE & ETHNICITY 2016



GENDER 2016

Target Occupations

49.2% Male / 50.8% Female

Total, All Occupations

54.4% Male / 45.6% Female

Cardiovascular Technologists & Technicians

(SOC 29-2031)

Cardiovascular technologists and technicians conduct tests on pulmonary or cardiovascular systems of patients for diagnostic, therapeutic, or research purposes. They may conduct or assist in electrocardiograms, cardiac catheterizations, pulmonary functions, lung capacity, and similar tests.

2016 HOURLY WAGES IN LA BASIN

LOS ANGELES

ORANGE COUNTY

Median Hourly Wage | Living Wage (1 Adult)*

** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

1,660 → **98.0%**

Cardiovascular Technologists & Technicians employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Cardiovascular Technologists & Technicians almost exclusively employed in health services. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory Health Care Services (NAICS 621)
- Education Services (NAICS 611)
- Administrative and Support Services (NAICS 561)

5-YR PROJECTION

420

Total projected openings 2021 (5-Yr)

270 Net Job Change
150 5-Yr Replacements

420

Health Care-related projected openings 2021

250 Net Job Change
180 5-Yr Replacements

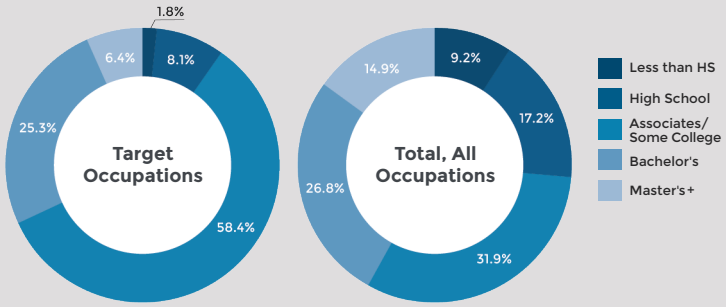
1,660

Industry jobs in LA/OC 2016

Worker Characteristics

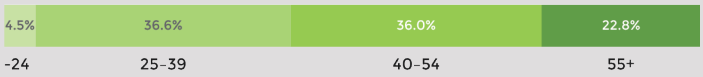
The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

EDUCATIONAL ATTAINMENT 2016



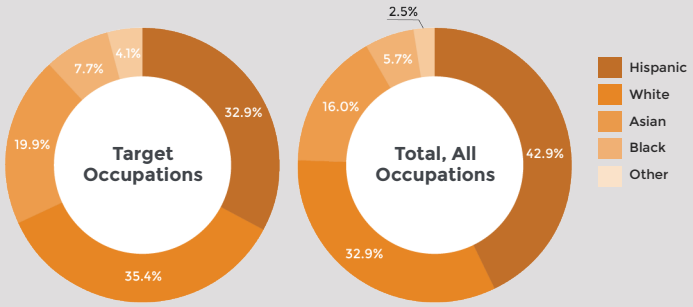
AGE DISTRIBUTION 2016

Target Occupations



Total, All Occupations

RACE & ETHNICITY 2016



GENDER 2016

Target Occupations

49.2% Male / 50.8% Female

Total, All Occupations

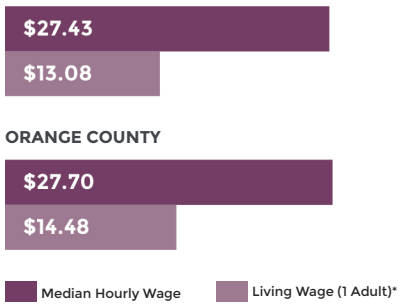
54.4% Male / 45.6% Female

Surgical Technologists

(SOC 29-2055)

Assist in operations, under the supervision of surgeons, registered nurses, or other surgical personnel. They may help set up operating rooms, prepare and transport patients for surgery, adjust lights and equipment, pass instruments and other supplies to surgeons and surgeon's assistants, hold retractors, cut sutures, and help count sponges, needles, supplies and instruments.

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

3,730 → **96.0%**

Surgical Technologists employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Surgical Technologists are hired across a number of different industries; however, most are employed in health services. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory Health Care Services (NAICS 621)
- Education Services (NAICS 611)
- Administrative and Support Services (NAICS 561)

5-YR PROJECTION

410

Total projected openings 2021 (5-Yr)

220 Net Job Change
190 5-Yr Replacements

440

Health Care-related projected openings 2021

250 Net Job Change
180 5-Yr Replacements

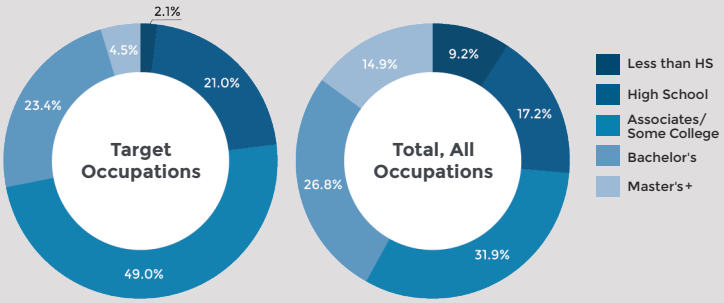
3,880

Industry jobs in LA/OC 2016

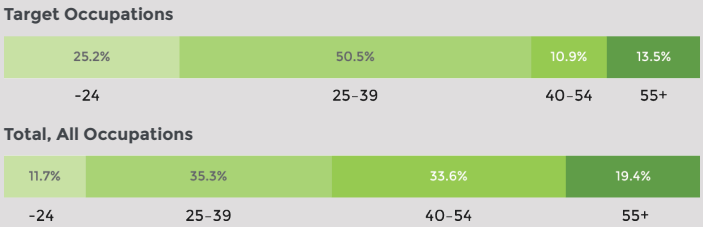
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

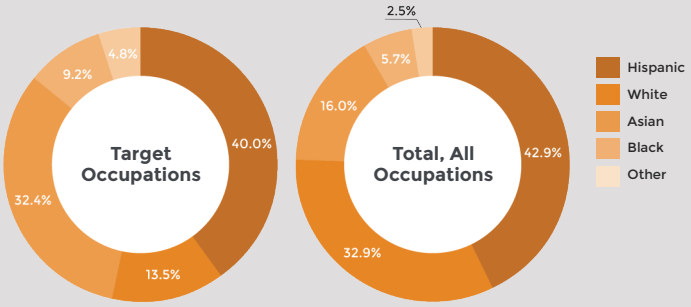
EDUCATIONAL ATTAINMENT 2016



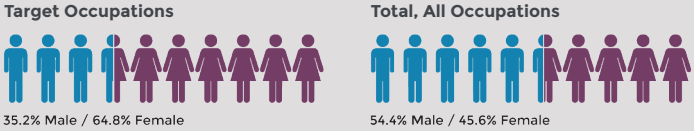
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016



Medical & Clinical Laboratory Technologists

(SOC 29-2011)

Medical and clinical laboratory technologists perform complex medical laboratory tests for diagnosis, treatment, and prevention of disease. They may train or supervise staff.

2016 HOURLY WAGES IN LA BASIN

LOS ANGELES

ORANGE COUNTY

Median Hourly Wage | Living Wage (1 Adult)*

** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

4,990 → **90.0%**

Medical & Clinical Laboratory Technologists employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Medical & Clinical Laboratory Technologists are hired across a number of different industries with most are employed in health services. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory health care services (NAICS 621)
- Hospitals (NAICS 622)
- Administrative and support services (NAICS 561)

5-YR PROJECTION

690

Total projected openings 2021 (5-Yr)

10 Net Job Change
680 5-Yr Replacements

500

Health Care-related projected openings 2021

-100 Net Job Change
500 5-Yr Replacements

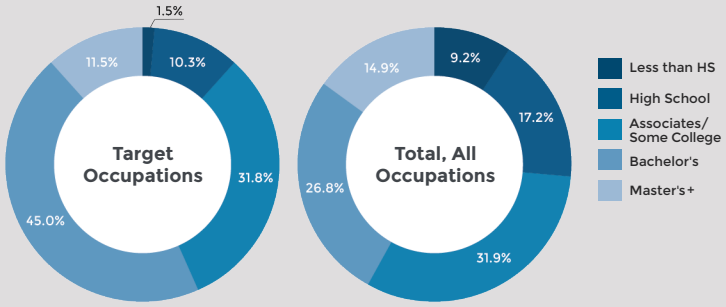
5,660

Industry jobs in LA/OC 2016

Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

EDUCATIONAL ATTAINMENT 2016

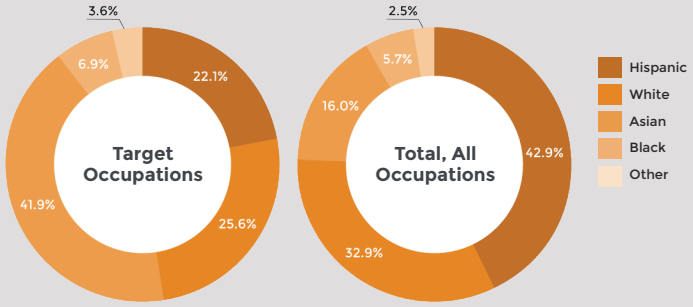


AGE DISTRIBUTION 2016

Target Occupations

Total, All Occupations

RACE & ETHNICITY 2016



GENDER 2016

Target Occupations

38.4% Male / 61.6% Female

Total, All Occupations

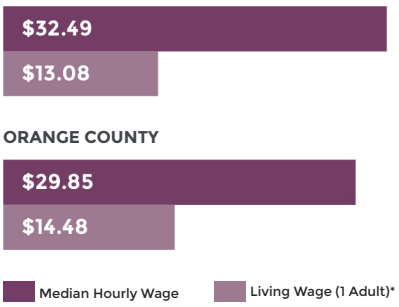
54.4% Male / 45.6% Female

Physical Therapist Assistants

(SOC 31-2021)

Assess, plan, organize, and participate in rehabilitative programs that improve mobility, relieve pain, increase strength, and improve or correct disabling conditions resulting from disease or injury.

2016 HOURLY WAGES IN LA BASIN



** MIT Living Wage Calculator*

2016 INDUSTRY DISTRIBUTION

2,210 → **97.0%**

Physical Therapist Assistants employed in Health Care industry in the LA Basin

Percentage of employment in this occupation across all industries

Physical Therapist Assistants are hired almost exclusively in health services. The three industry subsectors employing this occupation in the LA Basin are:

- Ambulatory health care services (NAICS 621)
- Hospitals (NAICS 622)
- Nursing and residential care facilities (NAICS 623)

5-YR PROJECTION

450

Total projected openings 2021 (5-Yr)

120 Net Job Change
330 5-Yr Replacements

430

Health Care-related projected openings 2021

110 Net Job Change
320 5-Yr Replacements

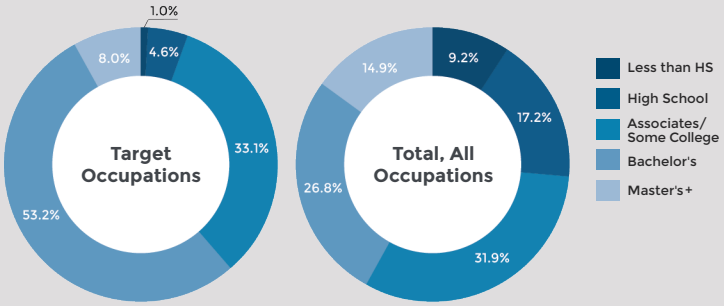
2,290

Industry jobs in LA/OC 2016

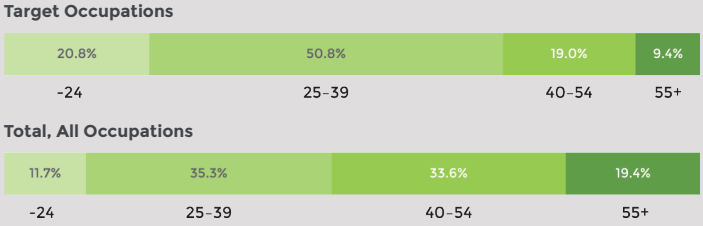
Worker Characteristics

The demographics of the workforce provide an additional layer of information to further highlight who is employed in this occupation in the LA Basin:

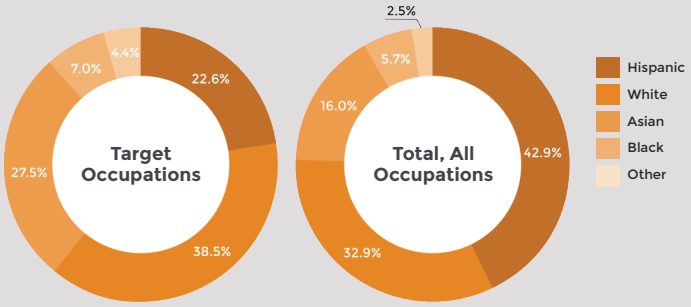
EDUCATIONAL ATTAINMENT 2016



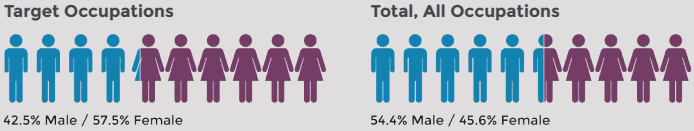
AGE DISTRIBUTION 2016



RACE & ETHNICITY 2016



GENDER 2016



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Economic Impact

Analysis of Economic Impact of Health Care Services

The extent to which an industry's impact extends to other sectors of the economy and into local households depends on the share of industry revenue recirculated within the region. The total economic contribution of the health care industry to the economy of the Los Angeles Basin is magnified through its supply chain and payroll spending.

Where the Health Care Industry Spends Its Revenues

Firms generate revenues through sales of their products and services, and use those funds to purchase the inputs needed to produce their products and services, pay workers and taxes, and generate a return on capital in the form of profits.

Health care impacts a broad spectrum of industries through its supply chain.

In 2016 (the most recent data available), the health care industry spent $44.3 billion on labor payments and distributed $5.5 billion in profits (Exhibit 22). Purchases of intermediate inputs into production reached $28.0 billion, accounting for 35.6 percent of all outlays. Tax payments represent a very small percentage of all outlays.

The overall impact that an industry has on the broader regional economy depends upon the expenditures made within the region. In general, outlays for labor costs occur locally, and households are supported by these earnings.

If most of the inputs used in production are purchased from local suppliers, those firms experience increased demand for their products and can ramp up hiring, thereby supporting additional households in the region. If, on the other hand, most of the inputs are purchased elsewhere in the nation, then these purchases have no impact locally (other than perhaps in their transportation and storage) and the industry itself generates fewer indirect effects.

Together, labor costs and regional purchases of intermediate inputs determine the spillover, or multiplier, impacts of the industry.

$7.87 BILLION TOTAL OUTLAYS IN 2016

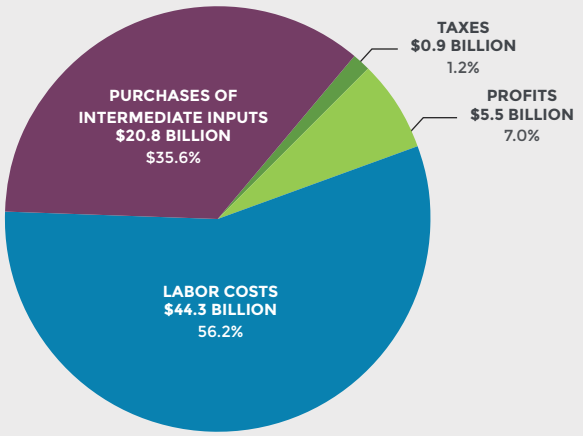

EXHIBIT 22:
How the health care industry allocates revenues.

Sources: BEA; Analysis by LAEDC

The Health Care Industry's Regional Economic Contribution

The contribution of the health care industry to the regional economy is measured by analyzing its direct activity, as well as indirect and induced activity. This contribution is dependent on the payments made to suppliers of intermediate goods and services in the region and payments made to workers, who usually live locally and spend most of their incomes on household purchases from local suppliers.

In addition to the 588,330 direct payroll jobs in the health care industry, there were 39,330 contingent workers in the industry. An additional 165,470 jobs were supported in 2016 through indirect effects of supply chain purchases (those made outside the industry) (Exhibit 23). More than 207,300 jobs were supported through the household spending of employees in the industry and its supply chain.

Labor income (which includes wages and benefits) earned by all health care services-supported employment in the Los Angeles Basin reached $65.3 billion in 2016. This accounts for just under 12 percent of all labor income paid in the region.

The industry produced $89.7 billion in value-added, which accounted for 9.5 percent of the Los Angeles Basin's gross regional product (Exhibit 24).

The overall impacts of the health care industry are widely distributed across many sectors of the economy through indirect and induced effects, including construction, food services, manufacturing industries, real estate, rental, leasing, wholesale trade, professional and technical services, and administrative support and waste services.

The health care industry's total fiscal impact in 2016—including direct, indirect and induced activity—exceeded $21 billion (Exhibit 25). This includes, for example, property taxes paid by firms and households, sales taxes on consumption purchases, personal and corporate income, and payroll taxes paid for and by employees.

Health Care Services Supply Chain Analysis

The intermediate purchases of the health care industry comprise an important part of the overall economic contribution of the industry. It was shown above that these accounted for 35.6 percent of the industry outlays, or $28.0 billion, in 2016.

Gross inputs are a combination of goods and services. In this industry, approximately 30 percent of intermediate goods are financial activities-related services, such as insurance and credit intermediation (Exhibit 26). Manufactured goods accounted for just over 20 percent of intermediate inputs. These include pharmaceuticals, medical devices, lab and surgical instruments, and irradiation apparatus. Trade, transportation and utilities, and information services, respectively, accounted for 9 percent and 3 percent of intermediate inputs, including such services as patient transport services, power and electric, wholesale purchases and data processing, hosting, and related services. The remaining 9 percent of inputs were provided by other industries.

Regional Purchase Gap

The ability of a region to fill the demands of its industries speaks to the richness and diversity of the regional economy. Not all regions can effectively compete, or wish to compete, with suppliers of specific goods and services based elsewhere. Industries making purchases of goods elsewhere are clearly benefiting from lower costs, better quality or other advantages to importing intermediate goods rather than purchasing from local firms.

About 90 percent of the health care industry's purchases of professional and business services and financial services, which includes insurance, are from firms in the LA Basin.

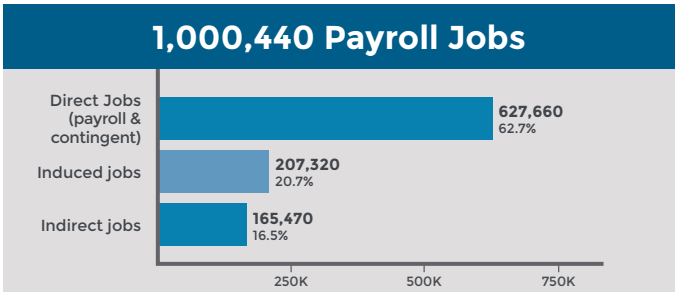

EXHIBIT 23:
Direct, indirect and induced jobs resulting from the health care industry.

	DIRECT	TOTAL	% OF LA BASIN
Output ($ billions)	$78.70	$140.90	9.20%
Employment (jobs)*	627,660	1,000,440	11.80%
Labor Income ($ billions)	$44.30	$65.30	11.90%
Value-Added ($ billions)	$50.70	$89.70	9.50%

*Includes contingent workers

Sources: Estimates by LAEDC

EXHIBIT 24:
The health care industry's total economic contribution, 2016.

TYPE OF TAX	$ BILLIONS
Personal income taxes	$7.90
Social insurance	$7.40
Sales and excise taxes	$2.20
Property taxes	$1.40
Corporate profits taxes	$1.60
Other taxes	$1.00
TOTAL	$21.40

TYPE OF GOVERNMENT	$ BILLIONS
Federal	$14.70
State	$4.60
Counties	$1.50
Cities	$0.60
TOTAL	$21.40

Sources: Estimates by LAEDC

EXHIBIT 25:
The health care industry's total fiscal impacts by type.

The percent of all inputs purchased regionally are shown on the right of Exhibit 26. In general, financial services, which includes insurance, and professional and business services are purchased from regional suppliers. Firms in the health care services industry purchase about 90 percent of these services from regional suppliers. Similarly, the region is able to supply the industry with most of its needs locally, with regional purchases accounting for more than 85 percent of the industry's purchases of trade, transportation and utilities, information, leisure and hospitality, other services, construction, and education and health services.

In contrast, just 27 percent of the industry's purchases of manufacturing-related goods and services occur in the Los Angeles Basin.

Because this represents a small share of the industry's intermediate inputs, the impact on the overall regional supply pipeline is very small in magnitude related to this lost opportunity. In terms of value, the industry spends about $6.5 billion with firms outside the region.

The percentage of intermediate goods and services that an industry is able to purchase from local suppliers has a direct impact on its contribution to the region's economic activity. The higher that percentage, the larger the multiplying effects that its revenues will have, which translates to increased wealth generation for the region.

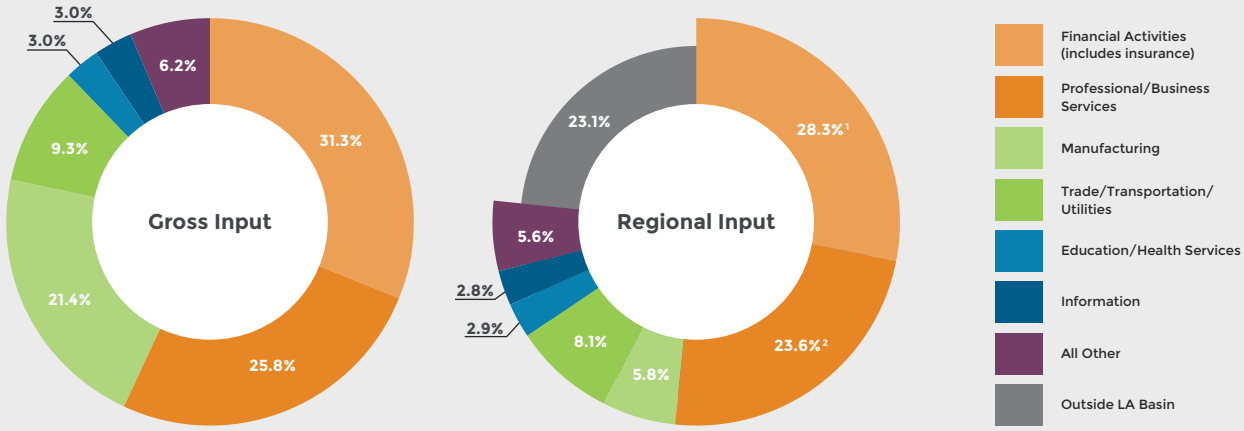

EXHIBIT 26:
Health care services, regional provision of inputs.

[1] *90 percent of industry purchases are financial activities/services made in LA Basin*
[2] *91 percent of industry purchases of professional/business services are made in the LA Basin*

Appendix

How (and Why) We Did What We Did

Numerous data sources and methodologies were used to measure the target industry for this deep dive.

Industry Forecast

An economic forecast is created to project employment by industry over the next five years using statistical analysis of historical data paired with the most recent qualitative information impacting a set of 151 industries in the Los Angeles Basin. The industries configured for this forecast are defined through the North American Industry Classification System (NAICS) and comprise industries denoted with 2-digit, 3-digit and 4-digit codes through the NAICS hierarchical classification system. A key input for the regional forecast is projected population growth in Los Angeles and Orange counties, provided by the California Department of Finance. State and national trends concerning production methods, consumer behavior, construction and property values that correspond to each industry are a few of the inputs used for the economic forecast model.

Occupations and Projections

Occupations are commonly classified using the Standard Occupational Classification (SOC) system, developed by the Bureau of Labor Statistics. This system classifies workers into 840 detailed occupations that share similar job duties, skills, education and training. These occupations are not industry-specific, but are common to many industries. For example, retail salespersons are employed in a full spectrum of industries, from department and discount stores to computer systems design.

The economic forecast for employment by industry is used to guide a projection of net new jobs for each occupation, calculated by applying the industry occupational composition to the detailed industry employment forecast; occupational forecasts are aggregated across industries.

The United States Census Bureau estimates replacement needs by industry and occupation through detailed surveys of employers and households. These take into account industry changes, the age of the current workforce within each industry and occupation, and the nature of the career path. These estimates are an important component of occupational job openings and workforce development needs, since the retirement and promotion of individuals leave openings for new entrants and those moving up the career ladder. Total openings are the sum of projected five-year replacement needs and positive net new jobs forecast over the period.

Target Industries and Occupations

Target industries are selected using a variety of metrics: middle-skill job share; the projected change in middle-skill jobs from 2016 to 2021 (number and rate); the five-year job replacement rate; the 2016 location quotient; the change in location quotient from 2011 to 2016; the 2016 annual average wage relative to all industries; and value added per worker. (Middle-skill jobs require education and training beyond a high school diploma but less than a bachelor's degree.)

Target occupations are selected in a two-step process. First, all occupations identified as middle-skill are isolated from each target industry. Then, a variety of metrics are used to select target occupations: 2016 employment; projected net job change; replacement rate; number of projected replacement jobs from 2016 to 2021; number of projected total job openings from 2016 to 2021; and annual median wages.

Location Quotient

A common metric to assess a region's competitiveness is employment concentration or location quotients. A location quotient for an industry in a specific region compares the percent of total employment in the industry to the average percent nationwide. For example, if 4 percent of employment in a region is in the aerospace industry compared to 2 percent across the nation, the location quotient for the region's aerospace industry is 2, indicating the region is more specialized in aerospace than the nation.

A location quotient equal to 1.0 indicates the employment concentration in the region is equal to the nation, meaning the region is not highly-specialized in that industry. Higher location quotients imply a competitive advantage. While there can be some variation in this metric, the location quotient threshold of 1.2 usually demonstrates regional specialization and competitiveness.

Supply

Community colleges and other two-year educational institutions provide education and training relevant to middle-skill occupations. Comparing occupations with related training programs provides information for supply-and-demand analysis. The number of awards conferred by community colleges reflects the most recent data available from the 2015-16 academic year. Award data for other two-year education institutions is from the 2014-2015 academic year. Due to data and timing limitations, training gap forecasts are an approximation of unmet labor demand do not represent an absolute oversupply or undersupply of available talent. In addition, a one-to-one relationship between program completions and occupational demand does not exist because some programs train for multiple occupations. Consequently, awards for some education and training programs overall with multiple occupations.

Economic Impact & Contribution Analysis

Economic contribution analysis is used to estimate the portion of a region's economic activity that can be attributed to an existing industry sector, including the expenditure of money for goods and services from regional vendors. These purchases circulate throughout the regional economy.

The health care services industries spend billions of dollars every year on wages and benefits for employees and contingent workers. These workers, as well as the employees of all suppliers, spend a portion of their incomes on groceries, rent, vehicle expenses, health care, entertainment, and so on. This recirculation of household earnings multiplies the initial industry spending through indirect and induced effects.

The extent to which the initial expenditures multiply is estimated using economic models that depict the relationships between industries (such as hospitals and its suppliers) and among different economic agents (such as industries and their employees). These models are built upon data of expenditure patterns reported to the Bureau of Labor Statistics, U.S. Census Bureau and Bureau of Economic Analysis of the U.S. Department of Commerce. Data is regionalized to reflect local conditions such as wage rates, commuting patterns, and resource availability and costs.

The magnitude of the multiplying effect differs from one region to another depending on the extent to which the local region can fill the demand for all rounds of supplying needs. For example, the automobile manufacturing industry has high multipliers in Detroit and Indiana since these regions have deep supplier networks, while the same industry multiplier in Phoenix is quite small. In another example, the jobs multiplier for the construction industry is higher in, say, Arkansas, than in California because a given amount of spending will purchase fewer workers in Los Angeles than in Little Rock.

Multipliers also differ from year to year as relative material and labor costs change and as the production "recipe" of industries change. For example, the IT revolution significantly reduced the job multiplier of many industries (such as manufacturing, accounting and publishing) as computers replaced administrative and production workers.

The metrics used to determine the value of the economic contribution are employment, labor income, value-added and the value of output. Employment includes full-time, part-time, permanent and seasonal employees and the self-employed, and is measured on a job-count basis regardless of the number of hours worked. Labor income includes all income received by both payroll employees and the self-employed, including wages and benefits such as health insurance and pension plan contributions. Value-added is the measure of the contribution to GDP made by the industry, and consists of compensation of employees, taxes on production and gross operating surplus (otherwise known as profit). Output is the value of the goods and services produced. For most industries, this is simply the revenues generated through sales; for others, such as retail, output is the value of the services supplied.

Estimates are developed using software and data from IMPLAN Group, LLC which traces inter-industry transactions resulting from an increase in demand in a given region. The economic region of interest in this document is the Los Angeles Basin. The activity is reported for 2016, the most recent year for which a complete set of data is available. Estimates for labor income and output are expressed in 2016 dollars to maintain consistency with the reported industry activity.

The total estimated economic contribution includes direct, indirect and induced effects. Direct activity includes materials purchased and employees hired by the industry itself. Indirect effects are those which stem from employment and business revenues resulting from purchases made by the industry and any of its suppliers. Induced effects are those generated by household spending of employees whose wages are sustained by both direct and indirect spending.

Contribution analysis differs from economic impact analysis in that linkages between the individual component industries are removed, so that indirect activity is not double-counted as part of direct activity. For example, firms in the aerospace industry purchase supplies from smaller manufacturers of aerospace parts, which would then be included as both direct revenue of the parts supplier and as an expense of the aerospace industry, resulting in a double-counting of overall revenue. Breaking these inter-industry linkages eliminates this double-counting and is a more accurate method of estimating the economic contribution of the industry cluster.

Data Sources

All data was obtained from the Bureau of Labor Statistics and the Census Bureau. Annual employment and payroll data are from the Quarterly Census of Employment and Wages series. Estimates for non-disclosed employment and payroll data were produced using proportional shares of the prior year's data or using midpoint estimates from the Census Bureau's County Business Patterns dataset. Occupational data are from the Occupational Employment Statistics program. Unless noted otherwise, all data is for the 2016 calendar year.

Supply Chain and Output Analysis

Composition of gross output is a metric tracked by the BEA at the state level. It is assumed that the proportion attributable to each component of this metric at the county level is comparable to that at the state level. This seems reasonable given the size of the Los Angeles Basin and its economic activity in the state. Estimates of regional purchases of intermediate goods and services are produced using econometric models by the IMPLAN Group, LLC.

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HEALTH CARE SERVICES: MAY 2018