

Computed Tomography

Inland Empire/Desert Region (Riverside and San Bernardino counties combined)

This workforce demand report uses state and federal job projection data that was developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.

Summary

- Employment for occupations related to computed tomography is expected to **increase by 16% between 2019 and 2024** in the Inland Empire/Desert Region. A total of **834 annual job openings** will be available each year over the five-year timeframe.
- The 50th percentile, entry-level hourly wages for occupations related to computed tomography are between **\$20.28 and \$49.80**. Median wages, except for health technologists and technicians, all other, are **above the \$21.78 per hour self-sustainable hourly wage** estimate for a single adult with one child.
- There was an average of 40 credentials issued annually from regional community college training programs over the last three academic years. One private educational institution outside the community college system issued an annual average of six credentials over the previous three academic years. There were no regional completions for computed tomography-specific programs over the last three years.

Introduction

The report provides data on the occupations and programs most closely related to computed tomography. Computed tomography (CT) refers to advanced computerized x-ray imaging that provides more detailed information than conventional x-rays (National Institute of Biomedical Imaging and Bioengineering, 2020). CT technology is a resource utilized by various medical professionals. According to O*NET Online, computed tomography appears as a common job title for the following middle-skill occupations (National Center for O*NET Development, 2020):

- Radiation Therapists (SOC 29-1124)
- Cardiovascular Technologists And Technicians (29-2031)
- Nuclear Medicine Technologists (29-2033)
- Radiologic Technologists (29-2034)
- Magnetic Resonance Imaging Technologists (29-2035)

- Health Technologists and Technicians, All Other (29-2099)
 - Ophthalmic Medical Technologists (29-2099.05)*
 - Radiologic Technicians (29-2099.06)*

**Ophthalmic medical technologists* and *radiologic technicians* are both emerging occupations embedded within the broader occupation, health technologists and technicians, all other. Information for *health technologists and technicians, all other* is displayed throughout this report because traditional labor market information is not available for these emerging occupations. Please note, there are two other occupations, not related to CT, embedded in this occupation.

The California Community College program closely related to computed tomography is the radiologic technology (TOP 1225.00). This program prepares students for employment as computed tomography technicians by providing instruction on the principles and techniques used in diagnostic radiography. (Taxonomy of Programs, 2012). Program outcomes and success metrics are available on page 8.

Computed Tomography Job Postings

The following section contains job posting information specific to computed tomography. Since computed tomography is a technology resource and not an occupation, this job posting search was conducted using a skills-based search. Therefore, the occupations included in this job posting search may not have strong primary associations with computed tomography, but CT skills may be essential to their position. It should be noted that this search includes job postings from the last two years. This timeframe was used to capture employer demand specific to computed tomography. Exhibit 1 displays the number of job ads and the regional and statewide time to fill information for the middle-skill occupations included in this job posting search. High-skill occupations, such as Radiologists (29-1069.10), with strong associations to CT, have been excluded from this job posting search as they require extensive preparation that exceeds the capabilities of community college training programs.

On average, local employers fill online job postings for *computed tomography positions* within 34 days. This regional average is six days shorter than the statewide average of 40 days, indicating that it is easier for local employers to fill open positions than other employers in California as a whole.

Exhibit 1: Job ads and time to fill, May 2018 – April 2020

Occupations	Job Ads	Regional Average Time to Fill (Days)	California Average Time to Fill (Days)
Magnetic Resonance Imaging Technologists (29-2035)	142	36	42
Radiologic Technologists (29-2034)	133	33	38
Health Technologists and Technicians, All Other (29-2099)	21	31	36

Occupations	Job Ads	Regional Average Time to Fill (Days)	California Average Time to Fill (Days)
Diagnostic Medical Sonographers (29-2032)	19	36	41
Cardiovascular Technologists and Technicians (29-2031)	16	34	39
Nuclear Medicine Technologists (29-2033)	9	36	41
Clinical Laboratory Technologists and Technicians (29-2018)	9	30	35
Radiologic Technicians (29-2099.06)	7	33	38
Total	356	34	40

Source: Burning Glass – Labor Insights

Exhibit 2 displays the job titles frequently associated with positions that require CT skills.

Exhibit 2: Job ads and time to fill, May 2018 – April 2020

Job Titles	Job Ads
CT Technician	79
CT Technologist	76
Radiology Technician	58
CT Imaging Specialist	24
Radiologic Technologist	18
Radiographer	15
CAT Scan Technician	11
Nuclear Medicine Technologist	8
Computerized Tomography Technologist	8
Diagnostic Radiologic Technologist	6
Rad Tech (Catheterization Lab)	6
Radiology Technician II	5
Radiographer II	4
Nuclear Medicine Technician	4
MRI Technologist	3
Mammography Technologist	2
Radiologic Specialist, CT/MRI	1
<i>All other job titles</i>	28
Total	356

Source: Burning Glass – Labor Insights

Employers, Skills, Education, Work Experience, and Certifications

Exhibit 3 displays the employers that posted the most job ads for middle-skill CT positions over the last two years in the IEDR.

Exhibit 3: Employers posting the most job ads for CT positions, May 2018 – April 2020

Employers (Cities)	Job Ads
Community Hospital of San Bernardino (Dignity Health) (San Bernardino)	39
Inland Valley Medical Center (Wildomar)	38
Rancho Springs Medical Center (Murrieta)	37
Chino Valley Medical Center (Chino)	35
Arrowhead Regional Medical Center (Colton)	25
RadNet (Outpatient Center Locations: Riverside, Victorville, Murrieta, Temecula, and Moreno Valley)	23
Loma Linda University Medical Center (Loma Linda)	22
Montclair Hospital Medical Center (Montclair)	11
St. Mary Health Care (Apple Valley)	11
Riverside Community Hospital (Riverside)	10
St. Bernardine Medical Center (San Bernardino)	10
Department of Veteran Affairs (Loma Linda)	10
Corona Regional Medical Center (Corona)	7
Corona Regional Medical Center (Corona)	7
Kaiser Permanente (Riverside, Moreno Valley, Fontana)	5
Beaver Medical Group (Highland and Redlands)	3
Desert Valley Medical Group (Victorville)	2
<i>Total for all other employers</i>	<i>64</i>
Total	356

Source: Burning Glass – Labor Insights

Exhibit 4 displays a sample of specialized and employability skills that employers are seeking when looking for workers to fill CT positions. Specialized skills are occupation-specific skills that employers are requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is commonly referred to as "soft skills." The skills requested in job postings may be utilized as a helpful guide for curriculum development.

Exhibit 4: Sample of in-demand skills from employer job ads for CT positions, May 2018 – April 2020

Specialized Skills (n=356)	Employability Skills
<ul style="list-style-type: none"> • Computed Tomography • Radiology • Radiologic Technology • Patient Care • Life Support • Mammography 	<ul style="list-style-type: none"> • Teamwork/Collaboration • Communication Skills • Computer Literacy • Writing • English • Detail Oriented

Source: Burning Glass – Labor Insights

Exhibit 5 displays the minimum advertised education requirement from employer job ads for CT positions.

Exhibit 5: Minimum advertised education requirements for CT positions, May 2018 – April 2020

Minimum Advertised Education Requirement from Job Ads			
Number of job postings	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
104	1%	93%	6%

Source: EMSI 2020.2, Burning Glass – Labor Insights

Exhibit 6 displays the real-time work experience requirements from employer job ads for CT positions over the last two years.

Exhibit 6: Real-time work experience requirements, last two years

Real-Time Work Experience Required from Job Ads			
Number of job postings	0 – 2 years	3 – 5 years	6+ years
210	86%	12%	2%

Source: EMSI 2020.2, Burning Glass – Labor Insights

Exhibit 7 displays the certifications required by employers posting job ads for CT positions in the IEDR.

While not mentioned in employer job postings, CT certifications are beyond those for radiologic technologists. The California Department of Public Health – Radiologic Health Branch (CDPH-RHB) is the regulatory agency that issues radiologic licenses. California requires that all individuals working in radiologic technology pass a radiologic technologist exam administered by the American Registry of Radiologic Technologies (ARRT). To earn a certification in computed tomography, individuals must first be certified and registered with ARRT in radiography then they are eligible to take the examination. For more information regarding ARRT certifications, please visit the ARRT website (ARRT, 2020a).

Exhibit 7: Certifications required by employer job ads for CT positions, May 2018 – April 2020

Certifications (n=279)
<ul style="list-style-type: none"> American Registry of Radiologic Technologists (ARRT) (246 posts) Basic Life Support (BLS) (147 posts) Registered Radiologic Technologist (64 posts)

Source: Burning Glass – Labor Insights

Job Opportunities

The occupations included in this report were selected due to their relevance to computed tomography (CT) found in employer job postings. The radiologic technician occupation has the closest relationship to CT and

is a primary user of the technology. The other CT occupations examined in this report may use CT on a less frequent basis. Based on the CT job posting search, all of these occupations will benefit from CT training even if it is not their primary job function. Thus, traditional labor market information for these occupations should not be confused with demand for CT-specific positions.

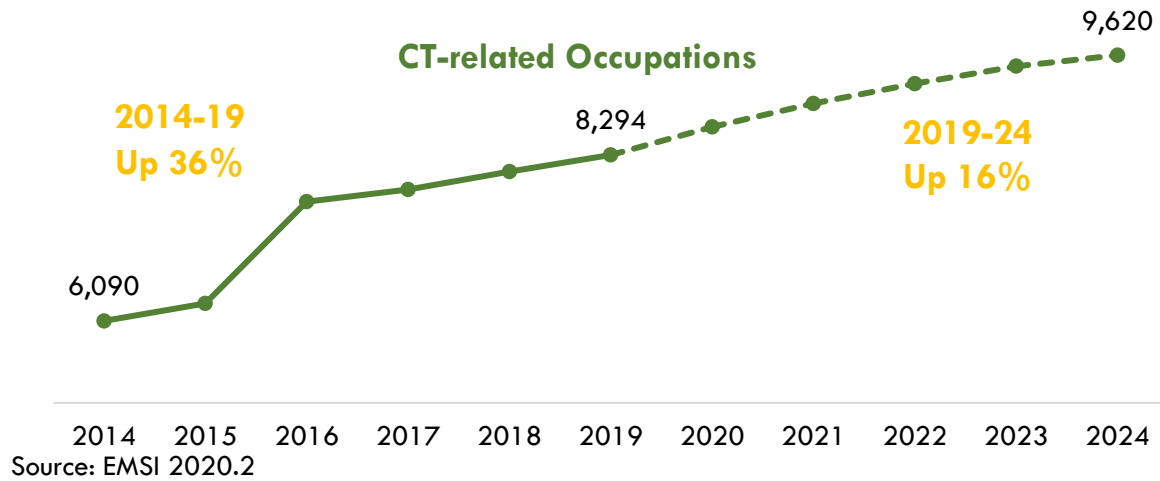
In 2019, there were 8,294 jobs in occupations related to CT in the Inland Empire/Desert Region (IEDR). This occupational group is projected to increase employment by 16% through 2024. Employers in the region will need to hire 4,168 workers over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 8 displays five-year projected job growth, and Exhibit 2 displays historical and projected jobs for *CT-related occupations* in the IEDR.

Exhibit 8: Five-year projections for CT-related occupations

Occupations	2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Health Technologists and Technicians, All Other*	3,126	3,787	21%	1,832	366	16%
Clinical Laboratory Technologists and Technicians	1,899	2,152	13%	970	194	22%
Radiologic Technologists	1,630	1,853	14%	700	140	18%
Diagnostic Medical Sonographers	631	723	15%	278	56	17%
Cardiovascular Technologists and Technicians	565	615	9%	211	42	19%
Magnetic Resonance Imaging Technologists	240	271	13%	102	20	15%
Nuclear Medicine Technologists	203	219	8%	75	15	15%
Total	8,294	9,620	16%	4,168	834	19%

Source: EMSI 2020.2 *Health Technologists and Technicians, All Other is a broad occupation that contains two emerging occupations related to CT, Ophthalmic Medical Technologists (29-2099.05) and Radiologic Technicians (29-2099.06).

Exhibit 9: Historical and projected jobs for CT-related occupations in the IEDR, 2014 – 2024

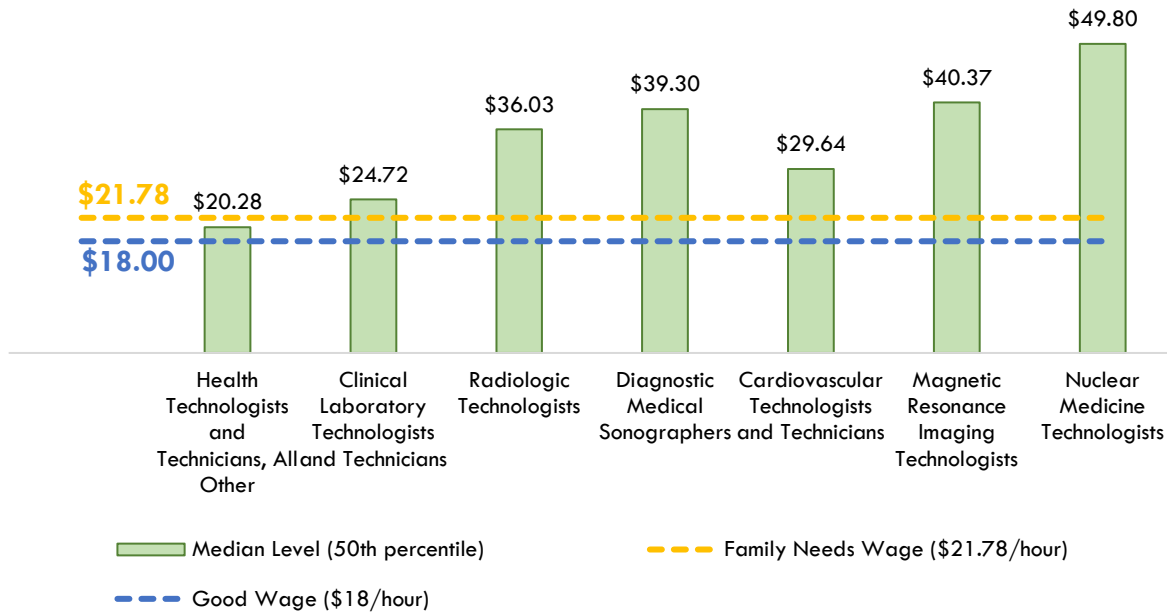


Earnings

Community colleges should ensure their training programs lead to employment opportunities that provide a self-sustainable level of income. The Brookings Institute in their Advancing Opportunity in California's Inland Empire report found that a "good job" wage in the region is above \$18.00 per hour, or \$37,440 per year (Shearer, Shah & Gootman, p. 25). The Family Needs Calculator estimates that a self-sustainable wage for a single adult with one school-age child is \$21.78 per hour or \$45,992 annually (Pearce & Manzer, 2020).

The median wages for CT-related occupations surpass the Brookings Institute's "good job" wage. These wages, except for *health technologists and technicians, all other*, are above the Family Needs Calculator self-sustainability rate. Exhibit 10 displays the IEDR hourly earnings for this occupation.

Exhibit 10: Median hourly earnings for CT-related occupations



Source: EMSI 2020.2

According to occupational guides developed by the California Labor Market Information Division, benefits for the CT-related occupations generally include medical, dental, life, and vision insurance, as well as vacation, sick leave, and retirement plans (Detailed Occupational Guides, 2020).

Student Completions and Program Outcomes

The radiologic technology (1225.00) program is most closely associated with computed tomography. Radiologic technology programs offered in the IEDR do not specifically train students for CT positions. According to the California Community College Chancellor's Office Curriculum Inventory (COCI), two colleges in the state offer programs specific to computed tomography, located at Folsom Lake College and Cabrillo College (California Community Colleges Chancellor's Office, 2020). The colleges share the program title, Computed Tomography, for their certificate of completion programs. Cabrillo College, located in Santa Cruz, offers Computed Tomography under the Radiologic Technology (1225.00) TOP code. This program's description may be helpful for curriculum development. Cabrillo College's program description is displayed below (Cabrillo College, 2020):

This is a one-year Postprimary Computed Tomography program for the working Radiologic Technologist (RT). The program provides professional training and a path to eligibility for the American Registry Radiologic Technology (ARRT) examination in Computed Tomography (CT). All courses are online and clinical education is offered as described in the flyer. Students must hold current ARRT certification in Diagnostic Radiologic Technology and be in good standing with ARRT, to enroll in the core CT program courses. RT189A Sectional Anatomy and Pathology must be successfully completed prior to the first course of the CT program, RT190A. The program design includes imaging pharmacology, physical principles of CT, protocol and procedures, and clinical practicum. The clinical practicum portion of the program is intended as a pathway to developing a well-rounded clinical experience and to aid the student in meeting the eligibility requirements for the ARRT Postprimary certification examination in CT.

Community college student outcome information based on the selected TOP code is provided in Exhibit 11. The following table displays outcome information for the two colleges in the state with computed tomography programs. Please note that CT programs at these colleges coded under the Radiologic Technology (1225.00) TOP code and outcome data is not specific to CT. Please contact the colleges for more detail on student success specifically for CT courses. Dashes indicated data points in which there were too few students to obtain accurate outcome information.

Exhibit 11: 1225.00 – Radiologic technology strong workforce program outcomes

Strong Workforce Program Metrics: 1225.00 – Radiologic Technology Academic Year 2016-17, unless noted otherwise	Cabrillo College	Folsom Lake College	California
Unduplicated count of enrolled students (2017-18)	53	17	3,215
Completed 9+ career education units in one year (2017-18)	83%	-	43%
Economically disadvantaged students	85%	63%	84%
Students who attained a noncredit workforce milestone in a year (2017-18)	-	-	-

Strong Workforce Program Metrics: 1225.00 – Radiologic Technology Academic Year 2016-17, unless noted otherwise	Cabrillo College	Folsom Lake College	California
Students who earned a degree, certificate, or attained apprenticeship (2017-18)	22	-	489
Transferred to a four-year institution (transfers)	-	-	37
Job closely related to the field of study (2015-16)	67%	-	87%
Median annual earnings (all exiters)	\$74,380	-	\$50,556
Median change in earnings (all exiters)	107%	-	82%
Attained a living wage (completers and skills-builders)	82%	-	63%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 12 displays completion data for California Community College radiologic technology (1225.00) programs in the IEDR between 2016 and 2019. While the radiologic technology programs in the IEDR do not provide training specific to computed tomography, knowing the completions and outcomes of related regional programs may provide insight into the potential success of a computed tomography program. The student completion and outcome methodology are available on page 14.

Exhibit 12: Annual average community college credentials for the radiologic technologist program in the IEDR

1225.00 – Radiologic Technology	60+ Semester Units Certificate	Associate of Science (A.S.)	CCC Annual Average Credentials, Academic Years 2016-19
Chaffey	-	24	24
Crafton Hills	8	8	16
Total	8	32	40

Source: LaunchBoard, MIS Data Mart

Community college student outcome information based on the selected TOP code and region is provided in Exhibit 13.

Exhibit 13: 1225.00 – Radiologic technology strong workforce program outcomes

Strong Workforce Program Metrics: 1225.00 – Radiologic Technology Academic Year 2016-17, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2017-18)	203	3,215
Completed 9+ career education units in one year (2017-18)	36%	43%
Economically disadvantaged students	80%	84%
Students who attained a noncredit workforce milestone in a year (2017-18)	-	-

Strong Workforce Program Metrics: 1225.00 – Radiologic Technology Academic Year 2016-17, unless noted otherwise	Inland Empire/Desert Region	California
Students who earned a degree, certificate, or attained apprenticeship (2017-18)	31	489
Transferred to a four-year institution (transfers)	-	37
Job closely related to the field of study (2015-16)	100%	87%
Median annual earnings (all exiters)	\$54,634	\$50,556
Median change in earnings (all exiters)	151%	82%
Attained a living wage (completers and skills-builders)	75%	63%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Credentials granted from other educational providers outside of the California Community College system are displayed in Exhibit 14 along with the relevant CIP code. Completion data is compiled from the Integrated Postsecondary Education Data System (IPEDS) for the most recent three years available. The CIP program, Vascular and Interventional Radiology Fellowship Program (61.2612) provides the most focused training for CT positions. According to the National Center for Education Statistics (NCES) Classification of Instructional Programs (CIP), this program is defined as (NCES, 2020):

A fellowship training program that prepares diagnostic radiologists with additional training in image-guided therapies, using fluoroscopy, digital radiography, computed tomography, sonography, and magnetic resonance imaging, to guide small devices inserted into the body through very small openings. These therapies include angioplasty, stent placement, thrombolysis, embolization, biliary and genitourinary drainages, and abscess drainages. Requires prior completion of a residency program in diagnostic radiology. This CIP code is not valid for IPEDS reporting.

Since this program is not valid for IPEDS reporting, there are no completions to report for these programs in the region.

Exhibit 14: Annual average community college credentials for the radiologic technology/science - radiographer program in the IEDR

51.0911 – Radiologic Technology/Science – Radiographer	Associate Degree	Other Educational Providers Annual Average Credentials, Academic Years 2014-17
American Career College-Ontario	6	6
Total	6	6

Source: IPEDS

Recommendation

Computed tomography (CT) is an advanced computerized x-ray imaging technology that provides more detailed information than conventional x-rays. CT technology is a resource utilized by various medical professionals; this report identifies six middle-skill occupations that use this technology. Some of these occupations may use the technology daily, and others may only use it when needed. These combined occupations will have 834 annual job openings in the Inland Empire/Desert region (IEDR). The median hourly wage for each occupation ranges between \$20.28 to \$49.80 per hour. The median hourly wage for each occupation exceeds the hourly \$21.78 per hour self-sustainable estimate for a single adult with one child, with the exception of the health technologists and technicians, all other occupation. Job postings over the last two years reveal employer demand for workers with CT skills.

The closest community college training to CT is the Radiologic Technology program. The IEDR does not have any known CT programs. The only known CT programs in the state are located at Folsom Lake College and Cabrillo College. It is not known if the success of these programs is solely tied to CT training, but the SWP metric for Cabrillo College exceeds the median SWP metrics for all radiologic tech programs in the state.

The COE recommends developing CT programs for the IEDR. Before proceeding with new program development, colleges should consult with local employers to identify their individual needs for more workers and understand the skills needed for students to secure jobs that offer self-sustainable wages.

Contact

Michael Goss, Director
Center of Excellence, Inland Empire/Desert Region
michael.goss@chaffey.edu
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Thank you Wendy Deras, IEDR Health RDEE & Paul Vaccher, COE Research Analyst

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Appendix: Occupation definitions, sample job titles, five-year projections for CT occupations

Occupation Definitions (SOC) code), Education and Training Requirement, Community College Educational Attainment

Clinical Laboratory Technologists and Technicians (29-2018)

Perform complex medical laboratory tests for diagnosis, treatment, and prevention of disease. May train or supervise staff.

Sample job titles: Chief Medical Technologist; Clinical Laboratory Scientist (CLS); Clinical Laboratory Technologist; Histologist Technologist; Medical Laboratory Technologist (Medical Lab Tech); Medical Technologist (MT); Medical Technologist, Clinical Laboratory Scientist; Microbiologist; Microbiology Technologist; Research Assistant

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Work Experience Required: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 39%

Cardiovascular Technologists and Technicians (29-2031)

Conduct tests on pulmonary or cardiovascular systems of patients for diagnostic purposes. May conduct or assist in electrocardiograms, cardiac catheterizations, pulmonary functions, lung capacity, and similar tests. Includes vascular technologists.

Sample job titles: Cardiac Catheterization Laboratory Technologist, Cardiac Catheterization Technician, Cardiac Technician, Cardiology Technician, Cardiopulmonary Technician, Cardiovascular Technician, Cardiovascular Technologist (CVT), Electrocardiogram Technician (EKG Tech), Registered Cardiovascular Invasive Specialist (RCIS)

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Work Experience Required: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 59%

Diagnostic Medical Sonographers (29-2032)

Produce ultrasonic recordings of internal organs for use by physicians.

Sample job titles: Cardiac Sonographer, Cardiac/Vascular Sonographer, Diagnostic Medical Sonographer, Medical Sonographer, Registered Diagnostic Medical Sonographer (RDMS), Sonographer, Staff Sonographer, Ultrasonographer, Ultrasound Technician (Ultrasound Tech), Ultrasound Technologist (Ultrasound Tech)

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Work Experience Required: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 59%

Nuclear Medicine Technologists (29-2033)

Prepare, administer, and measure radioactive isotopes in therapeutic, diagnostic, and tracer studies using a variety of radioisotope equipment. Prepare stock solutions of radioactive materials and calculate doses to be administered by radiologists. Subject patients to radiation. Execute blood volume, red cell survival, and fat absorption studies following standard laboratory techniques.

Sample job titles: Certified Nuclear Medicine Technologist (CNMT), Lead Nuclear Medicine Technologist (Lead Nuc Med Tech), Nuclear Cardiology Technologist, Nuclear Medicine PET-CT Technologist (Nuclear Medicine Positron Emission Tomography - Computed Tomography Technologist), Nuclear Medicine Technologist (Nuclear Med Tech), Radiation Safety Officer, Registered Nuclear Medicine Technologist, Senior Nuclear Medicine Technologist, Staff Nuclear Medicine Technologist, Supervisor Nuclear Medicine

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Work Experience Required: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 59%

Radiologic Technologists (29-2034)

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

Sample job titles: Computed Tomography Technologist (CT Technologist), CAT Scan Technologist (Computed Axial Tomography Technologist), CT Scan Special Procedures Technologist, Imaging Specialist, Mammographer, Mammography Technologist, Radiographer, Radiologic Technologist (RT), Radiological Technologist, Radiology Technologist, Staff Technologist, X-Ray Technologist (X-Ray Tech)

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Work Experience Required: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 59%

Magnetic Resonance Imaging Technologists (29-2035)

Operate Magnetic Resonance Imaging (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.

Sample job titles: Chief Magnetic Resonance Imaging Technologist (Chief MRI Technologist), Magnetic Resonance Imaging Coordinator (MRI Coordinator), Magnetic Resonance Imaging Director, Magnetic Resonance Imaging Quality Assurance Coordinator (MRI Quality Assurance Coordinator), Medical Imaging Director, MRI Specialist (Magnetic Resonance Imaging Specialist), MRI Supervisor (Magnetic Resonance Imaging Supervisor), MRI Technologist (Magnetic Resonance Imaging Technologist), Staff Technologist, Technologist

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Work Experience Required: Less than 5 years

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 59%

Health Technologists and Technicians, All Other (29-2099)

All health technologists and technicians not listed separately.

Ophthalmic Medical Technologists (29-2099.05)

Assist ophthalmologists by performing ophthalmic clinical functions and ophthalmic photography. Provide instruction and supervision to other ophthalmic personnel. Assist with minor surgical procedures, applying aseptic techniques and preparing instruments. May perform eye exams, administer eye medications, and instruct patients in care and use of corrective lenses.

Radiologic Technicians (29-2099.06)

Maintain and use equipment and supplies necessary to demonstrate portions of the human body on x-ray film or fluoroscopic screen for diagnostic purposes.

Appendix: Student Completions and Program Outcome Methodology

Exhibit 12 displays the average annual regional California Community College (CCC) credentials conferred during the three academic years between 2016 and 2019, from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, along with the enrollments from the most recent year available on LaunchBoard. Credentials are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year. Enrollments are the count of enrollments in courses assigned to the TOP code in the selected year.

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from records provided by California's Employment Development Department's Unemployment Insurance database. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2019a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2017).

Table 1: 2019 to 2024 job growth, wages, education, training, and work experience required for the CT occupations, IEDR

Occupation (SOC)	2019 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage Range (25 th to 75 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Health Technologists and Technicians, All Other (29-2099)	3,126	661	21%	366	\$17.42 to \$23.00	\$20.28	\$43,300	Postsecondary nondegree award & None	None
Clinical Laboratory Technologists and Technicians (29-2018)	1,899	253	13%	194	\$19.21 to \$35.08	\$24.72	\$58,100	Bachelor's degree & None	None
Radiologic Technologists (29-2034)	1,630	223	14%	140	\$30.62 to \$41.78	\$36.03	\$75,200	Associate's degree & None	None
Diagnostic Medical Sonographers (29-2032)	631	92	15%	56	\$32.15 to \$49.44	\$39.30	\$84,700	Associate's degree & None	None
Cardiovascular Technologists and Technicians (29-2031)	565	50	9%	42	\$19.08 to \$41.48	\$29.64	\$65,200	Associate's degree & None	None
Magnetic Resonance Imaging Technologists (29-2035)	240	31	13%	20	\$34.11 to \$47.50	\$40.37	\$84,200	Associate's degree & None	Less than 5 years
Nuclear Medicine Technologists (29-2033)	203	16	8%	15	\$43.67 to \$59.28	\$49.80	\$106,800	Associate's degree & None	None
Total	8,294	1,326	16%	834	-	-	-	-	-

Source: EMSI 2020.2