

Radiologic Technology/Computed Tomography (CT) Technologist

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

This workforce demand report uses state and federal job projection data 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

- Community college radiologic technology programs prepare students to enter the *radiologic technologists and technicians* occupation; computed tomography technologist is a common job title related to this occupation. The radiologic technologists and technicians are considered **an essential critical infrastructure occupation**.
- Employment for *radiologic technologists and technicians* is expected to **increase by 11% between 2019 and 2024**. A total of **131 annual job openings** will be available each year over the five-year timeframe.
- The **10th percentile hourly wage** for this occupation is **\$25.94 per hour, well above the \$19.94 per hour self-sustainable hourly wage** estimate for a single adult with one child in the region.
- There were **40 awards issued** from regional community college programs related to radiologic technology over the last three academic years. There were **18 awards issued** in programs related to radiologic technology from private educational institutions in the region.
- The COE **recommends** establishing new or expanding radiologic technology programs.

Introduction

This report provides information related to computed tomography (CT) technologists. CT technologist is a common job title for the occupation, *radiologic technologists and technicians*. Due to labor market information limitations, current and projected employment numbers are only available for radiologic technologists and technicians. The job advertisement analysis included in this report is strictly related to the CT technologist job title.

The California Community College program most likely to provide training for computed tomography technologists is the radiologic technology program. This program prepares students for employment through the instruction of the principles and techniques used in diagnostic radiography. These programs include radiographic techniques, radiation protection, equipment maintenance, and film processing and darkroom techniques (Taxonomy of Programs, 2012).

Radiologic Technologists and Technicians (SOC 29-2034)

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

Sample job titles: Computed Tomography Technologist (CT Technologist), Mammographer, Radiographer, Radiological Technologist, Radiology Technician (Radiology Tech), Radiology Technologist, Registered Radiographer, X-Ray Technician (X-Ray Tech), X-Ray Technologist (X-Ray Tech)

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Work Experience Requirement: None

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

Radiologic technologist and technician is considered an essential critical infrastructure occupation identified by the Public Policy Institute of California. This classification of occupations is vital in supporting California's basic economic and safety needs (Bohn et al.). Despite the ongoing pandemic, employment demand should continue due to this occupation's critical nature and social distance ability.

Job Opportunities

In 2019, there were 1,681 radiologic technologist and technician jobs in the Inland Empire/Desert Region (IEDR). This occupation is projected to increase employment by 11% through 2024. Employers are expected to have 131 annual job openings over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 1 displays five-year projected job growth in the region.

Exhibit 1: Five-year projections for radiologic technologists and technicians, IEDR

2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
1,681	1,865	11%	788	131	18%

Source: EMSI 2020.4

In 2019, there were 17,937 radiologic technologist and technician jobs across the state. This occupation is projected to increase employment by 9% through 2024. Employers are expected to have 1,329 annual job openings over the next five years. Exhibit 2 displays five-year projected job growth in California.

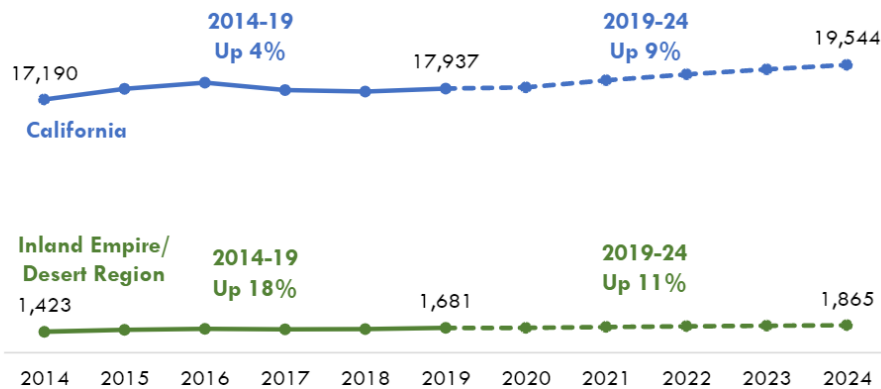
Exhibit 2: Five-year projections for radiologic technologists and technicians, California

2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
17,937	19,544	9%	7,974	1,329	19%

Source: EMSI 2020.4

Exhibit 3 displays historical (2014 to 2019) and projected (2019-2024) jobs for radiologic technologists and technicians in the Inland Empire/Desert Region and California. Demand for this occupation is expected to increase faster in the region (up 11%) than in the state (up 9%) over the next five years.

Exhibit 3: Historical and projected jobs for radiologic technologists and technicians in the Inland Empire/Desert Region (green) and California (blue), 2014 – 2024



Source: EMSI 2020.4

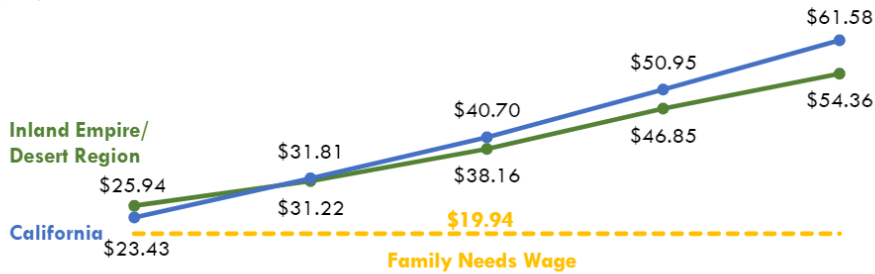
Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide a self-sustainable level of income. The Family Needs Calculator estimates that a self-sustainable wage for a single adult with one school-age child is \$19.94 per hour or \$41,475 annually in Riverside County, \$19.49 per hour or \$40,539 annually in San Bernardino County (Pearce & Manzer, 2018). For this study, the

higher hourly wage requirement in Riverside County is adopted as the self-sufficiently standard for the two-county region.

The 10th percentile hourly wage for *radiologic technologists and technicians* is above the Family Needs Calculator self-sustainability rate, indicating that 90% of workers in the field earn wages above the self-sustainability rate. Exhibit 4 displays the hourly earnings for each occupation in the IEDR and California.

Exhibit 4: Hourly earnings for radiologic technologists and technicians in the IEDR (green) and California (blue)



10th Percentile Hourly Earnings	25th Percentile Hourly Earnings	Median Hourly Earnings	75th Percentile Hourly Earnings	90th Percentile Hourly Earnings
---------------------------------	---------------------------------	------------------------	---------------------------------	---------------------------------

Source: EMSI 2020.4

According to the occupational guides developed by the California Labor Market Information Division, benefits for *radiologic technologists and technicians* usually include medical, dental, life, and vision insurance as well as vacation, sick leave, and retirement plans (Detailed Occupational Guides, 2020).

Online Job Advertisements (ads)

The following online job advertisement (ad) analysis has been limited to those that required computed tomography (CT) skills and contained the following titles: CT technologist, CAT technologist, and computed tomography technologist. Of the 492 unique job ads posted between December 2019 and November 2020 in California, nearly 8% (38 unique ads) were posted in the local region. On average, local employers fill online job postings for CT technologists within 44 days. This regional average is one day shorter than the statewide average of 45 days, indicating that local employers face similar challenges filling open positions as other employers in California as a whole.

Exhibit 5: Job ads and time to fill

Job Title	Job Ads	Regional Average Time to Fill (Days)	California Average Time to Fill (Days)
CT Technologist	492	44	45

Source: Burning Glass – Labor Insights

Employers, Locations, Skills, Education, and Work Experience

The table below displays the California employers who posted at least five unique advertisements for CT technologists over the last 12 months.

Exhibit 6: Employers posting the most job ads for CT technologists

Employers	Unique Job Ads
Adventist Health	54
RadNet	74
Sutter Health	56
Dignity Health	14
Department of Veteran Affairs	11
Community Memorial Health System	9
Antelope Valley Hospital	9
Los Angeles Community Hospital at Norwalk	7
El Camino Hospital	6
University of California, Irvine	5
All other employers	247
Total	492

Source: Burning Glass – Labor Insights

Exhibit 7 displays the counties with more than ten job advertisements for CT technologists posted over the last year in California. Of the 492 unique job advertisements posted in California, nearly 8% (38 unique ads) were posted in Riverside and San Bernardino counties.

Exhibit 7: Locations with the most job ads for CT technologists

Counties	Unique Job Ads
Los Angeles	98
Santa Clara	37
Kern	36
San Diego	30
Alameda	25
San Bernardino	22
San Francisco	21
Placer	21
Orange	21
Sacramento	17

Counties	Unique Job Ads
Riverside	16
Ventura	15
Contra Costa	13
Kings	12
Fresno	11
All other employers	97
Total	492

Source: Burning Glass – Labor Insights

Exhibit 8 displays a sample of specialized and employability skills employers sought when looking for workers to fill CT *technologist* positions. Hard skills are occupation-specific skills that employers request for industry or job competency. Common skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job postings may be utilized as a helpful guide for curriculum development. All of the job advertisements included in this report mentioned Computed Tomography (CT) as a required skill.

Exhibit 8: Sample of in-demand skills from employer job ads

Hard Skills	Employability Skills
<ul style="list-style-type: none"> • Radiologic Technology • Venipuncture • Patient Care • Life Support • Radiography 	<ul style="list-style-type: none"> • Communication Skills • Critical Thinking • Teamwork/Collaboration • Organizational Skills • Building Effective Relationships

Source: Burning Glass – Labor Insights

Exhibit 9 displays the entry-level education typically required to be a *radiologic technologist and technician* according to the Bureau of Labor Statistics (BLS), educational attainment for incumbent workers with "some college, no degree" and an "associate degree" according to the U.S. Census (2016-17) and the real-time minimum advertised education requirement from employer job ads for CT technologists. 77% of employers did not list an education level.

Exhibit 9: Typical entry-level education and educational attainment for radiologic technologists and technicians and minimum advertised education requirements for CT technologists

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Real-Time Minimum Advertised Education Requirement			
			Number of Job Ads	High school diploma or GED	Associate degree	Bachelor's degree or higher
Radiologic Technologists and Technicians	Associate degree	59%	114	2%	88%	10%

Source: EMSI, Burning Glass – Labor Insights

*Percentage of incumbent workers with a Community College Award or Some Postsecondary Coursework

Exhibit 10 displays the work experience typically required to be *radiologic technologists and technicians* and the real-time work experience requirements from employer job ads for CT technologists.

Exhibit 10: Work experience required and real-time work experience requirements

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of Job Ads	0 – 2 year	3 – 5 years	6+ years
Radiologic Technologists and Technicians	None	182	80%	19%	1%

Source: EMSI, Burning Glass – Labor Insights

Certifications

Exhibit 11 displays the certifications most frequently required by employers posting job ads for computed tomography technologists in California. The American Registry of Radiologic Technologists (ARRT) is the credentialing agency that verifies radiologic technologist workers' quality. This certification appeared most frequently in job ads for CT technologists. To meet the education requirement, individuals must earn an associate degree, completed an ARRT-approved educational program, satisfy an ethics requirement, and pass the ARRT credentialing exam. For more information regarding certifications related to computed tomography technologists, please visit the ARRT website (ARRT, 2020).

Exhibit 11: Certifications required by employer job ads for CT technologists

Job Title	Certifications
CT Technologist (n=435)	<ul style="list-style-type: none"> American Registry of Radiologic Technologists (ARRT) (421 ads) Basic Life Support (BLS) (268 ads)

Source: EMSI

Student Completions and Program Outcomes

Radiologic technology programs offered in the IEDR do not specifically train students for CT positions. The following section details student completions and program outcomes recorded in radiologic technology (1225.00) programs. Exhibit 12 displays annual average completion data for the California Community College radiologic technology programs based on the most recent three academic years.

Exhibit 12: 2016-19, Annual average community college awards for the radiologic technology programs in the IEDR

1225.00 – Radiologic Technology	Associate degree	Certificate requiring 60+ semester units	CCC Annual Average Awards, Academic Years 2016-19
Chaffey	24	-	24
Crafton Hills	8	8	16
Total	32	8	40

Source: MIS Data Mart

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP codes and region is provided in Exhibit 13. Please note that while the Radiologic Technology (1225.00) program is most closely associated with computed tomography, outcome data is not specific to CT. Dashes indicate there were too few students from which to obtain reliable program outcome information. The outcome methodology is available in the appendix section of this report.

Exhibit 13: 1225.00 – Radiologic technology strong workforce program outcomes

Strong Workforce Program Metrics: 1225.00 – Radiologic Technology Academic Year 2017-18, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2018-19)	203	3,279
Completed 9+ career education units in one year (2018-19)	38%	43%
Perkins Economically disadvantaged students (2018-19)	90%	87%
Students who attained a noncredit workforce milestone in a year (2018-19)	-	18%
Students who earned a degree, certificate, or attained apprenticeship (2018-19)	34	520
Transferred to a four-year institution (transfers)	-	50
Job closely related to the field of study (2016-17)	100%	88%
Median annual earnings (all exiters)	\$56,168	\$55,656

Strong Workforce Program Metrics: 1225.00 – Radiologic Technology Academic Year 2017-18, unless noted otherwise	Inland Empire/Desert Region	California
Median change in earnings (all exiters)	91%	76%
Attained a living wage (completers and skills-builders)	82%	70%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Private education providers report their radiologic technology programs under CIP 51.0911. American Career College-Ontario offers an Introduction to computed tomography awards course, and Loma Linda University offers a computed tomography certification (American Career College, Loma Linda University). The total awards reported from private educational institutions in the region are displayed in Exhibit 14 along with the relevant CIP code.

Exhibit 14: Annual average private educational institution awards from radiologic technology/science - radiographer programs in the Inland Empire/Desert region

51.0911 – Radiologic Technology/Science - Radiographer	Private Educational Institutions Annual Average Certificates or Other Credit Awards (2014-17)
American Career College-Ontario	
Associate Degree	6
Loma Linda University	
Bachelor's Degree	11
Total annual average other awards	18

Source: IPEDS

Recommendation

The California Community College radiologic technology program will likely provide training for computed tomography technologists, a common job title within the *radiologic technologists and technicians* occupation. *Radiologic technologists and technicians* is considered an essential critical infrastructure occupation. Despite the ongoing pandemic, this occupation's employment demand should continue due to this classification of workers' critical health and safety services. This occupation is projected to have 131 annual job openings, increasing employment by 11% through 2024. The 10th percentile hourly wage of \$25.94 per hour offered by this occupation is above the \$19.94 per hour self-sustainability standard for a single adult with one child in the region. This occupation typically requires an associate degree to enter employment; 88% of online employer job ads were seeking a candidate with an associate degree as a minimum educational requirement.

Two regional community colleges offer radiologic technology programs and reported 40 annual average awards over the last three academic years. Two private institutions offer computed tomography courses and awards, issuing 18 annual average awards over the previous three academic years available.

The COE recommends establishing new or expanding radiologic technology programs based on the relevant occupation's high number of projected annual job openings and self-sufficient hourly wages. Colleges considering this program should partner with applicable employers to document the required knowledge, skills, abilities, and certifications needed to gain employment in this field.

Contact

Michael Goss & Paul Vaccher
Center of Excellence Inland Empire/Desert Region
michael.goss@chaffey.edu
December 2020

References

- American Career College. (2021) Radiography Program. Retrieved January 08, 2021, from <https://americancareercollege.edu/programs/radiography.html>
- American Registry of Radiologic Technologists (ARRT). (2020). *Primary Eligibility Pathway Requirements*. Retrieved from <https://www.arrt.org/pages/earn-arrt-credentials/initial-requirements/primary-requirements>
- Bohn, S., Cuellar Mejia, M., Lafortune, J. (2020). Essential Workers and COVID-19 - Public Policy Institute of California. Retrieved from <https://www.ppic.org/blog/essential-workers-and-covid-19/>
- Burning Glass Technologies. (2020). *Labor Insights/ Jobs*. Retrieved from <https://www.burning-glass.com/>
- California Community Colleges Chancellor's Office. LaunchBoard. (2020). *California Community Colleges LaunchBoard*. Retrieved from <https://www.calpassplus.org/Launchboard/Home.aspx>
- California Community Colleges Chancellor's Office. LaunchBoard. (2020a). *Strong Workforce Program Metrics Data Element Dictionary*. Pg. 3. Retrieved from <https://www.calpassplus.org/MediaLibrary/calpassplus/launchboard/Documents/SWP-DED.PDF>
- California Community Colleges Chancellor's Office. (2020). *Chancellor's Office Curriculum Inventory (COCI)*, version 3.0. Retrieved from <https://coci2.ccctechcenter.org/programs>
- California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. (2020). *Data Mart*. Retrieved from <https://datamart.cccco.edu/datamart.aspx>
- California Community Colleges Chancellor's Office, Curriculum and Instructional Unit, Academic Affairs Division. (2012). *Taxonomy of Programs, 6th Edition, Corrected Version*. Retrieved from <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Digital-Innovation-and-Infrastructure/Research/Files/TOPmanual6200909corrected12513.ashx?la=en&hash=94C709CA83C0380828415579395A5F536736C7C1>
- Carnevale, A. P., Jayasundera, T., & Repnikov, D. (n.d.). Understanding Online Job Ads Data. Retrieved from <https://cew.georgetown.edu/wp-content/uploads/2014/11/OCLM.Tech.Web.pdf>
- Economic Modeling Specialists International (EMSI). (2020). *Datarun 2020.4*. Retrieved from <https://www.economicmodeling.com/>
- Labor Market Information Division. Employment Development Department of California. (2020). *Detailed Occupational Guides*. Retrieved from <https://www.labormarketinfo.edd.ca.gov/OccGuides/Search.aspx>
- Loma Linda University. (2021) Computed Tomography (CT) & Magnetic Resonance Imaging (MRI), Cert I Loma Linda University. Retrieved from <https://home.llu.edu/programs/computed-tomography-ct-magnetic-resonance-imaging-mri-cert>
- National Center for O*NET Development. (2020). *O*NET OnLine*. Retrieved from <https://www.onetonline.org/>
- Pearce, D., Manzer, L. Center for Women's Welfare at the University of Washington. (2018). Retrieved from <https://insightccd.org/2019-family-needs-calculator/>

Methodology

Exhibit 12 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2016 and 2019, from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards 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.

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, 2020a). 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, 2020a).

Job postings data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job postings often do not reveal the hiring intentions of employers; it is unknown if employers plan to hire one or multiple workers from a single online job posting, or if they are collecting resumes for future hiring needs. A closed job posting may not be the result of a hired worker.

Table 1: 2019 to 2024 job growth, wages, education, training, and work experience required for radiologic technologists and technicians, 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
Radiologic Technologists and Technicians (29-2034)	1,681	184	11%	131	\$31.22 to \$46.85	\$38.16	\$80,700	Associate degree & None	None

Source: EMSI 2020.4

Table 2: 2019 to 2024 job growth, wages, education, training, and work experience required for radiologic technologists and technicians, California

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
Radiologic Technologists and Technicians (29-2034)	117,937	1,607	9%	1,329	\$31.81 to \$50.95	\$40.70	\$86,300	Associate degree & None	None

Source: EMSI 2020.4