Labor Market Analysis for Program Modification: 0702.00/Computer Information Systems
(Data Analytics Associate of Science)
(Data Analytics Certificate of Achievement)
(Data Science Certificate of Achievement)
Orange County Center of Excellence, November 2023

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met	☐	Endorsed: Some LMI Criteria Met	☐	Not LMI Endorsed	☐

Program LMI Endorsement Criteria		
Supply Gap:	Yes ☐	No ☐
	Comments: The OC COE predicates endorsement only for middle-skill occupations. **Since this proposed new program includes above middle-skill occupations only, we are unable to evaluate the labor market information endorsement criteria.**	
Living Wage: (Entry-Level, 25th)	Yes ☐	No ☐
	Comments: See comment above.	
Education:	Yes ☐	No ☐
	Comments: See comment above.	

Emerging Occupation(s)	
Yes ☑	*No* ☐
Comments: Data analytics and data science are rapidly evolving fields that involve the use of descriptive and predictive analytics to inform business decisions. Generally, a data analyst examines and analyzes data sets to identify trends and provide insights for strategic decision making. Data scientists employ predictive analytics through machine learning models and other statistical methods to predict future trends using historical data.[1]	

The Orange County Center of Excellence for Labor Market Research (OC COE) prepared this report to determine whether there is a supply gap in the Los Angeles/Orange County regional labor market related to one above middle-skill occupations that is most closely related to data science and data analytics:

- Data Scientists (15-2051)

Currently, *data scientists* is the only Standard Occupational Classification (SOC) code in the Bureau of Labor Statistics system that is solely for data science jobs. This occupation was added to the SOC system in 2018, making it one of the newest occupations in the federal system. *Data scientists* typically requires a bachelor's degree and the majority of workers in the field hold a bachelor's, master's, or doctoral degree. It is important to note that there are currently no middle-skill occupations that are directly related to data analytics and data science and typical education requirements for these jobs are high. However, numerous other occupations may utilize data analytics or data science skills.

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[1] https://graduate.northeastern.edu/resources/data-analytics-vs-data-science/

Though data analyst and data science jobs typically require at least a bachelor's degree, community colleges throughout the country have developed data science programs. There is no singular source that includes data on all these programs. However, the OC COE was able to identify existing programs in numerous states including California, Illinois, Maryland, New Jersey, and North Carolina.[2] Additionally, there are several data analytics and data science certificate programs offered through university extension programs such as those at UC Irvine[3] and UCLA[4].

Online programs such as those offered by Coursera, DataCamp, edX, LinkedIn Learning, and Udemy, provide alternate paths to obtaining data analytics and data science skills. These platforms often partner with businesses to offer online curriculum, such as Google's Data Analytics Certificate[5] or IBM's Data Science Professional Certificate[6] – both of which are offered through Coursera. Additionally, these platforms may work with businesses to provide upskilling opportunities to the current workforce. DataCamp claims that "80% of the Fortune 500 use DataCamp."[7]

The remainder of this report analyzes traditional labor market information for *data scientists*, the three occupation that is most closely related to data analytics and data science jobs. An analysis of online job postings for data analytics and science skills across all occupations - including data analysis, Python and SQL programming, and data visualization - is included to better understand the real-time demand for this emerging area.

The OC COE predicates endorsement only for middle-skill occupations. **Since this proposed new program includes above middle-skill occupations only, we are unable to evaluate the labor market information endorsement criteria.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for the occupations included in this report.

Exhibit 1: Labor Market Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Data Scientists (15-2051)	LA: 548	LA: 154	OC: $34.97	Bachelor's degree	11%
	OC: 233	OC: 52			
	TTL: 781	*TTL: 206*			
Total	**781**	**206**	**N/A**	**N/A**	**N/A**

[2] https://magazine.amstat.org/blog/2022/08/01/new-two-year-programs/
[3] https://bootcamp.ce.uci.edu/data/landing/
[4] https://www.uclaextension.edu/digital-technology/data-analytics-management/certificate/data-science
[5] https://www.coursera.org/professional-certificates/google-data-analytics
[6] https://www.coursera.org/professional-certificates/ibm-data-science
[7] https://www.datacamp.com/business

Demand:

- The number of jobs related to *data scientists* is projected to increase 16% through 2027, equating to 781 annual job openings.
- Hourly entry-level wages for *data scientists* are $34.97 in Orange County, which is above the living wage of $20.63.
- There were 6,040 online job postings for *data scientists* over the past 12 months. The top titles for these postings were data analyst, data scientists, and business intelligence analyst.
  - Across all occupations, there were 64,856 online job postings that requested data analytics and data science skills over the past 12 months.
- The typical entry-level education for *data scientists* is a bachelor's degree.
- Approximately 11% of workers in the field have completed some college or an associate degree as their highest level of education.

Supply:

- There was an average of 201 awards conferred by 22 community colleges in Los Angeles and Orange counties from 2019 to 2022.
  - It is important to note these supply figures reflect awards conferred under the 0702.00 (Computer Information Systems) TOP code. However, community colleges throughout Los Angeles and Orange counties offer data analytics and data science programs under six different TOP codes, ranging from 0506.00 (Business Management) to 0707.20 (Database Design and Administration). In many cases, colleges offer other programs that are unrelated to data analytics and data science under these TOP codes. Therefore, the COE is unable to isolate supply solely for data analytics and data science and supply may be overstated.
- Non-community college institutions conferred an average of 5 awards from 2019 to 2021.
  - However, the supply data for non-community college institutions includes only programs directly related to data analytics or data science such as 30.7101 (Data Analytics, General) and Business Analytics (30.7102). Students may obtain similar skills in other programs and courses such as mathematics, statistics, econometrics, computer science, and more. These figures also do not include certificates awarded by extension or continuing education programs offered at four-year colleges and universities. Therefore, supply is likely understated.
- Orange County community college students that exited computer information systems programs in the 2020-21 academic year had a median annual wage of $38,842 after exiting the program and 43% of students attained the living wage.
- Throughout Orange County, 50% of computer information systems students that exited their program in 2019-20 reported that they are working in a job closely related to their field of study.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for *data scientists* from 2017 through 2027. Though there was a 7% decline across all occupations from 2019 to 2020 due to the COVID-19 pandemic, employment for *data scientists* sharply rose by 17% during the same period in Orange County. From 2020 to 2021, employment for *data scientists* increase 31% in Orange County and 41% in Los Angeles County. Employment for *data scientists* is projected to grow at a slightly higher rate compared to all occupations through 2027.

Exhibit 2: Annual Percent Change in Jobs for Data Analytics and Data Science Occupations, 2017-2027
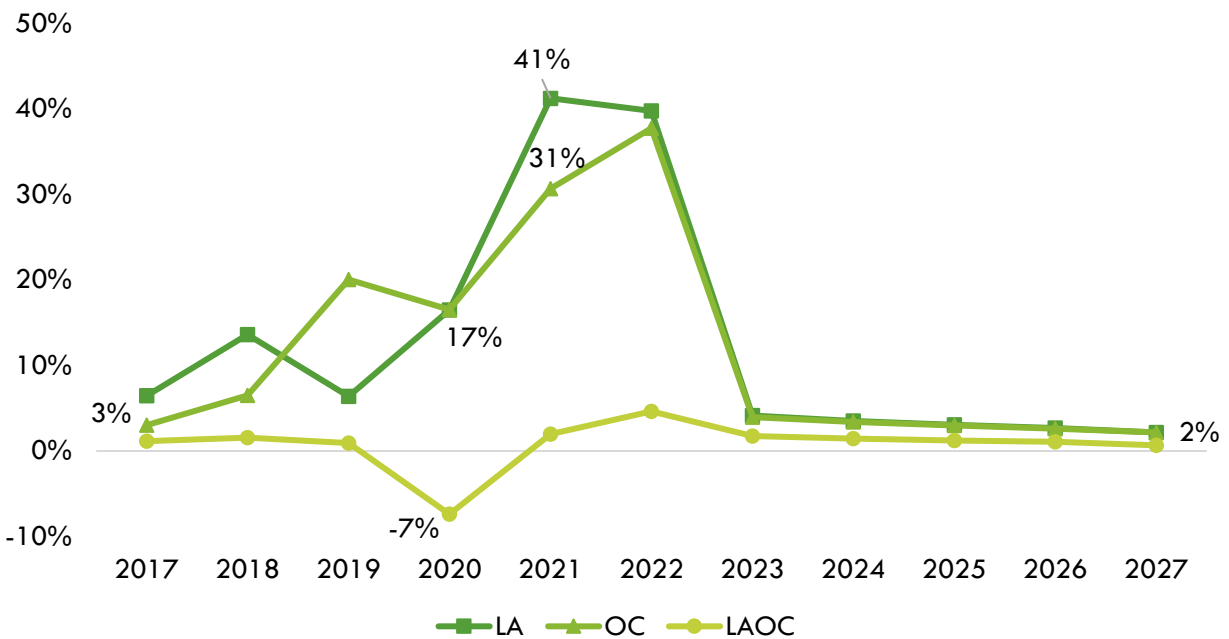

Exhibit 3 shows the five-year occupational demand projections for *data scientists*. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase by 16% through 2027. There is projected to be 781 jobs available annually.

Exhibit 3: Occupational Demand in Los Angeles and Orange Counties[8]

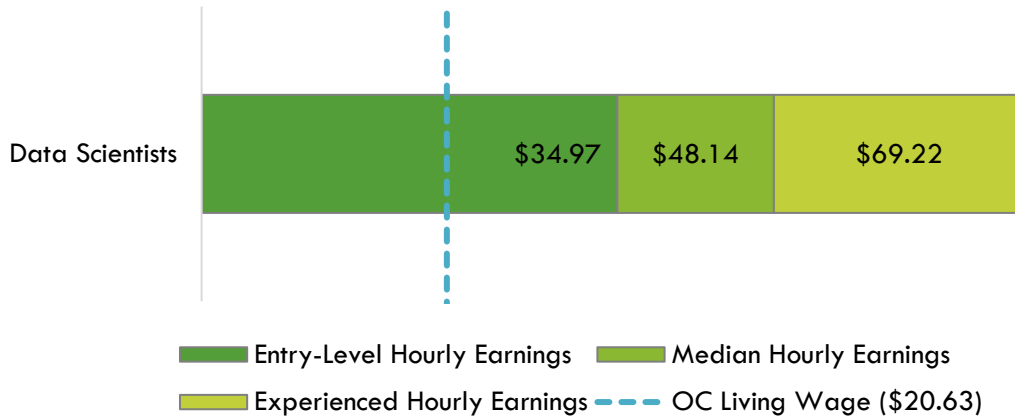| Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	5,006	5,838	833	17%	548
Orange	2,151	2,496	345	16%	233
Total	**7,157**	**8,334**	**1,178**	**16%**	**781**

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[8] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Wages:

The labor market analysis in this report considers the entry-level hourly wages for *data scientists* in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region.
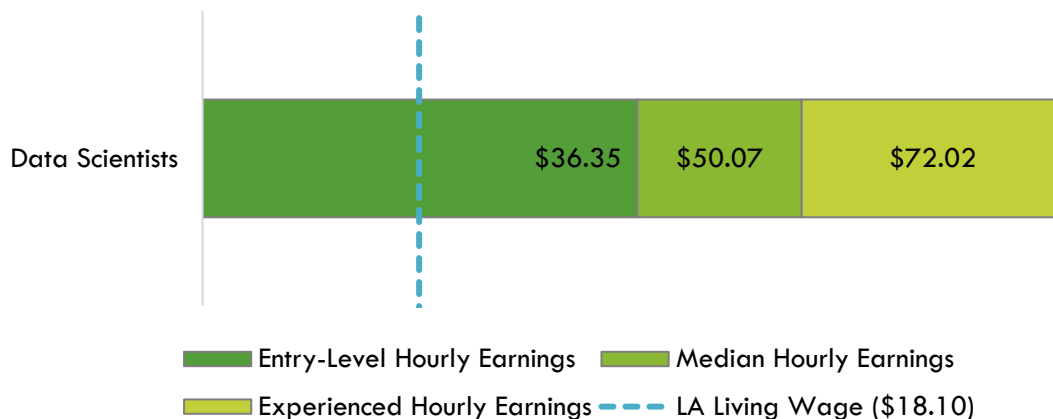
The typical entry-level hourly earnings for *data scientists* are $34.97, which is above the living wage for one adult ($20.63 in Orange County). Orange County's average wages ($56.21) are below the average statewide wage of $70.62 for this occupation. Exhibit 4 shows the wage range for *data scientists* in Orange County and how it compares to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 4: Wages by Occupation in Orange County

Data Scientists — $34.97 | $48.14 | $69.22

Legend:
- Entry-Level Hourly Earnings
- Median Hourly Earnings
- Experienced Hourly Earnings
- OC Living Wage ($20.63)

The typical entry-level hourly earnings for *data scientists* are $36.35, which is above the living wage for one adult ($18.10 in Los Angeles County). Los Angeles County's average wages ($58.45) are below the average statewide wage of $70.62 for these occupations. Exhibit 5 shows the wage range for *data scientists* in Orange County and how it compares to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 5: Wages by Occupation in Los Angeles County

Data Scientists — $36.35 | $50.07 | $72.02

Legend:
- Entry-Level Hourly Earnings
- Median Hourly Earnings
- Experienced Hourly Earnings
- LA Living Wage ($18.10)

Job Postings:

Important Online Job Postings Data Note: *Online job postings data is sourced from Lightcast, a labor market analytics firm that scrapes, collects, and organizes data from online job boards such as LinkedIn, Indeed, Glassdoor, Monster, GovernmentJobs.com, and thousands more. Lightcast uses natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. However, NLP has limitations that include understanding contextual words of phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors.[9] For these reasons, job postings could be assigned to the wrong employer, industry, or occupation within Lightcast's database.*

Additionally, there are several limitations when analyzing job postings. A single job posting may not represent a single job opening, as employers may be creating a pool of candidates for future openings or hiring for multiple positions with a single posting. Additionally, not all jobs are posted online, and jobs may be filled through other methods such as internal promotion, word-of-mouth advertising, physical job boards, or a variety of other channels.

This section includes two analyses of online job postings. The first analysis examines online job postings for *data scientists*. To better understand how data analytics and data science skills can be applied to other occupations, the second analysis examines all online job postings that requested these skills and not only those that are specifically for *data scientists*.

Occupation Job Postings

Over the past 12 months, there were 6,040 online job postings for *data scientists* as shown in Exhibit 6.

Exhibit 6: Number of Job Postings by Occupation

Occupation	Total Postings	% of Postings
Data Scientists	6,040	100%

Exhibit 7 shows the number of job postings by job title for the top 10 most frequently posted titles. The top job titles for this occupation were data analysts, data scientists, business intelligence analysts, machine learning engineers, and business data analysts.

Exhibit 7: Number of Job Postings by Title (n=6,040)

Occupation	Job Postings	Percentage of Job Postings
Data Analysts	939	16%
Data Scientists	679	11%
Business Intelligence Analysts	243	4%
Machine Learning Engineers	147	2%
Business Data Analysts	127	2%
Business Intelligence Managers	66	1%
Data and Analytics Consultants	62	1%
Reporting Analysts	52	1%
Analytics Engineers	51	1%
Data Science Managers	49	1%

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[9] K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), https://link.springer.com/book/10.1007/978-81-322-3972-7.

The top employers for *data scientists* in the region, by number of job postings, are shown in Exhibit 8.

Exhibit 8: Top Employers by Number of Job Postings (n=6,040)

Employer	Job Postings	Percentage of Job Postings
University of California	138	2%
Kaiser Permanente	110	2%
UnitedHealth Group	103	2%
Motion Recruitment	86	1%
Randstad	68	1%
Royal Bank of Canada	64	1%
Robert Half	58	1%
Accenture	49	1%
CyberCoders	49	1%
Deloitte	47	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 9.

Exhibit 9: Top Skills by Number of Job Postings (n=6,040)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Data Analysis (3,180)	Communications (2,417)	SQL (Programming Language) (2,600)
SQL (Programming Language) (2,600)	Management (1,952)	Python (Programming Language) (1,993)
Python (Programming Language) (1,993)	Problem Solving (1,418)	Tableau (Business Intelligence Software) (1,497)
Data Science (1,653)	Leadership (1,340)	Dashboard (1,298)
Computer Science (1,627)	Research (1,333)	Microsoft Excel (1,236)
Tableau (Business Intelligence Software) (1,497)	Microsoft Excel (1,236)	R (Programming Language) (1,168)
Dashboard (1,298)	Operations (1,190)	Power BI (938)
Business Intelligence (1,284)	Mathematics (1,182)	Microsoft PowerPoint (689)
Machine Learning (1,215)	Presentations (1,106)	Microsoft Office (536)
R (Programming Language) (1,168)	Writing (1,038)	SAP Applications (475)

Data Analysis and Data Science Skills Postings

Over the past 12 months, there were 64,856 online job postings that requested data analysis and data science skills. Exhibit 10 shows the top 10 occupations for which employers requested these skills.

Notably, in addition to traditional data-related roles such as *data scientists* and *database administrators*, the top occupations include marketing, finance, and operations occupations.

Exhibit 10: Top Data Analytics and Data Science Occupations (n=64,856)

Occupation	Total Postings	% of Postings
Data Scientists	4,382	7%
Computer Occupations, All Other	4,131	6%
Managers, All Other	2,170	3%
Management Analysts	1,961	3%
Marketing Managers	1,857	3%
Database Administrators	1,813	3%
Computer Systems Analysts	1,770	3%
Financial and Investment Analysts	1,270	2%
Operations Research Analysts	1,237	2%
Market Research Analysts and Marketing Specialists	1,154	2%

Exhibit 11 shows the number of job postings by job title. Notably, administrative assistants was included in the top 10 job titles.

Exhibit 11: Number of Data Analytics and Data Science Job Postings by Title (n=64,856)

Occupation	Job Postings	Percentage of Job Postings
Data Analysts	966	1%
Data Engineers	753	1%
Data Scientists	670	1%
Business Analysts	580	1%
Financial Analysts	479	1%
Business Systems Analysts	355	1%
Systems Engineers	301	0.5%
Business Intelligence Analysts	212	0.3%
Site Reliability Engineers	200	0.3%
Administrative Assistants	193	0.3%

The top employers that requested data analytics and data science skills across all occupations, by number of job postings, are shown in Exhibit 12.

Exhibit 12: Top Data Analytics and Data Science Employers by Number of Job Postings (n=64,856)

Employer	Job Postings	Percentage of Job Postings
University of California	1,442	2%
SpaceX	1,111	2%
Boeing	1,110	2%
Northrop Grumman	894	1%
UnitedHealth Group	836	1%
Kaiser Permanente	690	1%
Motion Recruitment	663	1%
Cedars-Sinai	586	1%
The Aerospace Corporation	574	1%
Robert Half	456	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 13.

Exhibit 13: Top Skills by Number of Job Postings (n=64,856)

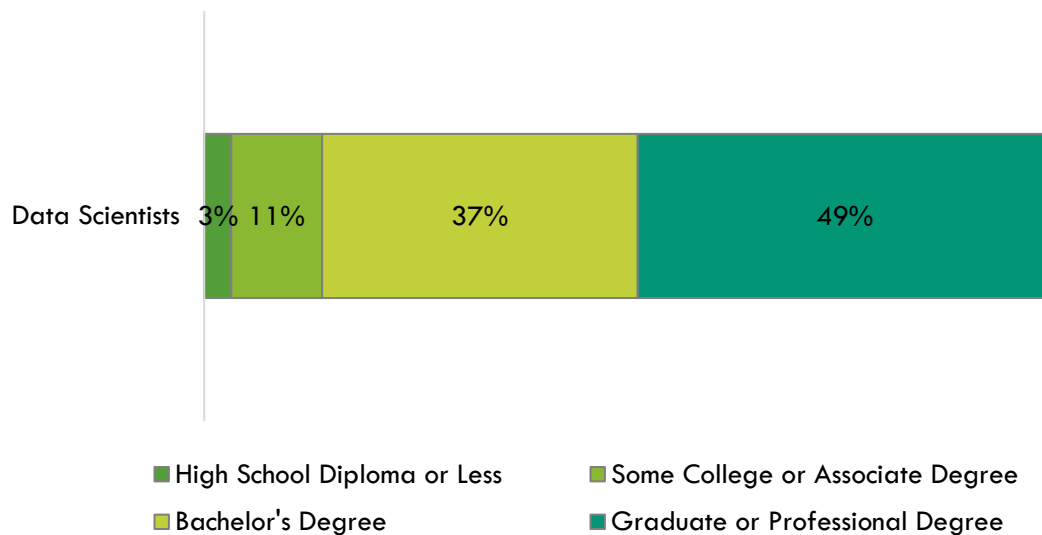| Top Specialized Skills	Top Soft Skills	Top Computer Skills
Data Analysis (39,019)	Communications (32,057)	SQL (Programming Language) (18,902)
SQL (Programming Language) (18,902)	Management (24,502)	Python (Programming Language) (18,282)
Python (Programming Language) (18,282)	Operations (17,437)	Microsoft Excel (13,346)
Computer Science (12,871)	Leadership (16,982)	Microsoft Office (8,188)
Project Management (12,349)	Problem Solving (16,549)	Microsoft PowerPoint (7,992)
Finance (8,770)	Research (15,657)	Tableau (Business Intelligence Software) (5,948)
Marketing (8,282)	Writing (13,713)	Dashboard (5,147)
Automation (7,584)	Microsoft Excel (13,346)	Amazon Web Services (5,059)
Auditing (6,797)	Planning (13,101)	R (Programming Language) (4,920)
Workflow Management (6,418)	Detail Oriented (12,830)	C++ (Programming Language) (4,897)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for *data scientists*. Additionally, the national-level educational attainment data indicates only 11% of workers in the field have completed some college or an associate degree as their highest level of education. Over 85% of workers in this occupation have completed a bachelor's, master's, or doctoral degree as their highest level of education. Exhibit 14 shows the educational attainment for *data scientists*.

Of the 72% of the cumulative job postings for *data scientists* that listed a minimum education requirement in Los Angeles/Orange County, 91% (3,959) requested a bachelor's, master's, or doctoral degree and 9% (390) requested a high school diploma or an associate degree.

Of the 56% of the cumulative job postings for data analysis and data science skills across all occupations that listed a minimum education requirement in Los Angeles/Orange County, 88% (44,188) requested a bachelor's, master's, or doctoral degree and 12% (5,803) requested a high school diploma or an associate degree.

Exhibit 14: National-level Educational Attainment for Occupations

Data Scientists: 3% High School Diploma or Less, 11% Some College or Associate Degree, 37% Bachelor's Degree, 49% Graduate or Professional Degree

- ■ High School Diploma or Less
- ■ Some College or Associate Degree
- ■ Bachelor's Degree
- ■ Graduate or Professional Degree

Educational Supply

Community College Supply:

Exhibit 15 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Computer Information Systems (0702.00). The colleges with the most completions are Pasadena, Mt. San Antonio, and Long Beach. Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

It is important to note these supply figures reflect awards conferred under the 0702.00 (Computer Information Systems) TOP code. However, community colleges throughout Los Angeles and Orange counties offer data analytics and data science programs under six different TOP codes, ranging from 0506.00 (Business Management) to 0707.20 (Database Design and Administration). In many cases, colleges offer other programs that are unrelated to data analytics and data science under these TOP codes. Therefore, the COE is unable to isolate supply solely for data analytics and data science and supply may be overstated. Additionally, *data scientists* has high education requirements and employers typically require more than a community college education for these occupations.

Exhibit 15: Regional Community College Awards (Certificates and Degrees), 2019-2022

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
0702.00	Computer Information Systems	Citrus	8	4	6	6
		Compton	0	0	12	4
		East LA	15	23	11	16
		El Camino	21	11	28	20
		Glendale	5	6	8	6
		LA City	1	4	3	3
		LA Harbor	0	0	1	0
		LA Mission	1	1	1	1
		LA Southwest	0	0	21	7
		LA Trade	20	15	17	17
		Long Beach	0	3	0	1
		Mt San Antonio	79	6	68	51
		Rio Hondo	10	6	15	11
		West LA	10	9	14	11
		LA Subtotal	**170**	**88**	**205**	**154**
		Coastline	6	5	4	5
		Coastline	0	0	2	0
		Cypress	4	0	0	1
		Fullerton	11	31	49	30
		Irvine	2	0	0	1
		Orange Coast	2	0	1	1
		Saddleback	0	1	0	0

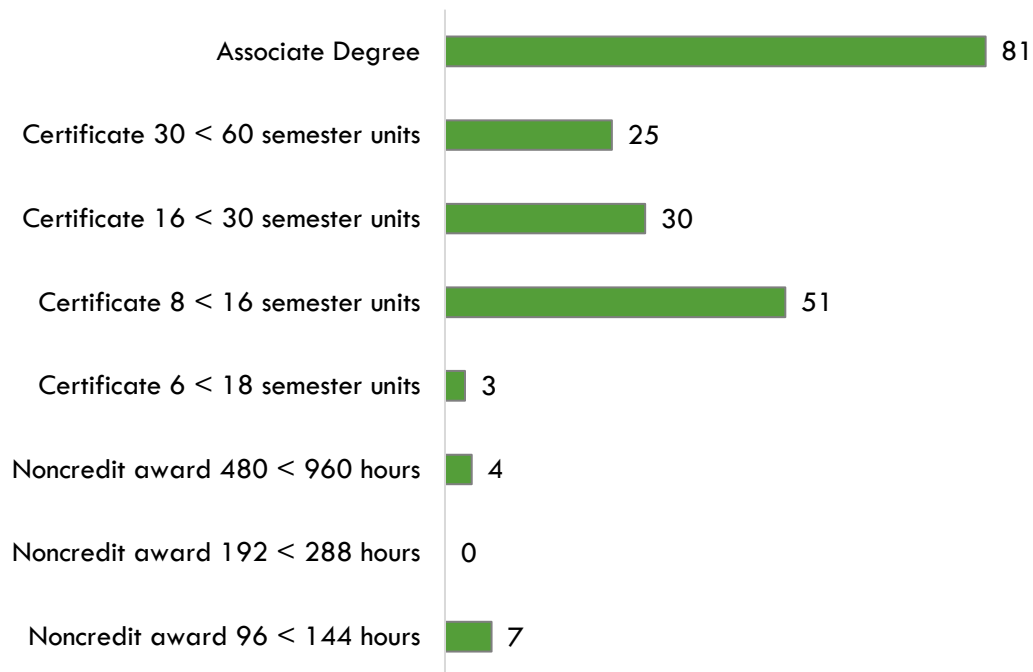| TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Santa Ana	2	16	18	12
		Santiago Canyon	4	1	1	2
		OC Subtotal	**25**	**49**	**71**	**47**
		Supply Total/Average	**195**	**137**	**276**	**201**

As noted previously, , community colleges throughout Los Angeles and Orange counties offer data analytics and data science programs under six different TOP codes. To better understand the colleges that offer data analytics and data science programs, Exhibit 16 shows each college, as well as the TOP code, program name, award type, and approval date for data analytics and data science programs offered by regional community colleges.

Exhibit 16: Regional Community College Data Analytics and Data Science Programs

TOP Code/Title	College	Program Name	Award Type	CCCCO Approval Date
0502.00/Accounting	Orange Coast	Accounting Data Analytics	Certificate	3/22/23
0506.00/Business Management	Fullerton	Business Data Analytics	Certificate	2/12/21
	Pasadena City	Business Data Analytics	Certificate	3/21/22
	Pasadena City	Business Data Analytics	A.S. Degree	3/21/22
0702.00/Computer Information Systems	Coastline	Data Analytics	Certificate	Not available
			A.S. Degree	Not available
	L.A. Mission	Data Analytics	Certificate	5/17/2023
	Mt. San Antonio	Big Data Analytics	Certificate	4/24/2019
		Big Data Analytics For Business	A.S. Degree	1/28/2022
	Santa Monica	Data Analyst	Certificate	7/19/2022
	West L.A.	Data Analytics	Certificate	9/19/2023
0702.10/Software Applications	Santa Monica	Business Information Worker - Data Analytics Applications	Certificate	6/1/2022
0707.00/Computer Software Development	Saddleback	Business Data Analytics And Database	A.S. Degree	9/26/2022
		Data Analytics	Certificate	9/26/2022
0707.20/Database Design and Administration	Cypress	Data Analytics	Certificate	1/29/2021
	Santa Ana	Data Analytics	Certificate	2/8/2022

Exhibit 17 shows the annual average community college awards by type from 2019-20 through 2021-22. Approximately 40 of the awards are for associate degrees, followed by certificates between 8 and less than 16 semester units.

Exhibit 17: Annual Average Community College Awards by Type, 2018-2021

Award Type	Value
Associate Degree	81
Certificate 30 < 60 semester units	25
Certificate 16 < 30 semester units	30
Certificate 8 < 16 semester units	51
Certificate 6 < 18 semester units	3
Noncredit award 480 < 960 hours	4
Noncredit award 192 < 288 hours	0
Noncredit award 96 < 144 hours	7

Community College Student Outcomes:

Exhibit 18 shows the Strong Workforce Program (SWP) metrics for computer information systems programs in Coast Community College District (CCCD), the Orange County Region, and California. Of the 3,746 computer information systems students in the 2020-21 academic year, 7% (278) attended a CCCD college.

CCCD students that exited computer information systems programs in the 2020-21 academic year had significantly higher median annual earnings ($45,576) compared to computer information systems students throughout Orange County ($38,842) and the state ($35,840). A higher percentage of CCCD computer information systems students attained the living wage (54%) compared to computer information systems throughout Orange County (43%) and the state (50%).

Exhibit 18: Computer Information Systems (0702.00) Strong Workforce Program Metrics, 2020-21[10]

SWP Metric	CCCD	OC Region	California
SWP Students	278	3,746	23,104
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	32%	32%	36%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	Insufficient Data	7%	52%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	Insufficient Data	40	601

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[10] All SWP metrics are for 2020-21 unless otherwise noted.

SWP Metric	CCCD	OC Region	California
SWP Students Who Transferred to a Four-Year Postsecondary Institution	Insufficient Data	264	2,053
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	Insufficient Data	50%	63%
Median Annual Earnings for SWP Exiting Students	$45,576 ($21.91)	$38,842 ($18.67)	$35,840 ($17.23)
Median Change in Earnings for SWP Exiting Students	7%	21%	23%
SWP Exiting Students Who Attained the Living Wage	54%	43%	50%

Non-Community College Supply:

For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for *data scientists*. Exhibit 19 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes: Data Analytics, General (30.7101) and Business Analytics (30.7102).

Currently, only two years of data are currently available due to changes in the CIP Taxonomy. Between 2019 and 2021, non-community colleges in the region conferred an average of 5 awards annually in related training programs.

It is important to note the supply data for non-community college institutions includes only programs directly related to data analytics or data science such as 30.7101 (Data Analytics, General) and Business Analytics (30.7102). Students may obtain similar skills in other programs and courses such as mathematics, statistics, econometrics, computer science, and more. These figures also do not include certificates awarded by extension or continuing education programs offered at four-year colleges and universities. Therefore, supply is likely understated.

Exhibit 19: Regional Non-Community College Awards, 2019-2021

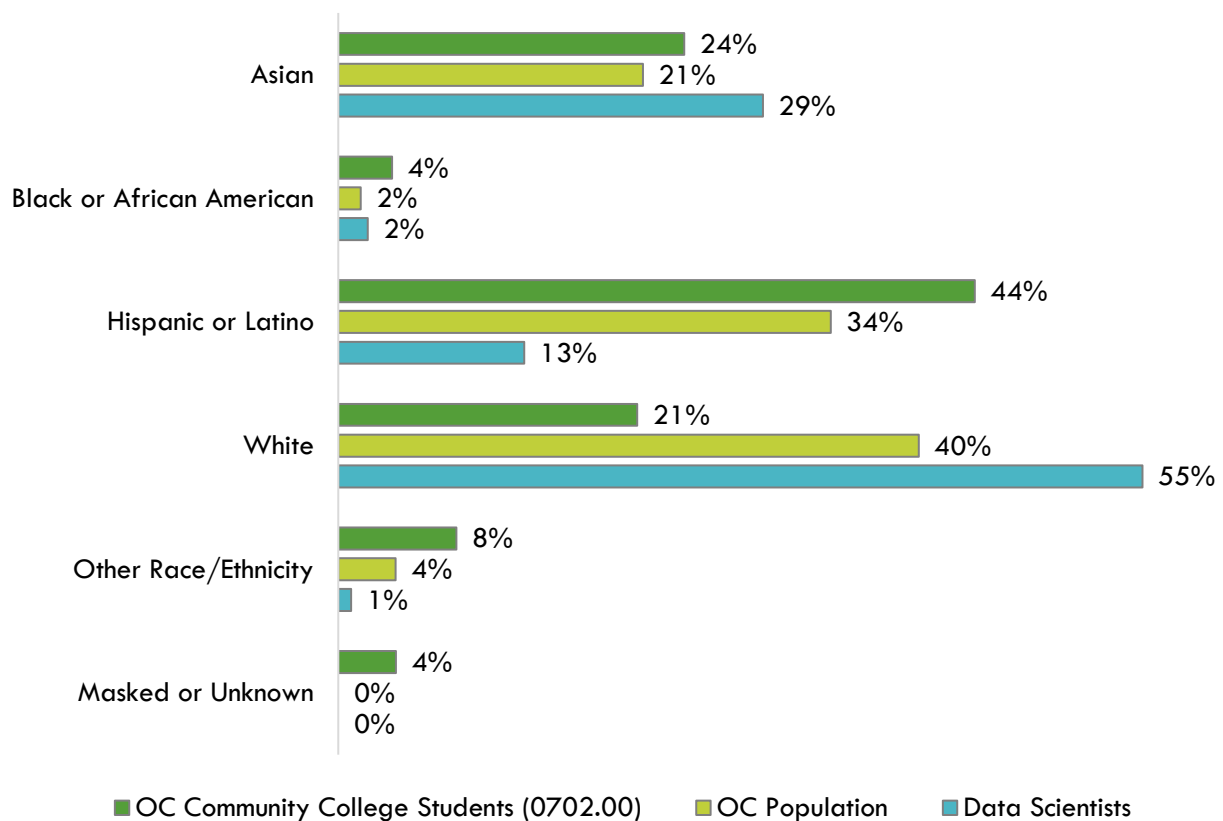| CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
30.7101	Data Analytics, General	University of Massachusetts Global	3	7	5
		Supply Subtotal/Average	**3**	**7**	**5**
30.7102	Business Analytics	Touro University Worldwide	0	0	0
		Supply Subtotal/Average	**0**	**0**	**0**
		Supply Total/Average	**3**	**7**	**5**

Regional Demographics

This section analyzes demographic data for Orange County community college students enrolled in computer information systems programs compared to the OC population, as well occupational data, for the purpose of identifying potential diversity and equity issues that can be addressed by community college programs.

Ethnicity:

Exhibit 20 shows the ethnicity of Orange County community college students enrolled in computer information systems programs compared to the overall Orange County population, as well as *data scientists*. Notably, 55% of *data scientists* are white, which is significantly higher than the population (40%) and more than double community college computer information systems students (21%). Conversely, 44% of community college computer information systems students are Hispanic or Latino, which is higher than the population (34%) and more than triple *data scientists* (13%).
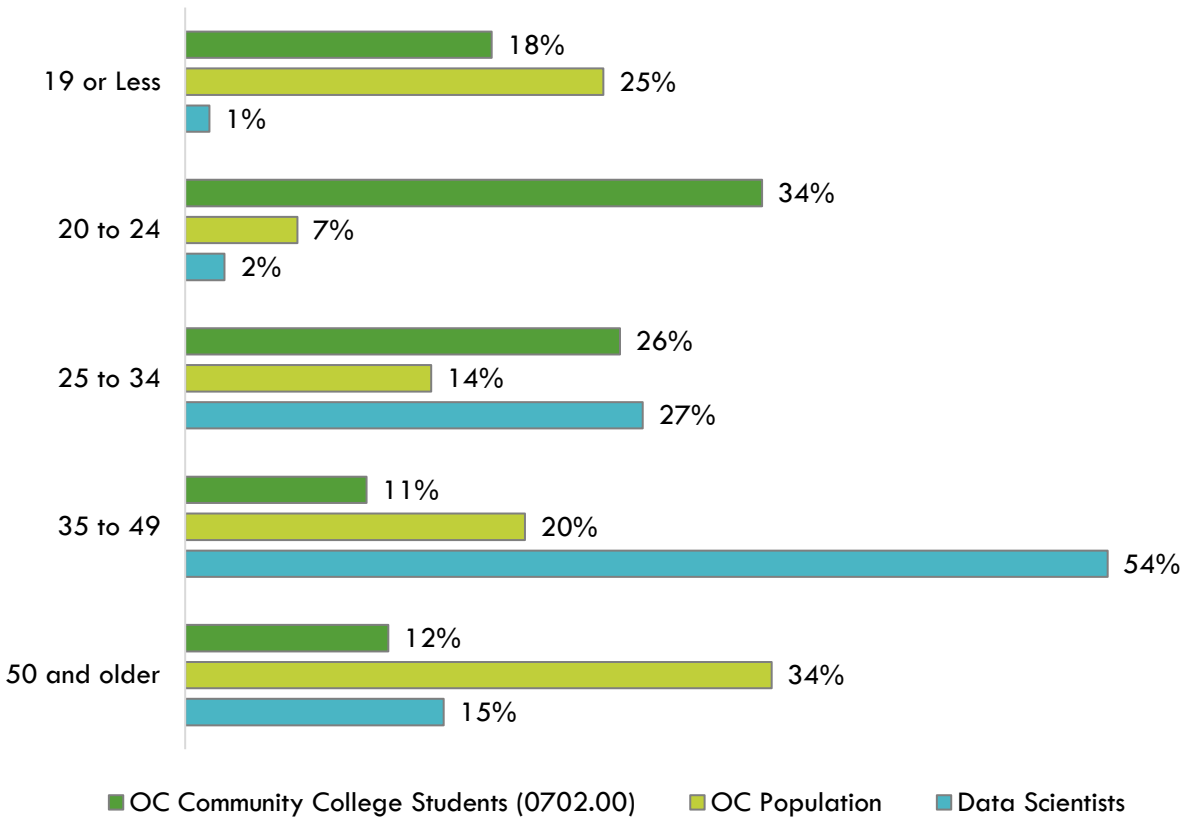
Exhibit 20: Program and County Demographics by Ethnicity

Ethnicity	OC Community College Students (0702.00)	OC Population	Data Scientists
Asian	24%	21%	29%
Black or African American	4%	2%	2%
Hispanic or Latino	44%	34%	13%
White	21%	40%	55%
Other Race/Ethnicity	8%	4%	1%
Masked or Unknown	4%	0%	0%

■OC Community College Students (0702.00) ■OC Population ■Data Scientists

Age:

Exhibit 21 shows the age of Orange County community college students enrolled in computer information systems programs compared to the overall Orange County population, as well as *data scientists*.. Over half (54%) of *data scientists* are 35 to 49, which is more than double the population (20%) and nearly five-times more community college computer information systems students (11%).

Exhibit 21: Program and County Demographics by Age

Age	OC Community College Students (0702.00)	OC Population	Data Scientists
19 or Less	18%	25%	1%
20 to 24	34%	7%	2%
25 to 34	26%	14%	27%
35 to 49	11%	20%	54%
50 and older	12%	34%	15%

■ OC Community College Students (0702.00) ■ OC Population ■ Data Scientists

Sex:

Exhibit 22 shows the sex of Orange County community college students enrolled in computer information systems programs compared to the overall Orange County population, as well as *data scientists* . All three groups are split nearly equally between women and men. However, the sex of 3% of community college computer information systems is unknown.

Exhibit 22: Program and County Demographics by Sex

	Female	Male	Masked or Unknown
OC Community College Students (0702.00)	45%	52%	3%
OC Population	51%	49%	
Data Scientists	49%	51%	
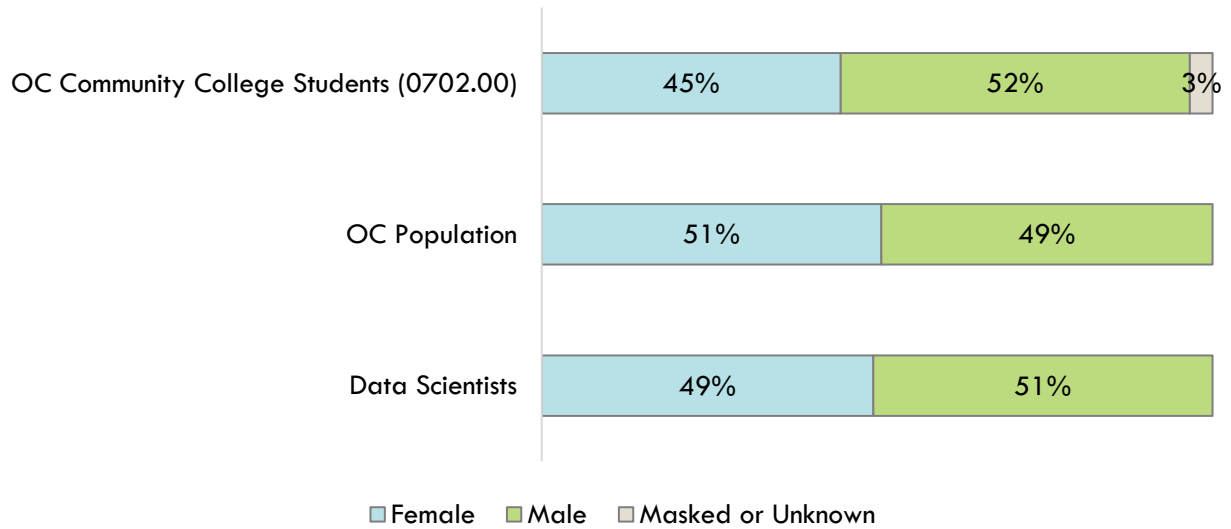
Appendix A: Methodology

The OC COE prepared this report by analyzing data from occupations and education programs. Occupational data is derived from Lightcast, a labor market analytics firm that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Program supply data is drawn from two systems: Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP).

Using a TOP-SOC crosswalk, the OC COE identified middle-skill jobs for which programs within these TOP codes train. Middle-skill jobs include:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

The OC COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The COE developed a "supply table" with this information, which is the source of the program supply data for this report. TOP code data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP code data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data), also known as IPEDS. TOP is a system of numerical codes used at the state level to collect and report information on California community college programs and courses throughout the state that have similar outcomes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. Institutions outside of the California Community College system do not use TOP codes in their reporting systems.

Data included in this analysis represent the labor market demand for relevant positions most closely related to the proposed program as expressed by the requesting college in consultation with the OC COE. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study which can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions.

All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/
Living Wage	The living wage is derived from the Insight Center's California Family Needs Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data assesses the cost of housing, food, child care, health care, transportation, and taxes. For more information, see: https://insightcced.org/family-needs-calculator/ The living wage for one adult in Orange County is $20.63 per hour ($42,910.40 annually). This figure is used by the CCCCO to calculate the percentage of students that attained the regional living wage.
Typical Education and Training Requirements, and Educational Attainment	The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/
Educational Supply	The CCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions
Student Metrics and Demographics	LaunchBoard, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://www.calpassplus.org/LaunchBoard/Home.aspx

Data Type	Source
Population and Occupation Demographics	The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml

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