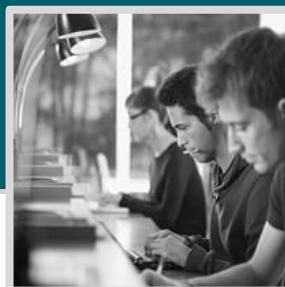
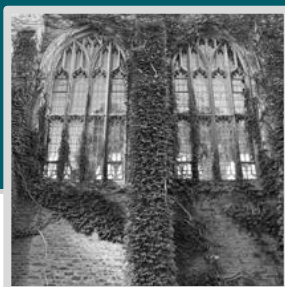


# Benefits of Increasing Educational Attainment in Society

Prepared for Merced Community College District

November 2014



This report discusses benefits associated with increasing educational attainment in society. The report also provides estimates of adult income for varying levels of educational attainment in the state of California and in an approximation of the Merced Community College District service area.

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# INTRODUCTION AND KEY FINDINGS

## INTRODUCTION

The association between increased education and better and more numerous employment opportunities is widely discussed. The increases in pay associated with successively higher levels of educational attainment have been calculated nationally, though these increases will vary at regional levels. In addition to constructing estimates of these increases for the region surrounding Merced College, Hanover has provided a discussion of the wide range of other benefits, both public and private, that are linked to promoting greater levels of educational attainment in society.

## KEY FINDINGS

- **The growth in income that is linked to increasing levels of educational attainment is clear and dramatic, though the differences are more significant statewide than in the Merced service area.** Data from the 2012 American Community Survey show that, for the California population aged 25 to 64 who were generally employed over the prior 12 months, moving from no diploma to a diploma or equivalent was associated with growth in average income of \$10,177 (\$4,445 for the Merced area). Similarly, moving from a diploma or equivalent to an associate's degree is linked to growth in average income of \$16,855 (\$18,477 for the Merced area), and moving from an associate's degree to a bachelor's degree is linked to growth in average income of \$24,196 (\$8,730 for the Merced area). *See the methodology described in Section II for a more complete description of the calculation of these figures (which are in 2012 dollars) and what they indicate.*
- **In 17 of the 18 major industry groups used in the American Community Survey, reported salary averages are in line with expectations regarding educational attainment.** That is, groups with higher levels of educational attainment earn higher average salaries than groups with lower educational attainment. The one exception is in the Extraction and Mining industry, which is known for offering jobs with unusually high salaries for people with relatively little formal education. The small population involved in this industry may also affect the analysis.
- **Numerous other benefits to increasing the level of educational attainment in society are demonstrated in research.** These benefits range from the straightforward—such as increased pay leading to increased government revenues and reduced expenditures on public assistance—to the more complex—such as increased education leading to more cohesive societies. Other major benefits relate to improving individual and family health, higher educational attainment in children of more educated parents, and reductions in crime rates and recidivism.

## SECTION I: GENERAL BENEFITS OF INCREASING EDUCATIONAL ATTAINMENT LEVELS

The benefits that result from increasing educational attainment in the adult population go far beyond simple considerations of income growth. While many of these benefits may have some degree of causal link to personal income growth, it is important to identify them separately, as their positive effects cumulate into a larger return on investment in adult education than a simple comparison of program cost and associated personal income growth can provide. Note that, in large part, the benefits of education here discussed are based on research focused on increased attainment itself, leaving aside the question of differences in results between those achieving higher levels of attainment according to the “traditional” path and those who do so through adult education programs. It is not clear if any such differences exist.

### PUBLIC BENEFITS LINKED TO INCREASING EDUCATIONAL ATTAINMENT LEVELS

Investing in adult education to obtain a better-educated working population leads to a wide range of public (or shared) benefits. From the standpoint of governments that are facing stretched budgets, the prospect of taking one action that leads to increased revenues and reduced expenditures on public assistance and policing must be appealing; investing for a more educated population is, according to existing research, such an action.

The general economic benefits to be had from increasing education attainment among adults are relatively straightforward in nature. If more individuals are capable of performing new work of greater economic value or more work of same level of economic value (both of which are considered increases in productivity), then these individuals ought to be able to obtain greater incomes, leading to increased tax revenue, greater demand for other goods and services, and other developments associated with economic growth. While scenarios can be created where productivity gains are not without downsides, the general case that increasing educational attainment leads to public benefits through increased productivity) is well-demonstrated.<sup>1</sup>

Another side of the public economic benefits to be had from improving individuals’ educational attainment concerns public expenditures. Spending on the criminal justice system has grown tremendously in recent decades, and the costs of the system are increasingly hard for state and local governments to bear.<sup>2</sup> While the relative merits of the

<sup>1</sup> See, for example: Berger, N., and P. Fisher. “A Well-Educated Workforce is Key to State Prosperity.” Economic Policy Institute, August 22, 2013, pp. 1-5. <http://s2.epi.org/files/2013/A%20well-educated%20workforce%20is%20key%20to%20state%20prosperity.pdf>

<sup>2</sup> For a look at incarceration cost growth alone, see: Badger, E. “The Meteoric, Costly, and Unprecedented Rise of Incarceration in America.” *The Washington Post* “Wonkblog,” April 30, 2014. <http://www.washingtonpost.com/blogs/wonkblog/wp/2014/04/30/the-meteoric-costly-and-unprecedented-rise-of-incarceration-in-america/>

current approach to criminal justice are outside the scope of this report, more educated people generally commit fewer crimes, and education has been demonstrated as a means to reduce recidivism among those who have turned to crime in the past.<sup>3</sup> Increasing educational attainment for a population also leads to reduced spending on public assistance programs,<sup>4</sup> as people who are able to obtain jobs with higher pay clearly have a reduced need for both direct monetary aid and other forms of assistance.

A more abstract set of public benefits can also be assembled out of the results of increasing educational attainment in society. Research indicates that individuals with greater levels of education are more involved in their societies, participating more frequently in elections, volunteering their time more often, and even donating blood more frequently.<sup>5</sup> The latter two benefits may clearly be tied to having greater incomes and more free time as a consequence of higher pay (and thus reduced need to work for pay). The former speaks to a less measurable increase in the quality of a democratic society. Greater education also is associated with reduced social strife<sup>6</sup>—people are more able to get along with others when they are more educated, perhaps as a result of not feeling as though one is constantly in competition just to make ends meet. Another factor contributing to this benefit could be the longstanding belief that education “opens minds” and encourages people to better understand each other.

### PRIVATE BENEFITS LINKED TO INCREASING EDUCATIONAL ATTAINMENT LEVELS

Of course, for many people, the motivation to increase their educational attainment emerges from a more straightforward desire to improve their personal economic situation. Education in general is routinely framed for the public as a way to increase one’s pay rather than as a means to foster social cohesion or improve the quality of democracy. On this point, the existing body of evidence is known to speak very clearly: obtaining higher levels of education is, all else equal, historically linked to increased pay and greater job security and opportunities. This latter point is particularly relevant in the current economic context, as increased attachment to the labor market, by definition, means that individuals are less likely to experience periods of unemployment that can stretch into long-term unemployment (and thus contribute to labor market exit, which places one outside the workforce and thus out of calculations of headline unemployment figures). People in jobs requiring higher levels of education also generally have access to more benefits, such as health insurance.

<sup>3</sup> See both “Education and Vocational Training in Prisons Reduces Recidivism, Improves Job Outlook.” The RAND Corporation, August 22, 2013. <http://www.rand.org/news/press/2013/08/22.html> and Lochner, L., and E. Moretti. “The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports.” *American Economic Review*, 94(1), 2004. pp. 155-189.

<sup>4</sup> French, L., and P. Fisher. “Education Pays in Iowa: The State’s Return on Investment In Workforce Education.” The Iowa Policy Project, May 2009. pp. 10-11. <http://www.iowapolicyproject.org/2009docs/090528-ROI-educ.pdf>

<sup>5</sup> Baum, S., and J. Ma. “Education Pays: The Benefits of Higher Education for Individuals and Society.” College Board, 2007. pp. 25-28. [http://www.collegeboard.com/prod\\_downloads/about/news\\_info/trends/ed\\_pays\\_2007.pdf](http://www.collegeboard.com/prod_downloads/about/news_info/trends/ed_pays_2007.pdf)

<sup>6</sup> Harrison, H. et al. “Executive Summary: The Economic Impact of Secondary and Post-Secondary Career and Technical Education in Tennessee.” Sparks Bureau of Business and Economic Research, December 2006. p. 10. [http://www.tn.gov/education/cte/docs\\_tccte/execsummary.pdf](http://www.tn.gov/education/cte/docs_tccte/execsummary.pdf)

Increased personal pay and higher levels of personal education also contribute to improved family life for many people. Research indicates that more educated parents are more likely to have healthy offspring who perform better in school and, in turn, seek higher levels of education themselves.<sup>7</sup> The benefits of having parents with greater experience of the higher education system in general, including the financial aid process, have been clearly shown in higher rates of attendance and persistence among students with such parents.<sup>8</sup> While the Merced Community College District regional adult education consortium's interest in this report is in the effect of raising adults one "level" of education (and thus some only would rise to "diploma/equivalent" rather than any level linked to higher education), the point of increased parent education generally improving the life trajectories of offspring remains.

There are numerous other private benefits to be had from increasing one's educational attainment. While many of these are again likely tied closely to increased income, they nonetheless increase the return on investment beyond what can be assessed simply through income comparisons. For example, being able to amass greater savings allows people to increase their quality of life in a wide number of evident ways, including feeling more economically secure (and thus experiencing reduced stress levels) and, more simplistically, being able to purchase "big-ticket" items like major appliances, cars, and housing. The benefits of the former point are not to be ignored—the stress of living in poverty has been clearly shown to reduce measures of health and negatively affect decision-making in ways that have long-term consequences for individuals, their families, and, ultimately, society at large.<sup>9</sup> In this sense, many of the private benefits here described also generate or are linked to public benefits described above.

<sup>7</sup> See both "America's Health Starts with Healthy Children: How Do States Compare?" Robert Wood Johnson Foundation, 2008. p. 15 [http://www.commissiononhealth.org/PDF/819a3435-8bbb-4549-94db-7758248075cf/ChildrensHealth\\_Chartbook.pdf](http://www.commissiononhealth.org/PDF/819a3435-8bbb-4549-94db-7758248075cf/ChildrensHealth_Chartbook.pdf) and Brownstein, R. "Are College Degrees Inherited?" *The Atlantic*, April 11, 2014. <http://www.theatlantic.com/education/archive/2014/04/are-college-degrees-inherited/360532/>

<sup>8</sup> Westbrook, S., and J. Scott. "The Influence of Parents on the Persistence Decisions of First-Generation College Students." *Focus on Colleges, Universities, and Schools*, 6:1, November 2012. p. 3. <http://www.nationalforum.com/Electronic%20Journal%20Volumes/Westbrook,%20Steven%20Parents%20of%20First-Generation%20College%20Students%20FOCUS%20V6%20N1%202012.pdf>

<sup>9</sup> See both Weintraub, D. "Why Reducing Poverty—and Stress—Might Be the Key to Better Health." California Health Report, October 13, 2014. <http://www.healthycal.org/archives/16857> and Dennis, B. "Poverty Strains Cognitive Abilities, Opening Door for Bad Decision-Making, New Study Finds." *The Washington Post*, August 29, 2013. [http://www.washingtonpost.com/national/health-science/poverty-strains-cognitive-abilities-opening-door-for-bad-decision-making-new-study-finds/2013/08/29/89990288-102b-11e3-8cdd-bcdc09410972\\_story.html](http://www.washingtonpost.com/national/health-science/poverty-strains-cognitive-abilities-opening-door-for-bad-decision-making-new-study-finds/2013/08/29/89990288-102b-11e3-8cdd-bcdc09410972_story.html)

## SECTION II: INCOME GROWTH LINKED TO ADULT EDUCATIONAL ATTAINMENT

The consortium’s interest in measuring the income growth linked to increasing the educational attainment of adults within its service area presents some interesting challenges. To better understand the results that Hanover has obtained for this question, please review the methodology section below.

### METHODOLOGY FOR ESTIMATING INCOME GROWTH

To examine individual income according to educational attainment within the Merced service area and in California, Hanover relied upon the Census Bureau’s 2012 1-year Public Use Microdata Series (PUMS) for the American Community Survey (ACS), which is an annual survey that gathers data on a wide variety of housing, social, demographic and economic topics. In particular, one of the PUMS data points is “WAGP,” or wage and salary income over the prior 12 months. Hanover used this variable to measure changes in personal income attributable to educational attainment (thus ignoring income from other sources).

The PUMS data are segmented according to state and Public Use Microdata Areas (PUMAs), which are artificial, non-overlapping areas within a state that are constructed to contain at least 100,000 residents according to prior census results and population projections. The PUMA is the smallest area by which the ACS PUMS data can be analyzed. We chose the following four PUMAS to approximate the broader service area served by providers in the Merced service area:

- 00300 – Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, and Tuolumne Counties
- 03900 – Madera County/Madera City
- 04701 – Merced County (West and South)—Los Banos and Livingston Cities
- 04702 – Merced County (Northeast)—Merced and Atwater Cities

In order to include any part of Mariposa County, the six other counties that are part of PUMA 00300 had to be included as well. To the extent that their economies are similar to that of Mariposa County’s, however, this addition would not significantly change the final results obtained.

After establishing the geographic boundaries, Hanover turned to the question of whom to include in the income-change analysis. Ultimately, the following population characteristics were chosen:

- Age: 25 to 64 years
- Not enrolled in an educational program within the last three months

- Worked at least 11 months over the prior 12-month period
- Worked an average of at least 35 hours per week over the prior 12-month period
- Reported highest educational attainment of—
  - Group 1: 8th to 12th grade (without diploma)
  - Group 2: High school diploma or equivalent
  - Group 3: Associate’s degree
  - Group 4: Bachelor’s degree

The reasoning behind these decisions is as follows. Restricting the age range to 25 to 64 years captures the people who are at an age when any planned initial educational attainment has, for the most part, been completed. Large majorities of people within each of the four education groups, at this stage, will thus have had adequate time to find employment following their initial education. This age range is based on the “prime working age” category of 25-54, with the 10-year extension increasing it the border of what is generally considered the age when retirement begins to phase in (65 and over).

The work restrictions were imposed to eliminate the effects of unemployment and lower-hour, part-time employment on the figures. As much as possible, the goal for this study was to compare similar populations that vary only by level of educational attainment. Thus, a fairly high bar (working at least 11 of the past 12 months for an average of at least 35 hours per week) was set to effectively allow for comparison only between those with stable and significant (if not quite full-time) employment. This is not to say, however, that these topics should be ignored when assessing overall individual welfare and the benefits that higher educational attainment can bring (those with more education routinely posting lower unemployment figures and higher levels of full-time work). Rather, they are excluded because the inclusion of large numbers of unemployed or lower-hour, part-time workers would have unduly lowered the reported pay results (particularly for Groups 1 and 2); the goal of this report was to show what people in the four groups *do* earn when employed.

### *WHAT THIS ANALYSIS IGNORES*

As important as what goes into the data analysis are the elements that are left out. This report does not speak to the income effects for different areas of study, which clearly have major effects on rates of pay.<sup>10</sup> The report also ignores sex and race/ethnicity, for which varying income effects may exist. Similarly, different effects may be present for different age groups; this report considers virtually the entire adult working population within each of the education groups as one mass.

Also ignored in this analysis is the question of how the labor market itself may react to the hypothetical increase in educational attainment levels posed by providers in the region. If there were a sudden large expansion in the number of people educated to the diploma,

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<sup>10</sup> For median annual salaries by degree program and award type (e.g., degree in Computer Information Systems) two years before, two years after, and five years after, see the California Community Colleges Chancellor’s Office SalarySurfer. <http://salariesurfer.cccco.edu/SalarySurfer.aspx>



associate’s degree, and bachelor’s degree levels, it is possible that local labor demand may be insufficient for people at these higher educational levels. If they are also unable or unwilling to relocate, then the oversupply of better-educated people relative to need may result in lower local salaries. While it is widely accepted that there is a nationwide education gap (particularly at the postsecondary level), local labor market conditions may vary significantly from this.

As an example of this, consider the employment projections for Merced County, developed by the California Economic Development Department. The 2010-2020 projections indicate a total of 234 annual job openings for occupations classified as needing a bachelor’s degree for entry-level employment. The equivalent annual total figure for associate’s-degree-linked occupations is 54 (see the appendix for the full tables).<sup>11</sup> While these projections and categorizations are not beyond questioning, the general case remains that local labor markets may not be able to supply appropriate jobs for a given large increase in the number of better-educated adults (who would also be competing with the constant inflow of “traditional” students graduating into the local labor market, of course). Thus, these adults may leave the region or even the state in search of employment, meaning that the “return on investment” may primarily be realized elsewhere in the country.

**INCOME GROWTH FOR THE AREA SURROUNDING THE MERCED SERVICE AREA**

For the population as described and constrained in the methodology section, Hanover’s analysis on income change (measured in 2012 dollars) linked to varying educational levels for those living in the four PUMAs of interest is detailed in Figure 2.1.

**Figure 2.1: Income Differentials Based on Educational Attainment Groups, Merced Area**

GROUP*/VALUE	GROUP 1	GROUP 2	GROUP 3	GROUP 4
Population Estimate**	13,893	29,828	11,073	15,803
Total Wage & Salary Income Estimate**	\$453,629,615	\$1,106,531,106	\$615,378,201	\$1,016,211,973
Average Wage & Salary Income Estimate**	\$32,652	\$37,097	\$55,575	\$64,305
Absolute (%) Growth, Lower to Higher Group	\$4,445 (13.6%)	\$18,477 (49.8%)	\$8,730 (15.7%)	N/A

Source: Hanover analysis of Census Bureau data  
 \*Group 1: 8th-12th grade, no diploma; Group 2: Diploma or equivalent; Group 3: Associate’s degree; Group 4: Bachelor’s degree  
 \*\*Note that all of these values are estimates for which confidence intervals can be constructed. As these are all relatively large populations, the confidence intervals are small, and it is not clear that including them makes the figures substantially more useful. If desired, they can be supplied.

The largest gain to be had is in the jump from diploma completion to associate’s degree completion, where the average of reported incomes goes up by over \$18,000 (or almost 50 percent). Sizeable gains are present for both other educational attainment increases,

<sup>11</sup> “2010-2020 Occupational Employment Projections: Merced Metropolitan Statistical Area (Merced County).” California Employment Development Department, 2013.  
<http://www.labormarketinfo.edd.ca.gov/county/merced.html#OCCDATA>

though. Interestingly, those without a high school diploma appear to fare better in this area than they do statewide, while those with a bachelor's degree in this area appear to do less well than they do statewide (as the next subsection focusing on changes in income by educational level statewide indicates). This may be due to the use of average as opposed to median income figures, though both measures are in common use for this type of analysis.

## INCOME GROWTH FOR CALIFORNIA

To illustrate the statewide labor market into which adult students from the Merced area may head, Hanover has conducted a similar income growth analysis (measured in 2012 dollars) for the state. The results of this analysis are shown in Figure 2.2.

**Figure 2.2: Income Differentials Based on Educational Attainment Groups, Statewide**

GROUP*/VALUE	GROUP 1	GROUP 2	GROUP 3	GROUP 4
Population Estimate**	733,286	1,875,849	779,165	2,397,582
Total Wage & Salary Income Estimate**	\$21,433,422,834	\$73,920,312,493	\$43,837,020,548	\$192,904,039,762
Average Wage & Salary Income Estimate**	\$29,229	\$39,406	\$56,262	\$80,458
Absolute (%) Growth from Group to Group	\$10,177 (34.8%)	\$16,855 (42.8%)	\$24,196 (43.0%)	N/A

Source: Hanover analysis of Census Bureau data

\*Group 1: 8th-12th grade, no diploma; Group 2: Diploma or equivalent; Group 3: Associate's degree; Group 4: Bachelor's degree

\*\*Note that all of these values are estimates for which confidence intervals can be constructed. As these are all relatively large populations, the confidence intervals are small, and it is not clear that including them makes the figures substantially more useful. If desired, they can be supplied.

Statewide, the jumps from diploma to associate's degree and from associate's degree to bachelor's degree entail nearly identical percentage increases in income. The \$80,000+ figure for average income in Group 4 may be skewed upward by the use of average income; while use of median income figures would show income levels that may be overall more likely to be obtained, this would mask some of the upward potential possible in income growth. If desired, median assessments can also be produced from these datasets.

## INCOME GROWTH LINKED TO EMPLOYMENT IN DIFFERENT INDUSTRIES

The income changes seen above can be broken down another level by looking at how advancing education affects wage and salary income associated with employment in particular industries. For the Merced area, breaking down the population in this fashion—by industry of employment and educational level—results in estimates that are based on population groups that are too small to be considered reliable indicators. In many cases, the income data would be based on only a few actual responses from individuals. In such cases, one can look at larger areas—like the state of California—and focus only on the most recent data, or one can use larger datasets that add in additional years of data for a smaller region. Hanover uses only the most recent data for California rather than focusing solely on the Merced area to allow for an analysis of more recent data for a larger sample size.

The ACS divides individuals who reported employment into 18 major industry groups, which are listed below:

- ADM (Public Administration)
- AGR (Agriculture, Forestry, Fishing and Hunting)
- CON (Construction)
- EDU (Educational Services)
- ENT (Arts, Entertainment, Recreation, Accommodations, and Food Services)
- EXT (Extraction and Mining)
- FIN (Finance, Insurance, Real Estate, and Rental and Leasing)
- INF (Information and Communications)
- MED (Health Services)
- MFG (Manufacturing)
- MIL (Armed Forces)
- PRF (Professional, Scientific, Management, Administrative, and Waste Management Services)
- RET (Retail Trade)
- SCA (Social Services)
- SRV (Other Services)
- TRN (Transportation and Warehousing)
- UTL (Utilities)
- WHL (Wholesale Trade)

Figure 2.3 on the following page details the shifts in income linked to differing educational attainment within these 18 major industry groups statewide. The unusually high salary reported for Group 1 individuals (those without a diploma or equivalent) in the Extraction and Mining industry is likely attributable to one of two factors. The first is that salaries for people with relatively little formal education in this industry are genuinely quite high, often among the highest possible for those without a diploma.<sup>12</sup> The second is the relatively small population of Group 1 individuals reporting employment in this industry—if an individual in this set reported inaccurate salary information, it would have a significant impact on the data, given the relative lack of other salaries to balance it. This is one of the constraints that emerges when examining small populations.

<sup>12</sup> “Highest Pay without a High School Diploma: Jobs.” *Bloomberg*, 2013. <http://www.bloomberg.com/visual-data/best-and-worst//highest-pay-without-a-high-school-diploma-jobs>

**Figure 2.3: Average Salaries for 18 Major ACS Industries, California (2012 dollars)**



Source: Hanover analysis of ACS data \*These figures are estimates for which confidence intervals can be displayed if desired. Group 1 refers to individuals without a diploma or equivalent; Group 2, to individuals with a diploma or equivalent; Group 3, to individuals with an associate’s degree; and Group 4, to individuals with a bachelor’s degree. The populations are also restricted by the parameters set in the methodology section of this report.

## APPENDIX

The tables below detail Merced County and Madera County occupational projections for 2010-2020 that are linked with education at the bachelor’s and associate’s degree levels. These projections are prepared by the California Employment Development Department. A total of 234 annual openings are projected for bachelor’s-linked occupations in Merced County, with a further 125 projected for Madera County (359 total). The equivalent totals for Merced and Madera Counties at the associate’s degree level are 54 and 26, respectively (80 total). Adults obtaining higher levels of education would be competing with “traditional” students graduating into the employment market for many of these opportunities.

**Table A1: Bachelor’s-Linked Occupational Projections, Merced County**

OCCUPATION TITLE AND CODE	EMPLOYMENT ESTIMATES		PROJECTED CHANGE, 2010-20		TOTAL AVERAGE ANNUAL JOB OPENINGS
	2010	2020	NUMERIC	(PERCENT)	
11-1011 - Chief Executives	190	190	0	0.0%	5
11-1031 - Legislators	50	50	0	0.0%	1
11-2022 - Sales Managers	130	150	20	15.4%	6
11-3021 - Computer and Information Systems Managers	40	40	0	0.0%	1
11-3031 - Financial Managers	150	160	10	6.7%	5
11-3051 - Industrial Production Managers	70	80	10	14.3%	3
11-9151 - Social and Community Service Managers	130	150	20	15.4%	5
13-1041 - Compliance Officers	50	50	0	0.0%	1
13-1051 - Cost Estimators	60	80	20	33.3%	3
13-1078 - Human Resources, Training, and Labor Relations Specialists, All Other	170	200	30	17.6%	6
13-1111 - Management Analysts	150	180	30	20.0%	5
13-1151 - Training and Development Specialists	160	190	30	18.8%	7
13-1161 - Market Research Analysts and Marketing Specialists	40	60	20	50.0%	3
13-2011 - Accountants and Auditors	270	310	40	14.8%	10
15-1121 - Computer Systems Analysts	40	50	10	25.0%	1
15-1131 - Computer Programmers	40	50	10	25.0%	1
15-1132 - Software Developers, Applications	40	40	0	0.0%	0
15-1142 - Network and Computer Systems Administrators	120	160	40	33.3%	6
15-1179 - Information Security Analysts, Web Developers, and Computer Network Architects	60	70	10	16.7%	2
17-2051 - Civil Engineers	60	70	10	16.7%	2
19-1012 - Food Scientists and Technologists	40	50	10	25.0%	2
19-1013 - Soil and Plant Scientists	30	40	10	33.3%	2
19-2041 - Environmental Scientists and Specialists, Including Health	40	40	0	0.0%	1

OCCUPATION TITLE AND CODE	EMPLOYMENT ESTIMATES		PROJECTED CHANGE, 2010-20		TOTAL AVERAGE ANNUAL JOB OPENINGS
	2010	2020	NUMERIC	(PERCENT)	
19-3099 - Social Scientists and Related Workers, All Other	60	70	10	16.7%	3
21-1021 - Child, Family, and School Social Workers	200	220	20	10.0%	7
21-1023 - Mental Health and Substance Abuse Social Workers	50	70	20	40.0%	2
21-1029 - Social Workers, All Other	60	70	10	16.7%	2
21-1091 - Health Educators	80	120	40	50.0%	6
21-1092 - Probation Officers and Correctional Treatment Specialists	50	60	10	20.0%	2
21-1798 - Community and Social Service Specialists, All Other	120	140	20	16.7%	4
25-2012 - Kindergarten Teachers, Except Special Education	270	320	50	18.5%	12
25-2021 - Elementary School Teachers, Except Special Education	1,660	1,960	300	18.1%	67
25-2022 - Middle School Teachers, Except Special and Career/Technical Education	510	600	90	17.6%	20
25-3999 - Teachers and Instructors, All Other	450	520	70	15.6%	13
27-1024 - Graphic Designers	40	40	0	0.0%	1
27-3011 - Radio and Television Announcers	40	40	0	0.0%	1
27-3031 - Public Relations Specialists	40	50	10	25.0%	2
27-3091 - Interpreters and Translators	30	40	10	33.3%	2
39-9032 - Recreation Workers	250	280	30	12.0%	8
41-3031 - Securities, Commodities, and Financial Services Sales Agents	40	50	10	25.0%	2
45-2011 - Agricultural Inspectors	80	80	0	0.0%	2

Source: California Employment Development Department

**Table A2: Associate's-Linked Occupational Projections, Merced County**

OCCUPATION TITLE AND CODE	EMPLOYMENT ESTIMATES		CHANGE, 2010-20		TOTAL AVERAGE ANNUAL JOB OPENINGS
	2010	2020	NUMERIC	(PERCENT)	
11-1021 - General and Operations Managers	800	870	70	8.8%	21
11-9021 - Construction Managers	140	160	20	14.3%	3
17-3011 - Architectural and Civil Drafters	30	40	10	33.3%	1
17-3022 - Civil Engineering Technicians	30	40	10	33.3%	1
19-4011 - Agricultural and Food Science Technicians	80	100	20	25.0%	5
25-2011 - Preschool Teachers, Except Special Education	160	190	30	18.8%	8
29-2012 - Medical and Clinical Laboratory Technicians	60	70	10	16.7%	2
29-2021 - Dental Hygienists	130	170	40	30.8%	7
43-4061 - Eligibility Interviewers, Government Programs	190	200	10	5.3%	6

Source: California Employment Development Department

**Table A3: Bachelor’s-Linked Occupational Projections, Madera County**

OCCUPATION TITLE AND CODE	EMPLOYMENT ESTIMATES		CHANGE, 2010-20		TOTAL AVERAGE ANNUAL JOB OPENINGS
	2010	2020	NUMERIC	(PERCENT)	
11-1011 - Chief Executives	110	120	10	9.1%	4
11-2021 - Marketing Managers	20	20	0	0.0%	1
11-2022 - Sales Managers	60	70	10	16.7%	3
11-3021 - Computer and Information Systems Managers	30	40	10	33.3%	1
11-3031 - Financial Managers	80	100	20	25.0%	4
11-3051 - Industrial Production Managers	40	60	20	50.0%	3
11-9031 - Education Administrators, Preschool and Childcare Center/Program	50	50	0	0.0%	2
11-9111 - Medical and Health Services Managers	90	110	20	22.2%	3
11-9151 - Social and Community Service Managers	40	50	10	25.0%	1
13-1041 - Compliance Officers	90	110	20	22.2%	3
13-1051 - Cost Estimators	40	40	0	0.0%	2
13-1078 - Human Resources, Training, and Labor Relations Specialists, All Other	70	90	20	28.6%	3
13-1111 - Management Analysts	70	80	10	14.3%	3
13-1161 - Market Research Analysts and Marketing Specialists	30	40	10	33.3%	3
13-2011 - Accountants and Auditors	150	200	50	33.3%	7
13-2099 - Financial Specialists, All Other	50	60	10	20.0%	2
15-1121 - Computer Systems Analysts	30	40	10	33.3%	1
15-1131 - Computer Programmers	30	30	0	0.0%	1
15-1142 - Network and Computer Systems Administrators	50	60	10	20.0%	2
17-2051 - Civil Engineers	50	50	0	0.0%	1
17-2081 - Environmental Engineers	50	60	10	20.0%	2
19-2041 - Environmental Scientists and Specialists, Including Health	100	110	10	10.0%	4
19-4021 - Biological Technicians	30	30	0	0.0%	1
21-1021 - Child, Family, and School Social Workers	120	130	10	8.3%	4
21-1023 - Mental Health and Substance Abuse Social Workers	30	40	10	33.3%	1
21-1029 - Social Workers, All Other	60	70	10	16.7%	3
21-1091 - Health Educators	70	90	20	28.6%	4
21-1092 - Probation Officers and Correctional Treatment Specialists	130	160	30	23.1%	6
25-2012 - Kindergarten Teachers, Except Special Education	120	130	10	8.3%	4
25-2021 - Elementary School Teachers, Except Special Education	860	950	90	10.5%	28
25-2031 - Secondary School Teachers, Except Special and Career/Technical Education	400	400	0	0.0%	11

OCCUPATION TITLE AND CODE	EMPLOYMENT ESTIMATES		CHANGE, 2010-20		TOTAL AVERAGE ANNUAL JOB OPENINGS
	2010	2020	NUMERIC	(PERCENT)	
25-2032 - Career/Technical Education Teachers, Secondary School	20	20	0	0.0%	1
27-3031 - Public Relations Specialists	20	20	0	0.0%	1
39-9032 - Recreation Workers	100	100	0	0.0%	2
41-3031 - Securities, Commodities, and Financial Services Sales Agents	40	40	0	0.0%	1
41-4011 - Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	30	40	10	33.3%	2

Source: California Employment Development Department

**Table A4: Associate’s-Linked Occupational Projections, Madera County**

OCCUPATION TITLE AND CODE	EMPLOYMENT ESTIMATES		CHANGE, 2010-20		TOTAL AVERAGE ANNUAL JOB OPENINGS
	2010	2020	NUMERIC	(PERCENT)	
11-1021 - General and Operations Managers	390	420	30	7.7%	10
11-9021 - Construction Managers	90	100	10	11.1%	2
19-4093 - Forest and Conservation Technicians	130	150	20	15.4%	7
29-2021 - Dental Hygienists	50	70	20	40.0%	3
29-2032 - Diagnostic Medical Sonographers	30	40	10	33.3%	1
43-4061 - Eligibility Interviewers, Government Programs	60	70	10	16.7%	3
11-1021 - General and Operations Managers	390	420	30	7.7%	10

Source: California Employment Development Department



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