PENNSYLVANIA

Degrees of Value: College Majors and the Pennsylvania State System's Contribution to the Workforce

Anthony P. Carnevale
Cary Lou
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FOREWORD: ADVANCING STUDENTS' AND PENNSYLVANIA'S PROSPERITY

Pennsylvania's State System of Higher Education is the largest provider of higher education in the Commonwealth, with nearly 107,000 degree-seeking students and thousands more who are enrolled in certificate and other career-development programs. With almost 90 percent of our students coming from Pennsylvania and the vast majority of our graduates remaining in the state immediately after graduation, the future of the 14 State System universities and that of the Commonwealth are intimately tied.

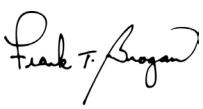
Today, the importance of education is greater than ever. According to projections by the Georgetown University Center on Education and the Workforce, by 2020, more than one-third of Pennsylvania jobs and job openings will require a Bachelor's degree or higher. Individuals with a college education fare better than their peers in both economic and non-economic terms. Students, parents, businesses, taxpayers, legislators, and other policymakers understand this and recognize the importance of higher education to the state.

In response to this changing environment and the State System's strategic plan, "Rising to the Challenge 2020," the State System has renewed its emphasis on aligning its academic programs with the workforce and personal growth needs of students. The State System is critically looking at ways to supplement and complement the existing work that is going on in our 14 universities to prepare our students for a lifetime of productive employment.

An important resource in this effort is the State System's Program Alignment Toolkit, an infrastructure of resources that will help our 14 universities individually and collectively connect better with the state's economy. The toolkit includes a supply/demand gap analysis, which will add to the State System's capacity to use labor market intelligence, provide better data to students, and offer needs-based research such as that conducted by our colleagues and partners at Georgetown University.

This report by the Georgetown Center demonstrates the State System's contribution to higher education in the Commonwealth and highlights the economic outcomes of college-educated workers in Pennsylvania. This information has informed and guided the development of the State System's supply/demand gap analysis project. It is an example of improved data developed specifically to help students, faculty, employers, state legislators, and policymakers better understand the Keystone State's higher education landscape and contextualize the State System's contribution within this environment.

We truly appreciate the work of the Georgetown Center and its collaboration with the Office of the Chancellor as we work together to help guarantee the State System's contribution to Pennsylvania's economic success. We look forward to leveraging this important work to ensure our 14 universities maintain their central role in advancing the economic prosperity of Pennsylvania and its residents.



Sincerely,

Frank T. Brogan
Chancellor, Pennsylvania's State System of Higher Education

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Many have contributed their thoughts and feedback throughout the production of this report. We are grateful for our talented designers, meticulous editorial advisors, and trusted printers whose tireless efforts were vital to our success. In addition, the dedication of the Georgetown University Center on Education and the Workforce's economists, analysts, writers, communications team, and operations staff was instrumental to production of this report, from conceptualization to completion.

- Jeff Strohl – research direction
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The views expressed in this publication are those of the authors and do not necessarily represent those of Lumina Foundation, the Bill & Melinda Gates Foundation, the Joyce Foundation, or their officers or employees.

SUMMARY

Demand for education and training in the United States has been on the rise for decades.[1] Pennsylvania's economy reflects this national trend. According to projections by the Georgetown University Center on Education and the Workforce, by 2020 more than 60 percent of jobs in Pennsylvania and nationally will require at least some postsecondary education.[2] Furthermore, more than one-third (733,000) of the 2,154,000 projected job openings in the state between 2010 and 2020 are expected to require a Bachelor's degree or higher.[3]

College-educated residents account for an increasing percentage of the state's prime-age (21-64 year-olds) population and an even larger and faster-growing share of Pennsylvania's prime-age workforce.[4]

As a major producer of Bachelor's degrees in the state, Pennsylvania's State System of Higher Education (State System) is poised to be a key contributor to the economic future of the state and its residents. In recent years, more than one-fifth of Bachelor's degrees awarded in Pennsylvania were conferred by the 14 system institutions.

The State System has already taken steps to meet the increasing demand for higher education through the proposals laid out in its strategic plan, "Rising to the Challenge 2020."[5] As part of this initiative, the State System is working to identify opportunities for programmatic expansion and to improve alignment with Pennsylvania's workforce needs.

The Pennsylvania State System of Higher Education serves almost 107,000 students, of whom almost 90 percent are Pennsylvania residents. The State System was established in 1983, bringing together 14 existing public institutions, and today includes several branch campuses and multi-institution centers in addition to the 14 universities' main campuses. The State System universities include institutions across Pennsylvania in major metropolitan areas, such as West Chester near Philadelphia, and institutions located in more rural areas, such as Mansfield, Lock Haven, and Edinboro. The system includes one of the state's historically black institutions: Cheyney University of Pennsylvania. The State System universities vary in size with the annual number of Bachelor's degrees awarded ranging from 2,639 at West Chester to 158 at Cheyney. The most popular majors are business and education. Together, the State System universities accounted for more than one-fifth of Pennsylvania Bachelor's degrees awarded in recent years.

1. Carnevale and Rose, *The Economy Goes to College*, 2015, and Carnevale and Rose, *The Undereducated American*, 2011.
2. Carnevale, Smith, and Strohl, *Recovery 2020*, 2013.
3. Ibid.
4. "College-educated" includes individuals who have completed a Bachelor's degree or higher.
5. State System Board of Governors, *Strategic Plan 2020*, 2014.

This report illustrates the 14 universities' contribution to the Pennsylvania workforce and the economic outcomes of all Bachelor's degree-holders working in the Commonwealth.[6] Detailed information on State System degree production, as well as median earnings and total employment for Pennsylvania workers with a Bachelor's degree or higher is presented, with breakdowns by aggregate and detailed majors and occupations. This analysis builds on previous work by the Georgetown Center that details the employment and earnings outcomes of Bachelor's degree-holders by field of study and occupational cluster.[7]

Key findings

- **Bachelor's degree-holders constitute a substantial and increasing component of Pennsylvania's population and an even faster-growing share of its workforce.** College graduates' share of Pennsylvania's prime-age workforce increased from 31.6 percent in 2009 to 34.7 percent in 2014, while their percentage of the state population grew from 28.6 percent to 30.7 percent. This growth is in response to the increasing demand for a more educated and skilled workforce.[8]

- **The State System is a substantial and consistent producer of college graduates in the state.** Between academic years 2009 and 2014, the number of Bachelor's degrees conferred by the State System institutions increased by 10 percent.

- **The growth of public colleges and universities in Pennsylvania has outpaced that of private colleges in the state in recent years.** Overall, public colleges and universities have been awarding a greater percentage of all Bachelor's degrees awarded in Pennsylvania in recent years, while private institutions' total share has dropped below 50 percent.[9]

- **On average, State System universities cost students receiving grant and scholarship aid almost $4,000 less annually than other Bachelor's degree-granting public institutions in the Commonwealth.** Pennsylvania residents saved even more at State System institutions compared to those in the private non-profit and for-profit sectors, where the average net price was more than $10,000 higher.

- **The State System served a higher percentage of Pell recipients (32%) than other public institutions (28%) and private non-profit institutions (24%).**

- **The private for-profit sector has the highest share of graduates that are underrepresented minorities (24%).[10]** A lower share of State System Bachelor's degrees (9%) went to underrepresented minorities than at other public (12%) and private non-profit institutions (11%).

- **The 14 State System universities tied with private non-profits for the highest share of Bachelor's degrees awarded to women (59%).**

6. Bachelor's degree-holders include individuals who have completed a Bachelor's degree or higher.
7. Carnevale, Strohl, and Melton, *What's It Worth,* 2011, and Carnevale, Cheah, and Hanson, *The Economic Value of College Majors,* 2015.
8. Carnevale and Rose, *The Economy Goes to College*, 2015.
9. We divide higher education institutions into categories (sectors) based on their control (classified as public or private based on how officials are appointed and main sources of financial support). Public institutions are those that are run by publicly selected officers and operate primarily on public funding. Private non-profit institutions are led by privately selected officials, are usually supported primarily by private funds, and do not provide compensation to the controlling entity outside of wages, rent, and other expenses for taking on risk. Private for-profit institutions are led by privately selected officials, are usually supported primarily by private funds, and do give compensation to the controlling entity outside of wages, rent, and other expenses for taking on risk. Source: U.S. Department of Education, "Integrated Postsecondary Education Data System Glossary," 2015.
10. "Underrepresented minorities" include blacks, Hispanics of any race, Native Americans and Alaska Natives, and multiracial individuals.

- **The majors that lead to the highest earnings for college graduates in Pennsylvania are in areas related to science, technology, engineering, and mathematics (STEM); health; and business.** These majors—in addition to education, humanities and liberal arts, and social sciences—were the most common majors for State System Bachelor's degree recipients in recent years, together accounting for more than 70 percent of graduates.

- **The number of graduates from State System universities with Bachelor's degrees in the STEM majors and Health (together STEM-H) has increased by 37 percent since 2009**. Degrees in STEM-H now represent almost one in four (24%) Bachelor's degrees awarded by the State System. However, the State System is still producing only 15 percent of all students who get a Bachelor's degree in STEM-H in Pennsylvania.

- **Almost three-quarters of college-educated workers live in southeast or southwest Pennsylvania, generally in the Philadelphia and Pittsburgh metropolitan areas.** The highest earnings in every major consistently go to those who live in southeast Pennsylvania. Workers in southeast Pennsylvania also have the greatest wage premium compared to workers with no more than a high school diploma. College-educated workers in the southeast earn 93 percent more than their high school-educated peers compared to an 84 percent difference in the second highest region, the southwest.

- **Among the top State System majors, some tend to have stronger links to specific occupational clusters, while others provide a more general education that prepares students for careers in a variety of areas.**[11] Among the top State System majors, education and health Bachelor's degree-holders had tighter relationships with a single occupational cluster – with more than half going into a single career area – while humanities and liberal arts and social sciences majors were employed in diverse occupational areas. Business majors fell somewhere in between.

11. Majors are associated with occupations with varying degrees of connectivity. The strength of a connection is based on the share of a major's employment in one or more occupational areas. Carnevale, Strohl, and Melton, *What's It Worth,* 2011.

COLLEGE-EDUCATED RESIDENTS ARE INCREASINGLY IMPORTANT TO THE COMMONWEALTH'S ECONOMY AND WORKFORCE.

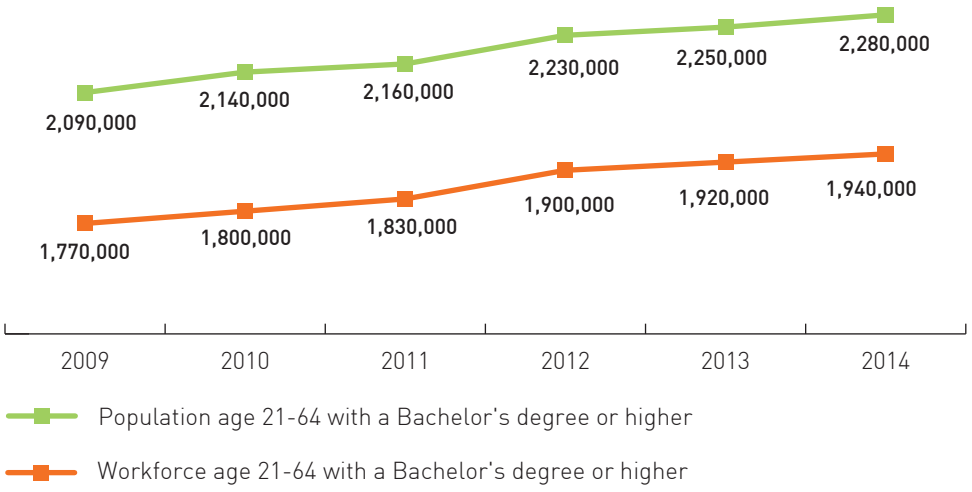
Bachelor's degree-holders constitute a large and growing component of Pennsylvania's population. College graduates make up an increasing share of the state workforce, and are more likely to be employed than those with less education. These trends reflect the economy and employers' growing demand for more educated and skilled workers.[12]

In recent years, both the number and proportion of Pennsylvania residents with a Bachelor's degree or higher have increased steadily. From 2009 to 2014, the number of prime-age Pennsylvania Bachelor's degree-holders grew at an average annual rate of 1.5 percent from almost 2.1 million individuals to almost 2.3 million (Figure 1). When looking just at Pennsylvanians age 21-64 who are in the workforce, the increase in the percentage of those who are college-educated has been even greater.

Although the *number* of state residents and workers with a Bachelor's degree or higher has increased at similar rates (1.5% versus 1.6% per year, respectively), Bachelor's degree-holders' *share* of Pennsylvania's prime-age workforce has grown from 31.6 percent in 2009 to 34.7 percent in 2014. By comparison, 30.7 percent of the prime-age population held a Bachelor's degree or higher in 2014, versus 28.6 percent in 2009 (Figure 2).

Figure 1. The number of college-educated Pennsylvania residents and workers has been rising in recent years.

Pennsylvania age 21-64 population and workforce with a Bachelor's degree or higher, 2009-2014

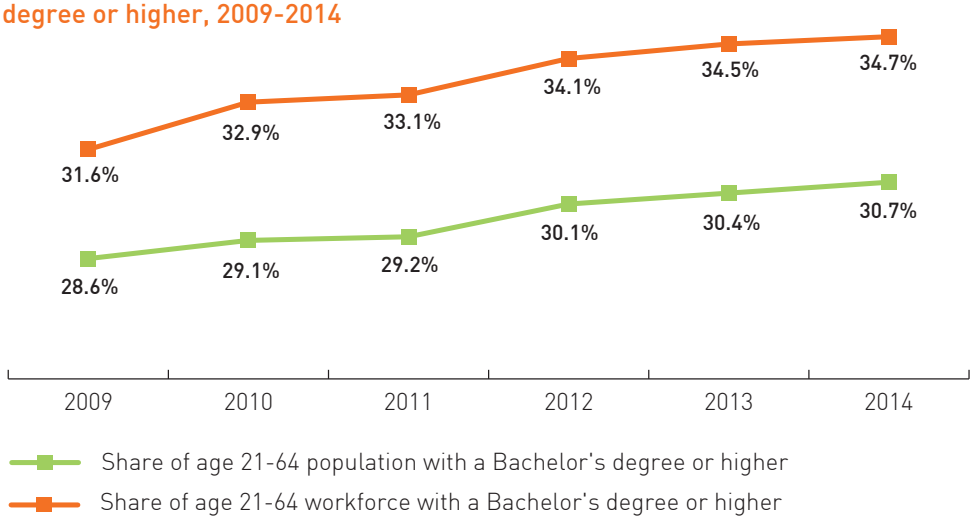


Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.[13]

12. Carnevale and Rose, *The Economy Goes to College*, 2015.
13. Downloaded 2009 through 2013 data from the Integrated Public Use Microdata Series-USA: Ruggles, Genadek, Goeken, Grover, and Sobek, *Integrated Public Use Microdata Series,* 2015.

Figure 2. Bachelor's degree-holders have grown more quickly as a share of the workforce than as a percentage of the population in the last six years.

Share of the age 21-64 Pennsylvania population and workforce with a Bachelor's degree or higher, 2009-2014

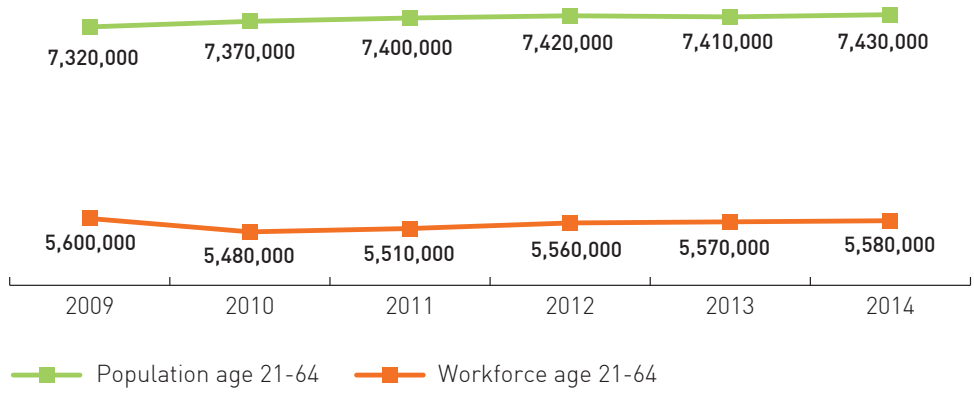


Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

The disproportionate growth of the highly educated portion of the workforce has been due in part to a recent decline in the size of the overall Pennsylvania prime-age workforce. While the state's age 21-64 *population* increased modestly in the years following the Great Recession, the number of Pennsylvania prime-age *workers* dipped by more than 100,000 between 2009 and 2010, and still was below its 2009 level as of 2014, the most recent year for which data was available (Figure 3). Prime-age Bachelor's degree-holders in Pennsylvania were also more likely to be employed than 21-64 year-olds generally, with the gap widening in recent years (84.8 and 76.5 percent of each group, respectively, were working in 2009 versus 85.1 and 75.2 percent in 2014). The decreased role of less-educated workers in Pennsylvania reflects, in part, structural changes in the economy.[14]

Figure 3. Pennsylvania's workforce contracted during the recession and still has not fully recovered.

Pennsylvania age 21-64 population and workforce, 2009-2014



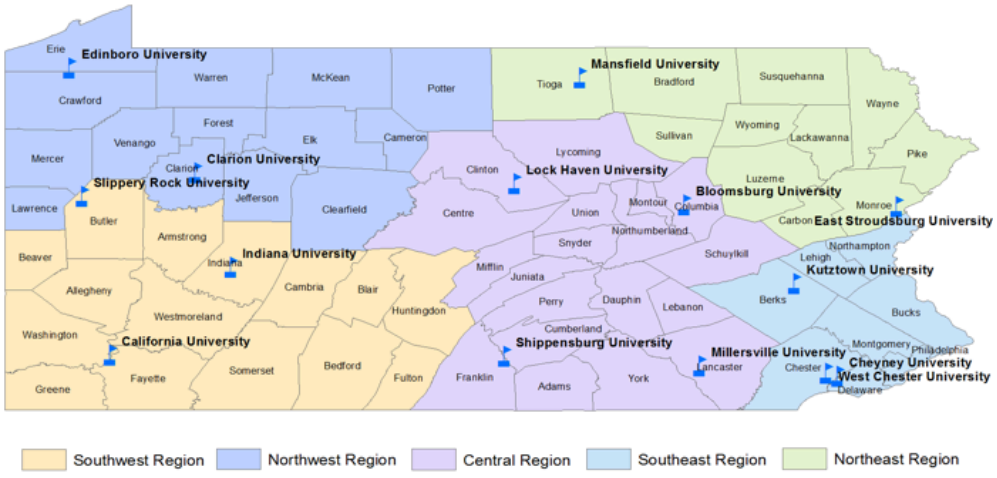
Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

14. Carnevale and Rose, *The Economy Goes to College*, 2015.

Almost half of Pennsylvania's college-educated workforce is in the state's southeast region.

The 14 State System universities are organized into five economic regions (central, northeast, northwest, southeast, and southwest) for the purposes of labor market and economic supply and demand analyses.[15]

Figure 4. Pennsylvania State System institutions are distributed among the state's five economic regions.



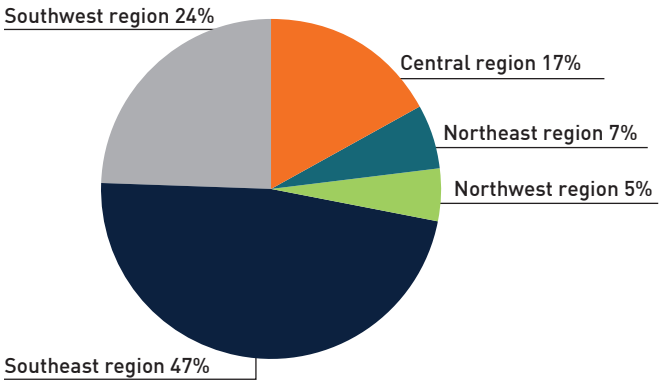
Source: Pennsylvania State System Office of Academic and Student Affairs and Oxford Economics, "State System Gap Analysis," 2015.

Almost half (47%) of Pennsylvania workers with Bachelor's degrees live in the southeast region, which includes the Philadelphia metropolitan area (Figure 5). The second largest share of college graduates in the workforce (24%) is located in the southwest region of the state that includes the Pittsburgh metropolitan area. Together, the other three regions include less than 30 percent of the state's prime-age college-educated workforce.

15. For the supply and demand gap analysis of academic programs and this workforce study, the State System and Oxford Economics divided the state into five economic regions built out of groups of contiguous counties. Public use microdata areas (PUMAs) were the most detailed level at which geographic information was available for the American Community Survey's public use microdata sample. Most PUMAs fell completely within one of the five sub-state regions; however, a handful straddled across counties in two different regions. In these cases, the PUMA sample was allocated proportionally across the two regions using factors generated by the *Missouri Census Data Center's* "MABLE/Geocorr12: Geographic Correspondence Engine," http://mcdc.missouri.edu/websas/geocorr12.html.

Figure 5. The vast majority of the Pennsylvania workforce with a Bachelor's degree or higher lives in or near the Philadelphia and Pittsburgh metropolitan areas.

Share of employment by region for Pennsylvania's prime-age workforce with a Bachelor's degree or higher, 2009-2014



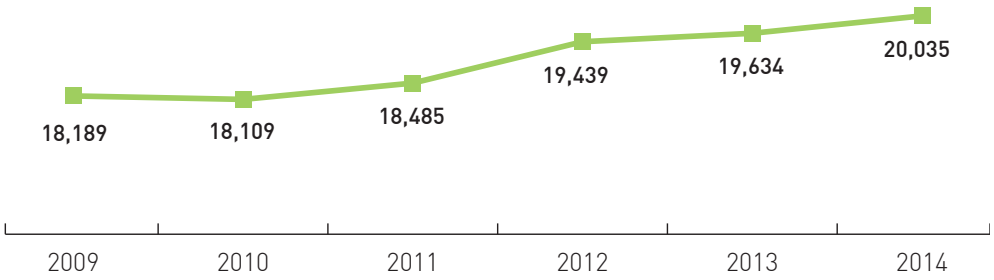
Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.
Note: Percentages may not sum to 100 due to rounding.

THE STATE SYSTEM IS A SIGNIFICANT CONTRIBUTOR OF BACHELOR'S DEGREES IN PENNSYLVANIA.

The number of degrees awarded by the State System has been on the rise in recent years. Annual Bachelor's degree production increased from about 18,200 in academic year 2009 to more than 20,000 in academic year 2014 (Figure 6).

Figure 6. The number of Bachelor's degrees awarded by State System institutions has risen by 10 percent in the last six years.

Annual State System Bachelor's degree production



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.

Public institutions have slightly increased their share of state Bachelor's degrees produced.[16]

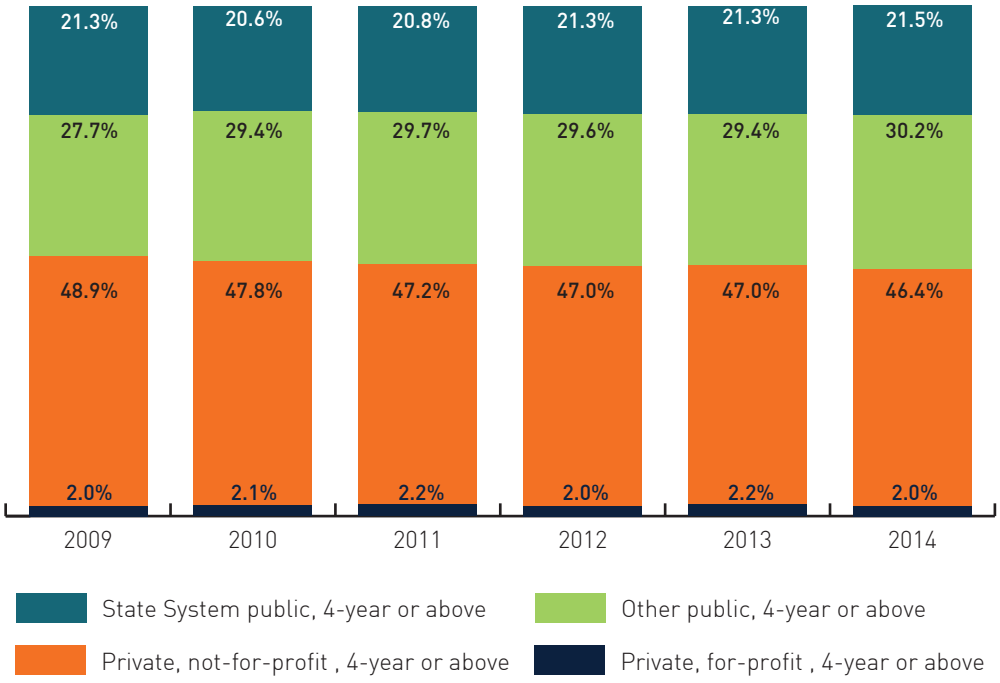
The growth in Bachelor's degrees produced in the State System mirrored the increase in Bachelor's degrees statewide. The 14 State System universities conferred just over one in five Bachelor's degrees in the state during the last six years.

Pennsylvania's higher education sector has historically been dominated by private colleges and universities. The Commonwealth includes more than 80 private institutions, including a member of the Ivy League (University of Pennsylvania) and other highly selective institutions, including Carnegie Mellon University, Lehigh University, and Swarthmore College. However, public universities are now producing more Bachelor's degrees in Pennsylvania than private colleges and universities (Figure 7). For-profit institutions are much smaller players, together accounting for just over 2 percent of the Bachelor's degrees produced in the state in recent years.

16. The other public group comprises Pennsylvania State University, the University of Pittsburgh, and Temple University. These public institutions have main campuses as well as numerous branch campuses across the Commonwealth.

Figure 7. The share of Bachelor's degrees awarded by public universities in Pennsylvania has slowly been growing, while the share awarded by private, non-profit colleges has been slightly declining.

Share of annual Pennsylvania Bachelor's degrees awarded by sector



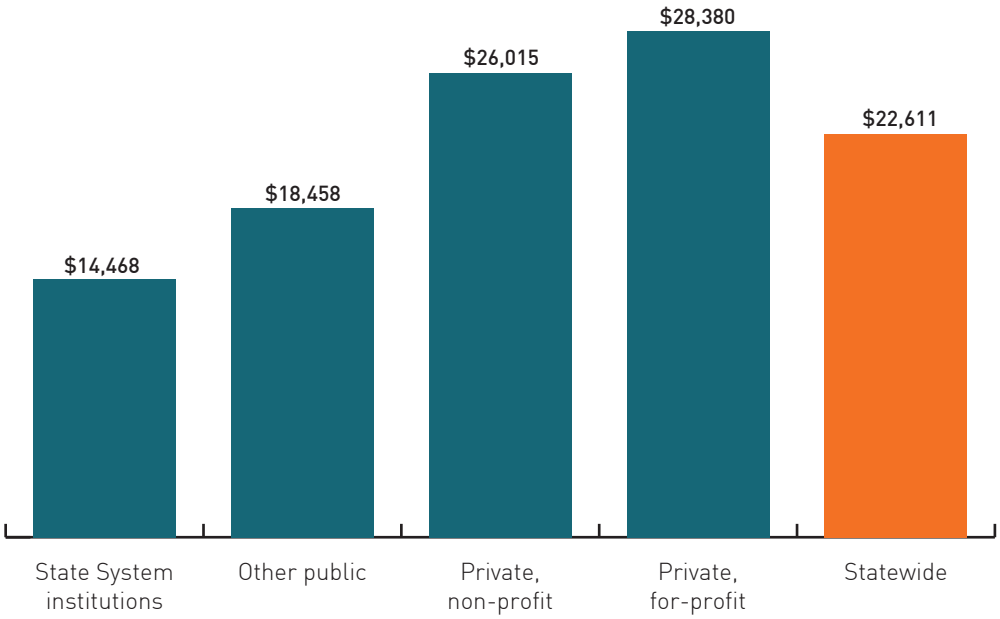
Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.
Note: Percentages may not sum to 100 due to rounding.

State System institutions cost less on average than those in the other sectors of Pennsylvania higher education.

For students receiving grants or scholarships, the State System universities, on average, are less expensive to attend than other colleges and universities in Pennsylvania. For Pennsylvania residents, attending a State System institution costs nearly $4,000 less than going to other public Bachelor's degree-granting institutions in the state (Figure 8).

Figure 8. Per-student costs at State System institutions are almost $4,000 less each year than at other public institutions in the state.

Average net price of Bachelor's degree granting institution by sector, academic years 2009-2013[17]



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.

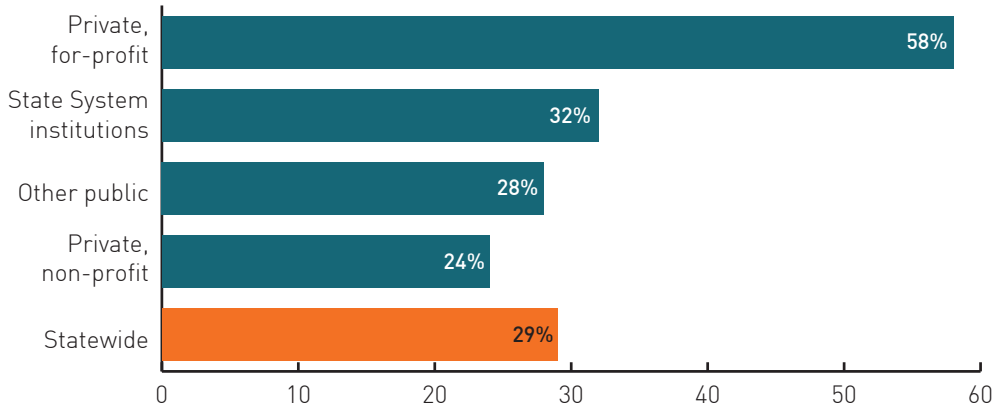
State System universities serve a greater share of economically disadvantaged students than other public institutions.

Almost a third of State System undergraduate students in academic years 2009 to 2013 received Pell grants (Figure 9). This was a higher percentage than at other public and private non-profit institutions in Pennsylvania. Only for-profit higher education institutions in Pennsylvania serve a larger share of students who receive Pell grants, but, as noted earlier in this report, for-profit universities produce only about 2 percent of the Bachelor's degrees awarded in the Commonwealth.

17. The figures listed are for first-time, full-time degree or certificate-seeking undergraduates who received grant or scholarship aid from the federal, state, or local government, or the institution. For public institutions, this figure is for those paying in-state or in-district tuition. The most recent academic year for which financial aid and net price data was available was 2013. All net price and earnings figures presented in this report are inflation adjusted to constant 2014 dollars based on the Consumer Price Index Research Series Using Current Methods (CPI-U-RS).

Figure 9. The State System had the second highest share of students who received Pell grants.

Share of undergraduates who received Pell grants by sector, academic years 2009-2013[18]



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.

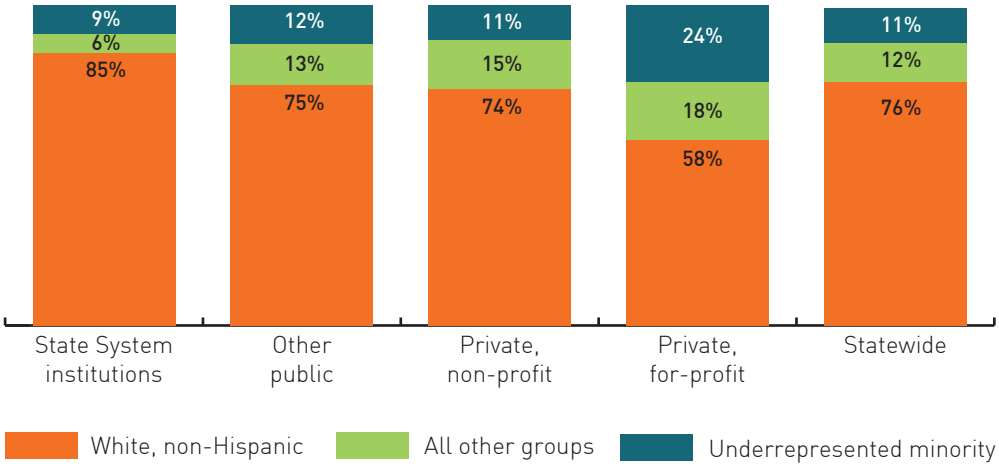
The State System awarded a lower percentage of Bachelor's degrees to racial and ethnic minorities than other sectors, but accounted for a higher share of awards to women.

Higher education institutions in the private for-profit sector had the highest share of Bachelor's degrees awarded to racial and ethnic minorities (Figure 10). For academic years 2009-2014, this sector had the highest share of Bachelor's degrees produced in terms of underrepresented minorities (24%), all other non-white groups (18%), and minorities overall (42%).[19] State System universities awarded a slightly lower share of their degrees (9%) to underrepresented minorities than private non-profit (11%) and other public (12%) institutions. These sectors also had higher shares of their Bachelor's degrees awarded to all other non-white groups than the State System (Figure 10).

18. Based on undergraduate students enrolled in the fall of each year for institutions with standard academic terms. For other institutions, based on an unduplicated count of a full-year cohort of students enrolled over 12 months. The most recent academic year for which financial aid and net price data was available was 2013.
19. The "underrepresented minority group" includes blacks, Hispanics of any race, Native Americans and Alaska Natives, and multiracial individuals. The "all other non-white groups" includes Asians and Native Hawaiians and Pacific islanders, non-resident aliens, and individuals whose race was unknown.

Figure 10. The private for-profit higher education sector awards the highest share of Bachelor's degrees to minority students.

Share of Bachelor's degrees awarded by race/ethnicity and sector, academic years 2009-2014

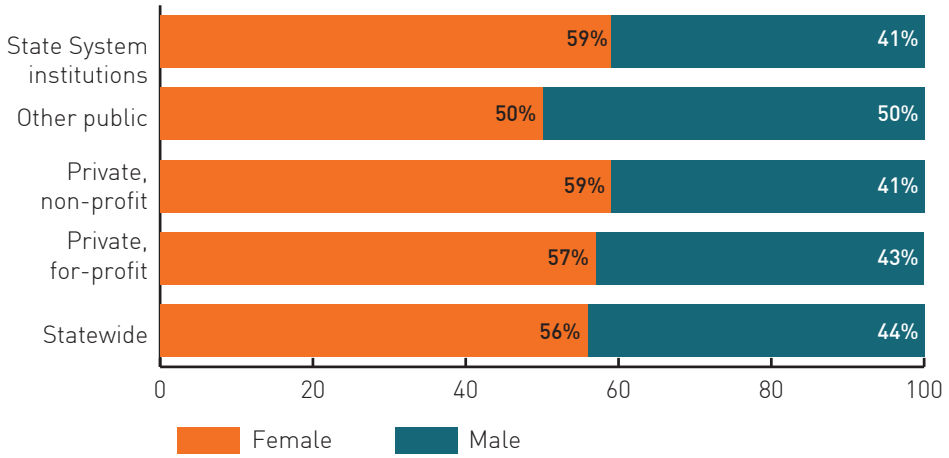


Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.
Note: Percentages may not sum to 100 due to rounding.

The majority of State System Bachelor's degree recipients in academic years 2009-2014 were female, mirroring the split at the state and national levels.[20] Nearly 60 percent of Bachelor's level graduates from the 14 universities were women, which was slightly higher than the share at institutions in the private for-profit sector and the same as those in the private, non-profit sector (Figure 11). Other public institutions had a more even gender split with half of Bachelor's degrees awarded to women and half to men sector-wide.

Figure 11. The State System produced a high share of female Bachelor's degree recipients, similar to private colleges and universities.

Share of Bachelor's degrees awarded by gender and sector, academic years 2009-2014



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.

20. U.S. Department of Education, "Fast Facts: Degrees conferred by sex and race," 2012.

One-third of State System Bachelor's degrees were awarded by its three largest institutions.

Of the 14 State System institutions, West Chester University awarded the most Bachelor's degrees during academic years 2009-2014, followed by Indiana University of Pennsylvania and Kutztown University (Table 1). Together, these three institutions accounted for more than one-third (35%) of all Bachelor's degrees the system awarded during this period.

Table 1. Three universities accounted for more than one-third of all Bachelor's degrees awarded by the State System from academic years 2009 to 2014.
Bachelor's degree production by State System institution

Institution	Bachelor's degrees awarded	Share of State System total
West Chester University of Pennsylvania	15,834	14%
Indiana University of Pennsylvania	13,245	12%
Kutztown University of Pennsylvania	10,682	9%
Slippery Rock University of Pennsylvania	10,204	9%
Bloomsburg University of Pennsylvania	9,941	9%
Millersville University of Pennsylvania	8,899	8%
California University of Pennsylvania	8,462	7%
Shippensburg University of Pennsylvania	8,161	7%
East Stroudsburg University of Pennsylvania	7,469	7%
Edinboro University of Pennsylvania	6,191	5%
Clarion University of Pennsylvania	5,600	5%
Lock Haven University	4,938	4%
Mansfield University of Pennsylvania	3,316	3%
Cheyney University of Pennsylvania	949	1%
Total	**113,891**	**100%**

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.

The top five major groups accounted for 60 percent of all State System Bachelor's degrees.

The most popular major for State System graduates was business, followed by education, humanities and liberal arts, health, and social sciences (Table 2). These five major groups accounted for three-fifths of State System Bachelor's degrees awarded between the 2009 and 2014 academic years.

The State System produced a disproportionate share of Bachelor's degrees awarded in Pennsylvania in education (41%) and industrial arts, consumer services, and recreation (40%). Many other top majors closely reflected the State System's overall share of Bachelor's degrees produced in Pennsylvania (21%).

Table 2. Three-fifths of State System Bachelor's degrees were awarded in business, education, humanities and liberal arts, health, and social sciences.
State System Bachelor's degrees awarded by major group, academic years 2009-2014

Major group	State System Bachelor's degrees	Share of State System total	Share of state total in field
Business	18,624	16%	18%
Education	14,621	13%	41%
Humanities and liberal arts	14,445	13%	23%
Health	10,884	10%	20%
Social sciences	9,192	8%	23%
Industrial arts, consumer services, and recreation	7,626	7%	40%
Psychology and social work	7,002	6%	23%
Law and public policy	6,873	6%	29%
Arts	6,546	6%	20%
Communications and journalism	5,287	5%	19%
Computers, statistics, and mathematics	3,881	3%	16%
Biology and life sciences	3,858	3%	13%
Physical sciences	2,587	2%	23%
Architecture and engineering	1,964	2%	5%
Agriculture and natural resources	501	<1%	8%
Total	**113,891**	**100%**	**21%**

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.[21]
Note: Percentages may not sum to 100 due to rounding.

21. To avoid double-counting awards, students' *first* major (2-digit CIP) was cross-walked to the 15 aggregated major groups used in this report's American Community Survey-based workforce analysis.

More than one-fifth of Bachelor's degrees awarded by the State System were in the combined STEM-H category, which comprises science, technology, engineering, and mathematics (STEM) as well as health degrees.[22] State System production of Bachelor's degrees in STEM-H majors has also been increasing, while the share of total Bachelor's degrees awarded in business and education has declined in recent years (Table 3).

The number of Bachelor's degrees in STEM-H fields awarded by the State System increased by 37 percent from 2009 to 2014. STEM-H degrees now comprise 24 percent of all Bachelor's degrees awarded by the State System, compared to 19 percent in 2009. Still the State System universities accounted for only 15 percent of STEM-H degrees awarded in the state. Since careers in STEM-H majors are the highest paying, increasing the number of recipients of these degrees will continue to be an area of opportunity for the State System.

Table 3. A growing share of State System Bachelor's degrees are being awarded in STEM-H fields.

State System Bachelor's degrees awarded in STEM-H and other fields[23]

	State System Bachelor's degrees		Share of State System total	
Field of study:	**2009**	**2014**	**2009**	**2014**
STEM-H	3,523	4,814	19%	24%
Non-STEM-H degrees				
Business	3,098	3,126	17%	16%
Education	2,638	2,067	15%	10%
Humanities and liberal arts	2,268	2,422	12%	12%
Social sciences	1,495	1,674	8%	8%
Industrial arts, consumer services, and recreation	1,214	1,329	7%	7%
Psychology and social work	1,102	1,269	6%	6%
Law and public policy	994	1,314	5%	7%
Arts	1,075	1,064	6%	5%
Communications and journalism	770	948	4%	5%
Other STEM related[24]	12	8	<1%	<1%
Agriculture and natural resources	0	0	0%	0%
Total	**18,189**	**20,035**	**100%**	**100%**

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Department of Education Integrated Postsecondary Education Data System data.
Note: Percentages may not sum to 100 due to rounding.[25]

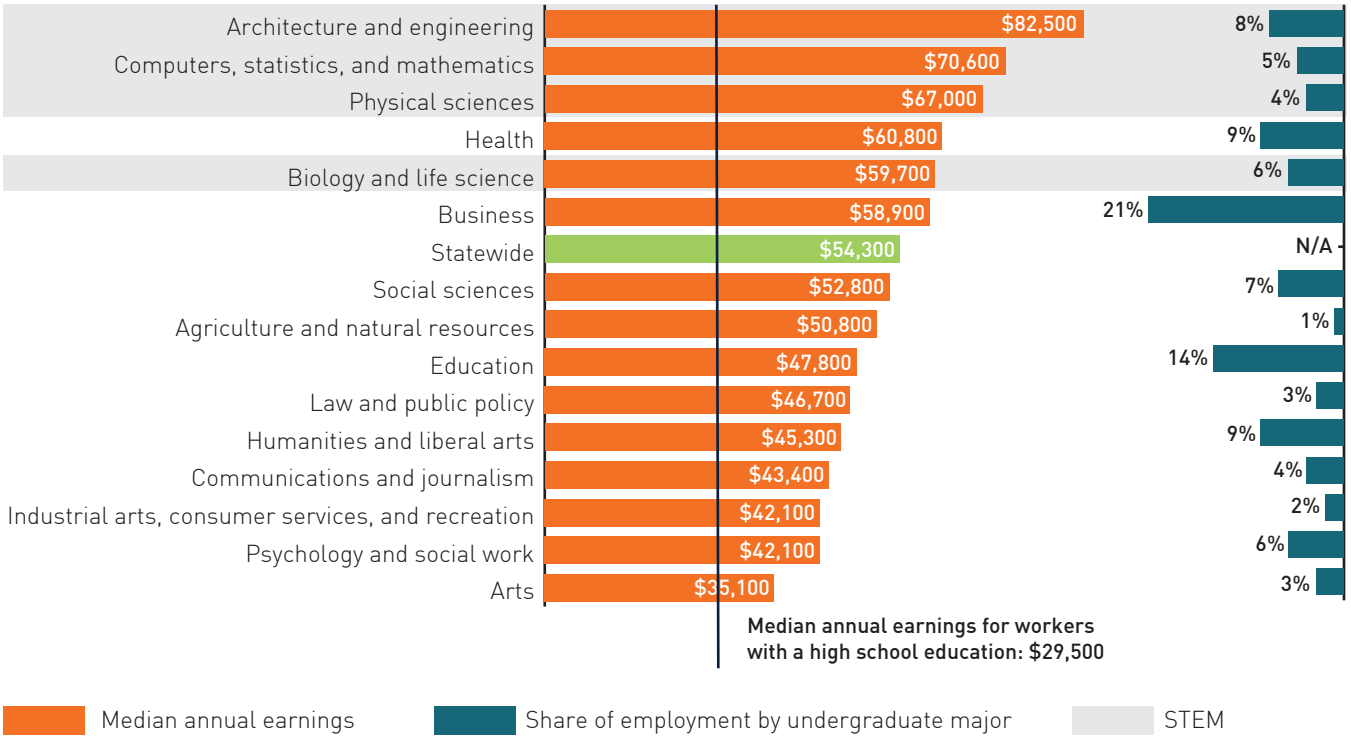
22. The "STEM-H" category comprises degrees in healthcare and STEM. Healthcare degrees are defined by the State System as all those that fall under two-digit code 51 in the classification of instructional programs (CIP). In this section, STEM degrees are defined as those that appear on the federal list of STEM-designated degrees maintained by the U.S. Department of Homeland Security. This list was last updated in 2012 and the current version is available at: http://www.ice.gov/sites/default/files/documents/Document/2014/stem-list.pdf.
23. The "other fields" (i.e., non-STEM-H degrees) are broken out into the major groups used throughout the rest of this analysis and do not include STEM-H degrees (see earlier definition), even those in detailed majors that fell under one of these other, non-STEM-H major groups in the previous table.
24. The "other STEM related" category includes degrees that appear to be related to STEM but do not explicitly appear on the federally designated list of STEM degrees. These include most majors in "architecture and related services" (those under 2-digit CIP 04) as well as the "computer and information sciences and support services, other" major (6-digit CIP 11.9999).
25. To avoid double-counting awards, students' *first* major (6-digit CIP) was first cross-walked to the STEM-H category, and then for all remaining awards students' first major was cross-walked at the 2-digit CIP level to the major group aggregations used in this report's American Community Survey-based workforce analysis.

STEM, HEALTH, AND BUSINESS MAJORS GENERALLY EARNED MORE THAN OTHER COLLEGE GRADUATES.[26,27]

The choice of student major strongly influences post-graduation earnings.[28] Workers who majored in STEM, health, and business as undergraduates typically had earnings above those of all workers with a Bachelor's degree (Figure 12). These fields were also among the top major groups for the State System. However, workers who majored in other top State System fields including education, humanities and liberal arts, and social sciences tended to have lower earnings than college-educated workers overall.

Figure 12. Workers with a Bachelor's degree earn more than those with a high school education, with STEM, health, and business majors earning the most.

Median earnings and share of employment by undergraduate major group for the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.
Note: Percentages may not sum to 100 due to rounding.

26. STEM in this and subsequent sections is defined slightly differently than in the previous section. Here STEM comprises the architecture and engineering; computers, statistics, and mathematics; physical sciences; and biology and life science major groups rather than the federal definition used in the previous section's analysis. There is significant overlap in the fields covered by these two definitions; however, the federal definition could not be applied to the Census data as the detailed field of degree categories in the American Community Survey do not completely align and in some cases are less detailed than the 6-digit program CIP codes used on the federal list of STEM programs.
27. STEM and health are considered separately here as outcomes are disaggregated by individual major group.
28. Carnevale, Cheah, and Hanson, *The Economic Value of College Majors,* 2015.

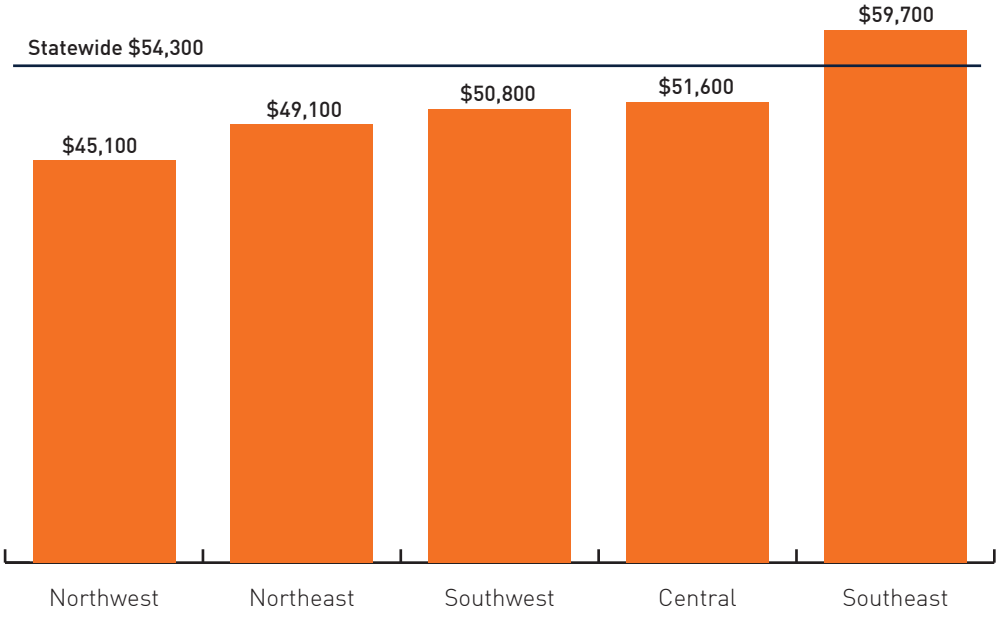
A college education is valuable regardless of choice of major. Workers with at least a Bachelor's degree tend to earn more than workers at lower educational attainment levels, and a college degree provides some protection from unemployment, even during major economic downturns.[29] In Pennsylvania, the median worker with a Bachelor's degree or higher earned $54,300, compared to $32,500 for those with an Associate's degree or some college, and $29,500 for those with a high school diploma or the equivalent. While the earnings difference between educational attainment levels is significant, the largest differences are between those who earn a Bachelor's degree in high-earning fields, such as architecture and engineering, and those in low-earning fields, such as the arts.

College-educated workers earn the most in Pennsylvania's southeast region.

The earnings of the state's college-educated workforce varied widely by region. The difference between the highest-earning region – the heavily-populated southeast – and the lowest – the more rural northwest – was nearly $15,000 a year (Figure 13). The typical worker with a Bachelor's degree or higher in the southeast made almost $59,700 annually. This was about $8,000 more than in central Pennsylvania, the second-highest-earning region.

Figure 13. The median college graduate earns $8,000 more in southeast Pennsylvania than in any other region.

Median annual earnings by region for the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

29. Carnevale and Cheah, *From Hard Times to Better Times,* 2015.

The cost of living and prevailing wages vary by region as well, and these differences can be accounted for in part by using a relative earnings measure. The southeast was by far the most financially rewarding region for college-educated workers *relative* to those with only a high school education. In the southeast, the typical Bachelor's degree-holding worker made 93 percent more than his or her high school-educated counterpart. Compared to completing only high school, the earnings premium for college-educated workers was 84 percent in the southwest region, 70 percent in the northwest, 69 percent in the central, and 68 percent in the northeast.

Regional differences were generally greatest in majors that overall have high earnings. Regional differences were generally smaller for those with lower-earning majors.

For some higher-earning majors, the difference between the highest and lowest earning regions was $20,000 a year or greater (Figure 14). For example, Pennsylvania workers with a Bachelor's degee in physical sciences in the southeast region earned a median annual salary of $75,200, compared to just $51,800 for a person with the same degree living in the northwest region.

By contrast, the difference in earnings for education majors – a low-paying major – was less than $7,000 between workers located in the highest-earning region, the southeast, and those located in the lowest, the northwest.

The earnings differences were not always consistent across regions, however. For example, the northwest region had the lowest median earnings for workers with a Bachelor's degree overall and in most major groups. However, this ranking did not hold for architecture and engineering majors in the northwest, who earned more than those with the same major in the northeast region and had similar earnings to those with the same major in the central region (Figure 14).

Figure 14. Whatever their major, college-educated workers had the highest median earnings in southeast Pennsylvania.

Median annual earnings by major group and region for the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

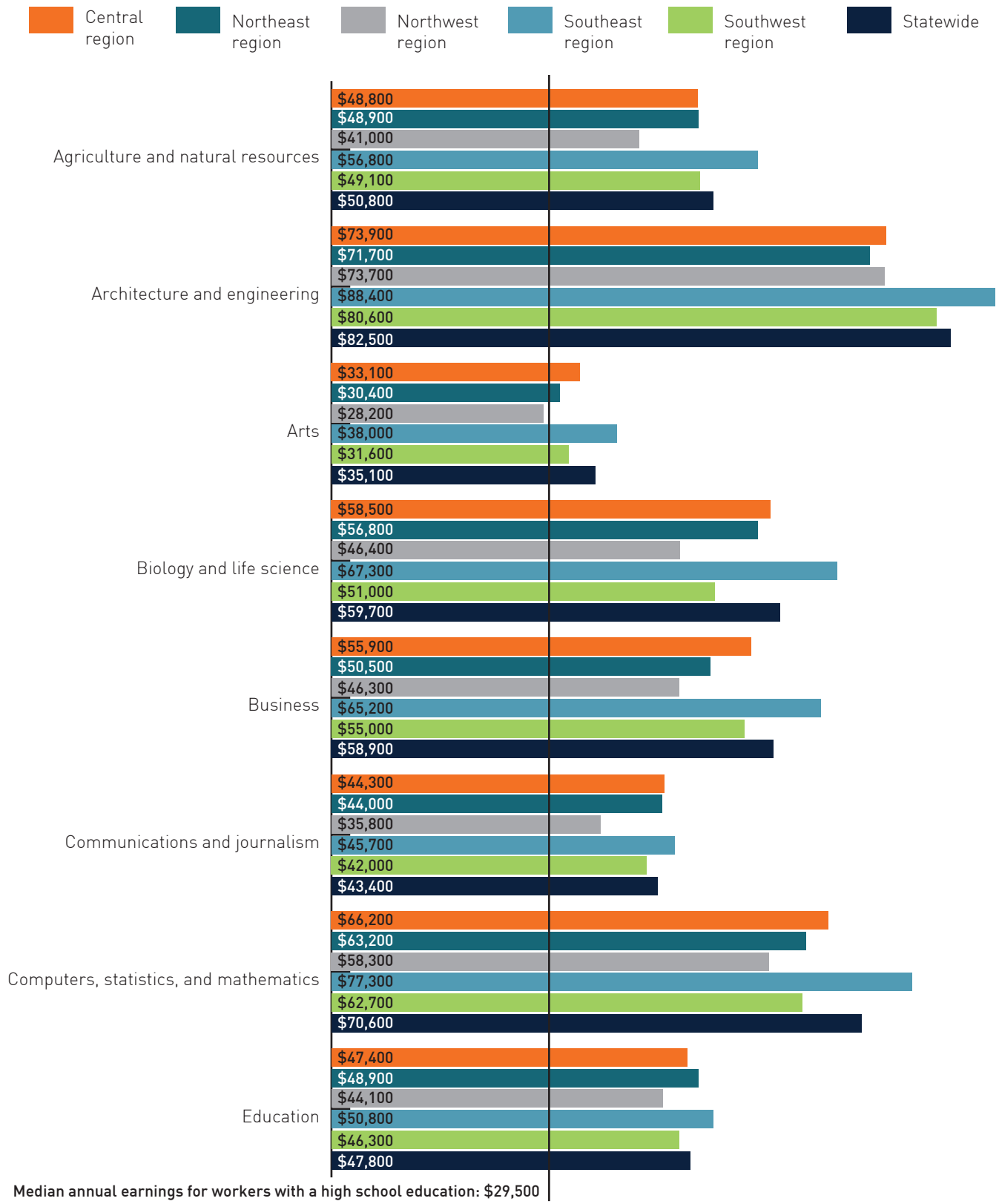
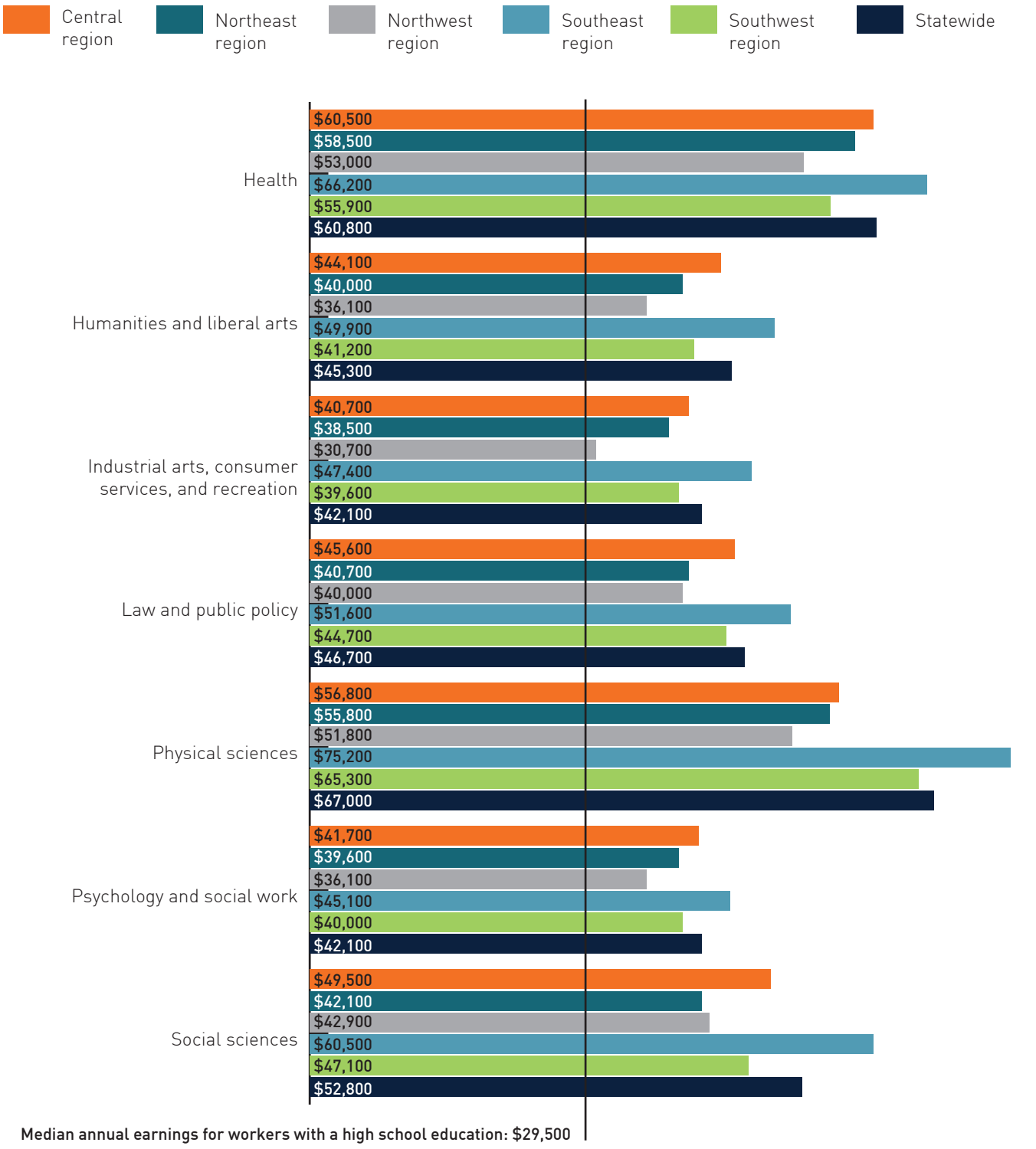


Figure 14 (continued)



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

SOME MAJORS – SUCH AS HEALTH AND EDUCATION – LEAD TO DEFINED CAREER PATHS, BUT OTHER MAJORS – SUCH AS HUMANITIES AND LIBERAL ARTS – DO NOT.

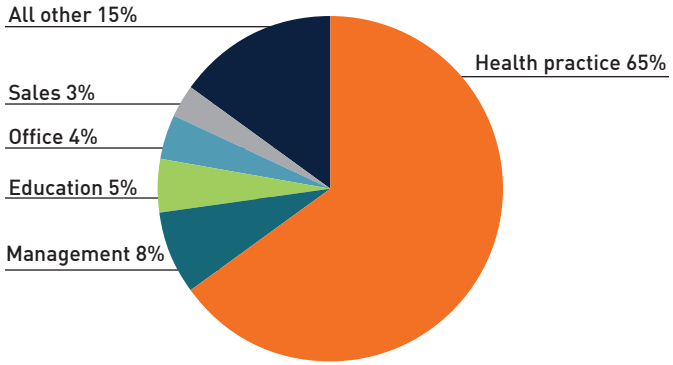
As colleges think about aligning their programs with workforce requirements, it is helpful to understand how student majors connect with careers. Many students select majors that are closely related to a particular career, such as health and education. For other students, however, their major leads to a college degree that opens the door to a wide range of jobs and career pathways.[30]

In order to demonstrate the different occupational pathways that college graduates in a variety of fields can pursue, in the analysis below we focus on the State System's top five major groups (business, education, humanities and liberal arts, health, and social sciences). Together these fields comprise 60 percent of the Bachelor's degrees awarded by the State System (Table 2), and therefore these examples summarize the experience of the majority of graduates.

Undergraduate health and education degrees are strongly linked to related career areas. From 2009 to 2014, 65 percent of prime-age Pennsylvania workers who completed a Bachelor's degree in health were working in a healthcare occupation (Figure 15). Over the same period, 59 percent of education majors in Pennsylvania were employed in education occupations.

Figure 15. Health majors in Pennsylvania usually end up working in healthcare occupations.

Health majors by occupational area of employment in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014



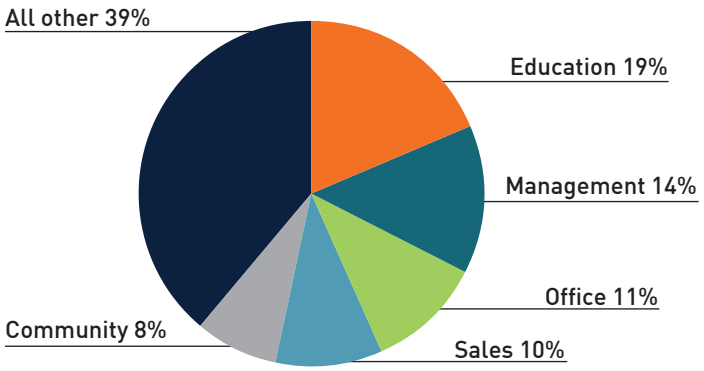
Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Other more general fields of study are not tied to specific occupations. Workers with these degrees go into a variety of different career areas. For example, workers with a Bachelor's degree in humanities and liberal arts (Figure 16) or social sciences ended up working in a variety of occupational clusters, with no single area comprising even 20 percent of their employment.

30. Carnevale, Strohl, and Melton, *What's It Worth,* 2011; see footnote 11.

Figure 16. Humanities and liberal arts majors in Pennsylvania ended up working in many different occupations.

Humanities and liberal arts majors by occupational area of employment in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

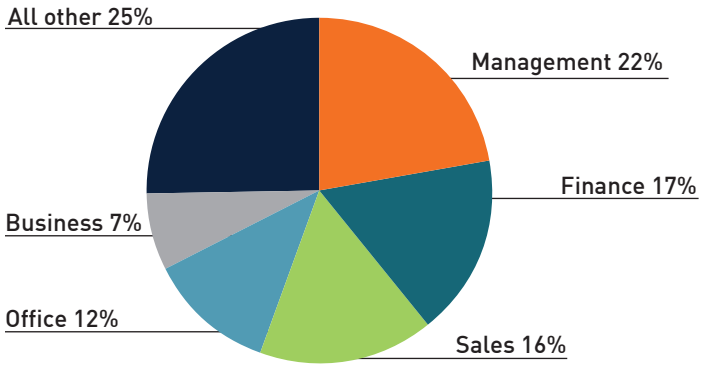


Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.
Note: Percentages may not sum to 100 due to rounding.

In terms of the connection between major and occupation, business, the most common Bachelor's degree awarded by the State System, fell somewhere between these other groups. There was no single, dominant cluster of employment as there was for health and education majors. However, three-quarters of workers with Bachelor's degrees in business ended up working in the related areas of management, finance, sales, office, and general business (Figure 17).

Figure 17. Business majors in Pennsylvania mostly work in five associated occupational clusters.

Business majors by occupational area of employment in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.
Note: Percentages may not sum to 100 due to rounding.

Additional in-depth analysis of the occupational employment and earnings for these five major groups is available in Appendix A.

THE MOST POPULAR UNDERGRADUATE MAJORS ARE NOT THE HIGHEST-PAYING MAJORS.

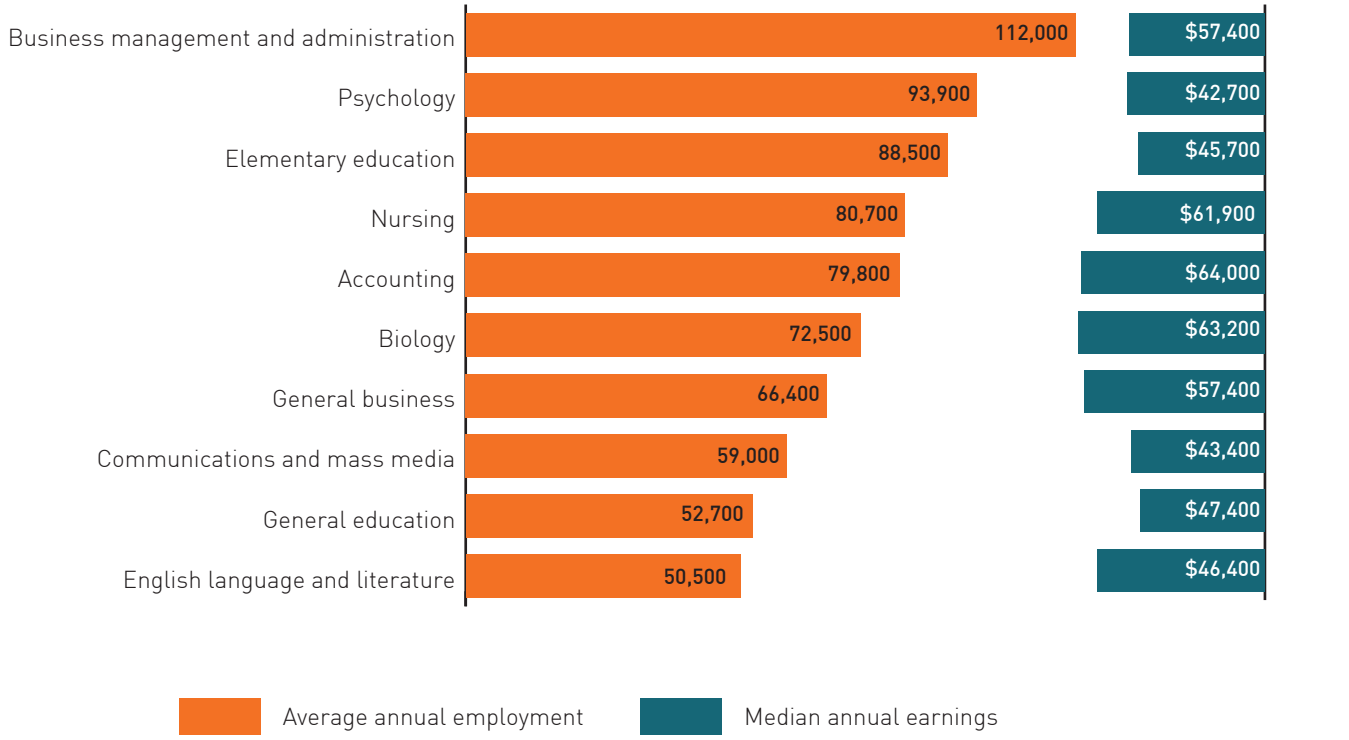
One important factor in analyzing educational programs is the earnings and other labor market outcomes associated with specific majors. To demonstrate the value of specific college majors, this section analyzes college-educated workers' earnings by detailed undergraduate major subgroup rather than the aggregated major groups used in the preceding analysis.

We focus first on the most common detailed majors in Pennsylvania before turning our analysis to the highest-earning (employment and earnings numbers for all major subgroups are detailed in Appendix B). We find that there is a large difference between the most popular and highest-paying majors.

The 10 most common majors in the state workforce were generally related to business, education, social sciences, and health and life sciences (Figure 18). Except for communications, these detailed fields of study all fell within the most common major groups for State System graduates and in the Pennsylvania workforce. However, the most common majors were not the highest-earning overall. Accounting was the highest-earning of the most common majors, but did not make the list of the 10 highest-earning detailed majors (Figures 18 and 19).

Figure 18. The detailed majors with the greatest employment were most frequently related to business.

Average annual employment and median annual earnings for detailed majors with the greatest employment in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

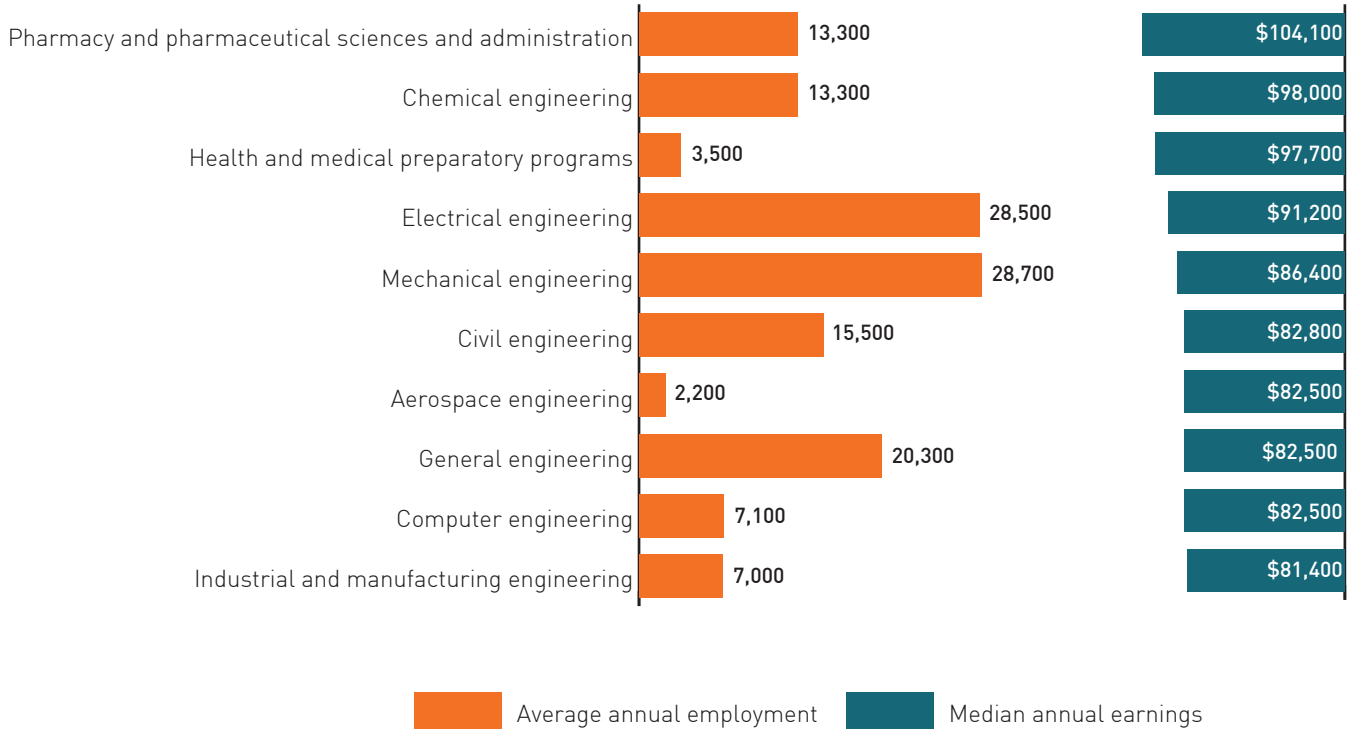


Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

The 10 highest-earning detailed majors were all in STEM and health.

The detailed majors with the highest median earnings in the Pennsylvania workforce were all in health and STEM-related areas (Figure 19). There was substantial earnings variation for college-educated workers based on their specific field of study, and these STEM-H subgroups in particular conveyed a substantial earnings premium. For instance, prime-age, college-educated Pennsylvania workers who majored in pharmacy and pharmaceutical sciences and administration as undergraduates made nearly double ($104,100) the median salary of all workers with a Bachelor's degree or higher in the state ($54,300).

Figure 19. The highest-earning detailed majors in Pennsylvania were all in health and engineering.
Average annual employment and median annual earnings for detailed majors with the highest median earnings in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

HIGH EMPLOYMENT LEVELS AND HIGH SALARIES OVERLAP IN SOME OCCUPATIONS.

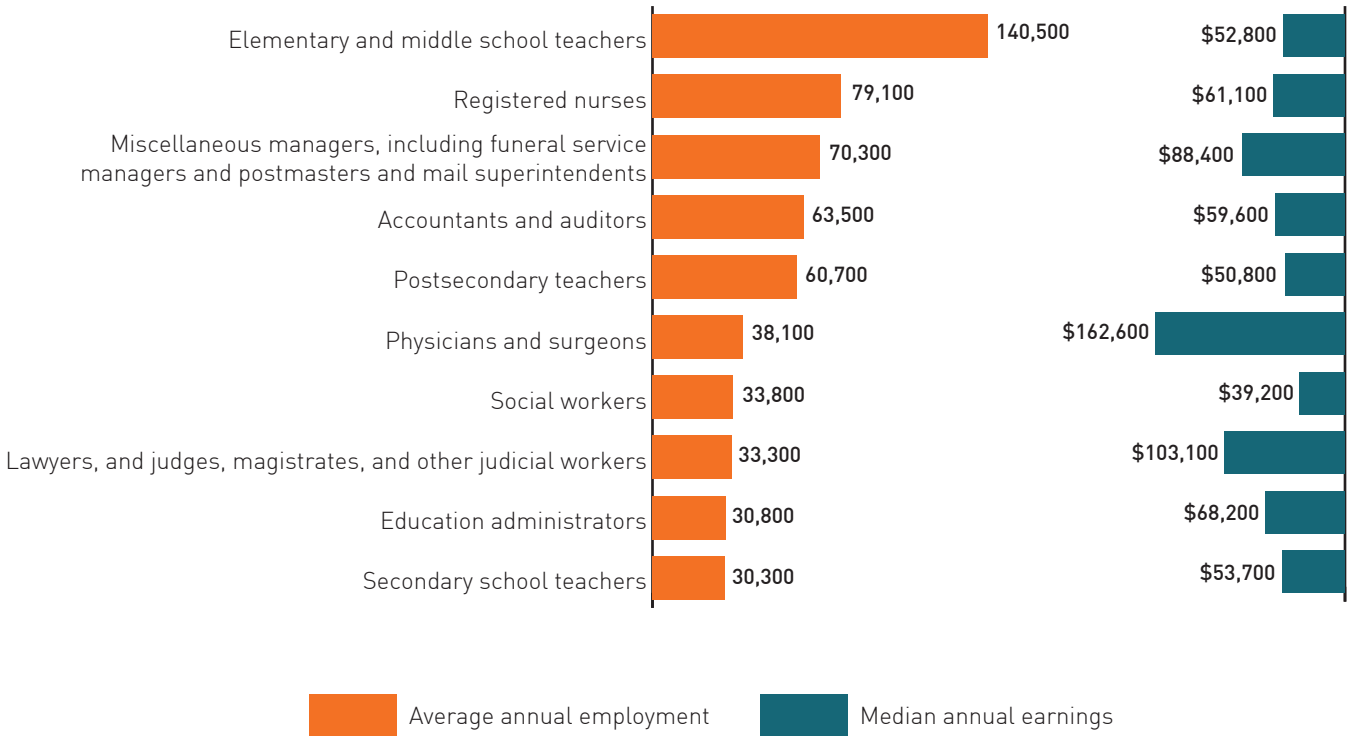
Data summarizing aggregated occupational areas can mask significant differences between specific occupations. The analysis in this section focuses on *detailed occupations* rather than the occupational clusters in the preceding analysis to provide a deeper understanding of the Pennsylvania workforce. Again we start our analysis by concentrating on the most common detailed occupations before turning to those that are the highest-earning.

As with college majors, there was substantial variation in college graduates' earnings based on the detailed occupation in which they were employed. However, unlike high-earning detailed majors, some high-earning occupations also featured substantial employment.

The 10 most common detailed occupations were generally in areas related to education, management and professional office, and health (Figure 20). These included both high-earning occupations, such as physicians and surgeons, and those with relatively low compensation, such as social workers.

Figure 20. The detailed occupations with the greatest employment were most often related to education.

Average annual employment and median annual earnings for detailed occupations with the greatest employment in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014



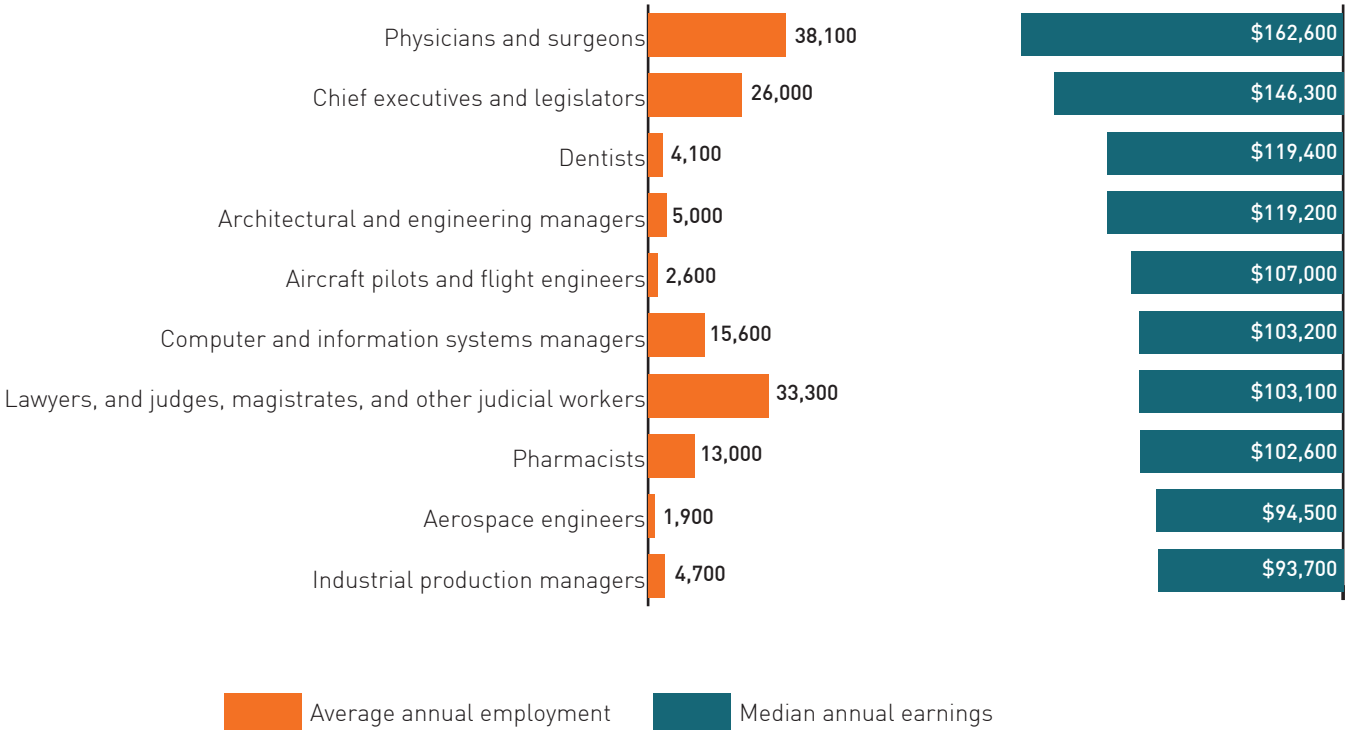
Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

The 10 highest-earning detailed occupations were in areas related to STEM, health, legal, and management and professional office.

By comparison, the detailed occupations with the highest median earnings in the workforce were in health, STEM, legal, and management and professional office areas (Figure 21). These high-earning occupations corresponded in a few cases with those on the high-employment list. Physicians and surgeons and lawyers and judges, magistrates, and other judicial workers were top-ten occupations both in terms of average annual employment and median earnings over these years (Figures 20 and 21).

Figure 21. The detailed occupations with the highest earnings were mostly related to health, engineering, and business.

Average annual employment and median annual earnings for detailed occupations with the highest earnings in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014



Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

CONCLUSION

The American workforce is shifting ever more quickly to favor those who have a postsecondary education. Pennsylvania is following that trend. College-educated workers already produce more than half of the nation's economic value annually even though they account for less than one-third of the workforce, and an increasing share of jobs and job openings are expected to require postsecondary education by 2020.[31,32] In Pennsylvania, Bachelor's degree-holders are a large and growing share of the prime-age *population* and are increasing even faster as a proportion of the prime-age *workforce*.

The State System is well positioned to meet this growing need. The 14 universities consistently award more than one-fifth of Pennsylvania Bachelor's degrees. **Furthermore, the most common majors for State System graduates were in areas with the highest employment in the Commonwealth**, including STEM-H, business, education, humanities and liberal arts, and social sciences.

Information on the earnings and employment patterns of the college-educated Pennsylvania workforce can provide valuable information on the career prospects of State System graduates and the returns of different program areas. Key findings that emerged from this analysis include:

- In the Pennsylvania workforce, Bachelor's degree-holders in STEM, health, and business had relatively high earnings. Individuals that pursued other undergraduate majors, including education, social science, and humanities and liberal arts typically made less than college-educated Pennsylvania workers overall.

- Workers with a Bachelor's degree or higher had the highest median earnings in Pennsylvania's southeast region and the lowest in the state's northwest region, but the magnitude of these geographic differences varied by field of study.

- Pennsylvania workers with a Bachelor's degree in education or health had tighter relationships with a single related occupational area, while humanities and liberal arts and social sciences majors had more varied occupational destinations. Business majors fell somewhere in between.

Higher education is of central and growing importance to the Commonwealth's economic future. For individual citizens, a Bachelor's degree has become the surest path to joining the middle class. For states, continued investments in education are likely to spur greater economic growth.[33] A changing economy and renewed attention to the role of higher education make this a good time for the State System to focus on better connections between college and careers. As college costs and the level of outstanding student debt have risen sharply, more students are asking pointed questions about the value of majors before pursuing a degree. Trends in assessing higher education and financing it are increasingly pointing to the importance of aligning programs with the needs of the workforce. Those providing higher education will be held to higher standards of accountability in the choices they are making and the outcomes of those choices.

Making better information available and data-informed decision-making are increasingly important in higher education. This report, together with the State System's program alignment toolkit, is a step in that direction. The next step for Pennsylvania is to do what a growing number of other states have done – make greater use of education data linked with wage records, the new frontier of data in higher education.

31. Carnevale and Rose, *The Economy Goes to College*, 2015.
32. Carnevale, Smith, and Strohl, *Recovery 2020,* 2013.
33. Aghion, Boustan, Hoxby, and Vandenbussche, "The Causal Impact of Education on Economic Growth," 2009.

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APPENDIX A. OCCUPATIONAL EARNINGS AND EMPLOYMENT FOR TOP STATE SYSTEM MAJOR GROUPS

A student's major in college is the greatest factor in determining his or her eventual career and earnings, but not all students follow the same path in the workplace. To illustrate this point, we analyzed data on the occupational choices of recipients of the five most popular Bachelor's degrees in the State System: business, education, humanities and liberal arts, health, and social sciences.

Degree recipients usually followed a typical career path associated with their major, if one existed. But some students earned higher salaries in other occupations. The highest salaries for these workers were generally in occupational clusters related to management and professional office, STEM, and health. The following tables show the median earnings for both the most popular and highest-earning occupations for college-educated workers who majored in the five most common State System Bachelor's degree major groups.

Business degree recipients

The median earnings for workers with a Bachelor's degree in business in the *most common* occupational areas of employment varied widely (Table A1). Those with occupations in management, for example, earned more than twice as much as those with office occupations.

Table A1. Share of employment and median earnings for top employment occupational clusters for undergraduate business majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Share of major group employment	Median annual earnings
Management	22%	$88,000
Finance	17%	$63,000
Sales	16%	$61,600
Office	12%	$38,100
Business	7%	$62,900

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Workers with Bachelor's degrees in business had the highest median earnings in management, legal, computers, architecture and engineering, and finance occupations (Table A2). However, it should be noted that legal, computers, and architectural and engineering occupations each employ less than 5 percent of business degree recipients.

Table A2. Share of employment and median earnings for occupational clusters with the highest earnings for undergraduate business majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Median annual earnings	Share of major group employment
Management	$88,000	22%
Legal	$82,800	2%
Computers	$73,700	4%
Architecture and engineering	$71,100	1%
Finance	$63,000	17%

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Social sciences degree recipients

Management was the largest occupational cluster for students who received Bachelor's degrees in social sciences (Table A3). Many with this degree also went into sales careers, as well as legal, office, and education careers.

Table A3. Share of employment and median earnings for top employment occupational clusters for undergraduate social sciences majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Share of major group employment	Median annual earnings
Management	17%	$83,900
Sales	11%	$53,700
Legal	10%	$94,700
Office	10%	$35,200
Education	10%	$48,600

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Legal and management careers were not only among the most popular occupational destinations for recipients of social sciences degrees; they were also the most lucrative (Table A4).

Table A4. Share of employment and median earnings for occupational clusters with the highest earnings for undergraduate social sciences majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Median annual earnings	Share of major group employment
Legal	$94,700	10%
Management	$83,900	17%
Finance	$76,200	5%
Computers	$67,300	3%
Protective	$63,800	3%

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Humanities and liberal arts degree recipients

Most recipients of humanities and liberal arts Bachelor's degrees went into occupations related to education, office work, sales, or the community (Table A5). All these areas were relatively low-paying. However, a significant number (14%) worked in management, a high-earning occupational area.

Table A5. Share of employment and median earnings for top employment occupational clusters for undergraduate humanities and liberal arts majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Share of major group employment	Median annual earnings
Education	19%	$46,900
Management	14%	$69,100
Office	11%	$30,400
Sales	10%	$40,200
Community	8%	$39,600

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Management is one of the highest-paying occupations for humanities and liberal arts majors, along with legal, health practice, computers, and finance occupations (Table A6).

Table A6. Share of employment and median earnings for occupational clusters with the highest earnings for undergraduate humanities and liberal arts majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Median annual earnings	Share of major group employment
Legal	$88,300	6%
Management	$69,100	14%
Health practice	$66,100	5%
Computers	$63,800	2%
Finance	$58,900	2%

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Education degree recipients

About three-fifths of workers with Bachelor's degrees in education stayed in education occupations. Of those in other career areas, some have jobs that have even lower earnings, such as office, sales, and community-related occupations (Table A7).

Table A7. Share of employment and median earnings for top employment occupational clusters for undergraduate education majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Share of major group employment	Median annual earnings
Education	59%	$51,600
Management	9%	$67,300
Office	7%	$29,700
Sales	5%	$33,100
Community	4%	$39,600

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Some workers with Bachelor's degrees in education have found careers in management, with earnings that are about 30 percent higher than in education occupations. Others have entered occupations in well-paying areas such as computers, business, and finance, but they make up a very small proportion of those with education degrees (Table A8).

Table A8. Share of employment and median earnings for occupational clusters with the highest earnings for undergraduate education majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Median annual earnings	Share of major group employment
Management	$67,300	9%
Computers	$67,100	1%
Finance	$55,000	1%
Business	$52,900	2%
Education	$51,600	59%

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Health degree recipients

Like those who received Bachelor's degrees in education, workers with Bachelor's degrees in health work most frequently in their field (Table A9).

Table A9. Share of employment and median earnings for top employment occupational clusters for undergraduate health majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Share of major group employment	Median annual earnings
Health practice	65%	$63,900
Management	8%	$86,400
Education	5%	$51,900
Office	4%	$33,000
Sales	3%	$49,500

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

Workers with health degrees made the most in management; life, physical, and social sciences; health practice; business; and education occupations (Table A10).

Table A10. Share of employment and median earnings for occupational clusters with the highest earnings for undergraduate health majors in the Pennsylvania age 21-64 workforce with a Bachelor's degree or higher, 2009-2014

Occupational area	Median annual earnings	Share of major group employment
Management	$86,400	8%
Life, physical, and social sciences	$68,200	1%
Health practice	$63,900	65%
Business	$63,800	2%
Education	$51,900	5%

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

APPENDIX B. PENNSYLVANIA EMPLOYMENT AND EARNINGS FOR DETAILED MAJOR SUBGROUPS

Employment and earnings could be calculated for 109 detailed undergraduate majors in the prime-age Pennsylvania workforce with a Bachelor's degree or higher from 2009 to 2014. The following is a list of those majors, from largest to smallest, including the average annual employment level and median annual earnings:

Detailed major	Average annual employment	Median annual earnings
Business management and administration	112,000	$57,400
Psychology	93,900	$42,700
Elementary education	88,500	$45,700
Nursing	80,700	$61,900
Accounting	79,800	$64,000
Biology	72,500	$63,200
General business	66,400	$57,400
Communications and mass media	59,000	$43,400
General education	52,700	$47,400
English language and literature	50,500	$46,400
Marketing and marketing research	47,600	$52,800
Criminal justice and fire protection	41,100	$46,300
Political science and government	40,100	$58,900
Finance	36,500	$66,000
History	36,400	$50,500
Computer science	35,900	$77,200
Economics	31,000	$68,400
Mechanical engineering	28,700	$86,400
Electrical engineering	28,500	$91,200
Chemistry	27,000	$78,900
Sociology	26,800	$43,400
Miscellaneous health medical professions	25,200	$50,300
Mathematics	23,200	$63,900
Social work	21,400	$41,200
Multidisciplinary or general science	21,000	$58,300
General engineering	20,300	$82,500
Fine arts	17,800	$32,600
Treatment therapy professions	17,600	$55,000
Special needs education	17,500	$52,900

Detailed major	Average annual employment	Median annual earnings
Physical fitness, parks, recreation, and leisure	17,400	$42,100
Liberal arts	17,300	$45,100
Art and music education	16,400	$45,400
Commercial art and graphic design	15,600	$36,900
Civil engineering	15,500	$82,800
Secondary teacher education	14,700	$53,900
Journalism	13,600	$43,400
Chemical engineering	13,300	$98,000
Pharmacy and pharmaceutical sciences and administration	13,300	$104,100
Physical and health education teaching	13,000	$53,200
Theology and religious vocations	12,900	$38,000
Philosophy and religious studies	12,600	$44,200
Music	11,200	$40,700
Miscellaneous education	11,200	$54,300
Family and consumer sciences	11,100	$35,200
French, German, Latin, and other common foreign language studies	11,100	$50,200
Language and drama education	10,900	$49,800
Computer and information systems	10,700	$65,200
Human resources and personnel management	10,600	$53,900
Architecture	10,000	$55,000
Hospitality management	9,000	$44,300
Communication disorders sciences and services	8,300	$52,600
Physics	8,200	$76,000
Biochemical sciences	8,100	$63,000
Management information systems and statistics	8,100	$71,700
Environmental science	8,000	$49,500
Social science or history teacher education	7,900	$47,400
Early childhood education	7,500	$36,800
Computer engineering	7,100	$82,500
Information sciences	7,100	$68,400
Industrial and manufacturing engineering	7,000	$81,400
Anthropology and archeology	6,900	$44,000
Health and medical administrative services	6,800	$56,500
Miscellaneous computer	6,700	$48,100

Detailed major	Average annual employment	Median annual earnings
Miscellaneous engineering	6,500	$68,100
Mathematics teacher education	6,200	$55,000
Geology and earth science	6,200	$64,000
Advertising and public relations	5,700	$41,200
Teacher education: multiple levels	5,500	$41,100
Drama and theater arts	5,300	$31,600
Criminology	5,100	$41,200
Miscellaneous biology	5,000	$53,900
Operations logistics and e-commerce	4,800	$66,100
Area ethnic and civilization studies	4,700	$38,600
Nutrition sciences	4,600	$41,700
Composition and speech	4,400	$33,700
Geography	4,400	$51,600
Science and computer teacher education	4,300	$56,100
Microbiology	4,100	$64,000
Art history and criticism	4,100	$35,500
Animal sciences	3,700	$50,800
Film, video, and photographic arts	3,700	$33,000
General social sciences	3,600	$49,500
Studio arts	3,500	$30,900
Business economics	3,500	$75,300
Miscellaneous business and medical administration	3,500	$45,700
Health and medical preparatory programs	3,500	$97,700
Interdisciplinary social sciences	3,300	$40,700
Miscellaneous industrial arts and consumer services	3,300	$45,600
Biomedical engineering	3,200	$52,600
Natural resources management	3,200	$44,100
International business	3,100	$54,900
Pre-law and legal studies	3,100	$44,300
Human services and community organization	3,000	$39,500
International relations	3,000	$55,200
Plant science and agronomy	2,700	$50,800
Miscellaneous agriculture	2,600	$48,000
Linguistics and comparative language and literature	2,500	$40,000

Detailed major	Average annual employment	Median annual earnings
Molecular biology	2,400	$52,600
General agriculture	2,400	$54,900
Zoology	2,200	$55,200
Aerospace engineering	2,200	$82,500
Miscellaneous engineering	2,100	$77,300
Transportation sciences and technologies	2,100	$72,800
Humanities	2,000	$51,100
Neuroscience	1,900	$41,900
Forestry	1,900	$60,700
Intercultural and international studies	1,900	$39,600
Other foreign languages	1,800	$45,600
Ecology	1,600	$43,300

Source: Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, American Community Survey micro data, 2009-2014.

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3300 Whitehaven St., NW
Suite 3200
Washington, DC 20007
cew.georgetown.edu

GEORGETOWN UNIVERSITY
Center
on Education
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McCourt School of Public Policy