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Annual Report to the Governor and General Assembly

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EXECUTIVE SUMMARY

This report is a requirement of *The Career Preparation Expansion Act*. The act directs the Maryland Longitudinal Data System Center and the Governor's Workforce Development Board to produce a report on the workforce outcomes of high school graduates five years after graduation. Specifically, the report must include their wages earned, the hours worked and the industry in which they are employed.

This report seeks to understand this population (high school graduates, class of 2012) and their workforce outcomes within the context of the other critical factor in the lives of recent high school graduates: postsecondary education. The first five years after high school is traditionally the time when high school graduates engage in college; and that is certainly the case with the cohort analyzed for this report. Notably, 79% of the high school graduates had or continue to have some involvement with college during the first five years after high school. The impact of college on workforce outcomes is of critical importance and highlighted throughout this report.

The report groups the cohort of high school graduates based on whether the high school graduates entered college and received degrees, attempted college but exited without a degree, are still in college, or bypassed college altogether and went straight into the workforce. Not surprisingly, each pathway yields different workforce outcomes. Those high school graduates with no college degree had a median wage in the 20th quarter (five years) after high school ranging from \$5,300 to \$6,000, which is \$2,000 to \$2,600 below the estimated living wage in Maryland. Those high school graduates who earned a college degree had median 20th quarter wages that ranged from \$7,000 to \$12,000, which is \$40 below to \$4,262 above the living wage.

Several important observations can be gleaned from the wage earnings data. First, there is no immediate return on the investment (both time and money) in college unless a degree is earned. Students who attempted college but did not earn a degree have a lower 20th quarter median wage than those students who directly enter the workforce. And, unlike students who earned a degree, they do not have the financial reward of higher wages to help offset any costs incurred with going to college. Second, the value of any postsecondary degree is significant. While those without a degree are on pace to earn \$1 million in their lifetime, those with a degree are on pace to earn \$1.5 to \$2 million in their lifetime. Finally, while all postsecondary degree earners have improved workforce outcomes over non-degree earners, bachelor's degree earners have a median 20th quarter wage that is approximately \$1,000 to \$2,000 higher than associate and certificate degree earners, respectively.

The report requirement to provide information on the hours worked cannot be directly addressed with MLDS data since the source of wage data only includes the total wage earned per quarter. One reason that hours worked is important is it helps paint a picture of the high school graduates' level of engagement in the workforce. Another approach to understanding the level of engagement in the workforce is to analyze the number of quarters during the five year period in which the high school graduates are reported as having wages. The results show that 86% of the cohort had at least one wage record during the five year period after high school, with 28% having wages in almost every quarter and 20% having wages in as few as one to five quarters. The range of workforce participation is once again impacted by college going. For example, bachelor's degree recipients have a high rate of irregular wage

visibility, which may be explained by the fact that actively pursuing and completing a four year degree leaves little time for work within five years. Further, the pattern and timing of when they are engaged in work corresponds with summer periods when they are less likely to be fully involved in college. However, the workforce participation patterns of certificate and associate degree earners indicates that they are more likely to have continuous or frequent wages during the five year period. This pattern may reflect their shorter time to degree as only one to two years of full-time enrollment are required to complete their degrees, leaving a longer period to be fully engaged in employment after college. Finally, high school graduates with no college attendance make up 37% of those students with no wage records. It is possible that those students left the state for employment or joined the military. However, the no college group also has a range of wages that are less than continuous, indicating that a portion of this group has remained in Maryland. This sporadic employment may be due to under-employment; possibly due to lack of jobs for individuals with no postsecondary credential.

The final requirement of the report is to identify the industry sector in which the high school graduates are employed. Generally, five years after high school, the sector with the largest percentage of high school graduates is *Wholesale and Retail*, followed by *Healthcare and Social Assistance*, and then *Accommodation and Food Services*. Once again, educational attainment has an impact on sector and wage outcomes. *Wholesale and Retail* sector was the largest employer of high school graduates who never went to college, had some college but no degree, students still in college, and associate's degree earners. In each case, the median earnings in this sector for these groups was below the living wage. For the remaining education groups, the largest sectors were *Public Administration* for certificate degree earners, *Professional, Scientific and Technical Services* for bachelor's degree earners and *Educational Services* for the other degree earners. In each case, median quarter earnings were above the living wage.

Finally, the report discusses and utilizes new methodologies for analyzing wages, reviews the gaps in the wage data and how those gaps impact the analysis, and discusses the implications of the report and direction for future research.

Table of Contents

EXECUTIVE SUMMARY	2
INTRODUCTION.....	6
Report Requirements.....	6
Overview of State Agencies	6
MLDS Data.....	6
Education Data	6
Wage Data	7
Contextual Data	7
MIT Living Wage Calculator	7
American Community Survey 5 Year Estimates	8
Population Groups.....	8
ANALYSIS AND RESULTS.....	10
Question 1. Wages Earned Five Years after High School Graduation	10
Methodology	10
Results.....	10
Question 2. Hours Worked Per Week	14
Methodology 1	14
Wage Visibility Across the Five Year Period	14
Results.....	15
Methodology 2	19
Quarterly Wage Visibility Full Five Year Period	19
Results.....	20
Question 3. High School Graduates and Industry of Employment	26
Methodology	26
Results.....	27
CONCLUSIONS AND IMPLICATIONS.....	31
APPENDICES.....	34
Appendix 1. High School Graduates, State of Maryland, 2012, by Educational Attainment and Quarterly Wage Visibility	34
Appendix 2. High School Graduates, State of Maryland, 2012, by Educational Attainment and Wage Visibility Frequency Group.....	36

Appendix 3. High School Graduates, State of Maryland, 2012, Median Quarterly Wages by Educational Attainment, Five Years after High School Graduation 37

Appendix 4. High School Graduates, State of Maryland, 2012, Industry of Employment by Educational Attainment, Five Years after High School Graduation 38

Appendix 5. High School Graduates, State of Maryland, 2012, Median Quarterly Earnings in Industry of Employment by Educational Attainment, Five Years after High School Graduation..... 40

Appendix 6. Educational Attainment Methodology 42

INTRODUCTION

Report Requirements

This Report is submitted in fulfillment of the requirement in the *The Career Preparation Expansion Act* (CPEA), Chapter 695 of 2017 (see Education Article § 21-205, Annotated Code of Maryland). The Maryland Longitudinal Data System (MLDS) Center and the Governor's Workforce Development Board (GWDB) are required to produce a report on high school graduates for the five-year period after graduation on:

1. Wages earned;
2. Hours worked per week; and
3. The industry in which the individuals are employed.

Overview of State Agencies

The MLDS is the State's central repository for student and workforce data. The MLDS Center develops and maintains the System in order to provide analyses, produce relevant information, and inform choices to improve student and workforce outcomes in the State of Maryland.

The Governor's Workforce Development Board helps plan, coordinate, and monitor State programs and services for workforce development, and advises the Governor on the development, implementation, and modification of the four-year State Plan, as required by federal law.

MLDS Data

The MLDS connects data from across Maryland's education and workforce agencies. These data are subject to strict data management, security, and privacy requirements. All research conducted by the MLDS Center focuses on what happens to students before and after critical transitions in education to workforce pathways. All research and analysis using the MLDS are cross-sector. The MLDS may only report aggregate, de-identified data.

This analysis focuses on the employment of individuals as they move from high school into the workforce, including whether or not any high school graduates enrolled in or complete college. Below is an overview of the available data within the System to support this analysis:

Education Data

The MLDS contains education data on all students from Maryland public high schools, and students attending Maryland institutions of higher education. The System also contains limited information on the out-of-state college enrollment of Maryland public high school graduates. Education data begin with the 2007-2008 school year and are current through the 2017-2018 school year.

The System does not contain education data on students in private high schools or for-profit private institutions of higher education. Nor does the System contain data on postsecondary students in continuing education or non-degree seeking programs.

Wage Data

The MLDS workforce data include quarterly Unemployment Insurance (UI) wages from 2008 through the first quarter of 2018. Unemployment Insurance (UI) filings are only available for employees who work for a business required to file UI. The federal government (including the military), certain non-profits, and self-employed and independent contractors do not file UI. MLDS data do not include information on out-of-state employment. Therefore, it is incorrect to assume that high school graduates not counted as “employed” in this report are unemployed.

Wage data in the System include North American Industry Classification System (NAICS) codes for employers. This system classifies employers by sector rather than identifies the specific jobs performed by employees. The wage data contained in the System cannot distinguish between part-time and full-time employment, or hourly and salaried wages. The UI data provided do not indicate the number of days a person worked in a particular quarter or the number of hours a person worked in a week.

Contextual Data

Two sources of data were selected to provide context for the results and guide the analysis. Collectively, these two sources provide comparison points between the wage data, cost of living, and median wages. Both sources provide data at the state-level and the county-level.

MIT Living Wage Calculator

The [Living Wage Calculator](#) developed by the Massachusetts Institute of Technology¹ provides data on the cost of living in various geographic areas across the United States. The living wage calculator incorporates the cost of food, housing, health insurance, transportation, taxes, clothing and other personal items to derive the minimum annual income required for basic self-sufficiency. It is more comprehensive than traditional poverty measures, which do not incorporate these broader costs of living. More information on the MIT Living Wage Calculator is available on their [website](#). The measure selected from the Living Wage Calculator was “required annual income before taxes” for one adult with no dependent children which was \$31,654 annually or \$7,913² per fiscal quarter in 2017. This income was converted to a quarterly income to align to the MLDS quarterly wage data and is referred to as “living wage” in the remainder of this analysis. The Living Wage Calculator also provides comparison data for occupation areas.

¹ Glasmeier, Amy K. (2018). [Living Wage Calculator](http://livingwage.mit.edu/). (<http://livingwage.mit.edu/>) Massachusetts Institute of Technology.

² Values reported in the Living Wage Calculator were \$30,420 annually in 2016 dollars. This was divided to a quarterly wage of \$7,605 in 2016 dollars. Both values were inflation adjusted to 2017 dollars using the CPI Inflation Calculator provided by the [U. S. Department of Labor, Bureau of Labor Statistics](#).

American Community Survey 5 Year Estimates

The second source of contextual data is the [American Community Survey \(ACS\) 5-Year Estimates, 2012 to 2016](#).³ This survey provides extensive data on demographic characteristics, housing, and wages for States and Counties throughout the United States. The measure selected from the ACS was “median nonfamily income”. This income measure was converted to quarterly earnings to align to the MLDS quarterly wage data. The ACS median nonfamily income in Maryland was \$48,152 annually or \$12,038 quarterly.⁴

Population Groups

The population of interest is high school students who graduated from a Maryland public high school with a diploma between January and October of 2012 and are between the ages of 16 and 24 at the time of graduation⁵. This is the latest year that high school graduates have five years of available wage data post-high school graduation. Almost 60,000 students graduated from Maryland public high schools in 2012 under this definition. See **Table 1**.

Table 1. High School Graduates, State of Maryland, 2012, Distribution by Educational Attainment

Education Level	Record Count	Percentage
High School Graduates, No College	14,118	24%
Some College	20,778	35%
Still in College	12,719	21%
Certificate	213	<1%
Associate's	1,418	2%
Bachelor's	10,213	17%
Other Degree	51	<1%
Total	59,510	

³ United States Census Bureau. (2016). 2012-2016 American Community Survey 5-Year Estimates. U.S. Census Bureau's American Community Survey Office. <https://factfinder.census.gov>

⁴ Values reported in the ACS were \$46,978 annually in 2016 dollars. This was divided to a quarterly wage of \$11,744 in 2016 dollars. Both values were inflation adjusted to 2017 dollars using the CPI Inflation Calculator provided by the [U. S. Department of Labor, Bureau of Labor Statistics](https://www.bls.gov/data/inflation_calculator.htm) - https://www.bls.gov/data/inflation_calculator.htm.

⁵ This definition of high school graduate was selected to align to reporting definitions used by the National Center for Education Statistics (NCES) and the U. S. Bureau of Labor Statistics (BLS) in reports on educational attainment and employment of high school graduates.

The high school graduates were disaggregated into educational attainment groups. See **Table 1**⁶. See **Appendix 6** for the definitions used to determine assignment to each group. Analyzing wage data by educational attainment is critical to any exploration of wage and industry of employment for the following reasons:

1. Research suggests that employment outcomes and wages may vary by level of educational attainment⁷;
2. Variation in length of degree program impacts the length of time in the workforce post-degree, which in turn impacts employment outcomes and wages; and
3. Enrollment in school negatively impacts amount of hours available for work each week.

⁶ Educational attainment should not be interpreted as college graduation rates as this report does not provide data on the number of students starting each degree, only the number of students who obtained each degree, are still enrolled in college or stop attending college without graduating. Reporting on time to degree and college completion is outside the scope of this report.

⁷For example, see:

Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). *Education Pays 2013: The benefits of higher education for individuals and society*. College Board.

Hout, Michael. (2012). Social and economic returns to college education in the United States. *Annual Review of Sociology*. 38: 379-400.

Kane, T.J. and Rouse, C. E. (1995). Labor market returns to two-year and four-year college. *The American Economic Review*, 85(3): 600-614

Thomas, Scott L. and Liang Zhang. (2005). Post-baccalaureate wage growth within 4 years of graduation: The effects of college quality and college major. *Research in Higher Education*. Volume 46. 4: 437-459.

ANALYSIS AND RESULTS

Question 1. Wages Earned Five Years after High School Graduation

This section outlines the approach used to determine the median quarterly wages for high school graduates five years after high school graduation.

Methodology

The median wage for high school graduates was calculated using the U. S. Census Bureau Stable (or Full-Quarter) Employment Methodology⁸. This methodology excludes individuals from the median calculation who do not have wage data in either the fiscal quarter before or after the period of interest. For this study, the period of interest is the 20th quarter after high school graduation or fiscal quarter 2 of 2017. Accordingly, individuals were included in the median wage calculation⁹ if, in addition to having wages in quarter 2 of 2017, they also had wages in fiscal quarter 1 of 2017 and fiscal quarter 3 of 2017. See **Appendix 3** for a comparison of individuals with stable wages to all individuals with wage data in fiscal quarter 2.

The Stable Employment Methodology was used because it provides a standardized method of determining whose wages to include in analysis. Using a standardized methodology allows the Center to compare its outcomes to the outcomes in other research that uses this same methodology. Further, restricting analysis to “stable wage earners” provides a clearer picture of wage outcomes for workers fully engaged in the workforce and eliminates the potential to deflate median wages calculations by including the wages, or lack of wages, of workers for who are absent, transient, or not fully engaged in the workforce. Other sections of this report will identify and analyze issues related to high school graduates that may not fully engaged in the workforce or have limited wage data available for analysis.

Results

There were 27,535 high school graduates, or 46% of all graduates, who had Stable Employment and were therefore included in median wage analysis. See **Table 2**¹⁰. Conversely, 54% of high school graduates did not have wage data for the full nine month period five year years after high school graduation. High school graduates excluded from this calculation include individuals who may have had wage data for some but not all of the quarters required to meet the Stable Employment definition, who may have had wages from a source not reported to the MLDS, who may be out-of-state, or who may be unemployed.

⁸ The Full-Quarter Employment (Stable) methodology is utilized by the U. S. Census Bureau to calculate average monthly earnings for individuals engaged in stable employment with any employer. The methodology is applied here to derive quarterly, rather than monthly median earnings. https://lehd.ces.census.gov/doc/QWI_101.pdf.

⁹ Some individuals have wages in a quarter from more than one employer. Those wages were summed and then the sum was used in the median quarterly wage calculation.

¹⁰ Wages are actual for Q2 2017 and not inflation adjusted to current day values. If an individual had more than one source of wages for the period those sources were summed to a personal quarterly wage and that value was used in determining the median.

Table 2. High School Graduates, State of Maryland, 2012, Median Quarterly Wages by Educational Attainment, Five Years after High School Graduation Compared to Living Wage

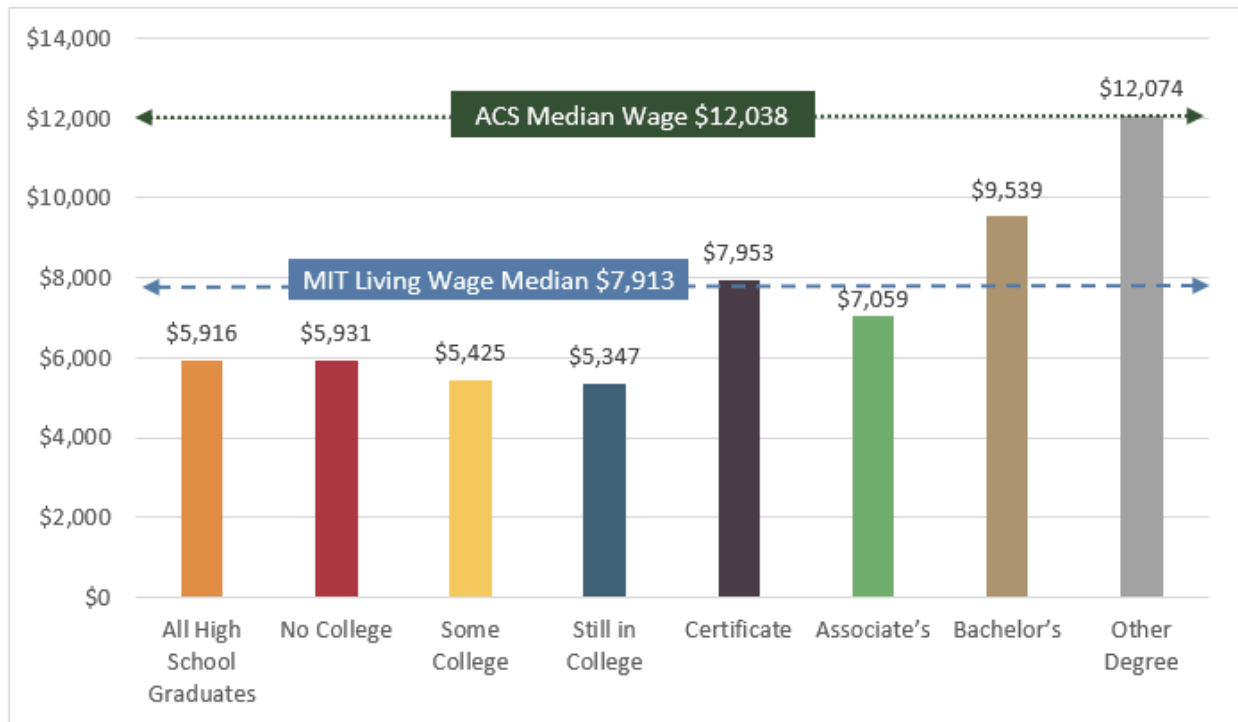
Educational Attainment	Total	Total with Stable Employment	% with Stable Employment	Median Wage for Quarter 20	Variation to Living Wage (\$7,913)
All High School Graduates	59,510	27,535	46%	\$5,916	↓ \$1,997
High School Graduates, No College	14,118	6,251	44%	\$5,931	↓ \$1,982
Some College	20,778	10,421	50%	\$5,425	↓ \$2,488
Still in College	12,719	6,472	51%	\$5,347	↓ \$2,566
Certificate	213	133	62%	\$7,953	↑ \$40
Associate's	1,418	793	56%	\$7,059	↓ \$854
Bachelor's	10,213	3,450	34%	\$9,539	↑ \$1,626
Other Degree	51	15	29%	\$12,074	↑ \$4,161

Overall, the median quarterly wage for all high school graduates with Stable Employment is \$5,916 in the 20th quarter – fiscal quarter 2 of 2017. Comparatively, this is approximately \$2,000 below the living wage¹¹ in Maryland and \$6,000 below the ACS median nonfamily income¹² in Maryland. This result is not uniform across all educational attainment groups. See **Table 2** and **Chart 1**. High school graduates that did not continue to college, those with some college and those still in college have a median quarterly wage that falls below the living wage. Of these three educational attainment groups, the No College group, which presumably went directly into the workforce, are earning slightly more than the other two groups. Further, as may be expected, students Still in College fall below the living wage as they are most likely working in a part-time capacity to prioritize their education. These students may have a portion of their living expenses covered by their parents or be receiving federal, state or institutional financial aid to cover their living expenses. Perhaps unexpected is the median quarterly wage for the Some College group, this group, who have some college but no degree, have a median quarterly wage approximately \$500 less than those who never went to college. This low median wage may result from delayed entry into career track employment while attempting college and then no college degree to boost their starting salary upon entering the workforce full-time.

¹¹ Glasmeier, Amy K. (2018). [Living Wage Calculator](#). Massachusetts Institute of Technology.

¹² United States Census Bureau. (2016). 012-2016 American Community Survey 5-Year Estimates. U.S. Census Bureau's American Community Survey Office.

Chart 1. High School Graduates, State of Maryland, 2012, Median Quarterly Wages by Educational Attainment Compared to Wage Indicators



High school graduates that completed a Certificate, Bachelor’s or Other Degree have median quarterly earnings above the living wage. See **Table 2 and Chart 1**. Certificate and Associate’s degree graduates, some of whom may have been in the workforce post-college graduations for two to four years, have median quarterly earnings that are close to that required to meet the living wage in Maryland. Bachelor’s degree graduates have median quarterly wages that exceed the living wage in Maryland by \$1,500, while, post-baccalaureate and Master’s degree graduates (Other Degree), not only exceed the living wage and are at the ACS nonfamily median wage for Maryland. Both the Bachelor’s degree and Other Degree groups realize these earnings despite only having nine months lapse since completing their college degrees. The MLDS Center plans to analyze additional data to isolate post-degree attainment earnings for each group to explore variations in entry-level salaries.

Whether the earnings gaps between the educational attainment groups persists, narrows or widens will be determined as additional times passes in the workforce. Currently, the No College, Some College and Still in College groups are on pace to earn \$1 million in their lifetime, while individuals with some level of college degree are on pace to earn \$1.5 to \$2 million in their lifetime,¹³ all of which align to research¹⁴ on the financial returns to education.

¹³ Projected lifetime earnings are based on the sum of median quarterly wages for individuals through the age of 65 for each education level.

¹⁴ For example, Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). [Education Pays 2013: The benefits of higher education for individuals and society](#). College Board.

Table 3. High School Graduates, State of Maryland, 2012, Median Quarterly Wages At or Above Living Wage by Educational Attainment, Five Years after High School Graduation

Education Level	Total	Total with Wages in Quarters 19, 20, and 21	% of Group with Wages in Q20	Total with Wages in Q20 At or Above Living Wage	% of Group with Wages At or Above Living Wage
All High School Graduates	59,510	27,535	46%	8,595	31%
High School Graduates, No College	14,118	6,251	44%	1,831	29%
Some College	20,778	10,421	50%	2,341	22%
Still in College	12,719	6,472	51%	1,855	29%
Certificate	213	133	62%	68	51%
Associate's	1,418	793	56%	329	41%
Bachelor's	10,213	3,450	34%	2,158	63%
Other Degree	51	15	29%	13	87%

Another way to analyze wages five years after high school graduation is to determine the number of high school graduates with wages at or above the living wage. See **Table 3**. The median quarterly wage identifies the quarterly wage for the person in the exact middle of a population; half the records in that population have a quarterly wage above this value, and half the records have a quarterly wage below this value. Identifying the number of individuals with quarterly wages at or above cost of living helps quantify the number of individuals that are engaged in the workforce at a level that provides for the basic cost of living in Maryland. Applying this measure also calls attention to the difference in outcomes at each educational attainment level. Less than a third of high school graduates in the educational attainment groups of No College, Some College and Still in College have a quarterly wage above the living wage. Comparatively, 41% to 63% of high school graduates that completed an undergraduate degree have quarterly wages above the living wage.

Finally, it is also important to consider that 53% of high school graduates do not have stable earnings (earnings for a nine month period) five years after high school graduation. This population is excluded from our analysis as their irregular wage data at the five year mark makes it difficult to analyze and interpret. It is possible these individuals have employment out-of-state, with the federal government, or as contractors. It is impossible to predict if medians for each group would increase, decrease or remain relatively unchanged if complete data were available.

Question 2. Hours Worked Per Week

The second requirement for the report is to analyze the hours worked for the five year period following graduation. As previously stated, the wage data received from UI does not contain hours worked. Knowing the number of hours worked would shed light on whether employment is full-time or part-time and the extent to which the high school graduate is engaged in the workforce. While the full-time/part-time question cannot be directly answered, data are available to help assess the level of engagement in the workforce amongst this cohort of high school graduates.

Two methods were used to assess the level of engagement in the workforce. The first method looks at the number of quarters in which individuals had wages during the five year period post-high school graduation. The second method looks at each quarter for the five year period after high school to determine the number of high school graduates with wages.

This section outlines the two approaches used to identify the population of interest, group the population for analysis, and determine the wage visibility for high school graduates for the five year period following high school graduation.

Methodology 1

Wage Visibility Across the Five Year Period

Wage visibility is defined as the number of quarters in which an individual has reported wages for the timeframe of interest. Wage visibility is directly affected by gaps in the MLDS employment data. The MLDS does not contain workforce data on self-employed persons, independent contractors, military personnel, out-of-state, or federal employees. Further, as individuals change jobs over the course of the period of analysis it is possible that the gaps in wage data may be due to changes in type and location of employment rather than due to unemployment.

Two types of wage visibility analysis were completed. First, wage visibility for the population of interest was analyzed and individuals were placed into one of five mutually exclusive groups based upon the following criteria:

1. **No Visibility** – no wages for the entire 20 quarters,
2. **Irregular Visibility** – wages for 25% of the period (1 to 5 quarters)
3. **Intermittent Visibility** – wages for 25%-49% of the period (6 to 10 quarters)
4. **Frequent Visibility** – wages for 50%-74% (11 to 15 quarters), or
5. **Continuous Visibility** – wages for 75% or more of the period (16 to 20 quarters).

This analysis provides insight into the number of high school graduates that never appear in wage data, those with limited wage data, and those with complete wage data for the full five year period. For those with wage data, the median quarterly wage was calculated by selecting wages in the final quarter of visibility for each individual and then determining the median wage. For example, if one individual in the Intermittent group had 8 quarters of wages, and another had 6 quarters of wages, those two quarters were selected to determine the overall median for the group.

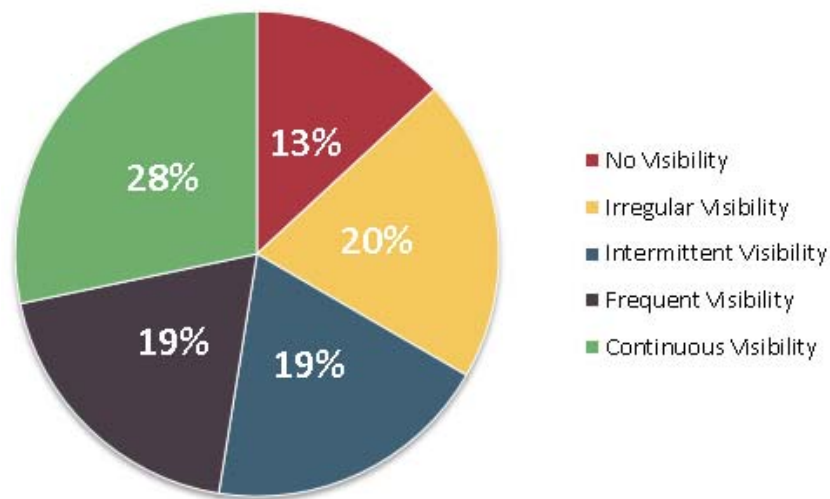
Results

At least one quarter of wage data were available for 86% of this population. The wage data available varies, with 13% of high school graduates never appearing in the wage data, 28% appearing in almost every wage quarter (continuous), 38% appearing periodically (intermittent and frequent), and another 20% appearing in only 1 to 5 quarters in the 5 year period (irregular). See **Table 4** and **Figure 2**. **Appendix 2** provides wage visibility by educational attainment.

Table 4. High School Graduates, State of Maryland, 2012, No Wages for Full Five Year Period

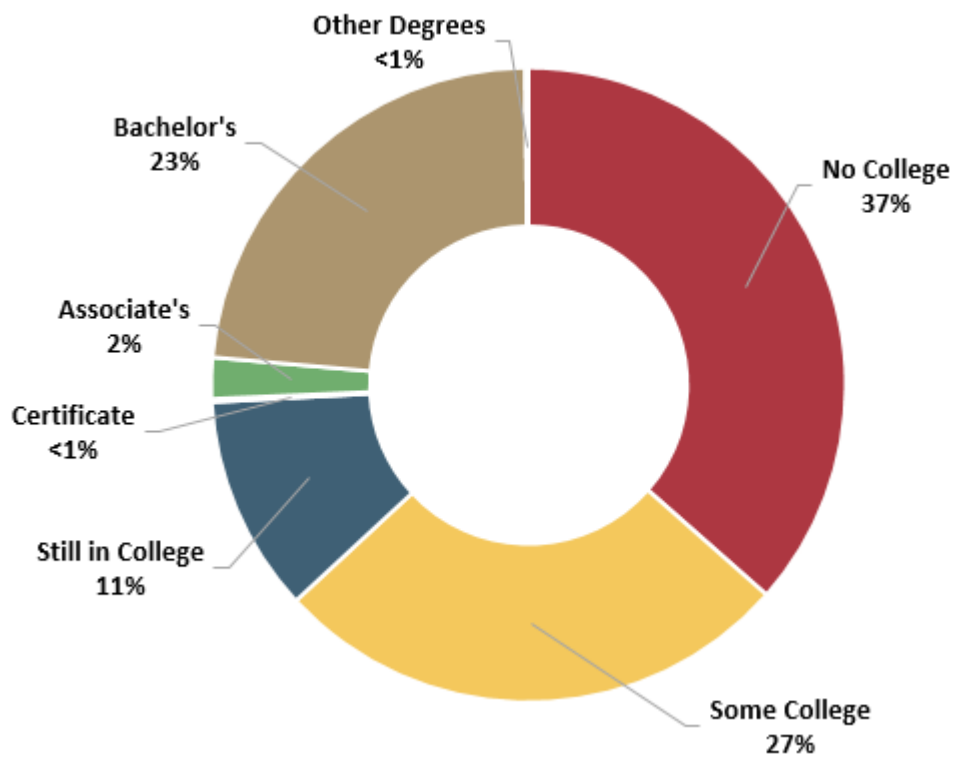
Total High School Graduates	No Wages for Full Five Years	% Without Wages
59,510	8,017	13%

Figure 2. Overall Wage Visibility, High School Graduates, State of Maryland, 2012



The vast majority of high school graduates without a single wage record for the entire five year period are those graduates in the No College, Some College and Bachelor's degree educational attainment groups. See **Figure 3**. It is possible that the lack of visibility for the Bachelor's and Some College groups could be driven by out-of-state college enrollment. Approximately 27% of the 2012 high school graduates who enrolled in college did so out-of-state.¹⁵ Those in the No College group may also reflect high school graduates that are working out-of-state, joined the military after high school or are pursuing other types of employment that does not require reporting for Unemployment Insurance (UI) and therefore are not wage data contained within the MLDS System.

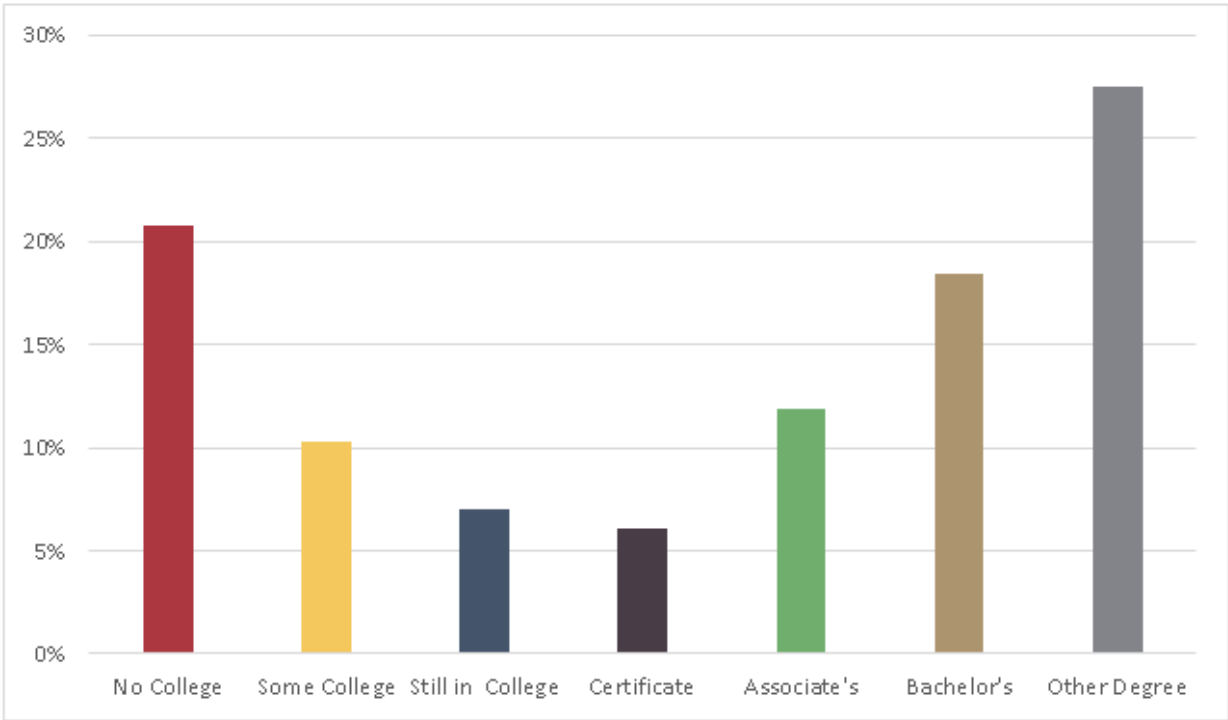
Figure 3. High School Graduates, State of Maryland, 2012, Distribution of No Wage Visibility by Educational Attainment



¹⁵ MLDS Center. [Initial Postsecondary Enrollments - In-State vs. Out-of-State Overview](#).

Another option for considering the distribution of the No Wage Visibility group is to consider what percentage of each educational attainment group does not have wages. See **Chart 2**. From this perspective, the Other Degree (27%) has the most high school graduates without any wage data, at nearly double the overall average. The No College group (21%) and Bachelor's (18%) now rank second and third respectively. The lack of wage data for such a large percentage of the Other Degree group may reflect two phenomenon. First, to earn both a bachelor's and either a post-bacceleaurate or Master's degree in five years would leave little time to work. Second, research suggests that the higher the level of the college degree the more likely a graduate is to relocate outside the geographic area of the college that conferred the degree.¹⁶

Chart 2. High School Graduates, State of Maryland, 2012, Percentage of Educational Attainment Group with No Wage Visibility



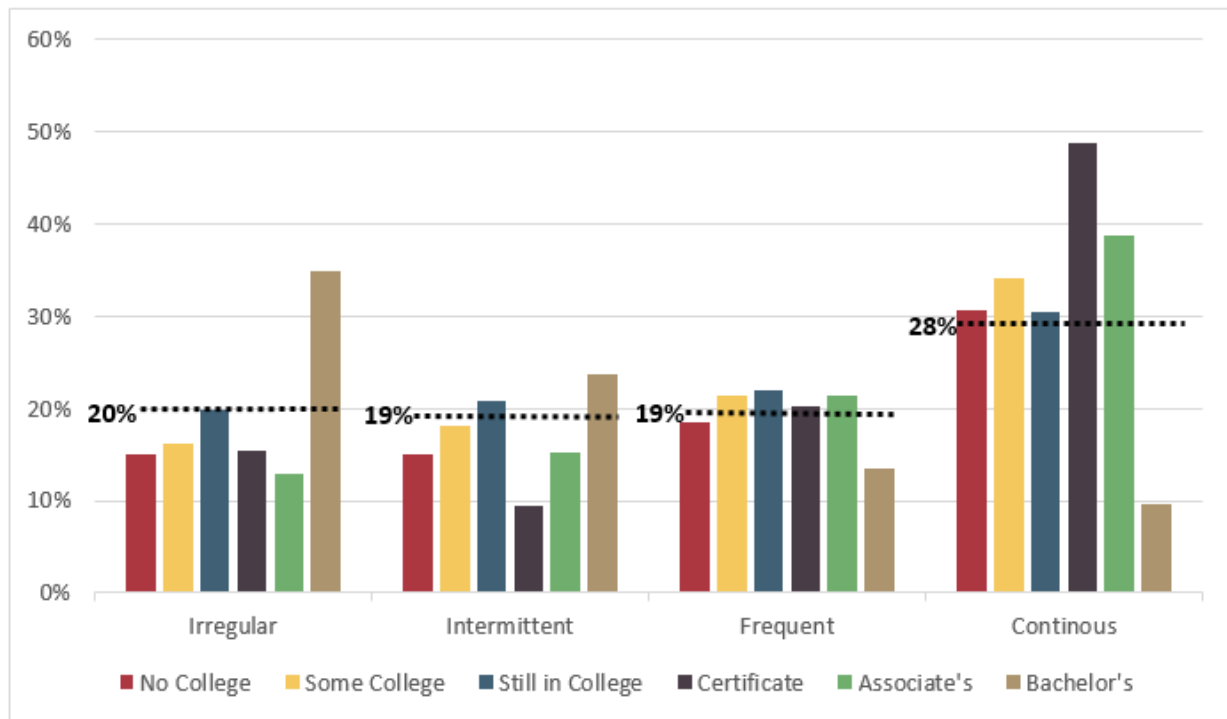
¹⁶ Rothwell, Jonathan. (2015). [What colleges do for local economies: A direct measure based on consumption](#). Brookings Institute.

For the 86% of high school graduates that have one or more quarter of wages in the five years post-high school graduation, 39% have irregular (20%) or intermittent (19%) wages while 47% have frequent (19%) or continuous (28%) wages. See **Table 5**.

Table 5. High School Graduates, State of Maryland, 2012, Wage Visibility for Full Five Year Period with Median Quarterly Wage

Wage Visibility	All High School Graduates	% Wage Visibility	Median Quarterly Wage
Irregular	11,808	20%	\$1,269
Intermittent	11,180	19%	\$2,267
Frequent	11,565	19%	\$3,520
Continuous	16,940	28%	\$5,681
Total with Wages	51,493	86%	
Total High School Graduates	59,510		

Chart 3. High School Graduates, 2012, Percentage of Wage Visibility by Educational Attainment



*Note: The *Other Degrees* category was omitted from this analysis due to small cell size.

As with the high school graduates without wages, these wage visibility patterns vary by educational attainment. See **Chart 3**. High school graduates in the Bachelor's educational attainment group have the highest rate of irregular wages. As with the No Wage group, this again is not surprising as completion of a Bachelor's degree within five years allows very little time to work. This group may also be unique in

that it most likely contains more students that went out-of-state for a degree¹⁷ as compared to the other groups and therefore their wage data may be restricted to summer fiscal quarters when they return home from college.

Another noticeable variation from the overall averages is in the Continuous wage group*. Overall, 28% of high school graduates fall into this wage visibility group. However, for each educational attainment group, the percent that falls into Continuous category varies widely with 49% of Certificate students, 39% of Associate's students and 10% of Bachelor's students. The low rate in the Bachelor's degree group may again reflect a combination of little time to work or pursuing a degree out of state. The higher rates in the Certificate and Associate's groups may reflect both financial need to work while in college as well as more time in workforce post-degree as a Certificate is typically a one year program and an Associate's is two year program. High school graduates in these two degree groups will have a longer period of time post-college degree attainment to begin working full-time in the workforce. They are also less likely to have gone out-of-state for college so that their rate of employment during college will be more visible.

Methodology 2

Quarterly Wage Visibility Full Five Year Period

Wage data were also analyzed for each fiscal quarter after high school graduation to determine the number of high school graduates with wage data in each fiscal quarter. As with the previous method, wage visibility is defined as having a wage record in a specific quarter. Also, as previously noted, wage visibility is directly affected by gaps in the MLDS employment data. The MLDS does not contain workforce data on self-employed persons, independent contractors, military personnel, out-of-state, or federal employees. Further, as individuals change jobs over the course of the period of analysis it is possible that the gaps in wage data may be due to changes in type and location of employment rather than due to unemployment.

¹⁷Approximately 27% of the 2012 high school graduates had an initial enrollment that was out-of-state. MLDS Center. [Initial Postsecondary Enrollments - In-State vs. Out-of-State Overview](#).

*Note: The Other Degrees category was omitted from this analysis due to small cell size.

Results

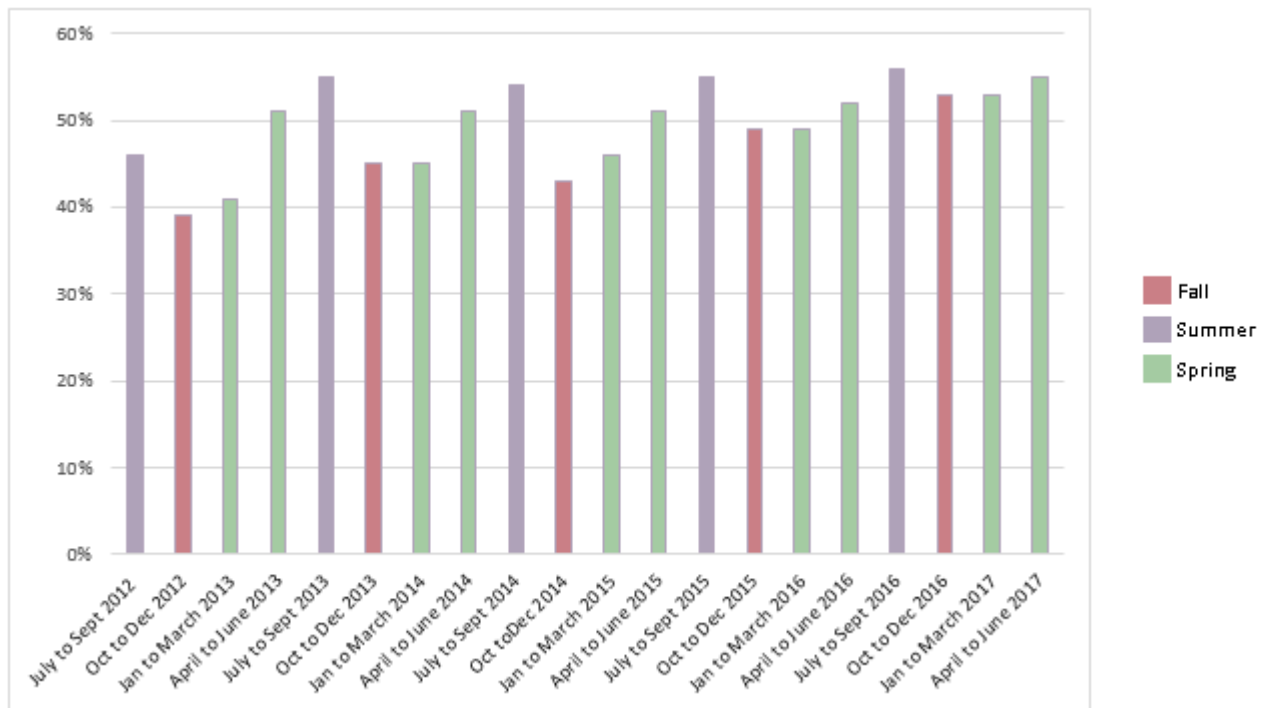
The results of the analysis are presented in **Table 6** and **Chart 4**. For a full analysis by educational attainment, see **Appendix 1**. The number high school graduates with wage data in any one quarter is somewhat consistent for the majority of the five year period, ranging from a low of 39% to a high of 56% with an average of 49%.

Table 6. High School Graduates, State of Maryland, 2012, Wage Visibility by Quarter for Full Five Year Period

Year	Fiscal Quarter	High School Graduates with Wages in Quarter	% of All High School Graduates with Wages in Quarter	
Year 1	Q1	July to September 2012	27,562	46%
	Q2	October to December 2012	23,033	39%
	Q3	January to March 2013	24,243	41%
	Q4	April to June 2013	30,255	51%
Year 2	Q5	July to September 2013	32,472	55%
	Q6	October to December 2013	26,889	45%
	Q7	January to March 2014	26,561	45%
	Q8	April to June 2014	30,444	51%
Year 3	Q9	July to September 2014	31,952	54%
	Q10	October-December 2014	25,422	43%
	Q11	January to March 2015	27,126	46%
	Q12	April to June 2015	30,621	51%
Year 4	Q13	July to September 2015	32,682	55%
	Q14	October to December 2015	29,164	49%
	Q15	January to March 2016	29,011	49%
	Q16	April to June 2016	31,144	52%
Year 5	Q17	July to September 2016	33,189	56%
	Q18	October to December 2016	31,588	53%
	Q19	January to March 2017	31,730	53%
	Q20	April to June 2017	32,584	55%
Total High School Graduates		59,510		

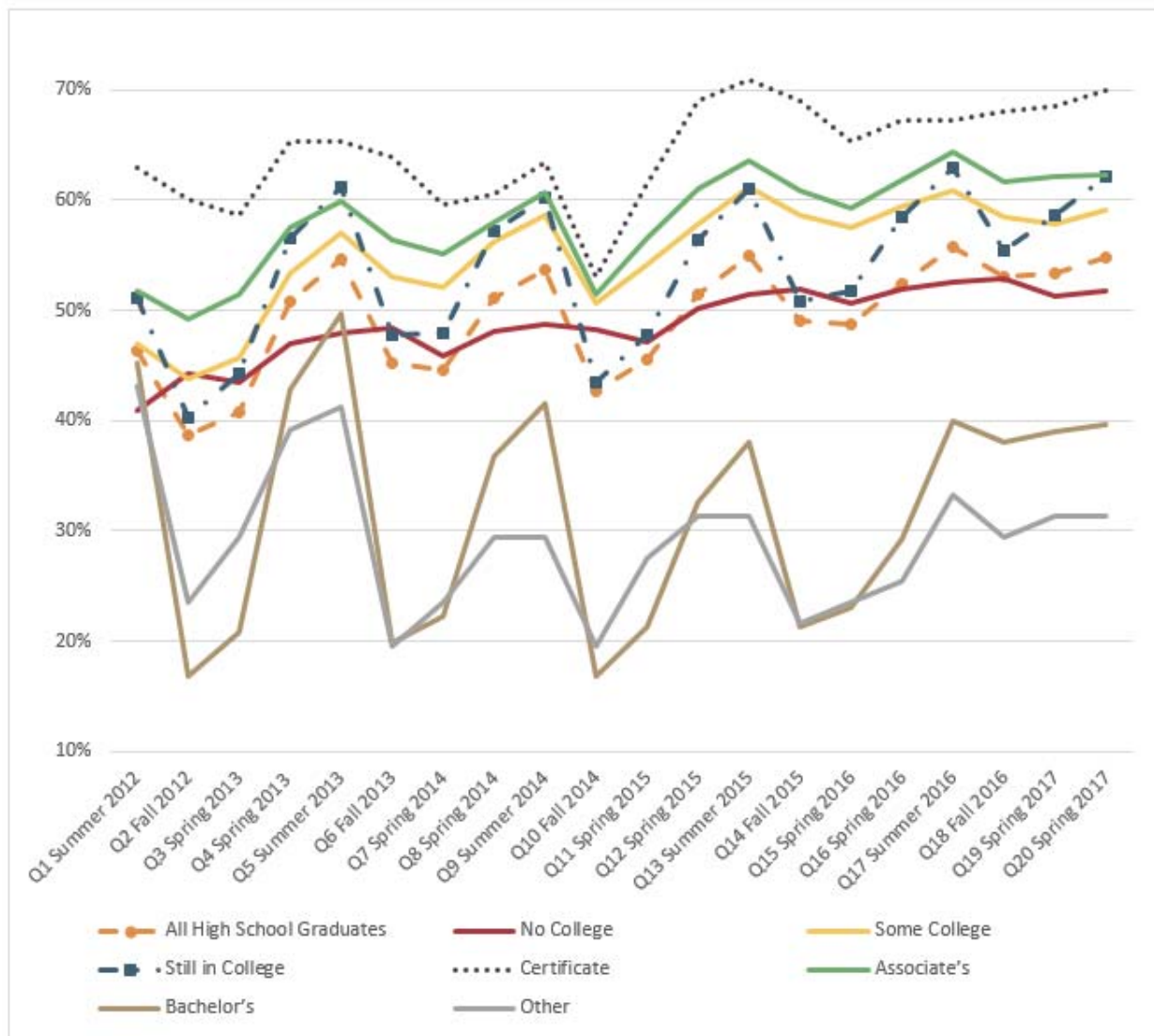
Wage visibility peaks each summer and declines each fall for the first four years of the period. See **Chart 4**. In most summers, the rate of wage visibility exceeds the average by five percentage points. In the fall, the rate of wage visibility falls below average by three to six percentage points. This pattern holds for the first four years but begins to change in quarter 18, or fall 2016. In fall 2016, wage visibility is four percentage points above the five year average and the highest of all fall periods, a full 14 percentage points above the first fall in 2012. This increase in wage visibility may be due to graduates from bachelor’s degree program entering the workforce at an increasing rate, a rate that is almost double that of earlier periods. See **Appendix 1** for distributions of wage visibility by quarter for each educational attainment group.

Chart 4. High School Graduates, State of Maryland, 2012, Wage Visibility by Quarter for Full Five Year Period



Distinct patterns emerge when examining the wage visibility patterns for the full five year period across each educational attainment group. See **Chart 5**. First, for all educational attainment groups except the No College group, the rate of wage visibility distinctly drops in fiscal quarters aligned to fall academic terms and increases in fiscal quarters aligned to summer academic terms. This is perhaps not surprising as students pursuing higher education are less likely to be enrolled in college in the summer and therefore have more time to work as compared to fall. Conversely, high school graduates in the “No College” group have a somewhat steady rate of wage visibility for the full five years.

Chart 5. High School Graduates, State of Maryland, 2012, Wage Visibility by Quarter and Education Level for Full Five Year Period

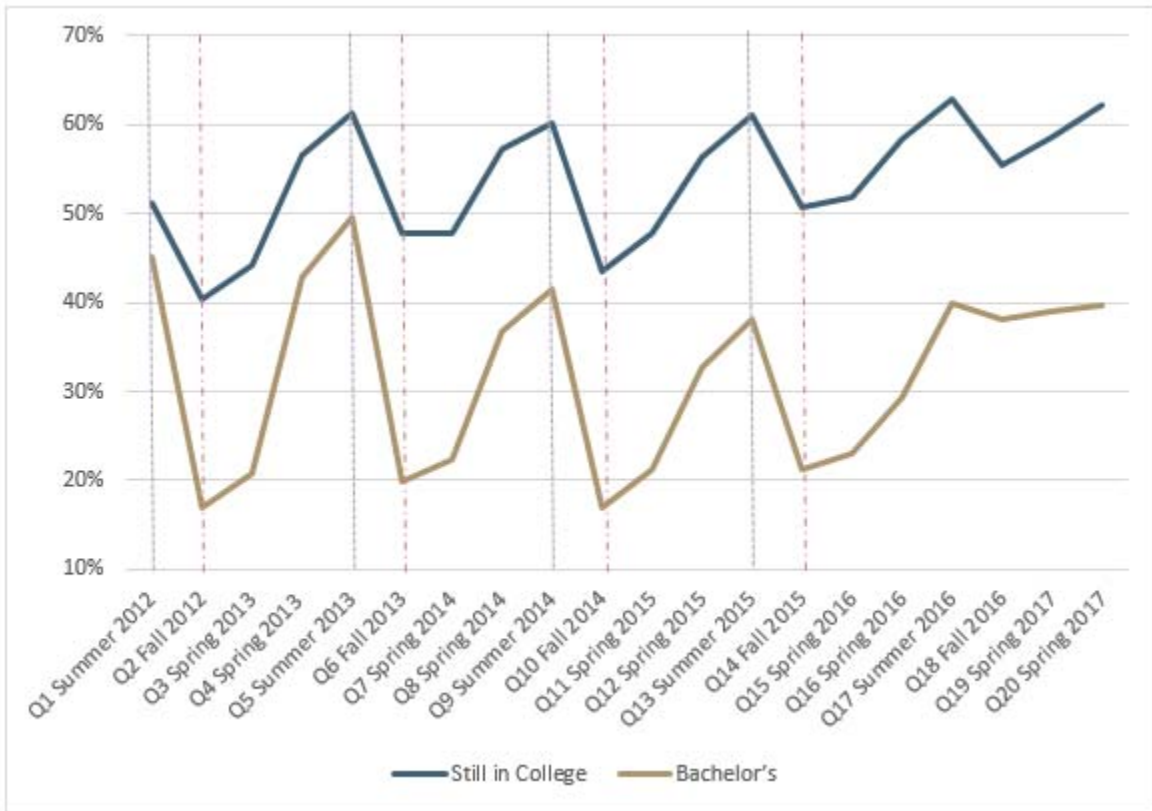


The second pattern to consider is the variation in the overall rates of intragroup wage visibility. Most notably, students in the Still College, Associate’s, Some College and Certificate groups have the highest overall intragroup rates of wage visibility, ranging from lows around 50% to highs around 70%. See

Chart 5. While it may not be surprising that these groups have high wage visibility in the first two or three years of the five year period, the fact that the high rates of visibility continue for the Certificate and Associate’s groups at 70% and 62% respectively after they most likely earned their college degrees suggests that there is a labor market in Maryland for these degree recipients that keeps them in Maryland rather than requiring them to move out of state for employment. Comparatively, Bachelor’s and Other Degree students have wage visibility after graduation at only 40% and 31% respectively. These rates, rather than indicating unemployment or lack of employment opportunities for graduates with these degrees in Maryland, may indicate an increase in mobility. Research by the Brookings Institute indicates that 42% of students with Bachelor’s degree remain in the area of the college they attended compared to 68% of students with Associate’s degrees.¹⁸ The linkage between degree attainment, local labor market needs and student mobility requires further research to better understand the patterns identified in this study.

¹⁸ Rothwell, Jonathan. (2015). [What colleges do for local economies: A direct measure based on consumption.](#) Brookings Institute.

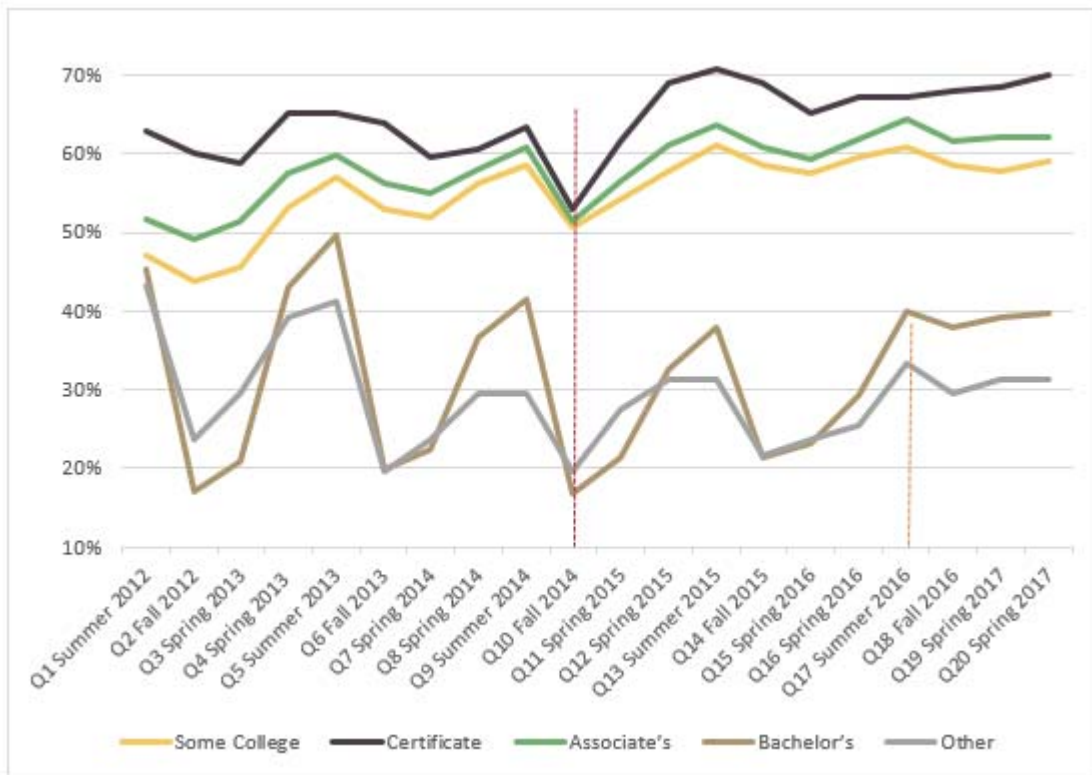
Chart 6. High School Graduates, State of Maryland, 2012, Wage Visibility by Quarter for Associate's and Bachelor's Degrees



The third distinct pattern is that, while the cycle of summer peaks and fall valleys for wage visibility is consistent across postsecondary educational attainment groups, the intragroup visibility for two groups, Still in College and Bachelor's, may reflect an important distinction in these two groups. See **Chart 6**. In fiscal quarters aligned to fall academic terms, only 15-20% of all students who attain a Bachelor's degree by fall 2016 have wage data in the fall, compared to students still enrolled in college five years later. The Still in College group has a wage visibility of 40-55% each fall. This is a 25 to 30 percentage point difference in wage visibility in fall between the two groups. It cannot be said definitively that students enrolled in bachelor's degree programs work less than those in other types of degrees due to the gaps in MLDS wage data; however, the pattern suggests that those who *earn* a bachelor's degree in 4 years may in fact be devoting the majority of their time to school rather than working, allowing them to graduate on-time. It is also possible that the rates of bachelor's degree students with wage data could be understated due to enrollment in out-of-state colleges rather than due to non-participation in the workforce¹⁹. Additional research is needed to explore the relationship between wage visibility, workforce participation, and degree attainment.

¹⁹ Approximately 27% of the 2012 high school graduates had an initial enrollment that was out-of-state. MLDS Center. [Initial Postsecondary Enrollments - In-State vs. Out-of-State Overview](#).

Chart 7. High School Graduates, State of Maryland, 2012, Wage Visibility by Quarter and Educational Attainment



A final pattern that emerges in the intragroup wage visibility analysis occurs in the fiscal periods that align to the fall 2014 academic term and the summer 2016 academic term. See **Chart 7**. In the first example, fall 2014 for Some College, Certificate, and Associate’s, shows a distinct drop in visibility followed by an increase and plateau of visibility. For these groups, fall 2014 may mark an exit from college and an entrance into post-college employment. For Certificate and Associate’s graduates, fall 2014 would conclude the full-time or near-full time study required to earn a certificate (at least 1 year) or associate’s (2 year) degree. For those with Some College, this may mark the point at which they stopped pursuing a college education. Nationally, 43% of students enrolled in 2-year colleges and 20% of students enrolled in 4-year colleges do not persist beyond their second year of study, so it is possible that this group mirrors those national trends²⁰. The increase and plateau visibility pattern repeats itself for Bachelor’s and Other Degree students in summer 2016. For students in these two groups, wage visibility increases in summer 2016 and plateaus for the remaining period and may mark an exit from college and an entrance into post-college employment. For these graduates, summer 2016 would conclude the four years of full-time study, the minimum, typically required to earn a bachelor’s degree or a bachelor’s plus a post-baccalaureate or master’s degree. More analysis is needed to better understand the increase and plateau patterns identified.

²⁰ U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study. Digest of Education Statistics 2016. [Table 326.50](#).

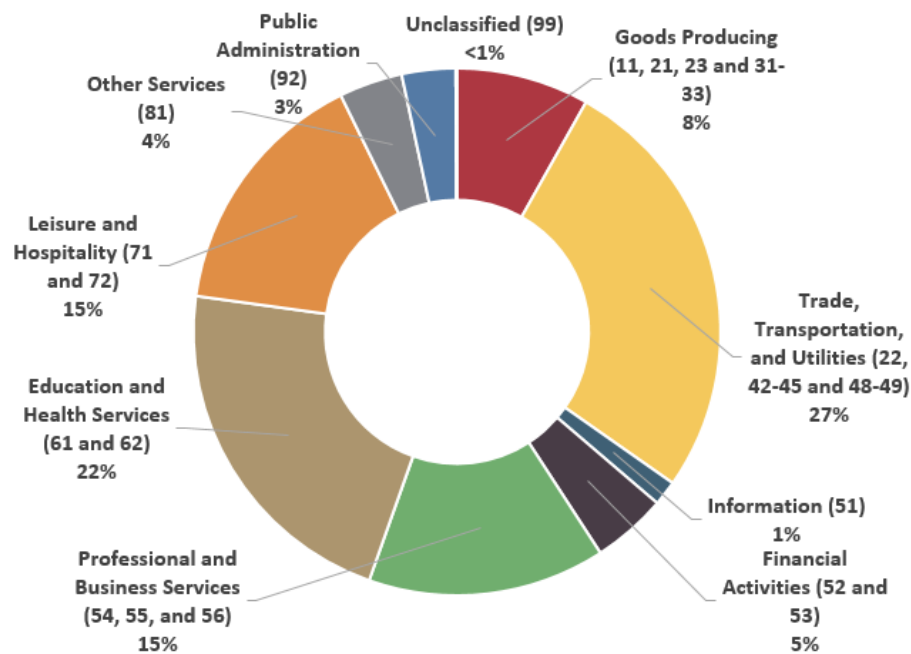
Question 3. High School Graduates and Industry of Employment

This section outlines the approach used to analyze the industry of employment and corresponding median quarterly wages for high school graduates five years after high school graduation.

Methodology

The industry of employment was determined by evaluating the North American Industry Classification System (NAICS) code reported with each wage record. NAICS codes were grouped according to standard reporting categories.²¹ The U. S. Census Bureau Stable Employment Methodology²² was used as a basis for selecting high school graduates to include in the analysis with the added requirement that they must have been employed by the same employer for the nine month period (Q1 of 2017, Q2 of 2017 and Q3 of 2017) before deriving median wage calculations for fiscal quarter 2 of 2017²³. Median wages are derived for any NAICS grouping with at least 10 high school graduates. See **Figure 4**.

Figure 4. High School Graduates, State of Maryland, 2012, Industry of Employment, Five Years after High School Graduation



²¹ The 20 NAICS codes were grouped based upon industry sector as aligned to Bureau of Labor Statistics and U.S. Statistical Agencies Office of Management and Budget (Federal), Economic Classification Policy Committee.

²² The Full-Quarter Employment (Stable) methodology is utilized by the U. S. Census Bureau to calculate average monthly earnings for individuals engaged in stable employment with the same employer. The methodology applied here derives quarterly, rather than monthly, median earnings.

https://lehd.ces.census.gov/doc/QWI_101.pdf.

²³ For the NAICS quarterly median wage calculation, some individuals had wages in the quarter from more than one employer and more than one NAICS. Only wages from the employer that covered all three quarters were used in median wage calculations.

Results

The Stable Employment with Same Employer Methodology yielded 19,915 high school graduates or 33% of all high school graduates available for analysis. This means that 72% of high school graduates with stable wages (wages for three quarters) also have stable employment with the same employer for the all three fiscal quarters; only 25% of high school graduates with stable wages changed employers at least once during this period. See **Appendix 4 and 5** for industry of employment and median quarterly wages²⁴ by educational attainment.

Five years after high school graduation, the NAICS sector with largest percentage of high school graduates with stable same-employer wages is *Wholesale and Retail* (24%), followed by *Healthcare and Social Assistance* (16%), and *Accommodation and Food Services* (13%). The median quarterly wage for all three sectors is below the living wage by \$2,500 to \$3,000. The largest sectors of stable same-employer wages for the overall high school population are also the largest sectors for high school graduates with No College (28%, 13% and 12% respectively), graduates with Some College (29%, 16% and 17% respectively), and graduates Still in College (20%, 19% and 13%). For these three groups, median quarterly wages are also below the living wage in all three sectors. The pattern also holds for high school graduates that earn associate’s degree (23%, 17% and 12%), although the median quarterly wage for those in *Healthcare and Social Assistance* are slightly above the living wage. See **Table 7**, and **Appendices 4 and 5**.

Table 7. High School Graduates, State of Maryland, 2012, Three Largest Employers by Educational Attainment and Median Wages Compared to Living Wage, Five Years after High School Graduation

Education Attainment	Wholesale and Retail		Healthcare and Social Assistance		Accommodation and Food Services	
All High School Graduates	24%	↓	16%	↓	13%	↓
No college	28%	↓	13%	↓	12%	↓
Some College	29%	↓	16%	↓	17%	↓
Still in College	20%	↓	19%	↓	13%	↓
Associate’s	23%	↓	17%	↑	12%	↓
Certificate	Public Administration		Wholesale and Retail		Healthcare and Social Assistance	
	36%	↑	21%	↔	16%	↓
Bachelor’s	Professional, Scientific, and Technical Services		Educational Services		Healthcare and Social Assistance	
	20%	↑	15%	↑	14%	↑
Other Degrees	Educational Services		Finance and Insurance		Construction	
	20%	↑	20%	↑	13%	↑

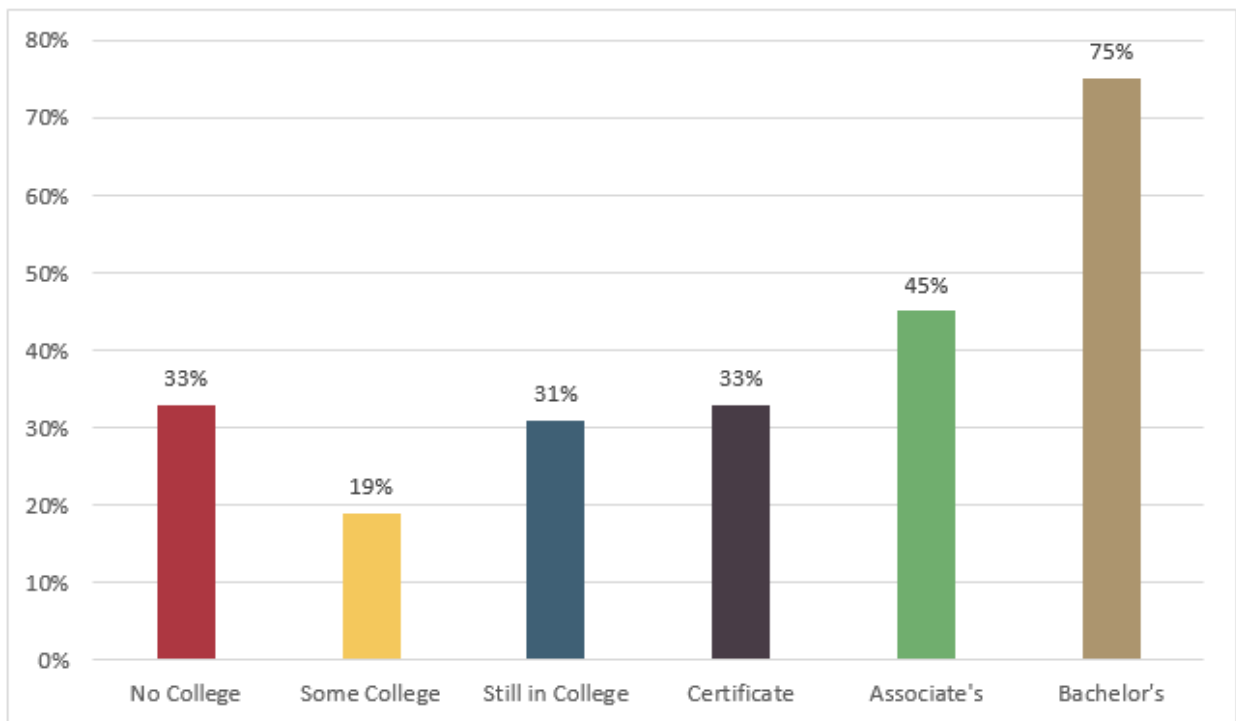
The distribution of NAICS sectors with the largest percentages of graduates with stable same-employer employment changes for high school graduates who complete Certificates, Bachelor’s and other types of postsecondary awards. Certificate graduates are employed in *Public Administration* (36%), *Wholesale*

²⁴ Wages are actual for Q2 2017 and not inflation adjusted to current day values.

and Retail (21%), and *Healthcare and Social Assistance* (16%). Bachelor's graduates are employed in *Professional, Scientific, and Technical Services* (20%), *Educational Services* (15%) and *Healthcare and Social Assistance* (14%) while graduates with Other Degrees (post-baccalaureate's or Master's) are employed in *Construction* (13%), *Finance and Insurance* (20%), and *Educational Services* (20%). The median quarterly wages are above the living wage for high school graduates with certificates, bachelor's and other degrees in these sectors with one except, certificate graduates only have median quarterly wages above the living wage in one of the three sectors: *Public Administration*, although the median quarterly wage for *Healthcare and Social Assistance* are only under the living wage by about \$100. See **Table 7**, and **Appendices 4 and 5**.

Overall, ten NAICS sectors have median wages below the living wage while ten have median wages above the living wage. See **Table 8**. This means that approximately 31% of all high school graduates with stable same-employer employment are employed in a sector with a median quarterly earnings above the living wage. The number of NAICS with median wages above the living wage varied by educational attainment level. Of the 18 NAICS with sufficient unit records²⁵ for analysis only 6 NAICS have median quarterly earnings above the living wage for high school graduates that never went to college. Conversely, of the 16 NAICS with sufficient unit records for analysis for bachelor's degree graduates, 12 or 75% have median quarterly earnings above the living wage. See **Chart 8** and **Appendices 4 and 5**.

Chart 8. High School Graduates, State of Maryland, 2012, Percentage of NAICS with Median Wages Above Living Wage, Five Years after High School Graduation by Educational Attainment



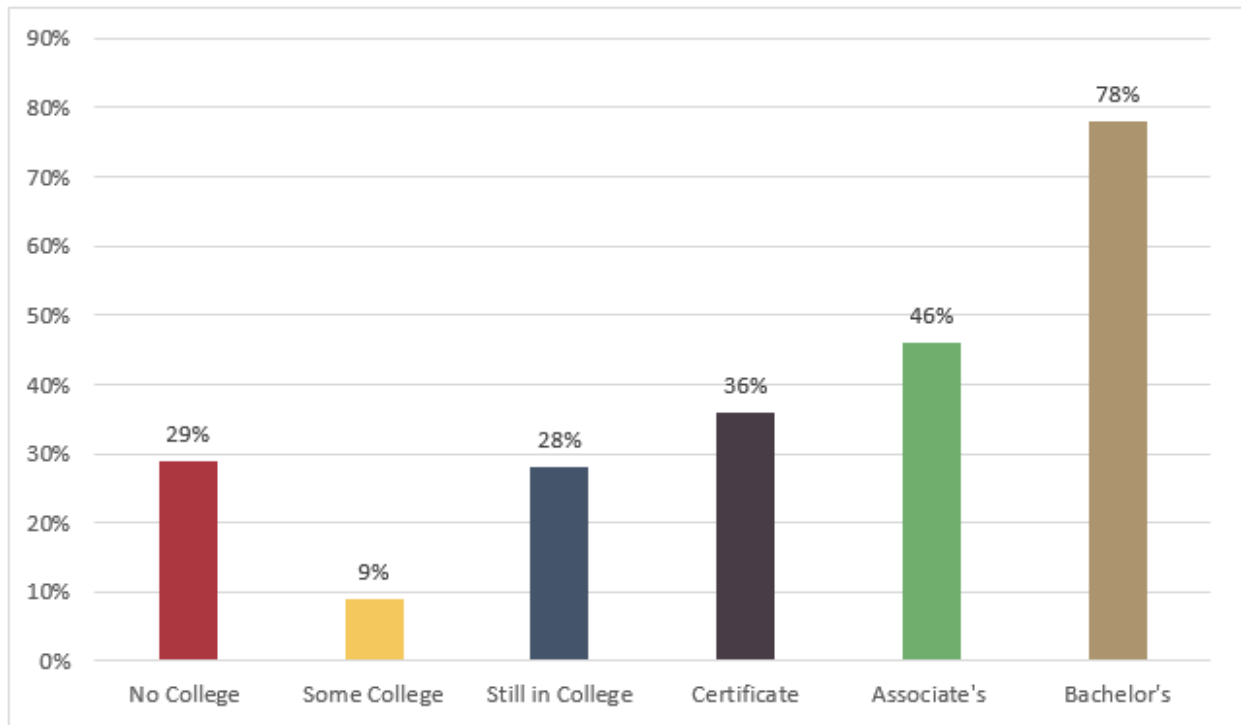
²⁵ MLDS Center does not calculate median wages when total unit records are below 10.

Table 8. High School Graduates, State of Maryland, 2012, Industry of Employment, Five Years after High School Graduation

Sector	Total		Median Q20
Goods-Producing			
Natural Resources and Mining			
Agriculture (11)	37	<1%	↓ \$6,388
Mining (21)	10	<1%	↑ \$9,072
Goods Production			
Construction (23)	990	5%	↑ \$9,397
Manufacturing (31-33)	587	3%	↑ \$9,198
Service Providing			
Trade, Transportation, and Utilities			
Utilities (22)	29	<1%	↑ \$18,140
Wholesale and Retail (42-45)	4,762	24%	↓ \$5,387
Transportation and Warehousing (48-49)	501	3%	↓ \$7,094
Information			
Information (51)	305	2%	↑ \$8,129
Financial Activities			
Finance and Insurance (52)	594	3%	↑ \$8,366
Real Estate (53)	318	2%	↑ \$8,620
Professional and Business Services			
Professional, Scientific, Technical Services (54)	1,473	7%	↑ \$9,691
Management (55)	114	1%	↓ \$7,092
Administrative, Support and Waste Management (56)	1,315	7%	↓ \$7,166
Education and Health Services			
Educational Services (61)	1,170	6%	↑ \$7,929
Health Care and Social Assistance (62)	3,165	16%	↓ \$6,556
Leisure and Hospitality			
Arts, Entertainment and Recreation (71)	442	2%	↓ \$4,765
Accommodation and Food Services (72)	2,655	13%	↓ \$4,733
Other Services			
Other Services (81)	776	4%	↓ \$5,993
Public Administration			
Public Administration (92)	657	3%	↑ \$9,144
Unclassified<1%			
Unclassified (99)	15	<1%	↓ \$7,311
Total	19,915		

The percentage of students in each NAICS with median quarterly earnings above the living wage also varies. Only 20% of all high school graduates that never went to college are employed in a NAICS with median quarterly earnings above the living wage. Conversely, 78% of all bachelor's degree graduates are employed in a NAICS with median earnings above the living wage. See **Chart 9, and Appendices 4 and 5**. Of course, not all high school graduates in a NAICS are at the median, by definition, half are above the median and half are below the median. Similarly, not all high school graduates in a NAICS with a median quarterly wage below the living wage have wages below the living wage. However, this analysis does seem to indicate that students who earn a bachelor's degree may have more opportunities to earn wages above the living wage regardless of the employment sector. Further, the small populations of certificate and associate's degree graduates limits the employment sector analysis that can be completed. Additional analysis of wage distributions are needed to more fully understand the number of students by NAICS, five years after high school graduation that are earning wages above the living wage.

Chart 9. High School Graduates, State of Maryland, 2012, Percentage of High School Graduates by Educational Attainment in NAICS with Median Wages Above Living Wage, Five Years after High School Graduation



CONCLUSIONS AND IMPLICATIONS

The Career Preparation Expansion Act, Chapter 695 of 2017 (CPEA) requires the Maryland Longitudinal Data System (MLDS) Center and the Governor’s Workforce Development Board (GWDB) to produce a report on employment for high school graduates five years after graduation. The analysis in this report demonstrates that outcomes, five years after high school graduation, vary greatly by educational attainment. The results are consistent with national data available on earnings by educational attainment level²⁶. However, the analysis must be interpreted with caution as limitations on MLDS System data result in gaps in wage data. It is impossible to speculate on how the analysis may change if complete wage data were available on all 59,510 high school graduates of 2012. The chart below summarizes the variation in wage data available for analysis:

Method	Definition	Count	Percent
Population of Interest	2012 High School Graduates	59,510	100%
Wages in Quarter 20	2012 High School Graduates with wages in Q20 or fiscal quarter 2 of 2017	32,584	55%
Full-Quarter Employment	2012 High School Graduates with wage data in Q19, Q20 and Q21 or fiscal quarter 1, 2 and 3 of 2017	27,535	46%
Full-Quarter Employment – Same Employer	2012 High School Graduates with wage data from the same employer in Q19, Q20 and Q21 or fiscal quarter 1, 2 and 3 of 2017	19,915	33%
Wage Visibility Overall	2012 High School Graduates with at least one quarter of wage data in the 5 year period.	51,493	84%
Wage Visibility – Quarter Average	The average number of 2012 High School Graduates with wage data in any one of the twenty fiscal quarters	32,720	55%

It is important to note that the analysis presented here is conducted at the early stages in this population’s career. Many individuals in this population have only been in the workforce for 1 to 3 years after college graduation. Even for high school students that do not continue to college, many may be exploring career options and training programs, including completing licensure requirements or apprenticeships, which may depress wages during the first two or three years of employment after high school. Much of the analysis is based upon what are likely to be entry level wages and therefore it is difficult to predict if the wages gaps present between educational groups will widen or narrow as this cohort progresses through their careers.

The analysis presented provides a high-level overview of the earnings outcomes for one cohort of high school graduates five years after graduation. The age of the 2012 high school graduates is approximately

²⁶ For example, Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). [Education Pays 2013: The benefits of higher education for individuals and society](#). College Board.

23 years old five years after graduation, so it is too soon to draw extensive comparisons between the earnings report here and the ACS nonfamily median quarterly earnings of \$12,038. Additional time will also provide insight into which NAICS and educational attainment groups obtain median quarterly earnings at or above those reported in the American Community Survey.²⁷ The ACS data is provided for contextual information to gauge how this cohort compares to the larger population of workers in Maryland.

Most students require six years to graduate from college with a bachelor's degree, so observing students five years after high school eliminates a large number of bachelor degree graduates that will complete college one year later. It is difficult to predict if the wage premium that appears to be associated with bachelor's degree graduates who complete in four years will be still be presented when the pool is expanded to include those who required extended time to complete a bachelor's degree. Further, the analysis also fails to account for the relationship between wages and multiple and/or stackable credentials. Some high school graduates in this population obtained multiple associate's or certificate's or obtained an associate's followed by a bachelor's during the five year period. Additional analysis is required to understand which degree "pays" when a student has multiple degrees or if there is a wage difference between graduates with an associate's and bachelor's versus a bachelor's.

It is also important to note that all wage comparisons here are made to overall State of Maryland living wage of \$7,913, something that varies greatly by region. The quarterly living wage according to the MIT Living Wage Calculator in Garrett County is \$5,467 while it is \$8,742 in Montgomery County. This wide variation may mean that median wages and median wages by NAICS, are not necessarily below the living wage when regional variation is factored into the analysis.

Finally, it is important to remember that in 2012, as this cohort was graduating from high school, the impact of the economic recession on unemployment and underemployment was still present in the economy.²⁸ The extended recovery from the recession may impact this analysis in three ways. First, it may mean that there were fewer jobs available in the early part of the analysis, thus, wage visibility may be lower due to scarcity of open positions in the job market rather than individuals employed in positions that are exempt from UI reporting. Second, it may mean that wages were lower during the first year or two of the period than in pre-recession periods, something that may curtail life-time earnings. Third, for high school graduates that did not continue to college, this group may have been competing with more experienced and/or college educated individuals for entry-level employment typically available to recent high school graduates. This may have limited the high school graduates' employment opportunities or may have required more frequent job changes to advance careers. It also

²⁷ Values reported in the ACS were \$46,978 annually in 2016 dollars which. This was divided to \$11,744 quarterly in 2016 dollars. Both values were inflation adjusted to 2017 dollars using the CPI Inflation Calculator provided by the [U. S. Department of Labor, Bureau of Labor Statistics](#).

²⁸ For example, see Abel, Jaison R. and Richard Deits (2016). Underemployment in the early careers of college graduations following the great recession. NBER Working Paper #22654.; Oreopoulos, Philip, Till von Wachter, and Andrew Heisz. (2012). The Short- and Long- Term Career Effects of Graduating in a Recession. *American Economic Journal: Applied Economics*, 4(1): 1-29.

could have been responsible for depressing wages. Additional research is required to understand both the short-term and long-term impact of the recession on the high school graduates of 2012.

Policy Consideration

First, there is a large number of high school graduates with “some college” (20,000+). This population, almost a third of the population of high school graduates, attempted college for the first one to four years after high school graduation but stopped attending at the start of year 5. This group has median quarterly wages of \$5,425, almost \$2,500 below the living wage, and, unlike high school graduates that never attended college, these high school graduates may have student loan debt. Providing some type of capstone to an otherwise incomplete college educational experience may help increase the earnings prospects for this group. Additional analysis should be conducted to determine if this group may benefit from programs like the Maryland Higher Education Commission’s Reverse Transfer initiative or the Department of Labor, Licensing and Regulation’s adult training programs.

Second, the data point to another important policy area to explore – the relationship between time to degree and working. Approximately 20% of high school graduates were still pursuing college degrees five years after high school graduation. The Still in College group has a median quarterly wage of \$5,347 or \$1,782 per month five years after high school graduation. Additional research should be conducted to determine if additional funding supports that would allow this group to focus on college and reduce the need to work may allow them to graduate sooner, with less debt, and launch into career tracks four years after high school graduation rather than five or six years.

APPENDICES

Appendix 1. High School Graduates, State of Maryland, 2012, by Educational Attainment and Quarterly Wage Visibility

This table presents the percentage of high school graduates with wages each quarter for the five year period after high school graduation. The percentages are calculated as the number of high school graduates in a given educational attainment category each quarter divided by the total high school graduates in a given educational attainment category.

Fiscal Quarter to Academic Semester Alignment				% of All High School Graduates with Wages	% of No College with Wages	% of Some College with Wages	% of Still in College with Wages	% of Certificate with Wages	% Associate's with Wages	% Bachelor's with Wages	% Other Degrees with Wages
Year 1	Q1	July to September 2012	Summer	46%	41%	47%	51%	63%	52%	45%	43%
	Q2	October to December 2012	Fall	39%	44%	44%	40%	60%	49%	17%	24%
	Q3	January to March 2013	Spring	41%	44%	46%	44%	59%	51%	21%	29%
	Q4	April to June 2013	Spring	51%	47%	53%	57%	65%	58%	43%	39%
Year 2	Q5	July to September 2013	Summer	55%	48%	57%	61%	65%	60%	50%	41%
	Q6	October to December 2013	Fall	45%	48%	53%	48%	64%	56%	20%	20%
	Q7	January to March 2014	Spring	45%	46%	52%	48%	60%	55%	22%	24%
	Q8	April to June 2014	Spring	51%	48%	56%	57%	61%	58%	37%	29%
Year 3	Q9	July to September 2014	Summer	54%	49%	59%	60%	63%	61%	41%	29%
	Q10	October to December 2014	Fall	43%	48%	51%	43%	53%	51%	17%	20%
	Q11	January to March 2015	Spring	46%	47%	54%	48%	62%	57%	21%	27%
	Q12	April to June 2015	Spring	51%	50%	58%	56%	69%	61%	33%	31%

Fiscal Quarter to Academic Semester Alignment				% of All High School Graduates with Wages	% of No College with Wages	% of Some College with Wages	% of Still in College with Wages	% of Certificate with Wages	% Associate's with Wages	% Bachelor's with Wages	% Other Degrees with Wages
Year 4	Q13	July to September 2015	Summer	55%	51%	61%	61%	71%	64%	38%	31%
	Q14	October to December 2015	Fall	49%	52%	59%	51%	69%	61%	21%	22%
	Q15	January to March 2016	Spring	49%	51%	57%	52%	65%	59%	23%	24%
	Q16	April to June 2016	Spring	52%	52%	59%	58%	67%	62%	29%	25%
Year 5	Q17	July to September 2016	Summer	56%	53%	61%	63%	67%	64%	40%	33%
	Q18	October to December 2016	Fall	53%	53%	58%	55%	68%	62%	38%	29%
	Q19	January to March 2017	Spring	53%	51%	58%	59%	69%	62%	39%	31%
	Q20	April to June 2017	Spring	55%	52%	59%	62%	70%	62%	40%	31%
			Average	49%	49%	55%	54%	64%	58%	32%	29%

Appendix 2. High School Graduates, State of Maryland, 2012, by Educational Attainment and Wage Visibility Frequency Group

This table presents the number of high school graduates by wage visibility frequency and educational attainment. Each high school graduate is evaluated for the full five year period and placed in one of the mutually exclusive wage frequency group based upon the total number of quarters that graduate has wage data. Note, this table represents total number of quarters with wage data, quarters do not necessarily represent consecutive periods of employment.

Wage Visibility	No College	Some College	Still in College	Certificate	Associate's	Bachelor's and Other	Total by Visibility
None	2,926	2,133	885	13	168	1,892	8,017
Irregular	2,132	3,352	2,523	33	182	3,586	11,808
Intermittent	2,131	3,757	2,634	20	217	2,421	11,180
Frequent	2,597	4,438	2,803	43	303	1,381	11,565
Continuous	4,332	7,098	3,874	104	548	984	16,940
Total with Wages	11,192	18,645	11,834	200	1,250	8,372	51,493

Due to small cell size, graduates in the Other Degree group were combined with the Bachelor's Degree group.

Appendix 3. High School Graduates, State of Maryland, 2012, Median Quarterly Wages by Educational Attainment, Five Years after High School Graduation

This table presents the number of high school graduates, graduates with wages in Q20 and graduates with wages in Q19, Q20 and Q21. The Stable Employment methodology reduces the graduates included in quarterly median wage calculation between 2% and 9% percentage points for each educational attainment category and increases the median quarterly wage between \$50 and \$935.

Education Level	Total	Total with Wages in Quarter 20th	% of Group with Wages in Q20	Quarter 20 Median Wage	Total with Wages in Quarters 19, 20, and 21	% of Group with Wages in Q20	Quarter 20 Median Wage	Variation in Quarterly Median
All High School Graduates	59,510	32,584	55%	\$5,277	27,535	46%	\$5,916	\$639
High School Graduates, No College	14,118	7,310	52%	\$5,394	6,251	44%	\$5,931	\$537
Some College	20,778	12,290	59%	\$4,865	10,421	50%	\$5,425	\$560
Still in College	12,719	7,895	62%	\$4,621	6,472	51%	\$5,347	\$726
Certificate	213	149	70%	\$7,810	133	62%	\$7,953	\$143
Associate's	1,418	882	62%	\$6,774	793	56%	\$7,059	\$285
Bachelor's	10,213	4,042	40%	\$8,604	3,450	34%	\$9,539	\$935
Other Degree	51	16	31%	\$12,024	15	29%	\$12,074	\$50

Appendix 4. High School Graduates, State of Maryland, 2012, Industry of Employment by Educational Attainment, Five Years after High School Graduation

This table presents the number of high school graduates with stable employment with the same employer in quarters 19, 20 and 21 after high school graduation.

Industry	Total High School Graduates	No College	Some College	Still in College	Certificate	Associate's	Bachelor's	Other
Goods-Producing	1,624							
Natural Resources and Mining	47							
Agriculture (11)	37	15	*	*	*	*	*	*
Mining (21)	10	*	*	*	*	*	*	*
Goods Production	1,577							
Construction (23)	990	450	276	143	*	34	77	*
Manufacturing (31-33)	587	181	186	119	*	*	91	*
Service Providing	18,276							
Trade, Transportation, and Utilities	5,292							
Utilities (22)	29	14	*	*	*	*	*	*
Wholesale and Retail (42-45)	4,762	1,291	2,113	883	*	140	314	*
Transportation and Warehousing (48-49)	501	177	182	89	*	*	36	*
Information	305							
Information (51)	305	51	125	60	*	*	59	*
Financial Activities	912							
Finance and Insurance (52)	594	75	219	126	*	*	150	*
Real Estate (53)	318	82	115	53	*	*	58	*
Professional and Business Services	2,902							
Professional, Scientific, Technical Services (54)	1,473	118	322	428	*	62	533	*
Management (55)	114	24	41	*	*	*	27	*
Administrative, Support and Waste Management (56)	1,315	362	422	275	*	*	217	*

Industry	Total High School Graduates	No College	Some College	Still in College	Certificate	Associate's	Bachelor's	Other
Education and Health Services	4,335							
Educational Services (61)	1,170	116	202	429	*	*	398	*
Health Care and Social Assistance (62)	3,165	573	1,206	874	*	103	392	*
Leisure and Hospitality	3,097							
Arts, Entertainment and Recreation (71)	442	70	193	102	*	*	68	*
Accommodation and Food Services (72)	2,655	562	1,272	595	*	76	140	*
Other Services	776							
Other Services (81)	776	232	293	151	*	*	71	*
Public Administration	657							
Public Administration (92)	657	133	211	143	*	47	87	*
Unknown	15							
Unclassified	15							
Unclassified (99)	15	*	*	*	*	*	*	*

Appendix 5. High School Graduates, State of Maryland, 2012, Median Quarterly Earnings in Industry of Employment by Educational Attainment, Five Years after High School Graduation

This table presents the median quarterly wages for high school graduates with same-employer stable employment for each educational attainment grouping. Quarterly median wages above the living wage are denoted with an ^.

Industry	Total High School Graduates Median Wages	No College Median Wages	Some College Median Wages	Still in College Median Wages	Certificate Median Wages	Associate's Median Wages	Bachelor's Median Wages	Other Median Wages
Goods-Producing								
Natural Resources and Mining								
Agriculture (11)	\$6,388	\$6,998	**	**	**	**	**	**
Mining (21)	\$8,905^	\$9,072	**	**	**	**	**	**
Goods Production								
Construction (23)	\$9,397^	\$9,791^	\$8,403^	\$17,325^	**	\$8,591^	\$12,250^	**
Manufacturing (31-33)	\$9,198^	\$8,329^	\$8,253^	\$8,642^	**	**	\$13,848^	**
Service Providing								
Trade, Transportation, and Utilities								
Utilities (22)	\$18,140^	\$16,203^	**	**	**	**	**	**
Wholesale and Retail (42-45)	\$5,387	\$5,828	\$5,305	\$4,341	\$5,841	\$6,345	\$7,221	**
Transportation and Warehousing (48-49)	\$7,094	\$7,418	\$6,623	\$7,053	**	\$7,296	\$8,597^	**
Information								
Information (51)	\$8,129^	\$8,075^	\$7,765	\$6,730	**	**	\$9,333^	**
Financial Activities								
Finance and Insurance (52)	\$8,366^	\$7,410	\$7,639	\$7,756	**	\$7,336	\$11,489^	**
Real Estate (53)	\$8,620^	\$9,413^	\$7,285	\$7,650	**	**	\$10,500^	**

**median not provided on NAICS with fewer than 10 high school graduates in a given category.

^value is above living wage in the State of Maryland.

Industry	Total High School Graduates Median Wages	No College Median Wages	Some College Median Wages	Still in College Median Wages	Certificate Median Wages	Associate's Median Wages	Bachelor's Median Wages	Other Median Wages
Professional and Business Services								
Professional, Scientific, Technical Services (54)	\$9,691^	\$7,539	\$7,190	\$9,401^	**	\$8,229^	\$12,648^	**
Management (55)	\$7,092	\$7,137	\$6,302	\$5,742	**	**	\$9,934^	**
Administrative, Support and Waste Management (56)	\$7,166	\$6,570	\$6,663	\$6,371	**	\$8,876^	\$9,585^	**
Education and Health Services								
Educational Services (61)	\$7,929^	\$5,570	\$4,811	\$8,440^	**	\$7,360	\$11,569^	**
Health Care and Social Assistance (62)	\$6,556	\$6,151	\$6,185	\$6,387	\$7,811	\$8,085^	\$9,173^	**
Leisure and Hospitality								
Arts, Entertainment and Recreation (71)	\$4,765	\$5,470	\$4,608	\$4,090	**	**	\$5,787	**
Accommodation and Food Services (72)	\$4,733	\$4,587	\$4,856	\$4,431	**	\$4,986	\$5,657	**
Other Services								
Other Services (81)	\$5,993	\$6,587	\$5,562	\$5,315	**	\$6,911	\$6,845	**
Public Administration								
Public Administration (92)	\$9,144^	\$9,199^	\$8,646^	\$8,257^	\$14,539^	\$11,088^	\$8,826^	**
Unknown								
Unclassified								
Unclassified (99)	\$7,371	**	**	**	**	**	**	**

**median not provided on NAICS with fewer than 10 high school graduates in a given category.

^value is above living wage in the State of Maryland

Appendix 6. Educational Attainment Methodology

Educational attainment has the following important implications for workforce outcomes. First, research suggests that employment outcomes and wages may vary by level of educational attainment²⁹. Second, high school graduates enrolled in college may be employed in part-time entry-level minimum-wage positions so they can prioritize college; comparatively high school graduates that did not enroll in college may have been available to enter the workforce in full-time career-track employment. Finally, the time to degree widely varies based upon the type the postsecondary degree. Certificate's, Associate's and Bachelor's degree programs are designed to require one, two or four years of full-time study respectively. The length of each program impacts the amount of time graduates may have been in the workforce after earning their college degree. For example, Certificate graduates may enter the workforce three years earlier than Bachelor's degree graduates, while Associate's graduates may enter the workforce two years earlier than Bachelor's degree graduates.

Accordingly, separating the population of interest into groups by educational attainment helps identify wages differences that may occur when using a common point in time (five years after high school graduation) as a measure for a population who has had different amounts of time in the workforce. These distinctions in educational attainment should not be interpreted as college graduation rates as this report does not provide the starting number of students entering each educational attainment category, only the number of students who obtained each degree, are still enrolled in college or stop attending college without graduating. Reporting on time to degree and college completion rates is outside the scope of this report.

For this report, the following seven educational groups were created See **Figure 1** and **Table 1** for distributions. Education attainment definitions:

1. **High School Graduates:** High school graduates without an in-state or out-of-state college enrollment record by the end of spring term 2017.
2. **Some College:** High school graduates enrolled for at least one term between fall 2012 and fall 2016 but who did not earn a postsecondary degree and are not actively enrolled in college in the spring 2017 or fall 2017 terms.
3. **Still in College:** High school graduates enrolled in college in-state or out-of-state in the spring 2017 and/or fall 2017 terms. These graduates may have earned a postsecondary degree by the end of the fall 2016 term; however, they are still actively pursuing additional postsecondary education.

²⁹For example, see:

Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). Education Pays 2013: The benefits of higher education for individuals and society. College Board.

Hout, Michael. (2012). Social and economic returns to college education in the United States. *Annual Review of Sociology*. 38: 379-400.

Kane, T.J. and Rouse, C. E. (1995). Labor market returns to two-year and four-year college. *The American Economic Review*, 85(3): 600-614

Thomas, Scott L. and Liang Zhang. (2005). Post-baccalaureate wage growth within 4 years of graduation: The effects of college quality and college major. *Research in Higher Education*. Volume 46. 4: 437-459.

4. **Certificate Graduates:** High school graduates who earned a postsecondary certificate by the end of the fall term 2016 and are not enrolled in college in the spring 2017 or fall 2017 terms.
5. **Associate's Graduates:** High school graduates who earned a postsecondary associate's degree by the end of the fall term 2016 and are not enrolled in college in the spring 2017 and/or fall 2017 terms.
6. **Bachelor's Graduates:** High school graduates who earned a postsecondary bachelor's degree by the end of the fall term 2016 and are not enrolled in college in the spring 2017 and/or fall 2017 terms.
7. **Other Degree Attainment:** High school graduates who earned a post-baccalaureate degree or a graduate degree by the end of fall 2016 term and are not enrolled in college in the spring 2017 or fall 2017 terms.

Note, some high school graduates received more than one degree during the five year period. Each graduate is counted only once, based upon highest degree attained. For example, if a high school graduate earned an Associate's degree and then earned a Bachelor's degree, the high school graduate is counted in the Bachelor's category. Other high school graduates earned a degree but were still progressing toward an additional degree, therefore some high school graduates in the Still in College category have already earned a degree.

The 20th quarter after high school graduation aligns with the postsecondary spring term which would end in May or June of 2017; however, assignment to an educational attainment category is made as of each student's status in fall 2016 (December 2016 or quarter 18 post-high school graduation). The decision to use this term for placement into an educational attainment category was made to allow students in each category time to transition from college to workforce and thus provide a more accurate picture of wages and industry of employment after college.