

Jobs of the Future

A Report Prepared by
Pennsylvania Economy League of Southwestern Pennsylvania

For distribution at
Allegheny Conference for Community Development Annual Meeting
November 9, 2005

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Introduction

Headlines about company closings, manufacturing and service jobs going offshore, and a slow economic recovery have been too common in southwestern Pennsylvania and in other regions of the country. But as the national economy begins to grow again, the economic development efforts of the past several years will enable southwestern Pennsylvania to grow new jobs and new companies.

However, as we look toward the future, it is increasingly clear that talent will be a key driver in economic competitiveness. The region will only succeed if it can provide a workforce of sufficient size and the right skills to satisfy the needs of existing, expanding, newly attracted and start-up businesses.

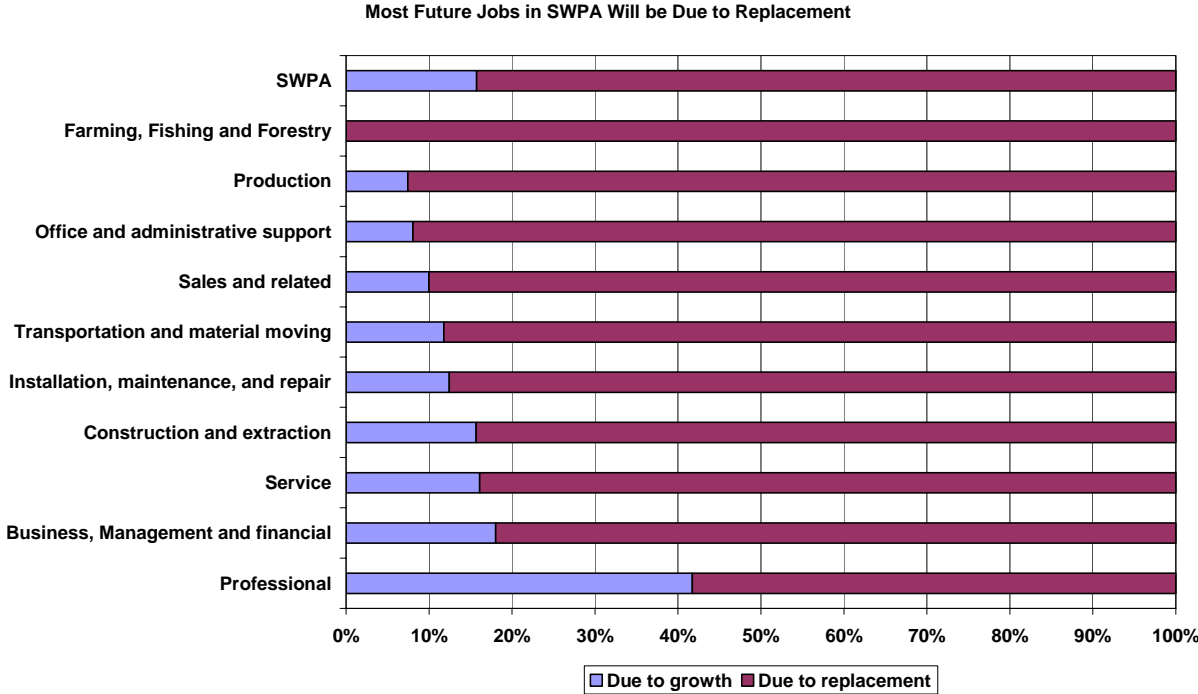
Meeting this objective requires that we have an understanding of what the jobs of the future will require and whether southwestern Pennsylvania's workforce will be able to meet those requirements. This report summarizes work done by the Pennsylvania Economy League of Southwestern Pennsylvania to answer the questions:

1. Is southwestern Pennsylvania's workforce competitive for the jobs of the future?
2. If not, what can be done to improve our competitiveness?

No one knows for sure which businesses will grow by how much, particularly in a volatile global economy. One of the challenges of economic development is to identify those sectors that can capitalize on the region's unique strengths and whose occupations provide good-paying jobs. The Allegheny Conference is focusing on the strength and convergence in three sectors – advanced materials, life sciences, and information technology – as drivers for the region's economic future. This report pays particular attention to these three sectors. We believe that the active efforts under way to attract, retain and create companies in the region will help these target sectors to grow. The purpose of this research is to help determine what the region needs to do, if anything, in order to insure that the companies in these sectors will find an adequate workforce if they locate and/or expand here.

The Majority of Job Openings for Many Years Will Be Replacement Jobs

Many analyses of the jobs of the future focus on how many “new” jobs will be created, i.e., jobs that did not exist before. From a job seeker’s point of view, this emphasis on the percentage growth of occupations is misleading since it fails to take into account *replacement* jobs, i.e., openings that occur due to turnover and retirements. The projections developed by the state’s Center for Workforce Information and Analysis (CWIA) demonstrate the importance of looking at all future job openings, not just jobs resulting from growth. The CWIA estimates that on average, nearly eighty-five percent of the future openings in the region will be due to replacement. Production occupations (92.56%), architecture and engineering occupations (92.01%), office and administrative support occupations (91.94%), and sales and related occupations (90.01%) have the highest proportion of openings due to replacement. Even in professional occupations, which have the highest percentage of vacancies due to growth, over half (53%) of the vacancies are due to replacement. Even if there were no net job growth in southwestern Pennsylvania over the next five years, there are projected to be 16,740 job openings in existing jobs (3,348 a year) due solely to retirements, promotions, etc.



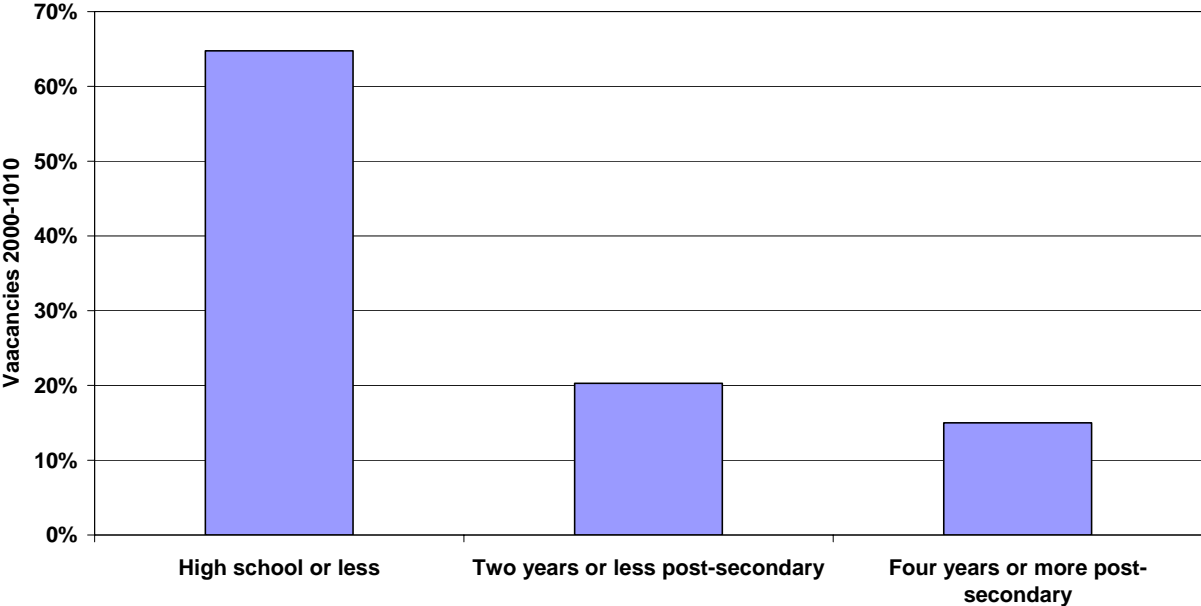
More Than 80% of the Job Openings Will Require Only a High School Diploma or a Two-Year Degree

What level of preparation is required for the anticipated regional job openings? Each occupation was assigned to one of five “Job Zones” as defined by the Department of Labor’s Occupational Information Network (O-Net). A Job Zone is a group of occupations that are similar in these ways: how most people get into the work, how much overall experience people need to do the work, how much education people need to do the work, and how much on-the-job training people need to do the work. For this analysis, we have collapsed the five zones into three categories as follows:

- Category 1 – High school degree or less (job zones 1 and 2)
- Category 2 – Two-years or less post-secondary education (job zone 3)
- Category 3 – Four years or more post-secondary education (job zones 4 and 5)

Based on the O-Net categorization, between 2000 and 2010 the majority of projected vacancies – 64.74% -- require only a high school degree or less.

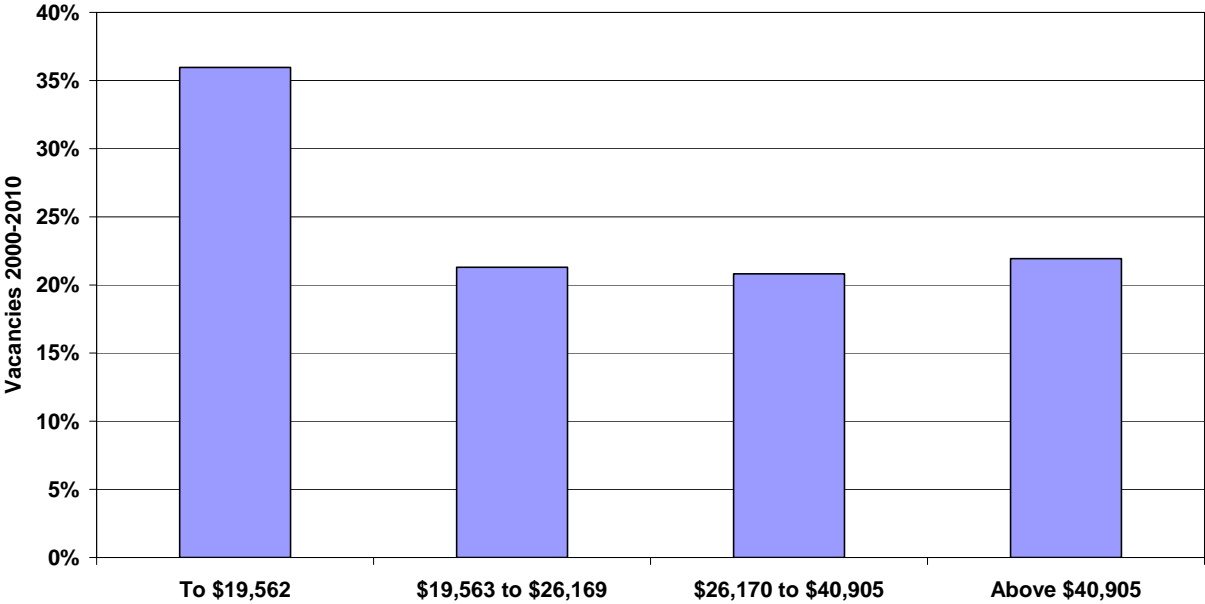
The Majority of Vacancies Require a HS Degree or Less



Pay Rates of Job Openings Will Vary Widely

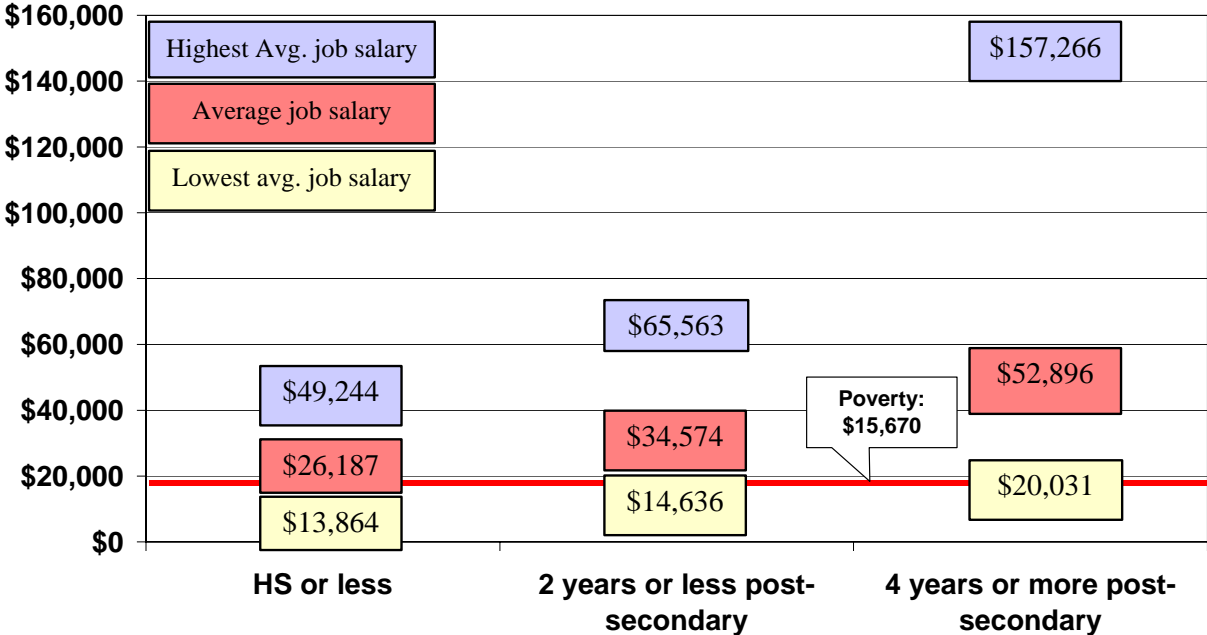
It is not enough to have jobs – we need jobs that enable a worker to sustain a family. The health and vitality of the region is increased to the degree that as many of its residents as possible can obtain good quality jobs. To obtain a picture of how well the jobs of the future will pay we used the average salaries for each of the region’s occupations weighted by the number of people in each occupation to identify the overall distribution of wages. We then determined the number of vacancies that are projected to occur between 2000 and 2010 in each quartile. The results show that over one-third of the vacancies involve jobs paying \$19,562 a year or less. However, the majority of jobs will pay over \$20,000, with the remaining vacancies fairly evenly distributed between jobs paying \$19,563 to \$26,169, jobs paying \$26,170 to \$40,905, and jobs paying above \$40,905. To put the salaries in perspective, the poverty level for a family of three living in Allegheny County is \$15,670.

Pay Rates of Vacancies Vary Widely



There Is a Return to Education, But Having a College Degree Does Not Guarantee You a High-Paying Job

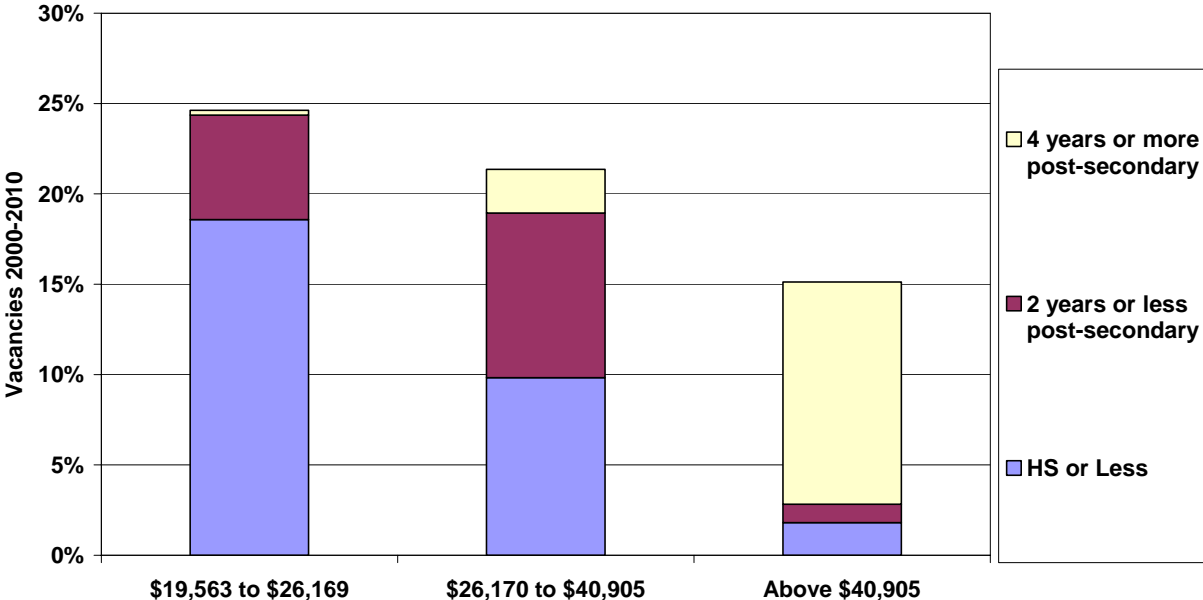
Numerous studies have shown a strong correlation between education and income. But correlations can be misleading. An analysis of the average salaries for occupations requiring different levels of education shows you can work in an occupation requiring a college degree and earn less than someone who works in an occupation requiring a high school degree. It is the occupation that makes the difference, not the degree per se.



You Can get a Good-Paying Job Without a 4-Year Degree, Although Most of the Best-Paying Jobs Do Require a 4-Year Degree

Eighteen percent of the projected vacancies that require a high school degree or less (11.63% of the total vacancies) pay an average salary over \$26,170. Half of the vacancies requiring two years or less of post-secondary preparation (10.13% of the total vacancies) are in this pay range.

Many Good-Paying Jobs Do Not Require a 4-Year College Degree



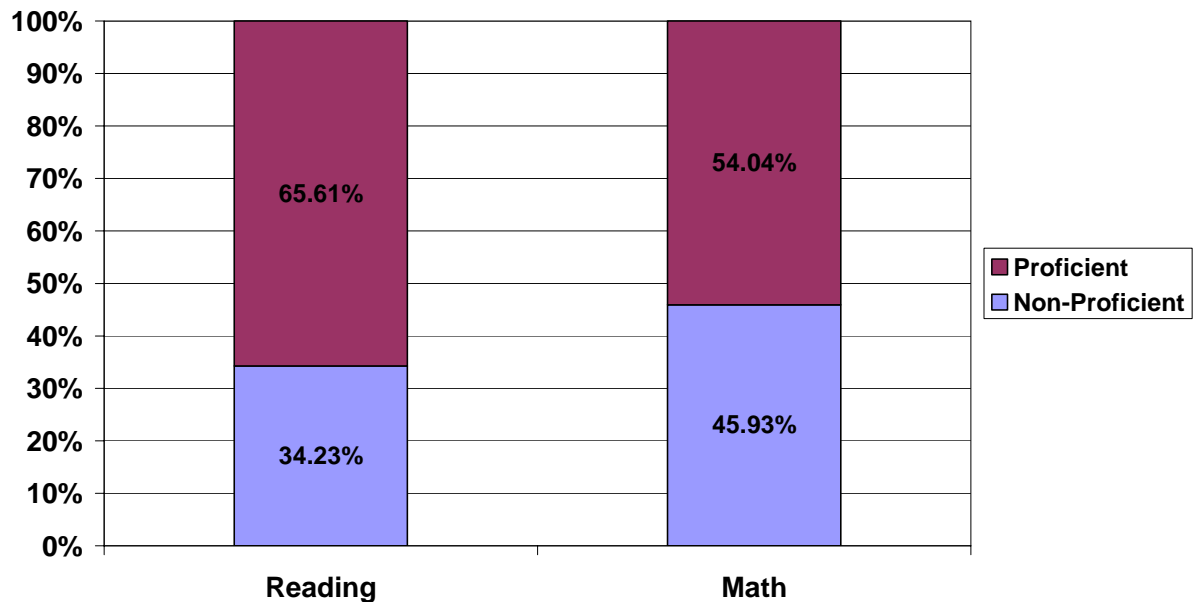
Many Jobs Requiring Less Education Still Require High Skill

It would be a mistake to presume that jobs that require on-the-job training as opposed to formal education are necessarily low-skill jobs. In a global economy, a company’s success is defined by quality and productivity, which are dependent on the skills of the workforce. National and international research has shown that the steps that employers have taken to compete in a global economy (e.g., adoption of technology, process improvement) require skilled workers to achieve the desired productivity improvements. The good-paying jobs that require two years of post-secondary preparation or less do require workers to have skills. The National Association of Manufacturers reports that 60 percent of manufacturers are having difficulty maintaining the production levels necessary to meet demand, and 40 percent say they cannot implement new productivity improvements because they cannot find skilled workers. While lack of technical skills are a concern, more important are lack of basic employability skills (attendance, timelines, work ethic, etc.) and poor reading, writing, math, and communications skills. This is one reason that employers are increasingly relying on a variety of tools to assess an applicant’s skills as part of the recruiting and screening process. Interviews with regional employers reinforce these findings. They report that only 10% to 20% of applicants pass pre-employment screening. Drug and alcohol abuse appear to be a significant factor.

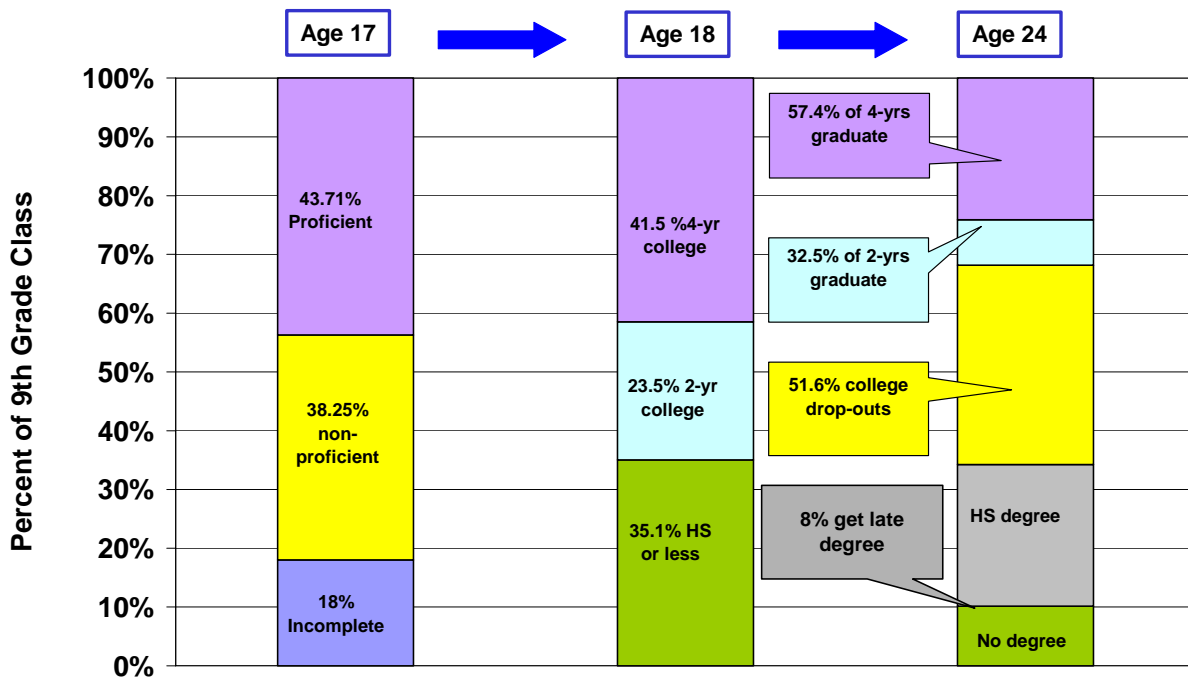
We Need to Pay Attention to the Future

While the workforce in SW PA is currently sufficiently prepared/skilled to provide a competitive advantage, it is becoming less so. Over one-half of the region's 11th graders are not proficient in math, and over one-third of them are not proficient in reading. In addition, 18% of the region's ninth-grade cohort does not graduate from high school. If we assume that the non-graduates are non-proficient, almost two-thirds of the 18-year olds may be non-proficient in basic skills.

Over One-Third of SWPA's 11th Graders Are Not Proficient

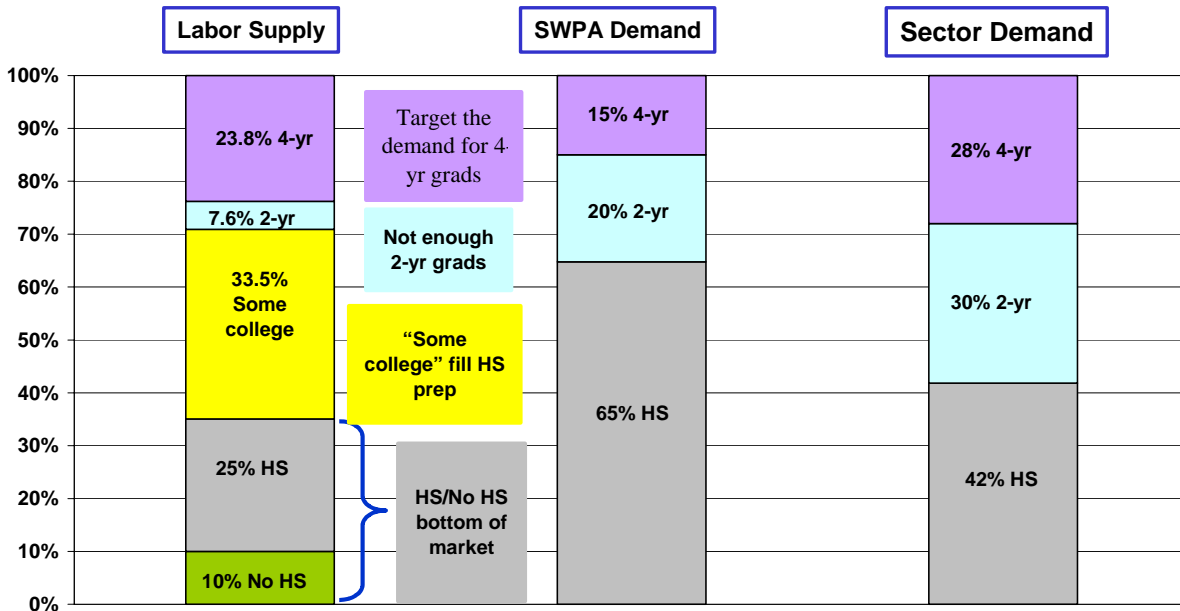


From 2001 to 2004, over three-quarters of the high-school graduates in the region intended to go to college – 50% to four-year schools and almost 30% to two-year schools. But looking at the colleges and universities in western Pennsylvania, only 57.4% of the students have graduated from four-year schools six years after enrolling (the national rate is between 54% and 58%, with the variation based on the use of institutional or individual reports), and less than a third of those enrolled in two-year schools have graduated three years after enrolling. In other words, over half of the students entering a two- or four-year college after graduating from high school will not graduate from college.



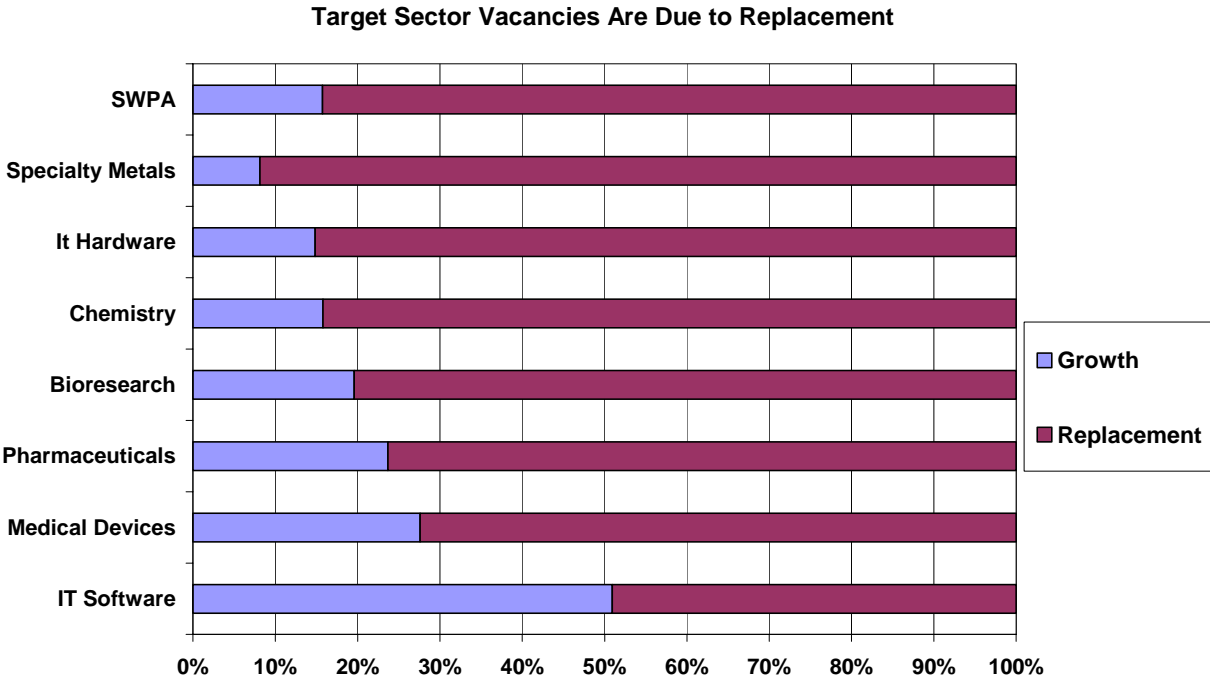
Using these high school graduation and college entrance and graduation rates, we can project that each cohort of children will have the following education characteristics in the labor market at the age of 24: 23.8 % will have four-year college degrees, 7.6% will have two-year postsecondary degrees, 33.5% will have some college, 25% will have a high school degree but probably not be proficient in basic skills, and 10% will have no high school degree. These numbers raise serious questions about the region’s potential to compete in the future. They suggest that: (1) there will be jobs for people with only a high school degree, but high school graduates may not be sufficiently proficient to qualify for or succeed in those jobs; (2) there will be jobs for people with 2-year degrees, but not enough graduates of 2-year programs; and (3) many who go to college will not finish or will have difficulty finding a job that requires a college degree.

Current Trends Are Inefficient



Replacement Jobs Dominate Openings in the Target Sectors

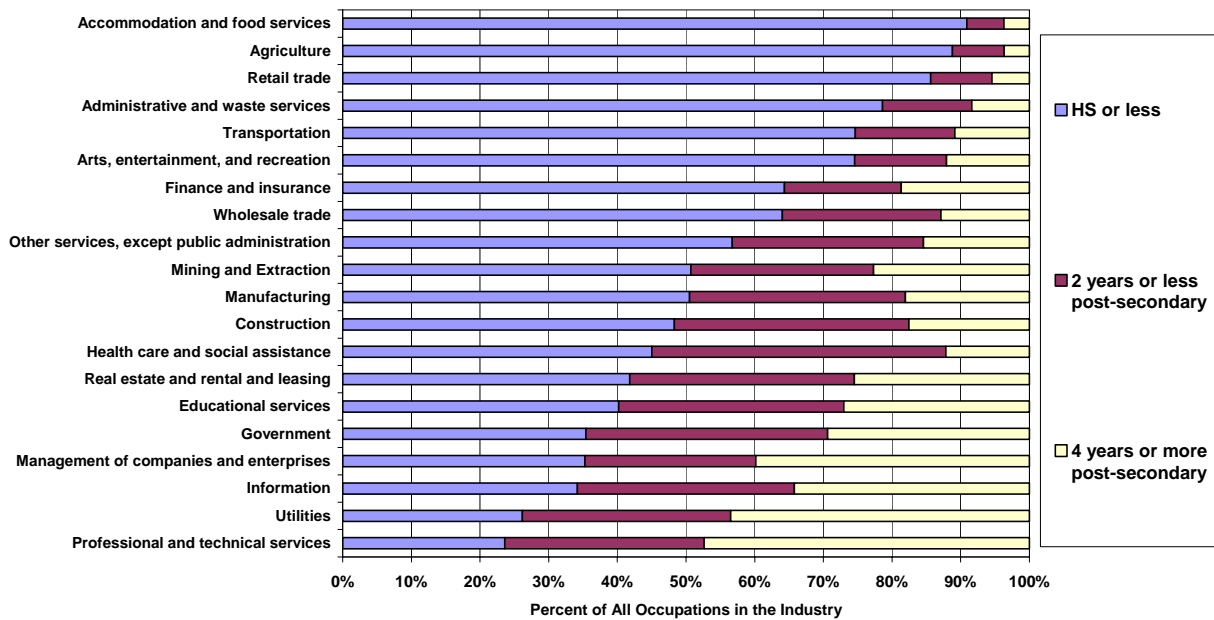
An analysis of the projected vacancies in the target sectors – advanced materials, life sciences, and information technology -- shows that like southwestern Pennsylvania as a whole, replacement jobs are the primary source of projected openings.



The Preparation Required for Jobs Varies Across Industries

The distribution of occupations (staffing profile) varies across industry sectors. A review of the national staffing profiles of different industry sectors reveals that some sectors (e.g., agriculture, accommodation and food services) are dominated by jobs requiring little preparation, other sectors (e.g., healthcare, construction) have a higher percentage of jobs requiring two years of post-secondary education, and a few (e.g., professional and technical services) have a larger percentage of positions requiring four years or more of post-secondary education. Importantly, there is no sector in which the majority of jobs require four years or more of post-secondary preparation.

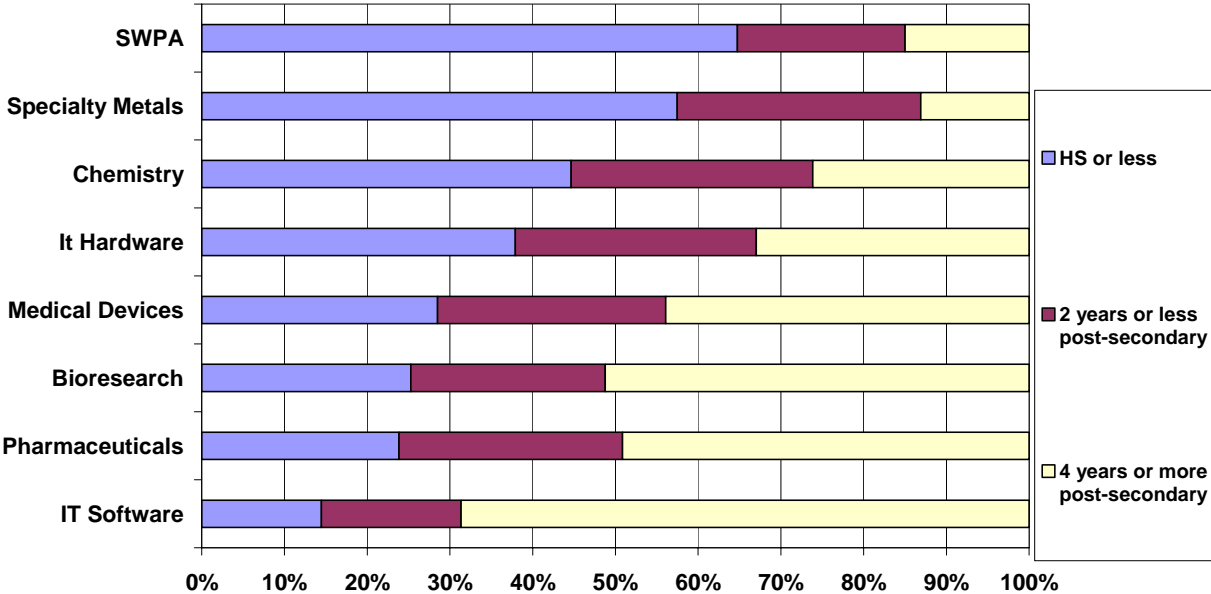
Type of Preparation Required Across Industries



Target Sector Jobs Require More Preparation Than the Average SWPA Job Opening

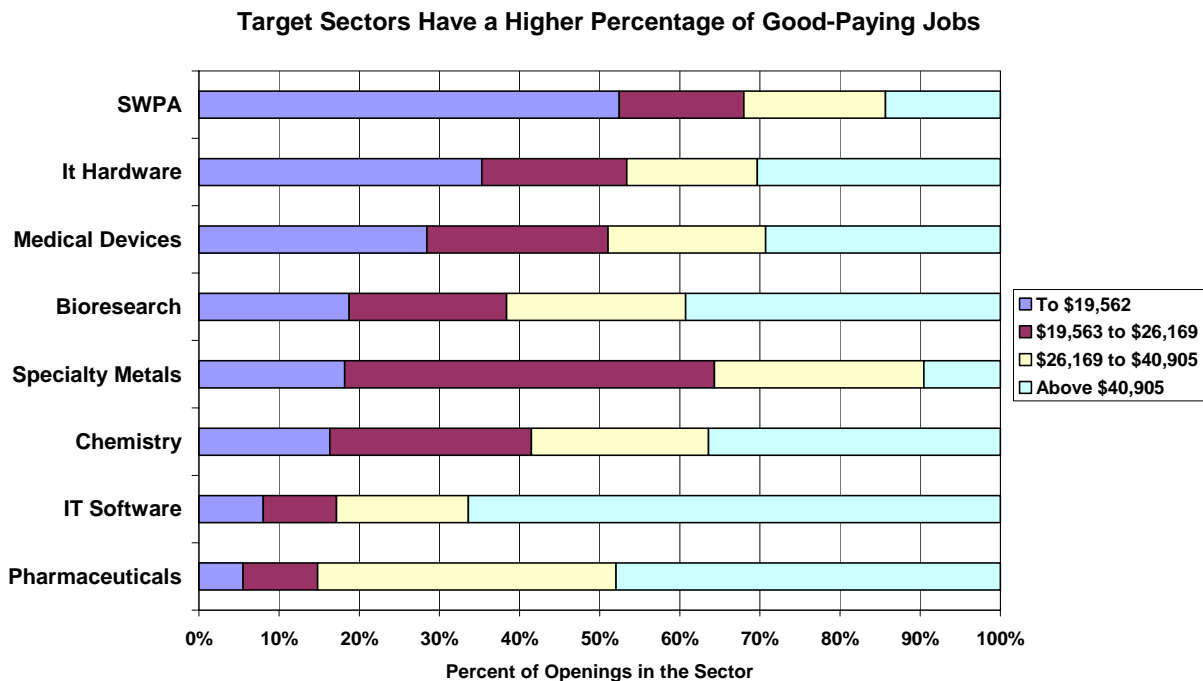
A review of the projected vacancies in the Conference’s target sectors shows that on a percentage basis, their openings require higher levels of preparation than the region as a whole.

Target Sectors Jobs Require More Preparation Than the Average SWPA Vacancy



The Target Sectors Have a Higher Percentage of Good-Paying Jobs

When we look at the compensation provided by the projected vacancies in the target sectors, we find that on a percentage basis, their openings pay more than the average job in the region as a whole. In terms of compensation, the jobs of the future in the target sectors are good-paying jobs relative to the region as a whole.



The Target Sectors Will Provide Jobs Accessible to Workers At All Education Levels

It has become common to argue that we must link economic and workforce development. One of the signs that that link has been established is that the companies that we are trying to start, expand, retain, or locate in the region will provide jobs that are accessible to the local workforce with the education and training that they have. The data show that of the population in southwestern Pennsylvania 24 years of age or older, 54.6% have a high school degree or less, 22.9% have two years or less of post-secondary education, and 22.5% have four years or more of post-secondary education. It appears the population as a whole is fairly well aligned to the preparation requirements of the employers in the region. Companies in the target sectors will be accessible to the local workforce with the education/training they have or with some remediation in basic skills, although companies in specific sub-sectors may offer disproportionately more jobs to higher skilled workers.

Companies in the Target Sectors Will Hire From the Region and Attract Newcomers to SWPA

Research on labor mobility and interviews with employers in the target sectors indicates that companies in the target sectors recruit talent from two distinct markets.

Candidates for professional and managerial positions tend to be part of a national or even international labor market. Large employers in particular are likely to cast as wide a net as possible to find top talent. A portion of the regional employers participating in the national/international competition for professional and managerial talent report having difficulty attracting this talent to SWPA. Attracting and retaining young, diverse talent appears to be especially challenging.

Small and mid-sized employers don't always have the resources to recruit nationally for top positions. Being in an area that has advanced education grads nearby may be an advantage for them, but the employers' connection to local colleges is often weak or non-existent. Moreover, their hiring needs tend not to be as predictable as large employers and do not necessarily coincide with the recruiting season of local schools.

In contrast, jobs requiring high school or technical degrees are filled primarily from the local labor market. Individuals in these positions are less likely to move for a job and more likely to have ties to the region. So if an employer cannot find an adequate number of job applicants with high school or technical degrees locally, it is likely to impede the employer's operations. Building a solid core of this technical labor is critical to any region's efforts to sustain and grow an industry cluster.

Elements of a Regional Workforce Strategy for Growth in Target Sectors

In order to succeed in growing the target sectors, the region will need to provide a skilled workforce of sufficient size to satisfy the needs of existing, expanding, newly attracted, and start-up businesses. The analysis of projected vacancies, combined with the finding that employers recruit from two different labor markets, suggests the first two objectives of a regional workforce strategy for growth in the target sectors. The third objective emerges from the recognition that continuing technological advances and the emphasis on innovation as an economic driver will continue to raise the bar on required skills. Therefore, three key objectives of a regional workforce strategy should be:

1. Ensure there are a sufficient number of skilled workers in the local labor market who are able to fill jobs requiring high school proficiencies and two years or less of post-secondary preparation
2. Compete successfully in the national/international labor market for professional and managerial workers
3. Continually re-train workers to keep pace with the changing economy

Objective 1. Ensure young people in the local labor market have adequate skills

The high percentage of high school graduates lacking proficiency in basic reading and math skills is a barrier to achieving the first objective. Continued support of the Conference's "Proficiency by 10" goal will help to address this barrier.

This foundation is necessary but not sufficient to ensure proficiency at the high school level and success in the workplace. There are national and state efforts underway to redesign our high schools. We should look to those efforts for regional application. Particular attention should be given to efforts that incorporate basic employability skills (workplace readiness) with academic proficiency, and that use applied learning to promote interest in science, technology, engineering, and math.

The value of post-secondary education as an investment in the future depends upon the degree to which the education and training received prepares an individual to take advantage of opportunities in the labor market. A four-year degree is not necessarily of more value than a two-year degree, particularly given its added cost, if it does not lead to a good-paying job. Our analysis suggests that southwestern Pennsylvania is not producing a sufficient number of young people with two years of postsecondary preparation, and that many who go to college will not finish or will have difficulty finding a job that requires the college degree. The research suggests that this is due in part to a lack of awareness of the labor market opportunities and/or a bias against jobs requiring less than a four-year degree. The design and implementation of career literacy programs that better explain the career opportunities in the target sectors to middle and high school students can help improve career awareness.

Objective 2. Compete successfully to attract talent

Jobs, amenities, and culture are the three factors most often cited as affecting a region's ability to attract and retain young talent. Perceived lack of jobs, a negative image of the region, and a lack of diversity contribute to the difficulty some southwestern Pennsylvania employers have in attracting and retaining young professional talent to the region. The region has developed several initiatives to make southwestern Pennsylvania a place where young or "prime-age" individuals (ages 22-45) wish to locate during the first two decades of their working lives. A variety of programs exist to communicate to skilled workers inside and outside the region the opportunities that exist here and engage them in the regional economy and community.

Small and mid-sized employers confront a special challenge in attracting and retaining professional and managerial talent. They do not have the volume of hires or resources needed to justify recruiting at regional college campuses or the brand recognition of a large employer. As a consequence, graduates are often unaware of the opportunities that might be available in these firms. We can learn from Boston, which has instituted an annual "Hub crawl" in which students from local colleges and universities are taken on tours of local life science companies. A similar event could be undertaken in southwestern Pennsylvania's target sectors. Other initiatives such as the Regional Internship Center that connect students to local employers can also contribute to achieving this objective.

Objective 3. Re-train the current workforce

Objective 1 focuses on improving the pipeline of future talent. Objective 2 places a premium on the developing relationship with professional and managerial talent pools. Objective 3 focuses on the existing workforce. It starts with the recognition that all firms must innovate to stay competitive in a global economy. Innovation, whether in new products, improved quality, or improved productivity, is dependent on the skills of the workforce. Services that identify and develop the skills employees need to achieve a company's business objectives are an essential element of a regional workforce strategy. Such services may focus on technical and production employees, managerial and professional employees, or service all levels of workers. These types of programs -- often with support provided through state incumbent worker training programs -- help ensure employees in target sector firms have the skills to compete.

The second component to re-skill the current workforce emphasizes the advancement of the workforce. It recognizes that individuals who leave school with low levels of (formal) educational attainment and poor basic skills are at a higher risk of experiencing social exclusion as adults. The first objective aims to address this problem at its core; this component aims to help those already in the workforce to pursue the best possible opportunity. This is exemplified by sector-focused initiatives that train individuals for difficult-to-fill jobs in target sectors, and/or help individuals advance within career tracks in a sector.

Appendix: Data and Analysis Notes

This appendix provides information on the data and analysis that was used to produce the primary graphs displayed in the report.

Graph 1. The Majority of Job Openings for Many Years Will Be Replacement Jobs. The data behind this graphic comes from the Center For Workforce Information and Analysis (CWIA) 2000-2010 occupational projections. The CWIA projections include estimates of total vacancies, openings due to growth, and openings due to replacement. The data reported here are aggregated from the five WIB areas in southwestern Pennsylvania: Three Rivers, Tri-County, Southwest Corner, West Central, and Westmoreland-Fayette.

Graph 2. More Than 80% of the Job Openings Will Require Only a High School Diploma or a Two-Year Degree. The U.S. Department of Labor's Occupational Information Network (O-Net) assigns occupations to one of five "Job Zones." A Job Zone is a group of occupations that are similar in these ways: how most people get into the work, how much overall experience people need to do the work, how much education people need to do the work, and how much on-the-job training people need to do the work. For this analysis, we have collapsed the five zones into three categories as follows:

- Category 1 – High school degree or less (job zones 1 and 2)
- Category 2 – Two-years or less post-secondary education (job zone 3)
- Category 3 – Four years or more post-secondary education (job zones 4 and 5)

The graphic represents a sum of the total vacancies in each of these three categories as reported in the CWIA 2000-2010 occupational projections.

Graph 3. Pay Rates of Job Openings Will Vary Widely. The salary data is based on the 2002 occupational average salaries reported by CWIA. The data are aggregated from the five WIB areas in southwestern Pennsylvania. We weighted the average salaries for each by the number of people in each occupation to identify the quartiles for the overall distribution of wages in southwestern Pennsylvania. We then determined the number of vacancies that are projected to occur between 2000 and 2010 in each quartile.

Graph 4. There Is a Return to Education, But Having a College Degree Does Not Guarantee You a High-Paying Job. Occupations were sorted into the three preparation categories based on their O-Net scores. The regional average salary for each occupation was used to determine the low, average, and high salary for each preparation category.

Graph 5. You Can Get a Good-Paying Job Without a 4-Year Degree, Although Most of the Best Paying Jobs Do Require a 4-Year Degree. Occupations were sorted into the three preparation categories based on their O-Net scores. The regional average salary for each occupation was used to determine the salary quartile in which each occupation fell. We then determined the number of vacancies that are projected to occur between 2000 and 2010 in each quartile for each level or preparation.

Graph 6. Over one-Third of SWPA's 11th Graders are Not Proficient. The data used in this chart comes from the PSSA test results reported by Pennsylvania Department of Education. The 2002 to 2005 test results for the high schools in the eleven counties in the five WIB areas in southwestern Pennsylvania were aggregated and averaged to determine the percent of students scoring proficient or non-proficient across the region.

Graph 7. Ages 17, 18, and 24. This graph reflects a compilation of several pieces of information. The first bar (Age 17) combines the proficiency data reported in Graph 6 with state average drop-out rates reported by the Manhattan Institute for Policy Research ("High School Graduation Rates in the United States, Revised April 2002", Jay Greene). The second bar (Age 18) is based on the post high school

outcome surveys available from the state Department of Education. The analysis collapsed the 16 survey choices into four categories: four year, two year, employed, unemployed, and unknown. It then used these categories to average the results from the public school surveys for the 11 counties of southwestern Pennsylvania for 2002, 2003, and 2004. The final bar (Age 24) uses: (1) data from the National Center for Educational Statistics to determine the average graduation rate after six years in 2003 for the four-year colleges and universities in western Pennsylvania, and (2) 1999 data from the Pennsylvania Commission for Community Colleges (this was the latest data available from the Commission) combined with data on career schools obtained from the state Department of Education, to determine the average graduation rate after 3 years for the two-year postsecondary institutions in western Pennsylvania. The graduation rates are used to determine the percentage of individuals that would enter the labor with some college. The Manhattan Institute data indicates that almost half of the high school dropouts will obtain a high school degree or GED by the time they are 24.

Graph 8. Current Trends Are Inefficient. The graph combines the calculations done for Graph 7 with the calculations on the preparation required for the projected job openings in southwestern Pennsylvania (Graph 2) and calculations on the preparation required for the projected openings in the target sectors (see Graph 10).

Graph 9. Replacement Jobs Dominate Job Openings in the Target Sectors. A staffing profile details the distribution of occupations in an industry sector. Staffing profiles for the target sectors in the Pittsburgh MSA were obtained from the CWIA. These were used in combination with the overall distribution of occupations in the Pittsburgh MSA to determine what percentage of each occupation was employed in a target sector. For example, there were 7230 accountants and auditors in the Pittsburgh MSA in 2000, with 291 or 4.02% employed in specialty metals. These occupational percentages were then applied to the projected openings for southwestern Pennsylvania (see Graph 1) to determine the projected openings due to growth and replacement for each occupation in each target sector.

Graph 10. The Preparation Required for Jobs Varies Across Industries. National staffing profiles for the 20 two-digit NAICS industries were obtained from the Bureau of Labor Statistics. The O-Net coding scheme (see Graph 2) was applied to each profile to create data used in this graph.

Graph 11. Target Sector Jobs Require More Preparation Than the Average Southwestern Pennsylvania Job Opening. The O-Net coding scheme (Graph 2) was applied to each of the target sector staffing profiles (Graph 9) to create the data used in this graph. The sector preparation data are compared to the data for southwestern Pennsylvania as a whole used in Graph 2.

Graph 12. The Target Sectors Have a Higher Percentage of Good-Paying Jobs. The analysis used to create Graph 5 was applied to the sector profiles to generate Graph 12. Thus occupations were sorted into the three preparation categories based on their O-Net scores. The regional average salary for each occupation was used to determine the salary quartile in which each occupation fell. We then determined the number of vacancies that are projected to occur between 2000 and 2010 in each quartile for each level or preparation for each target sector. The sector salary data are compared to the data for southwestern Pennsylvania as a whole used in Graph 5.

The Target Sectors Will Provide Jobs accessible to workers At All Education Levels. The regional education levels are based on 2000 Census data aggregated for the 11 counties of southwestern Pennsylvania.