

LEHIGH VALLEY TALENT SUPPLY AND SECTOR ANALYSIS AND STRATEGIC ACTION PLAN

NOVEMBER 2021

PREPARED FOR:



PREPARED BY:



PROJECT TEAM

Camoin Associates

Camoin Associates has provided economic development consulting services to municipalities, economic development agencies, and private enterprises since 1999. Through the services offered, Camoin Associates has served EDOs and local and state governments from Maine to California; corporations and organizations that include Amazon, Lowes Home Improvement, FedEx, Volvo (Nova Bus) and the New York Islanders; as well as private developers proposing projects in excess of \$6 billion. Our reputation for detailed, place-specific, and accurate analysis has led to over 1,000 projects in over 40 states and garnered attention from national media outlets including Marketplace (NPR), Crain's New York Business, Forbes magazine, The New York Times, and The Wall Street Journal. Additionally, our marketing strategies have helped our clients gain both national and local media coverage for their projects in order to build public support and leverage additional funding. We are based in Saratoga Springs, NY, with regional offices in Richmond, VA; Portland, ME; Boston, MA; and Providence, RI. To learn more about our experience and projects in all of our service lines, please visit our website at www.camoinassociates.com. You can also find us on Twitter @camoinassociate and on Facebook.



Emsi Burning Glass

Emsi Burning Glass (EBG) is the world's leading authority on job skills, workforce talent, and labor market dynamics, providing expertise that empowers businesses, education providers, and governments to find the skills and talent they need and enables workers to unlock new career opportunities. Headquartered in Boston, Massachusetts, and Moscow, Idaho, EBG is active in more than 30 countries and has offices in the United Kingdom, Italy, New Zealand, and India. The company is backed by global private equity leader KKR.



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Camoin and EBG worked with Lehigh Valley Economic Development Corporation (LVEDC) and Workforce Board Lehigh Valley (WBLV) to develop this study. Camoin and EBG gratefully acknowledge the excellent support of LVEDC and WBLV.

Lehigh Valley Economic Development Corporation

The **Lehigh Valley Economic Development Corporation** (LVEDC) serves as the regional economic development agency for Lehigh and Northampton Counties in eastern Pennsylvania. Its mission is to market the economic assets of the Lehigh Valley and to create partnerships to lead the recruitment, growth, and retention of employers.



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Workforce Board Lehigh Valley

The **Workforce Board Lehigh Valley (WBLV)**'s mission is a private-sector led, integrated, regional workforce system of economic and workforce development, education, employers and community partners working in collaboration with data experts to ensure the Lehigh Valley workforce system has strategically positioned services for a universal population. WBLV focuses on those most in need to guarantee Lehigh Valley has an educated and skilled workforce that meets business and industry's global labor demands.



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Other Acknowledgements:

Lehigh Valley Economic Development Corporation and the **Workforce Board Lehigh Valley** wish to express gratitude to the following organizations and individuals who made this study possible:

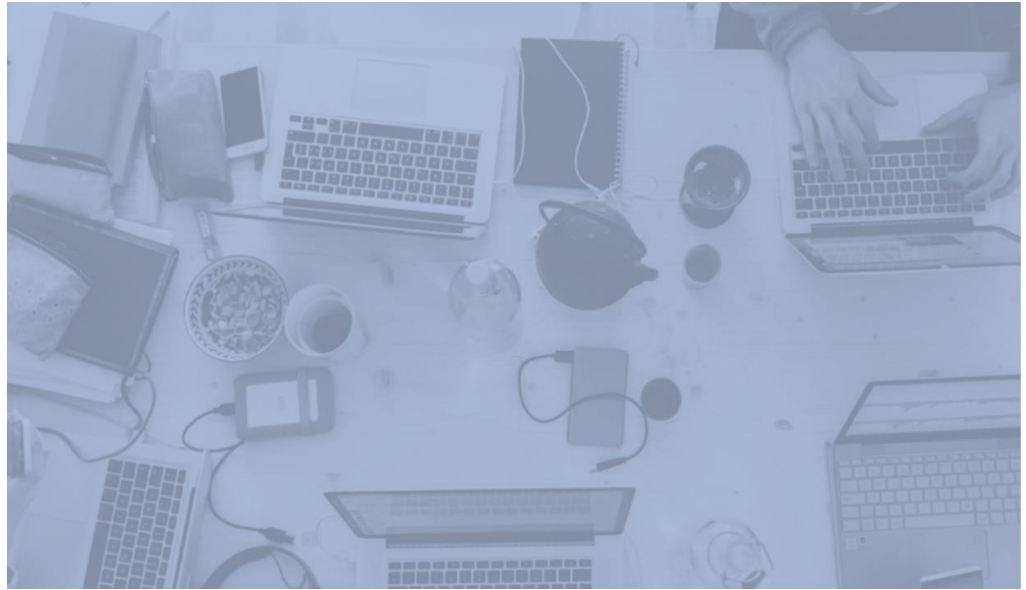
- Lehigh Valley Education and Talent Supply Council
- Local employers and stakeholders who participated in the various surveys, interviews, and focus groups
- 11 Lehigh Valley colleges and universities and 3 Career and Technical Centers for providing their insights and talent pipeline survey data



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The opinions and recommendations expressed in this report are those of EBG and Camoin. These views should not be construed as representing the official policies of LVEDC and WBLV. Furthermore, any errors in this report are the responsibility of EBG and Camoin, and not of any of the above-mentioned parties.



CONTENTS

| | |
|---|-----|
| INTRODUCTION..... | 1 |
| SUMMARY OF FINDINGS & RECOMMENDATIONS | 5 |
| APPENDIX I: LABOR MARKET ANALYSIS..... | 27 |
| APPENDIX II: LEHIGH VALLEY TALENT SURVEY..... | 98 |
| APPENDIX III: REVIEW OF PREVIOUS WORK..... | 140 |

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INTRODUCTION

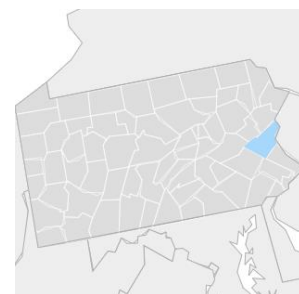
The Lehigh Valley Economic Development Corporation (LVEDC) and the Workforce Board Lehigh Valley (WBLV) collectively work to develop the region's talent pool through attraction, education, and coordination. They depend on accurate and up-to-date data to inform their efforts and have commissioned several studies in the past to understand gaps in their talent supply pipeline. However, as with all economic analysis, conditions change, and change rapidly. COVID-19¹ has created great uncertainty as to the emerging and future economy and workforce. This study provides the most current data on talent demand, supply, and gaps, and considers the impact of COVID-19 along with other emerging trends including remote work, automation/changing technology, and changing demographics.

LVEDC and WBLV serve Lehigh and Northampton Counties in eastern Pennsylvania, which include the cities of Allentown, Bethlehem, and Easton (Figure 1). LVEDC's mission is to market the economic assets of the Lehigh Valley and to create partnerships to lead the recruitment, growth, and retention of employers. WBLV's mission is a private-sector led regional workforce system of economic and workforce development, education, employers and community partners working with data experts to ensure the Lehigh Valley workforce system has strategically positioned services for a universal population, focusing on those most in need, resulting in an educated and skilled workforce that meets business and industry global labor demands.

No single solution will completely enhance access to in-demand jobs for communities in the Lehigh Valley. However, leveraging labor market information (LMI) to identify key surpluses and shortages enables workforce leaders to proactively—and efficiently—engage in economic development. Furthermore, understanding career opportunities in target industries, or industries that help diversify the local economy, demonstrate how Lehigh Valley residents are a tremendous asset to local businesses.

This report builds upon previous work done by Oxford Economics and MDB Insight in collaboration with LVEDC and WBLV. Oxford Economics' *Bridging the Workforce Gap: Lehigh Valley Workforce & Economic Development Strategy*² was conducted in 2014 to better align education, workforce development, and economic development resources to support workforce and businesses needs in five key sectors. *The Lehigh Valley: Talent Supply and Industry Sector Analysis and Strategic Action Plan*³ by MDB Insight evaluated the region's education and talent pipeline, ensuring the current and future needs of the Lehigh Valley economy. Both reports focused their analyses on five sectors that were chosen due to 1. the significant number of workers the sectors employ, 2. the employers' concerns about their access to talent, and/or 3. the potential

Figure 1: Lehigh and Northampton Counties comprise the Lehigh Valley in Pennsylvania



Source: Region provided by LVEDC.

¹ COVID-19 refers to the coronavirus disease of 2019, caused by the coronavirus known as SARS-CoV-2.

² The full report can be found by following this QR code:



³ The full report can be found by following this QR code



strategic growth for these sectors in the Lehigh Valley. The same target sectors are evaluated in this report, using current LMI and real-time job postings. The target sectors are:

- Advanced Manufacturing
- Health Care
- High Value Business Services
- Life Science Research and Manufacturing
- Transportation, Warehousing, Logistics, and Wholesale

OBJECTIVE

The goal of this report is to identify opportunities for continual development of the talent pool based on employer and specific sector needs. Specifically, this report identifies workforce gaps in the five target sectors to strengthen the LVEDC and WBLV's ability to work within the region to prepare the future workforce and close labor market gaps.

PROCESS

REVIEW OF EXISTING REPORTS AND RESOURCE MATERIALS

There is a wealth of data that already exists on the talent market in the Lehigh Valley region. Camoin and Emsi reviewed existing reports, surveys, data, and resources to provide context for the analysis. A list of resources reviewed can be found in Appendix III: Review of Previous Work.

ENGAGEMENT

Camoin engaged with Lehigh Valley employers, economic development organizations, workforce organizations, and educational institutions to understand current workforce challenges impacting hiring and retention trends, as well as current solutions and partnerships being utilized.

- **Lehigh Valley Employer Survey** – Lehigh Valley Talent Survey was a digital survey open from July 13, 2021, to September 7, 2021, and received a total of 350 responses that were used to assess and understand labor force gaps and challenges within Lehigh Valley. Survey results were examined for each of the target sectors. For a detailed analysis, view Appendix II: Lehigh Valley Talent Survey.
- **Focus Group Discussions** – Camoin hosted six focus group discussions with local employers, sector leaders, and educational organizations to discuss workforce challenges and opportunities in the region and validate findings from the survey analysis. Key themes from the focus groups and additional informational calls can be viewed in Appendix III: Focus groups and Informational Calls.
- **Informational Calls** – Camoin further engaged local employers through informational calls to provide additional details to workforce challenges and solutions. A list of business and contacts were generated by LVEDC and WBLV based on areas of the analysis that could be further expanded on. This included sectors that received a lower response in the survey, questions that arose from data analysis, etc. In total, Camoin connected with 31 employers for responses. Key themes from the focus groups and informational calls can be viewed in Appendix III: Focus groups and Informational Calls.

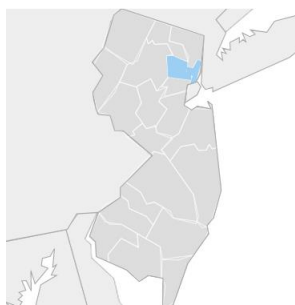
Multiple efforts through several different channels were made to obtain input overall and within each of the target sectors. The results of the survey were used to provide initial input that was then further investigated through sector focus groups, target phone calls, and detailed analysis of supply and demand data. The survey data proved to be both useful and representative of the Lehigh Valley economy when examined and used in combination with all the methods of input and analysis. Key themes that emerged from employer and stakeholder engagement are embedded into the findings and recommendations for this Talent Study.

LABOR MARKET ANALYSIS

The Labor Market Analysis examined demographic, sector, and skills trends to identify the gaps in Lehigh Valley's workforce in relation to the demand from the region's target industries. The analysis also examined COVID-19 related data and trends to better understand how the pandemic has and will continue to impact the target industries.

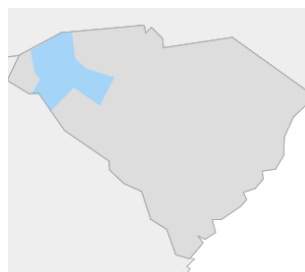
In the Labor Market Analysis, data for the Lehigh Valley was compared with benchmark regions, provided by LVEDC and WBLV: Lehigh County, Northampton County, the Commonwealth of Pennsylvania, the Greenville-Anderson MSA,⁴ and Essex and Hudson Counties in New Jersey. These areas were chosen as benchmarks due to similar characteristics and shared aspirational sector goals. Figures 2 and 3 show the locations of the Greenville-Anderson MSA and Essex and Hudson Counties.

Figure 2: Essex and Hudson Counties are in northern New Jersey



Source: Region provided by LVEDC and WBLV

Figure 3: Anderson, Greenville, Laurens, and Pickens Counties comprise the Greenville-Anderson MSA in South Carolina



Source: Region provided by LVEDC and WBLV

LEHIGH VALLEY ECONOMIC DASHBOARD

Emsi developed a comprehensive economic digital dashboard that serves as a dynamic synthesis of the Labor Market Analysis. The dashboard provides users with a broad overview of job postings, career transition pathways, target sectors, and COVID-19 data, as well as detail on each target sector. This dashboard enables Lehigh Valley leadership and businesses to monitor employment and job posting trends in their economy and the target sectors. Data and trends within this dashboard will be updated monthly from November 2021 to November 2022 with the option for additional updates beyond that scope of engagement. The dashboard can be viewed by clicking [here](#).

⁴ MSA refers to a metropolitan statistical area. MSAs consist of one or more counties and contain a core area with a substantial population that has a high degree of economic and social integration with the surrounding areas. Source: BLS.

STRATEGY ASSESSMENT

Camoin reviewed the strategies in the 2018 report, *The Lehigh Valley: Talent Supply and Industry Sector Analysis and Strategic Action Plan* with the context of the updated data and trends to evaluate the applicability and effectiveness of existing strategic actions. The 2018 Strategic Action Plan outlines five areas of strategic action:

- **Connect** – Improved collaboration across employers and academia;
- **Create** – Enhanced relevant Training Programs;
- **Rebrand** – Modernized job perceptions;
- **Promote** – Coordinated and aligned talent attraction activities; and
- **Inform** – Increased awareness of the talent landscape.

With updated data and trends in mind, Camoin worked to update actions and tactics to reflect work completed and underway, current trends, feasibility, and the timeline for execution.

SUMMARY OF FINDINGS & RECOMMENDATIONS

The following presents the findings and recommendations from the full body of work and analyses conducted for this project. In this section, we integrate and synthesize the data to identify areas of unique challenge and opportunity for Lehigh Valley targeted industries and develop recommendations for future initiatives. It starts with findings for the overall Lehigh Valley economy, then provides insights for each of the target sectors. The target sectors include:

- Advanced Manufacturing
- High Value Business Services
- Life Science Research and Manufacturing
- Transportation, Warehousing, Logistics, and Wholesale
- Health Care

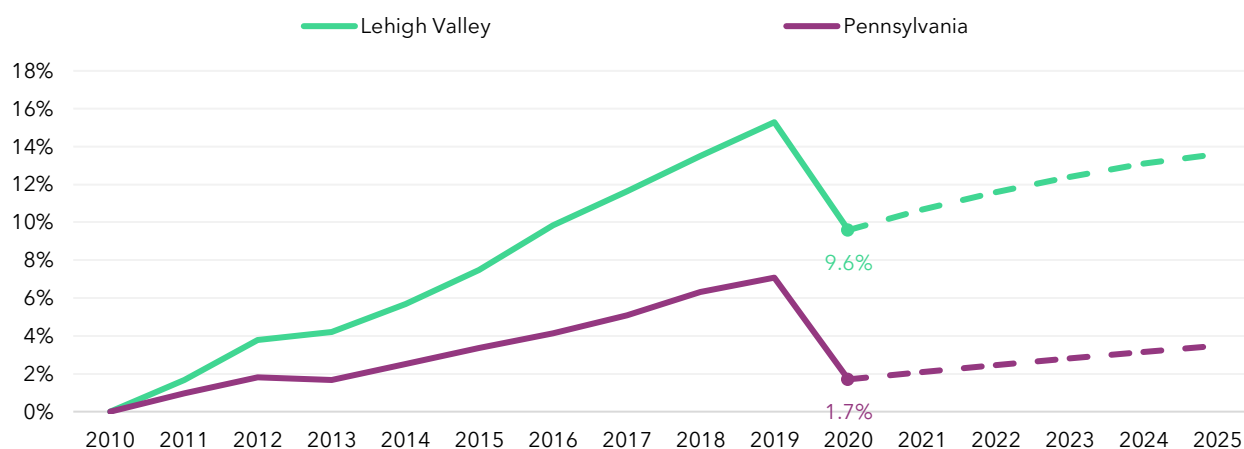
This section ends with recommendations on how to effectively attract, retain, and grow the talent in Lehigh Valley to meet the needs of the target sectors.

OVERALL ECONOMY

OVERVIEW

Lehigh Valley is a jobs growth region. After a loss of jobs due to COVID-19 between 2019 and 2020, Lehigh Valley's total number of jobs has grown and is projected to continue growing employment.

Figure 1: Jobs in the Lehigh Valley increased by nearly 10% between 2010 and 2020, whereas jobs in Pennsylvania increased by nearly 2%.



Source: Emsi Burning Glass Q2.2021 Dataset.

Population is also growing in the region. As of 2020, the region's population had increased by 2.5% since 2015, growing by 16,741 residents. The population is expected to increase by 3.0% between 2020 and 2025, growing by 20,146 people (Source: Emsi Burning Glass). The Lehigh Valley's population and job growth have outpaced growth in Pennsylvania as a whole. Lehigh Valley has the one of the fastest growing populations of individuals age 18-34 years across the Northeast with a 10.7% growth in this demographic between 2010 and 2020 (US Census Bureau, Population Estimates).

Unemployment in the Lehigh Valley drastically increased in April 2020 due to COVID-19 but started to recover in September 2020. The Lehigh Valley's recent growth in job postings points to an economic recovery amid the COVID-19 pandemic.

Workforce is a critical issue for the future growth of Lehigh Valley businesses. Lehigh Valley employers were asked, "how important is a skilled workforce for the future growth of your operations in the Lehigh Valley," approximately 87% indicated it is important or very important.

During COVID, and despite it, businesses in the Lehigh Valley added employment and are expecting to continue adding employees. Of the Lehigh Valley employers responding to the survey:

- 39% indicated they had gained employment (have higher employment levels) in the last 12 months, 31% had fewer employees, and 30% had the same number of employees.
- 91% have hired workers in the last 12 months.
- 74% expect to have more employees in the next 12 months and 91% anticipate hiring workers in the next 12 months.

National Labor Force Trends and COVID-19

It is important to note that this analysis was prepared during a period of extreme uncertainty in the national and international economy. With COVID-19 still causing economic disruptions for many industries, the overall labor force is in a period of transition. The true and final impacts of the COVID-19 pandemic on the Lehigh Valley is still to be seen and may never be fully understood.

One key impact of the pandemic is the widespread trend of large numbers of workers leaving their jobs during the COVID-19 pandemic. The Great Resignation or the Big Quit, as it is sometimes referred, is typically discussed in relation to the US workforce but the phenomenon is international. It is thought to be the result of many different factors, notably workers' dissatisfaction with current working conditions and personal reassessments of career and lifestyle due to the changes and hardships of the pandemic.

CHALLENGES

Businesses are experiencing significant challenges related to hiring. Of the Lehigh Valley employers responding to the survey:

- 89% have experienced challenges in recruiting, hiring, or retaining talent in the last 12 months.
- 72% had negative sentiments including being dissatisfied or very dissatisfied with the availability of qualified workers for positions in their companies. Of those that are dissatisfied or very dissatisfied, respondents noted the pool of talent available is very slim and response to recruiting efforts have been poor.

In terms of satisfaction with workforce attributes, employers are most concerned about the availability of needed required skills. Of the Lehigh Valley employers responding to the survey:

- 74% were very dissatisfied or dissatisfied with the availability of required skills to meet their needs. Employability/ soft skills and career experience were also a concern, with 63% dissatisfied or very dissatisfied. Education levels were less of a concern with 44% dissatisfied or very dissatisfied. Despite the lack of skills and experience, many employers indicated a willingness to train workers.
- Top employability (soft skills) challenges businesses face when recruiting, hiring, and retaining employees in Lehigh Valley include lack of critical thinking or problem-solving skills (48% of businesses), lack of interpersonal skills (36%), and lack of communication skills (35%). Other challenges respondents noted included lack of emotional intelligence, technical skills and experiences, attendance/no-shows, lack of motivation and commitment, lack of professional office skills, lack of workers overall, etc.

- With regard to the availability of workers with the required level of education to fill positions, 50% had positive sentiments including being satisfied or very satisfied while 44% had negative sentiments. Of the workforce attributes, 7% of respondents said they were very satisfied with the level of education.

Overall, there is a mismatch between educational attainment and jobs in the Lehigh Valley. As a region, a third of the workforce is comprised of people whose highest level of education is high school or GED. Based on job postings data, 42% of jobs within the Lehigh Valley require an HS/GED. There is a small demand for graduate degree candidates (5%), despite 12% of the population having a graduate degree or higher. This trend is not unique to the Lehigh Valley and is occurring in the comparative geographies of the Greenville MSA and Essex and Hudson Counties, but does indicate a challenge in the alignment of education and available jobs in Lehigh Valley.

Employers view that the barriers they encounter in recruiting, hiring, and retaining employees are largely driven by factors specific to the workers, including wage expectations, work ethic, poor attendance, and aging and retiring workforce.

- The biggest barrier to recruiting, hiring, and retaining employees in the Lehigh Valley is compensation expectations/wage pressures. Of employers responding to the survey, 76% indicated that as a barrier. Other top barriers include lack of work ethic (54% of businesses), poor attendance (45%), and aging workforce/retirements (27%).

Employers are responding in a variety of ways to overcome these barriers in recruiting, hiring, and retaining employees.

- Of the Lehigh Valley employers responding to the survey, 76% indicated increased wages/bonuses. Other top solutions include on-going recruitment/constant recruitment (63%), in-house training/training programs or seminars (59%) and outreach to schools/work with schools (internships/co-op) (56%). Other solutions include paying medical benefits, working from home, free food, utilizing non-citizen workers, and recruiting workers from outside the region.

COVID-19 has increased workforce challenges and barriers.

- Approximately 65% of Lehigh Valley employers responding to the survey indicated they face challenges recruiting, hiring, and retaining workers and the challenges they face also include inadequate or lack of childcare services (36%), challenges supporting employees' transition back to the office (35%), and reduced productivity (33%). Other responses include supply chain, losing clients due to COVID restrictions, unemployment incentives, lost work due to illness, and exposure to COVID.
- The focus groups supported the survey findings. All focus groups revealed that COVID has led to significant challenges in recruiting and retaining workers. While many of these challenges existed prior to COVID, they were further revealed and significantly exacerbated by COVID. Workforce is the most significant challenge facing all industries.

Remote work has occurred but has not been a solution overall to workforce challenges. Of employers responding to the survey:

- 65% indicated that less than 25% of their workers perform duties that could be entirely or mostly done at home.
- 73% have less than 25% of their workforce working remotely. Only 7% indicated that 76-100% of their workers are currently working remotely. The majority of the businesses (61%) with 76-100% of their workforce working remotely are within the High Value Business Services sector.

Retirement poses a threat to labor supply. This is a national trend that was occurring before COVID as the Baby Boomers aged but it was exacerbated by the pandemic as workers retired earlier than planned.

OPPORTUNITIES

Past and recent population and economic growth provide a basis and momentum for future growth. The Lehigh Valley offers a lower cost of living, lower housing prices, and a rich quality of life compared to nearby Essex and Hudson Counties, NJ. Population has and is projected to continue growing. Job postings and economic forecasts point to recovery from the pandemic and future growth.

Lehigh Valley, by many accounts, is meeting the changing needs of the workforce and employers.

- Key stakeholders on the focus group calls indicate that educational institutions and professional organizations in the Lehigh Valley are well connected with employers in the region. Furthermore, professional organizations work with educational institutions to better understand workforce challenges and opportunities. In some cases, educational institutions are working to bring employers into the classrooms to interact and engage with students. It was noted that these opportunities work best when they are woven into the class lessons (i.e. hospital workers visiting during biomedical lectures). Educational institutions connect with employers to foster internship opportunities. Educational institutions are also working with regional sector leaders on apprenticeship program guidance, pilot projects, and best practices.
- Professional organizations in the Lehigh Valley are working with colleges to develop students to create a reliable pipeline of workers for local employers. Professional organizations are also working to create short-term training to help bridge the gap in the current workforce shortage. The professional organizations we connected with noted that they evaluate programs and offerings on an annual or semi-annual basis to best meet the needs of the community.
- Overall, educational institutions and professional organizations in Lehigh Valley plan to continue collaborating with local partners and having conversations across industries to develop best practices and prepare students for future workforce needs.
- During COVID, educational institutions adapted to a hybrid schedule and online environment and intend to continue personalized learning in terms of format and structure into the future. Several educational institutions indicated they intend to have alternative options available to students to allow for career and educational learning.

ADVANCED MANUFACTURING

OVERVIEW

Advanced Manufacturing is comprised of 118 six-digit NAICS industries that are in metal product manufacturing; machinery manufacturing; computer and electronic product manufacturing; electrical equipment, appliance, and component manufacturing; transportation equipment manufacturing; and others. For a full list of Advanced Manufacturing NAICS view Appendix 2: Target Industries. As of 2020, there were 17,605 jobs in Advanced Manufacturing across 360 businesses in the Lehigh Valley. Looking forward to 2025, the number of Advanced Manufacturing jobs in the Lehigh Valley is projected to increase by 7%, while jobs in Pennsylvania overall will decline by 1%. Average earnings in Advanced Manufacturing are high in the Lehigh Valley at \$101,471 per job compared to \$85,353 statewide in that sector.⁵

⁵ Average earning figure is weighted average of the occupations' median earnings.

The Lehigh Valley has historically been strong in Advanced Manufacturing and this trend is projected to continue. There are several highly concentrated Advanced Manufacturing industries in the Lehigh Valley, including Office Supplies (except Paper) Manufacturing with a Location Quotient⁶ of 39.6, Heavy Duty Truck Manufacturing (LQ of 29.1), Musical Instrument Manufacturing (LQ of 23.4), and Cement Manufacturing (LQ of 20.8). Of the six-digit industries within Advanced Manufacturing, Relay and Industrial Control Manufacturing exhibited the strongest growth between 2015 and 2020, growing by 671 jobs for a growth rate of 423%. This sector also has higher-than-average earnings of \$134,697 per job and is concentrated within the Lehigh Valley (LQ of 9.3).

Assemblers and Fabricators are the most represented occupation in Advanced Manufacturing with 2,426 jobs in 2020. More than half of the Assemblers and Fabricators in the Lehigh Valley work in Advanced Manufacturing businesses. However, earnings in this occupation rank low with median annual earnings of \$38,003 compared to the regional average of \$68,853 per job for the Lehigh Valley.

The workforce is a critical issue for Lehigh Valley Advanced Manufacturing businesses. Employers need a reliable pipeline of workers, especially when considering expansions. Lehigh Valley employers were asked, "how important is a skilled workforce for the future growth of your operations in the Lehigh Valley," and 85% indicated it is important or very important.

During COVID, and despite it, Advanced Manufacturing businesses in the Lehigh Valley added employment and are expecting to continue adding employees. Of those responding to the survey:

- 46% indicated they had gained employment (have higher employment levels) in the last 12 months, 27% had fewer employees, and 28% had the same number of employees.
- 92% of the Lehigh Valley employers have hired workers in the last 12 months.
- 85% expect to have more employees in the next 12 months and 92% anticipate hiring workers in the next 12 months.

CHALLENGES

Advanced Manufacturing businesses are experiencing significant challenges to hiring. Of those responding to the survey:

- 90% have experienced challenges in recruiting, hiring, or retaining talent in the last 12 months.
- The top positions that Advanced Manufacturing employers in the Lehigh Valley have difficulty recruiting, hiring, or retaining are production and maintenance, with 91% of employers having difficulty. Other top positions that employers have difficulty recruiting, hiring, or retaining are engineering services and support (39%), logistics and supply chain (34%), and management and supervision (20%).

Interviewees and focus group participants further indicate that hourly workers and entry level workers are the most challenging to retain. Participants report difficulty finding CDL drivers, mechanics, engineers, and professional employees.

In terms of satisfaction with workforce attributes, employers are most concerned about the availability of needed required skills. Of Advanced Manufacturing employers responding to the survey:

⁶ Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. Note that the Center for Workforce Information & Analysis uses LQ to compare to the State which will result in different findings.

- 77% were dissatisfied or very dissatisfied with the availability of required skills to meet their needs. Employability/ soft skills were also a concern with 71% dissatisfied or very dissatisfied and career experience with 68%. Education levels were less of a concern with 48% dissatisfied or very dissatisfied.
- The most requested skills in Lehigh Valley's Advanced Manufacturing sector include specialized skills such as repair, hand tools, systems application and products, machining, CNC, computer skills, and woodworking. Top baseline skills include communication skills, physical ability, problem solving, detail-oriented skills, math, ability to be flexible, willingness to grow, and adaptability to everchanging technology.
- Many respondents feel that students leave high school without the ability to perform simple math, read tape measures, and other basic skills, which is negatively impacting their pool of applicants for entry level positions.

Based on regional job openings and education/training program completions, there are significant hiring gaps in Advanced Manufacturing. The Advanced Manufacturing Training program, which trains for a variety of assembler occupations, has the largest gap with 641 more projected annual job openings than annual program completers. Other large gaps include Quality Control Technology/Technician (gap of 168) and Machine Tool Technology/Machinist (gap of 146). Such data indicate that the Lehigh Valley must look to attract talent from other areas to fill the region's employment needs. In addition to employers attracting talent from other areas, the region should also support the rebranding and education of the community about manufacturing jobs and seek to develop more people here with the relevant skills to be successful in manufacturing.

Employers within the focus groups and follow-up calls indicated they are using multiple approaches to recruit and retain workers, including increasing wages, allowing more flexible schedules, and direct recruiting programs. They are also modifying their standards to fill positions, including forgoing testing and pre-employment screenings. Some noted that creating a culture with incentives such as free products, lunches, stock, etc. has helped increase worker retention. Some employers conduct exit surveys to inform an action plan to drive retention.

COVID-19 has increased workforce challenges and barriers but for Advanced Manufacturing so has supply chain disruptions. Many indicated that their supply chains are currently still disrupted from the pandemic, with increasing prices, and making it difficult to source materials and arrange for transportation.

Changes in demographics, industry, globalization, automation, and culture have all impacted the sector and COVID further exposed and intensified them:

- Women displaced from the manufacturing workforce was further accelerated by pandemic and childcare challenges.
- Employers noted that lack of transportation options is a hindrance to some 2nd and 3rd shift workers as well as second chance or re-entry employees.
- Current daycare capacity and restrictive hours do not support the Advanced Manufacturing sector, especially those in shift work.
- Aging of the workforce on the shop floor combined with the pandemic is accelerating retirements, at the same time there is a reduction of students going into manufacturing

Remote work is less prevalent in Advanced Manufacturing and according to those responding to the survey 86% indicated that less than 25% of their workers perform duties that could be entirely or mostly done at home. Those that are remote tend to be sales, marketing, and some administration.

Perception is that there is a lack of growth opportunities within the sector and that manufacturing jobs are “dirty”. There is more education needed to teach workers about automation and the changing nature of work in manufacturing. Social justice and climate change concerns create a need to improve manufacturers’ identities – the younger generations are sensitive to a world we are in and manufacturers can no longer ignore these issues if they want to attract young workers.

Automation poses both short-term and long-term challenges. In the short-term, if occupations are seen as presenting a risk of limited job security or opportunity it may deter people from committing to acquiring the skills and education needed today and into the short-term future. In the long-term, while automation can improve productivity and output, in high-wage jobs like advanced manufacturing, the income supported by those jobs may be hard to replace by some workers. Occupations with the highest likelihood for automation are welders, hand laborers and material movers, and machinists.

OPPORTUNITIES

Advanced Manufacturing is synergistic with Transportation, Warehousing, Logistics, and Wholesale and both are strong in the Lehigh Valley and growing with access to major markets and ports including Pittsburgh, Philadelphia, Newark, and New York City. The region’s strengths in Advanced Manufacturing and Transportation, Warehousing, Logistics, and Wholesale can support the future growth of one another. This has been, and can continue to be, a part of a critical regional economic “brand” and further be leveraged and extended for talent attraction and retention. Workers want to be and stay where there is future economic opportunity.

While there are jobs and careers at all levels from entry-level to management, from moderate to high skill, many in advanced manufacturing careers start with jobs that do not require advanced degrees and therefore require little to no student debt. This can be a major selling point given the increased national focus on the student debt crisis, and the desire of young workers to know their education and training will lead to good jobs.

Additionally, with automation and technological advancements on the rise, there is a great opportunity for employers to provide opportunities for the workforce to upskill to meet the emerging needs of the sector thus helping workers “future-proof” their skills.

The existing assets and offerings in place support the region to leverage both of these opportunities. Though there are some gaps, Lehigh Valley’s Advanced Manufacturing workforce is strongly supported by non-credit, certificate, and degree level programs offered at postsecondary institutions throughout the region.

Employers that provided input to this study were aware of the challenges that “old perceptions” of manufacturing are present and are already working to change the culture and therefore perception. The adoption of these changes by businesses are being accelerated due to the pandemic. This will position the region for the future of advanced manufacturing and long-term success.

PRIORITY OCCUPATIONS FOR FOCUS

The following occupations have been identified within this sector as having the greatest projected growth (by number) over the coming five years and therefore should be a priority for programming, attraction, and development (Source: Emsi Burning Glass, 2020-2025, Northampton and Lehigh Counties):

- Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers
- First-Line Supervisors of Production and Operating Workers
- Industrial Machinery Mechanics

- Laborers and Freight, Stock, and Material Movers, Hand
- Miscellaneous Assemblers and Fabricators
- Machinists
- Welders, Cutters, Solderers, and Brazers

HEALTH CARE

OVERVIEW

Health Care is comprised of 27 six-digit NAICS industries in ambulatory health care services, hospitals, and nursing and residential care facilities. Health Care is the largest of Lehigh Valley's target sectors with 46,570 jobs in 2020. Between 2015 and 2020, the sector grew by 4% and is projected to continue to grow by 8% from 2020 to 2025. During that time, Lehigh Valley's job growth in the Health Care sector is projected to outpace growth across Pennsylvania (6%). Overall, Health Care earnings in the Lehigh Valley are higher than the state average at \$80,413 and \$73,683, respectively. The Health Care sector provides a wide variety of job opportunities and earning potential ranging from high-skilled practitioners and lower-skilled technicians.

Health Care job growth in Lehigh Valley is consistent with the growth in the Greenville MSA and Essex and Hudson Counties. All geographies experienced a decline in the workforce from 2019 to 2020 followed by gradual growth following the onset of the COVID-19 pandemic.

Specialty Hospitals (hospitals that provide a limited range of services i.e., orthopedic surgery, obstetrics, etc.) in the Lehigh Valley have grown 27% in the past 5 years from 2015 to 2020 and are projected to grow an additional 28% by 2025. There are limited operations in the Lehigh Valley, indicating a possible opportunity for business expansion. Nationally, these operations are projected to grow based on increased demand for cancer treatment, long-term care, and disease care.

Registered Nurses are the largest occupation with 8,105 jobs accounting for 17% of jobs in the sector. Other top occupations include Nursing Assistants and Home Health and Personal Care Aides, which earn well below average for the Lehigh Valley with median annual earnings of \$32,769 and \$26,160, respectively.

Workforce is a critical issue for Lehigh Valley Health Care employers for future growth - Lehigh Valley employers were asked, "how important is a skilled workforce for the future growth of your operations in the Lehigh Valley," and 89% indicated it is important or very important.

Health Care employers in the Lehigh Valley were uniquely impacted by COVID-19 in terms of employment levels. Of those responding to the survey:

- 21% indicated they had gained employment (have higher employment levels) in the last 12 months, 49% had fewer employees, and 30% had the same number of employees.
- 91% of the Lehigh Valley employers have hired workers in the last 12 months, indicating challenges with retention.
- 61% expect to have more employees in the next 12 months and 91% anticipate hiring workers in the next 12 months.

CHALLENGES

Health Care employers are experiencing significant challenges to hiring. Of those responding to the survey:

- 89% have experienced challenges in recruiting, hiring, or retaining talent in the last 12 months.

- The top positions that Lehigh Valley Health Care employers have difficulty recruiting, hiring, or retaining are nursing professionals (47%), counseling and human services (47%), and medical assistants, technologists, and technicians (44%). Health Care employers in Lehigh Valley indicated that licensed therapists, mental health workers, behavioral health staff, direct care, residential staff, psychiatrists, emergency medical technicians, paramedics, and entry-level workers are difficult to recruit, hire, or retain. Difficulties in recruiting are exacerbated by high salary competition, the flexibility of remote/work from home, and wages in Lehigh Valley.

In terms of satisfaction with workforce attributes, employers are most concerned about the availability of needed required skills. Of Health Care employers responding to the survey:

- 62% were dissatisfied or very dissatisfied with the availability of required skills to meet their needs. Career experience was also a concern with 57% dissatisfied or very dissatisfied. Overall relative to the other target sectors, Health Care employers were more satisfied with workforce attributes in the Lehigh Valley region, than other sectors.
- CPR, home health, treatment planning, and scheduling were the top requested specialized skills in Lehigh Valley's Health Care sector.

Job postings in 2020 further confirm that CPR, home health, treatment planning, and scheduling were the top requested specialized skills in the Lehigh Valley's Health Care sector. Top sought-after baseline skills include computer literacy, communication skills, teamwork/collaboration, and problem solving.

Educational completions in the Lehigh Valley are not keeping up with occupational demand in several key programs (including noncredit programs). The largest gap between regional job openings and completions is in the Nursing Aide program with a gap of 1,454 jobs. Other hiring gaps are for Registered Nurses, Certified Nursing Assistants, Pharmacy Technicians, and Health Care Management.

Other challenges indicated by focus groups and interviews included limited practicum placement sites and that lower-level positions have low wages and therefore turn-over and recruitment is difficult. Employers have expressed challenges in filling lower-paying jobs in the Health Care sector such as Home Health Aides due to competition from other lower-skilled jobs in Distribution and Warehousing that are paying much higher wages in the current labor market.

COVID-19 is expected to continue to be a challenge for Health Care employers. 51% of survey respondents expect it to have a significant or very significant impact and another 44% expect it to have somewhat of an impact on operations.

Remote work is less prevalent in Health Care compared to other sectors except for medical and health services managers, clerks, and administrative assistants. Health Care employers in Lehigh Valley do not expect to have a large remote workforce, with 79% of employers indicating they expect less than 25% of their workforce to work remotely. Most Health Care occupations are not likely to be remote.

OPPORTUNITIES

The Health Care sector offers a variety of job placements across an array of experience and educational levels. Much of the workforce demand within the sector is focused on hospitals, and therefore, there is an increased need to work directly with hospital operators to build programs to solve their workforce needs, especially those focused on nurses.

There has been strong job growth for Physicians (as an occupation), which added 571 jobs between 2015 and 2020 for a 45% increase. Physicians have high earnings with median annual earnings of \$213,106 and represent an opportunity for the Lehigh Valley to attract new talent to the region.

PRIORITY OCCUPATIONS FOR FOCUS

The following occupations have been identified within this sector as having the greatest projected growth (by number) over the coming five years and therefore should be a priority for programming, attraction, and development (Source: Emsi Burning Glass, 2020-2025, Northampton and Lehigh Counties):

- Registered Nurses
- Home Health and Personal Care Aides
- Medical Assistants
- Medical and Health Service Managers
- Nursing Assistants
- Physicians, All Other; and Ophthalmologists, Except Pediatric

HIGH VALUE BUSINESS SERVICES

OVERVIEW

High Value Business Services is comprised of 68 six-digit NAICS industries that cover software publishing; data centers/processing; credit intermediation and related activities; insurance carriers and related activities; professional, scientific, and technical services; management of companies and enterprises; administrative and support services; and others. As of 2020, there were 26,423 High Value Business Service jobs across 1,806 businesses in the Lehigh Valley. While Pennsylvania is anticipated to see a 3% growth in sector jobs between 2020 and 2025, the Lehigh Valley is projected to decline by 5%. Jobs in the Lehigh Valley's High Value Business Services have slowly decreased since 2010, whereas jobs in the comparative geographies of Essex and Hudson Counties and the Greenville MSA have slowly increased. The Lehigh Valley also lags the state in sector earnings with average earnings in High Value Business Services at \$118,857 per job statewide compared to \$111,332 in the Lehigh Valley. High Value Business Service employers in the Lehigh Valley are largely comprised of businesses with 250 or fewer employees. Approximately 26% are businesses with 1 to 10 employees.

The top occupations in High Value Business Services cover a range of educational requirements. Those requiring college degrees are supported in the Lehigh Valley by several educational institutions from which local employers can recruit.

Software Developers and Software Quality Assurance Analysts and Testers rank as one of the most represented occupations within the sector (857 jobs). In the Lehigh Valley, this occupation grew by 26% from 2015 to 2020 and displayed high earnings with median annual earnings of \$91,588 per job. The occupation is one of the least likely to be automated of the top occupations in the sector, and the occupation is currently supported by regional education providers which had 108 Computer Science graduates in 2020. Continuing to capture these graduates and encourage residents to pursue jobs in this field will help to support an array of businesses in the Lehigh Valley.

Workforce is a critical issue for the Lehigh Valley High Value Business Services sector. Lehigh Valley employers were asked, "how important is a skilled workforce for the future growth of your operations in the Lehigh Valley," and 93% indicated it is important or very important.

During COVID, and despite it, High Value Business Services in the Lehigh Valley added employment and are expecting to continue adding employees. Of those responding to the survey:

- 48% indicated they had gained employment (have higher employment levels) in the last 12 months, 18% had fewer employees, and 34% had the same number of employees.
- 85% of the Lehigh Valley employers have hired workers in the last 12 months.
- 66% expect to have more employees in the next 12 months and 85% anticipate hiring workers in the next 12 months.

CHALLENGES

High Value Business Services are experiencing significant challenges to hiring. Of those responding to the survey:

- 86% have experienced challenges in recruiting, hiring, or retaining talent in the last 12 months.
- The top positions that High Value Business Services employers in the Lehigh Valley have difficulty recruiting, hiring, or retaining are administrative support (46%), technicians (32%), management and supervision (29%), and information sciences and technology (29%), skilled and technical trades (25%), marketing (21%), and engineering services (21%). Difficulty attracting and retaining architects and skilled labor was added by discussion within the focus groups.

Data on supply and demand reveals that Accounting Technology/Technician and Bookkeeping has the largest hiring gap in High Value Business Services with 446 more projected annual job openings than annual program completions.

Focus group and interviews revealed many additional insights on challenges including:

- High entry-level education requirement contributes to difficulty attracting candidates.
- There is a need to shift hiring requirements to encompass non-traditional education and experience to expand the local talent pool within the Lehigh Valley. Several employers and key stakeholders within the Lehigh Valley indicated these efforts are underway during COVID-19-strained labor markets.
- Wages have been lagging for a long time and are not being adjusted to meet the expectations of the market. Several high earning workers in this sector commute out of the Lehigh Valley for work. Business and Financial Operations is the largest out-commuting occupation in the Lehigh Valley. In 2020, approximately 1,060 Lehigh Valley residents worked in Business and Financial Operations occupations outside the Lehigh Valley. Additionally, high starting wages in warehousing and distribution facilities are pulling workers away from lower paying business service occupations.
- With many companies in this sector being smaller than other sectors, worker retention is difficult due to competitiveness of larger companies in the Lehigh Valley.
- Employers have not found the workers they need using the old standard hiring process, some employers are using recruiters for the first time and still are not finding the workforce they need.
- Challenges persist in expressing the commonality and connections of occupations within this sector to students and the workforce, specifically communicating and making understood, common skills needed within industry sectors that relate to occupations and career paths.

In terms of satisfaction with workforce attributes, employers are most concerned about the availability of needed required skills. Of High Value Business Services employers responding to the survey:

- 69% were dissatisfied or very dissatisfied with the availability of required skills to meet their needs. Soft skills were also a concern with 62% dissatisfied or very dissatisfied and career experience with 62% as well. Education levels were less of a concern with 44% dissatisfied or very dissatisfied. Follow-up with focus groups reveals that the presence of multiple higher education institutions in the region provides access to workers for jobs requiring degrees.
- Respondents indicated that the labor pool of experienced workers is limited and diminishing in quality. Overall, there are not enough people with appropriate levels of experience and certification within the Lehigh Valley and nationally. Top requested skills in this sector include specialized skills of customer services, sales, customer contact, and scheduling. More baseline requested skills include communication skills, problem solving, teamwork/collaboration, and Microsoft Office.

COVID-19 has been viewed as a challenge in terms of operations. Looking ahead over the next 12 months, few High Value Business Services employers in the Lehigh Valley that responded to the survey expect the COVID-19 pandemic to have a very significant impact on their operations at 4%. Approximately 30% expect the pandemic will have no impact at all on their operations. Also related to COVID and mentioned within focus groups was that unplanned retirements are catching companies by surprise.

Remote work is more prevalent in High Value Business Services than manufacturing or other “high touch” industries such as health care, however, the majority of the High Value Business Services workforce in the Lehigh Valley do not expect to work remotely over the next 12 months. Approximately 61% of employers in the Lehigh Valley expect less than 25% of their workforce to work remotely. Respondents indicate that training, productivity, leadership, professional development and collaboration have been challenging while working remotely. Follow-up with focus groups and interviews reveals that hiring capacity at some Lehigh Valley organizations has increased during COVID due to remote work.

OPPORTUNITIES

The Lehigh Valley has several educational institutions that support High Value Business Services. These institutions can be better leveraged to increase engagement with students to take on internship positions and work opportunities in the Lehigh Valley. Efforts to get local employers into classrooms to have discussions with students can also help bridge this gap.

The Lehigh Valley is within five hours proximity to numerous cities and can leverage its quality of life offering to attract talent.

Professional services are not seeing the retirement impact as severely as skilled trades and some retired workers are returning to the workforce as part-time workers.

Many occupations in High Value Business Services are more likely to be remote, which is concerning for employers looking to keep their workforce local but can also be leveraged to attract the best talent from all over the US.

PRIORITY OCCUPATIONS FOR FOCUS

The following occupations have been identified within this sector as having the greatest projected growth (by number) over the coming five years and therefore should be a priority for programming, attraction, and development (Source: Emsi Burning Glass, 2020-2025, Northampton and Lehigh Counties):

- Accountants and Auditors
- Software Developers and Software Quality Assurance Analysts and Testers

LIFE SCIENCE RESEARCH AND MANUFACTURING

OVERVIEW

The Life Science Research and Manufacturing sector is comprised of 20 six-digit NAICS industries in pharmaceutical and medicine manufacturing; navigational, measuring, electromedical, and control instruments manufacturing; medical equipment and supplies manufacturing; professional and commercial equipment and supplies merchant wholesalers; scientific research and development services; and medical and diagnostic laboratories. Life Science Research and Manufacturing is the smallest of the target sectors with 6,207 jobs in the Lehigh Valley in 2020 but is growing in employment and number of facilities and has been targeted by LVEDC. As of 2020, there are 174 Life Science Research and Manufacturing business establishments within the Valley.

Between 2020 and 2025, the Lehigh Valley can expect to grow the sector 5%, aligning with state growth. Average earnings per job⁷ are \$116,285 in the Lehigh Valley, lagging the state average of \$139,030. Life Science Research and Manufacturing job growth in the Lehigh Valley outpaces sector growth in the comparative regions of the Greenville MSA and Essex and Hudson Counties. Looking forward to 2025, the sector is expected to continue gaining jobs in the Lehigh Valley while the comparative regions are anticipated to experience a decline.

The highest-earning sector in Life Science Research and Manufacturing is Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) with average earnings per job of \$191,263. This sector has historically declined within the Lehigh Valley and is projected to continue declining into 2025.

Medical and Botanical Manufacturing has grown nearly 300% from 2015 to 2020, adding 204 jobs. Growth is projected to continue into 2025, and the Lehigh Valley can expect to add 158 new positions for a growth of 39%.

The most represented occupations in the target sector are Clinical Lab Technicians, Assemblers and Fabricators, Phlebotomists, and Packaging and Filling Machine Operators, together representing about 20% of Life Science Research and Manufacturing jobs.

Packaging and Filling Machine Operators and Tenders and Miscellaneous Assemblers and Fabricators grew at 157% and 90%, respectively between 2015 and 2020. With lower educational requirements of high school diplomas and their equivalent, these positions can more readily grow talent. However, low median annual earnings of \$38,000-\$39,000 per job have led to retention challenges.

Workforce is a critical issue for Lehigh Valley's Life Sciences Research and Manufacturing. Lehigh Valley employers were asked, "how important is a skilled workforce for the future growth of your operations in the Lehigh Valley," and 100% indicated it is important or very important.

During COVID, and despite it, Life Sciences Research and Manufacturing businesses in the Lehigh Valley added employment and are expecting to continue adding employees. Of those responding to the survey:

- 48% indicated they had gained employment (have higher employment levels) in the last 12 months, 18% had fewer employees, and 34% had the same number of employees.
- 100% of the Lehigh Valley employers have hired workers in the last 12 months.

⁷ Average Earnings per Job: Total annual earnings of a regional industry (wages, salaries, profits, benefits, and other compensation) divided by the number of jobs in the industry.

- 82% expect to have more employees in the next 12 months and 100% anticipate hiring workers in the next 12 months.

CHALLENGES

Life Science Research and Manufacturing businesses are experiencing significant challenges to hiring. Of those responding to the survey:

- All have experienced challenges in recruiting, hiring, or retaining talent in the last 12 months.
- Each surveyed Life Science Research and Manufacturing employer provided specific input into the positions they have difficulty recruiting, hiring, or retaining. Responses included entry level technicians, mechatronics, lab workers, quality control and assurance, manufacturing, engineering, volume production labor, regulatory affairs, warehouse support, service technicians, etc. Other top jobs that they have difficulty recruiting, hiring, or retaining include technicians (64%), equipment operation and maintenance (55%), and engineering services and support (45%), production (45%), and logistics and supply chain (45%).

Advanced Manufacturing Training has the largest hiring gap in Life Science Research and Manufacturing, with 641 more projected annual job openings than annual program completions. Another key training program for this sector is Clinical/Medical Laboratory Technician, which has a gap of 65. The program trains for Clinical Laboratory Technicians, an occupation with 964 jobs in the Lehigh Valley and 72 annual projected job openings. However, the program graduates less than 10 students annually, all of which are at the associate degree level.

In terms of satisfaction with workforce attributes, employers are most concerned about the availability of needed required skills. Of Life Sciences Research and Manufacturing businesses responding to the survey:

- 100% were dissatisfied or very dissatisfied with the availability of required skills to meet their needs. Employability/ soft skills were also a concern with 82% dissatisfied or very dissatisfied and career experience with 82% as well. Education levels were less of a concern than the top issues but still high with 73% reporting dissatisfied or very dissatisfied.
- Respondents indicated that due to the small size of the sector in Lehigh Valley, almost all businesses are experiencing the same levels of problems and looking for similar talent in Lehigh Valley.

Focus groups and interviews also reveal challenges specific to production and manufacturing in Life Sciences:

- The market for production workers is very competitive making it difficult to find workers in the Lehigh Valley.
- Difficult to retain entry level workers due to industry required adherence to strong protocols in clean rooms and labs and even in manufacturing settings. Requires both training and willingness to learn on the job as well as in advance of being hired.
- Difficult to attract people due to lack of transportation, especially for 2nd and 3rd shifts.
- Standards in hiring have been adapted to meet workforce needs, however, industries such as pharmaceuticals cannot lower background standards.
- High entry-level education requirement.

COVID-19 is expected to continue impacting the Life Science Research and Manufacturing employers in the Lehigh Valley. Survey respondents expect the COVID-19 pandemic to have somewhat of a significant impact.

Remote work is expected to decrease. Approximately 27% of Life Science Research and Manufacturing employers in Lehigh Valley expect less than 25% of their workforce to work remotely with another 27% expecting 26% to 50% of their workforce to work remotely. Compared to their current staffing levels, remote work is expected to decrease across Life Science Research and Manufacturing employers in Lehigh Valley. Customer service representatives are the most likely occupation within the sector to be remote. Some employers noted that the transition to remote work was difficult for some workers who were not trained to work from home.

OPPORTUNITIES

- The Lehigh Valley's strength in Health Care and Manufacturing are assets to growing Life Science Research and Manufacturing industries.
- Surgical and Medical Instrument Manufacturing is highly concentrated in the Lehigh Valley with a location quotient of 5.0, indicating it is five times more prevalent in the Lehigh Valley than the nation. This concentration of 1,401 jobs in 2020 is comprised of three companies. There are opportunities to further support these operations and develop support services.
- The Lehigh Valley is projected to experience a hiring surplus for the Chemistry and Chemical Engineering programs, based on job demand and educational completions. About 70% to 80% of the programs' completions are at the bachelor's degree level, and most of the remaining completions are for graduate degrees. Life Science Research and Manufacturing businesses can hire these well-educated and skilled students from local universities, retaining talent in the Lehigh Valley.
- Like the other sectors, General and Operations Managers is a top earning occupation within Life Sciences Research and Manufacturing. This is an occupation that, based on skills and practices, can for some companies and under certain environments be performed remotely. The Lehigh Valley can attract and leverage out-of-region talent to help fulfill some of the regional workforce needs. Additionally, workforce organizations in the Lehigh Valley can work to support organizations in need of these high earning positions to assist in training to grow workers from within.
- Education and training have the opportunity to start earlier in the K-12 system, some employers noted the need to incorporate components of training at the middle school level.
- Employers are working with local colleges and manufacturers to develop specialized programs to support production and automation roles.

PRIORITY OCCUPATIONS FOR FOCUS

The following occupations have been identified within this sector as having the greatest projected growth (by number) over the coming five years and therefore should be a priority for programming, attraction, and development (Source: Emsi Burning Glass, 2020-2025, Northampton and Lehigh Counties):

- Clinical Laboratory Technologies and Technicians
- Phlebotomists
- Packaging and Filling Machine Operators and Tenders

TRANSPORTATION, WAREHOUSING, LOGISTICS, AND WHOLESALE

OVERVIEW

Transportation, Warehousing, Logistics, and Wholesale is comprised of 40 six-digit NAICS industries in wholesale trade; rail transportation; truck transportation; support activities for transportation; and warehousing and storage. In 2020, the Lehigh Valley was home to 36,460 Transportation, Warehousing, Logistics, and Wholesale jobs across 790 businesses. This sector experienced the strongest growth of the target sectors growing by 49% from 2015 to 2020. Transportation, Warehousing, Logistics, and Wholesale is projected to grow by 14% in the Lehigh Valley from 2020 to 2025, growing over three times as fast as state growth (4%). This sector is experiencing organic growth in the Lehigh Valley due to location and infrastructure advantages that make it attractive to companies in this sector. Jobs within this sector provide opportunities to people with limited education and experience, and competition for labor in this sector has driven wages above \$15/hour for low-skilled entry-level jobs. While this sector is not a recruitment target for LVEDC, it remains an important one for understanding associated labor and workforce issues.

Many of the jobs held in this sector have low barriers to entry and are met with lower-than-average wages for the Lehigh Valley at \$60,101. Earnings are higher across the Commonwealth of Pennsylvania at \$71,746 per job. The Lehigh Valley's Transportation, Warehousing, Logistics, and Wholesale sector has grown significantly since 2010, and the region's job figures are comparable to those of Essex and Hudson Counties. At nearly an hour's driving distance away, the Lehigh Valley offers cost competitive sites and labor that can be further leveraged to draw additional jobs to the Valley.

Entry level positions in Transportation, Warehousing, Logistics and Wholesale are typically unskilled and associated with modest earnings. Hand laborers and movers are the most represented occupation in the target sector, and Transportation, Warehousing, Logistics, and Wholesale support 60% of their jobs in the Lehigh Valley. Additionally, the target sector's need for Packaging and Filling Machine Operators, Hand Laborers, and Movers, and Truck Drivers increase likelihood for automation.

Transportation and Material Moving occupations attract the greatest number of in-commuters from outside the region. The Lehigh Valley supported about 46,000 jobs for Transportation and Material Moving occupations in 2020, and about 3,600 of those jobs were held by workers from outside the Lehigh Valley. Many Transportation and Material Moving workers that travel to the region for work are doing so from the lower-wage labor markets located to the north and west of the Lehigh Valley.

Workforce is an important issue for Lehigh Valley Transportation, Warehousing, Logistics, and Wholesale employers for future growth but less so compared to the other target industries - Lehigh Valley employers were asked, "how important is a skilled workforce for the future growth of your operations in the Lehigh Valley," and 53% indicated it is important or very important.

During COVID, many Transportation, Warehousing, Logistics, and Wholesale employers in the Lehigh Valley decreased employment or stayed the same.

- 26% indicated they had gained employment (have higher employment levels) in the last 12 months, 42% had fewer employees, and 32% had the same number of employees.
- However, 100% of the Lehigh Valley employers have hired workers in the last 12 months meaning many likely replaced some lost workers due to turnover.
- Looking ahead, 84% expect to have more employees in the next 12 months and 94% anticipate hiring workers in the next 12 months.

CHALLENGES

Transportation, Warehousing, Logistics, and Wholesale businesses are experiencing significant challenges to hiring. Of those responding to the survey:

- All have experienced challenges in recruiting, hiring, or retaining talent in the last 12 months.
- The top positions that Transportation, Warehousing, Logistics, and Wholesale employers in the Lehigh Valley have difficulty recruiting, hiring, or retaining logistics and supply chain (79%), drivers and equipment operators (74%), and management and supervisor (42%). Approximately 26% of employers indicated other jobs that are difficult to recruit, hire, or retain which include general unskilled workers, production workers, transportation, general laborers, packers, and package handlers, and forklift drivers.

In terms of satisfaction with workforce attributes, employers are most concerned about the availability of needed required skills. Of Transportation, Warehousing, Logistics, and Wholesale businesses responding to the survey:

- 95% were dissatisfied or very dissatisfied with the availability of required skills to meet their needs. Employability/ soft skills were also a concern with 89% dissatisfied or very dissatisfied. Career experience, with 62% dissatisfied or very dissatisfied, was less of a concern and education levels even less so with 28% dissatisfied or very dissatisfied.
- Respondents indicated that they often have to take non-ideal candidates and that this sector is overlooked by many workers. Others note that they must train incoming workers in-house, which decreased the bandwidth of the operations. There is a consensus that the candidate pool is lacking based on the current economic climate. Employers are currently finding it difficult to get applicants to show up to interviews and get past the first day of work.

According to job postings data, communication skills are the most requested baseline skill. The top sought-after specialized skills include sorting, scheduling, forklift operation, and customer service.

Supply and demand data reveal that Ground Transportation has the largest hiring gap in the Lehigh Valley's Transportation, Warehousing, Logistics, and Wholesale sector. The region has three education and training programs related to Ground Transportation, all of which are non-credit, including Truck and Bus Driver/Commercial Vehicle Operation. If historic educational output remains constant, the Lehigh Valley will need nearly 1,500 more workers every year to fill the program area's job openings.

Focus group and interviewees cite the following additional challenges:

- Programs at career and technical schools are in high demand and cannot produce enough students to meet the local need.
- Difficulty attracting and retaining customer service representatives.
- Entry level positions are typically unskilled and associated with modest earnings.
- High turnover in jobs and little room for promotion.
- Perception that younger workforce does not want to "get their hands dirty" and it reflects in their work ethic and work choices.
- Higher earnings across the Commonwealth of Pennsylvania and surrounding New York City/New Jersey are enticing some workers to travel outside the region for higher pay.
- Increasing costs of labor have caused several companies in the Lehigh Valley to become price competitive, offering sign on bonuses, increasing hourly wages, offering referral programs, and increasing benefits packages.

- Supply chain disruptions during the COVID-19 pandemic hindered productivity, and in some cases led to the closure of operations.

COVID-19 is expected to continue impacting many of the Transportation, Warehousing, Logistics, and Wholesale businesses in the Lehigh Valley with 24% of survey respondents indicating a significant or very significant impact, 52% somewhat of an impact, and 24% no impact at all.

Remote work is less prevalent in Transportation, Warehousing, Logistics, and Wholesale compared to the other target sectors. The Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley do not expect to have a large remote workforce with 82% of employers indicating they expect less than 25% of their workforce to work remotely.

OPPORTUNITIES

- General Studies graduates from higher education institutions are a resource to regional employers looking for college completers to fill positions. Lehigh Valley employers recruit from local trade schools and leverage relationships with local high schools, colleges, Chamber of Commerce, Workforce Board Lehigh Valley, PA CareerLink® Lehigh Valley.
- General and Operations Managers in the sector grew by 244 jobs between 2015 and 2020, for a growth of 103%. The occupation's typical entry level of education is bachelor's degree with high median annual earnings of \$102,034.
- For certain industries and within certain companies and under the right conditions, General and Operations Managers' functions can be performed remotely or in a hybrid in-person and remote model. However, remote and hybrid work for General and Operations Managers is more challenging and less common within Transportation, Warehousing, Logistics, and Wholesale industries as well as Manufacturing. . Therefore, incorporating ways to upskill current employees into these positions and by offering incentives for management positions to transfer to the Lehigh Valley will help to support the local economy. Several sector stakeholders indicated that PA CareerLink® and Lehigh Valley LINC have been instrumental in providing quality of life guidance to secure transfers and new talent into the region.
- Sales representatives are the eighth-most common job within the sector with 978 jobs in 2020. This occupation has lower entry level requirements of a high school degree or GED and above-average earnings of \$71,683.
- A strong demand for CDL drivers in the Lehigh Valley will continue, seeing that General Freight Trucking industries are anticipated to increase by 403 jobs between 2020 and 2025. Moreover, there is a strong need to ensure certified drivers are employed in local operations to fulfill the region's employer demand. Opportunities for employers to supplement training can help to fill this gap.

PRIORITY OCCUPATIONS FOR FOCUS

The following occupations have been identified within this sector as having the greatest projected growth (by number) over the coming five years and therefore should be a priority for programming, attraction, and development (Source: Emsi Burning Glass, 2020-2025, Northampton and Lehigh Counties):

- Laborers and Freight, Stock, and Material Movers, Hand
- Light Truck Drivers
- Heavy and Tractor-Trailer Truck Drivers
- Industrial Truck and Tractor Operators
- Stockers and Order Fillers

- First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors
- Packers and Packagers, Hand

STRATEGY AND RECOMMENDATIONS

Using the findings and resulting analysis from all the sources of data and information for this study including the labor market data analysis, employer survey, focus groups, and interviews, strategy recommendations are provided. Using the detailed strategy and actions recommended from the 2018 study as a base, an updated action plan matrix is provided as a separate deliverable and includes input from LVEDC and WBLV on status to date. In addition, guidance and recommendations are provided based on the updated information and analysis completed as part of this study. Additionally, below we have provided additional strategies and details based on the work completed for this study. Most all recommendations apply to the system overall, meaning they are intended to be developed and implemented by a variety of stakeholders as appropriate as opposed to being meant for LVEDC or WBLV to complete alone. These also build on and support the “Opportunities” presented for each of the targeted industries.

STRATEGY

- **Continue to focus on skills** – While labor supply shortages are a concern, employers across all the sectors are most concerned with acquiring and retaining workers with the skills needed for success. The highest priority for skill development, and which has already been identified by LVEDC and WBLV, are employability and soft skills. Employability/ soft skills are important to all of the sectors and businesses within the Lehigh Valley, and no one sector or organization can address it alone. All together, the skills to focus on include:
 - Employability and "soft skills" availability and quality. This includes critical thinking or problem-solving skills, communication and interpersonal skills, digital literacy, adaptability, basic math and writing, and emotional intelligence. These skillsets are common across all industries and occupations. A priority should be to develop programs for training and certification that all employers can buy into and support that is basic, offered digitally, affordable, and results in work-ready certification.
 - Technical skills which are specific to the sectors and noted in the findings through education, training, and industry partnerships.
 - Expand STEM skills criteria to be applicable to all industries. While STEM is still important and there are "STEM high-intensive industries", STEM skills and learning is critical across all industries and occupations. Most past efforts in STEM and workforce across the US fail to recognize its integration across all sectors and occupations and create "either /or approaches" and are attainable to only persons perceived to have high interest and aptitude. Going forward the focus should be on STEM integration as a critical skill set across all occupations and industries along with other technical and employability/soft-skills.
 - Develop short-term immediate training – Short-term immediate training is needed for workers to meet the need of employers with employer input that leads to hiring.
 - Clarify understanding of organizations within the Lehigh Valley and their missions – There is an opportunity to create new partnerships within the Lehigh Valley to further workforce objectives. It was noted that career and technical schools are

sometimes utilized to place students that may not be on a traditional path instead of solely focusing on sending students with interest and aptitude for trades. This is an example where education institutions and career and technical schools can work together to best place students in the Lehigh Valley.

- **Continue to develop and adopt digital tools to support all aspects of communication, learning, training, information sharing, collaboration, and working** – The adoption and integration of digital technologies into education, workforce, economic development, and industry were happening rapidly prior to COVID and have accelerated since. This offers new opportunities for integration with in-person and traditional methods for even greater impacts and awareness of the opportunities within the Lehigh Valley. This includes:
 - Life-long learning, training, and certification which is accessible and scalable
 - Mentorships and internships
 - Digital dashboards and access to data, including advanced analytics for targeted talent attraction such as accessing data on people/talent movement and migration
 - Communications, sharing of resources, stories, best practices
 - Modernizing job fairs and events through tools such as virtual tours and experiences
 - Building and maintaining digital platforms that connect employers and education
- **Renew focus on bringing all ages into the workforce** – Focus groups indicated that the pandemic has led to employees reconsidering their career options. Many are prioritizing work from home, starting their own business, and searching for a work-life balance. This unique period of time in history is requiring employers and workforce organizations to consider shifting expectations and envision a future where the needs of a wider age range of individuals are being met.
 - The aging population, and particularly Baby Boomers, will continue to contribute to labor supply shortages as they retire from the workforce. This is true across many industries and particularly a problem in manufacturing and transportation/logistics. There were also a significant number of people who retired earlier than anticipated due to COVID. People are living longer and needing financial means as well as wanting to do meaningful work.
 - In order to address the workforce constraints in the Lehigh Valley, it must be a priority to understand the needs of and then attract older workers will both increase the supply of labor and help provide mentorship for younger workers.
 - The younger workforce is focused on locating in a place where there is a sense of community. Without a sense of community, it is difficult to retain that talent. At the moment, there is a disconnect in what employers think workers are trying to achieve, which can inhibit hiring and retention. The Lehigh Valley partners need to work together and share understanding and practices on how to support a workforce with differing expectations and views of job satisfaction and opportunities.
 - Intensify talent attraction initiatives and campaigns including targeting through talent and people analytics and digital campaigns to reach workers across the globe. Digital campaigns and analytics can be tracked over time to improve targeting and results.

- **Prepare for a future of hybrid, remote, and in-person learning, training, and working** – When the last strategy was developed, no one could have anticipated the impact that the COVID-19 pandemic would have. COVID has created the need for greater use and acceptance of remote capability for both learning and work. However, in terms of work, remote was not seen by employers as highly applicable or desirable. Much of this stems from the nature of the targeted industries and occupations in the Lehigh Valley which currently require "high touch" or in-person work, including Healthcare; Manufacturing (Advanced and Life Science); and Transportation, Warehousing, Logistics, and Wholesale. The exception is High Value Business Services, which has been and will likely continue to be more conducive to remote work. The data and research for this study reveals that while remote work is less applicable for several of the industries and occupations it will continue to be a factor including hybrid options, though not at levels required during COVID. Therefore, it is recommended that a new strategy that helps businesses and workers adapt to remote work and a new strategy for helping business recruit and retain remote workers be prioritized. Several are already doing this, but all can learn from each other. This will serve to increase flexibility and options including for those with challenges to access. This includes:
 - Skills for workers and employers on how to effectively work remotely and in hybrid situations as well as policies and practices
 - Assistance to employers in finding and retaining remote workers to meet their workforce needs while simultaneously attracting workers remote and in-person to live and remain in the Lehigh Valley
- **Ensure people can get to jobs and remain employed** – The current labor shortage is exacerbated by a lack of adequate and affordable housing, public transportation, and childcare/family care options. This was made clear through surveys, focus groups, and interviews and we see it as a primary role for economic and workforce organizations. This is also supported in recent national research on labor force participation.
 - There is a need to leverage key partnerships to ensure the workforce can get to places of employment and remain employed with flexibility that meets the needs of both employees and employers. This is especially true of industries and occupations that are subject to odd hours or "shift-work". This will require public and private investment and can be accomplished through partnerships among municipalities, professional organizations, industry/business, developers, and service providers.
 - Continue and support efforts aimed at diversity, equity, and inclusion. According to the Lehigh Valley Talent Survey, approximately 75% of Lehigh Valley employers are engaging in diversity, equity, and inclusion initiatives. This should be supported and continued to address labor supply constraints. Systemwide efforts should be broadened to include persons with disadvantages and challenges to education, training and workforce access including, minority populations, persons previously incarcerated; persons with physical, emotional, and mental disabilities; and persons recovering from substance use disorders.
- **Continue the process and commitment to stakeholder engagement and collaboration** - The current system of partnership and collaboration is working well and should be maintained and leveraged for further success. This includes the Education and Talent Supply Council created from recommendations of the earlier Talent Study. LVEDC created an Education and Talent Supply Council, which is a partnership of educational institutions, employers, and workforce agencies in the region whose focus is to create and execute regional strategies that will help the Lehigh Valley

maintain a competitive workforce and talent supply. The engagement, input, and support throughout this study was strong. This was backed by focus groups and interviews. It provides a proven and effective means for the primary way to communicate, coordinate and collaborate.

APPENDIX I: LABOR MARKET ANALYSIS

Labor Market Analysis of the Lehigh Valley

Focusing on Talent Retention, Migration, and Attraction

November 2021





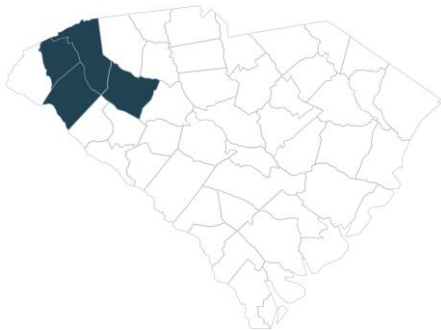
INTRODUCTION

The Labor Market Analysis and Skills Gap Analysis is designed to quantify the talent supply for Lehigh Valley's target sectors and includes a demographic profile, industry metrics, occupational metrics, remote worker indices, and more. The analysis starts with an overview of the Lehigh Valley demographics and economy as a whole then each of the Lehigh Valley's target sectors are evaluated individually, using current labor market intelligence (LMI) and real-time job postings. The five sectors that were chosen due to 1. the significant number of workers the sectors employ, 2. the employers' concerns about their access to talent, and/or 3. the potential strategic growth for these sectors in the Lehigh Valley. These target sectors are:

- Advanced Manufacturing
- Health Care
- High Value Business Services
- Life Science Research and Manufacturing
- Transportation, Warehousing, Logistics, and Wholesale

The Labor Market Analysis of the Lehigh Valley is a snapshot of in-demand jobs that present opportunities to aid workforce development efforts, emphasizing high-wage jobs and careers in the target sectors. Throughout the analysis, data for the Lehigh Valley are compared with benchmark regions, provided by LVEDC and WBLV. The comparative regions are Lehigh County, Northampton County, the Commonwealth of Pennsylvania, the Greenville-Anderson South Carolina MSA (Greenville MSA),⁸ and Essex and Hudson Counties in New Jersey. These areas were chosen as benchmarks due to similar characteristics and shared aspirational sector goals. Figures 2 and 3 show the locations of the Greenville MSA and Essex and Hudson Counties. This report, along with the Labor Market Analysis dashboard, are designed to promote Lehigh Valley stakeholder engagement and deepen the relationship between regional employers and its residents, to advance upskilling and reskilling career opportunities.

Figure 4: Anderson, Greenville, Laurens, and Pickens Counties comprise the Greenville-Anderson MSA in South Carolina



Source: Region provided by LVEDC.

Figure 5: Essex and Hudson Counties are in northern New Jersey



Source: Region provided by LVEDC.

⁸ MSA refers to a metropolitan statistical area. MSAs consist of one or more counties and contain a core area with a substantial population that has a high degree of economic and social integration with the surrounding areas. Source: BLS.



ABOUT THE LEHIGH VALLEY

The following assesses trends, gaps, and opportunities for the economy in Lehigh Valley prior to assessing each target sector.

TRENDS

- As of 2020, the region's population increased by 2.5% since 2015, growing by 16,741. The population is expected to increase by 3.0% between 2020 and 2025, growing by 20,146 people. The Lehigh Valley's population and job growth have outpaced growth in Pennsylvania.
- Jobs in the Lehigh Valley increased by nearly 10% between 2010 and 2020, whereas jobs in Pennsylvania increased by about 2%.
- Unemployment in the Lehigh Valley drastically increased in April 2020 due to COVID-19 and started to recover in September 2020.
- The Lehigh Valley's recent growth in job postings points to an economic recovery amid the COVID-19 pandemic.
- In 2019, there were 12,743 graduates in the Lehigh Valley⁹ ranging from certificates to master's degrees or higher.

GAPS

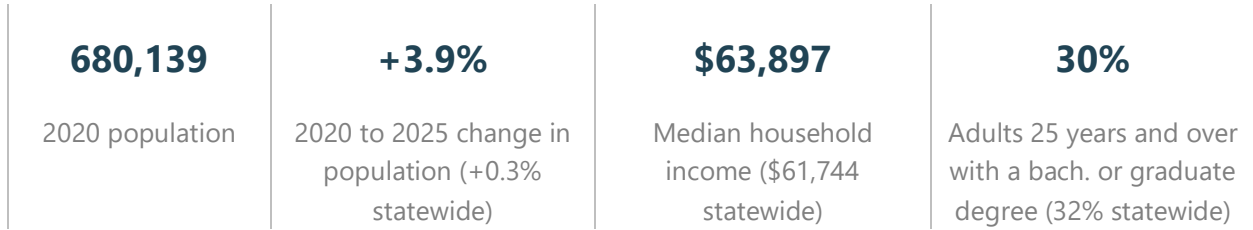
- Despite a variety of educational institutions, the educational attainment in the Lehigh Valley is slightly below the average in Pennsylvania for bachelor's degrees and graduate degrees.
- There is a mismatch between educational attainment and jobs in the Lehigh Valley. As a region, a third of the workforce is comprised of people whose highest level of education is a HS/GED. Based on job postings data, 42% of jobs within the Lehigh Valley require an HS/GED. There is a small demand for graduate degree candidates (5%), despite 12% of the population having a graduate degree or higher. This trend is not unique to the Lehigh Valley and is occurring in the comparative geographies of the Greenville MSA and Essex and Hudson Counties.
- Retirement could pose a threat to labor supply. Baby Boomers, who are likely to retire within the next decade, accounted for nearly one quarter of the Lehigh Valley's population in 2020.

OPPORTUNITIES

- While the top 10 occupations experiencing the largest decline from 2015 to 2020 are largely low earning positions with median annual earnings in the \$20,000s to \$30,000s, occupations that grew the most from 2015 to 2020 have overall higher earnings.
- The Lehigh Valley offers a lower cost of living, lower housing prices, and a high quality of life compared to nearby Essex and Hudson Counties, NJ. Population has and is projected to continue growing.
- The businesses, organizations, and higher education institutions in the Lehigh Valley attract well-educated professionals and efforts to retain this talent is critical to the growth of the Lehigh Valley.

⁹ Graduates or program completions include all postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University in Monroe County.

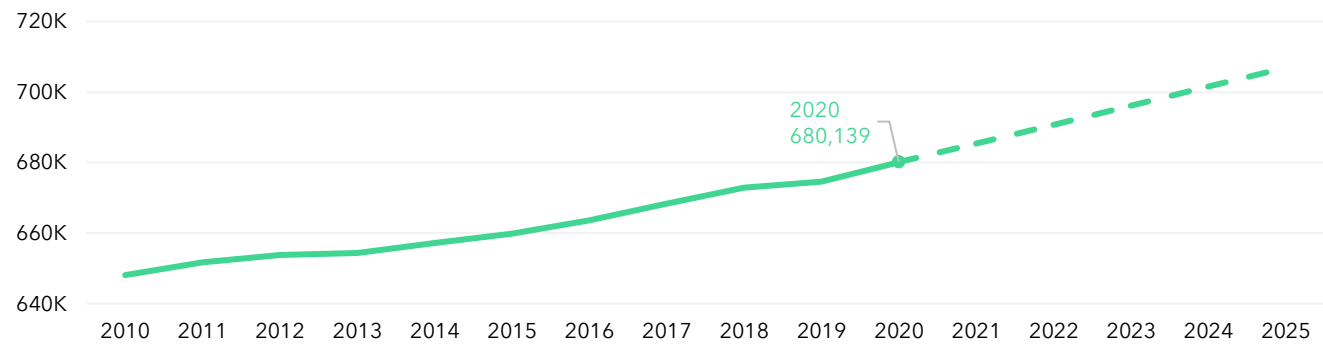
Figure 6: About Lehigh Valley



Source: Emsi Burning Glass Q2.2021 Dataset.

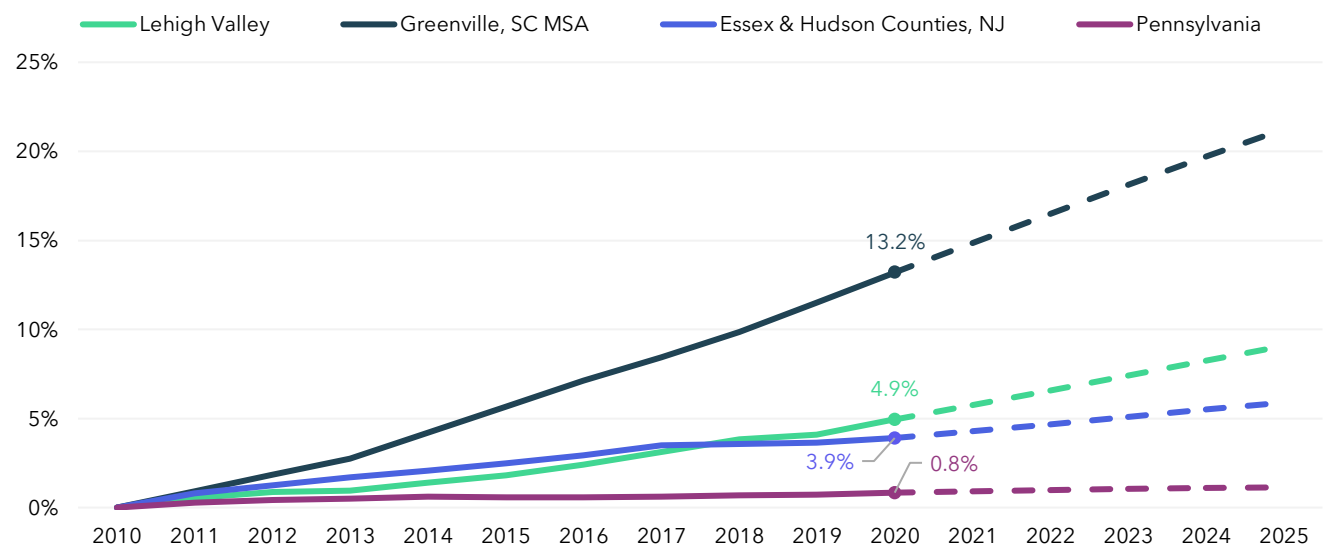
POPULATION TRENDS

Figure 7: In 2020, about 680,000 people lived in the Lehigh Valley.



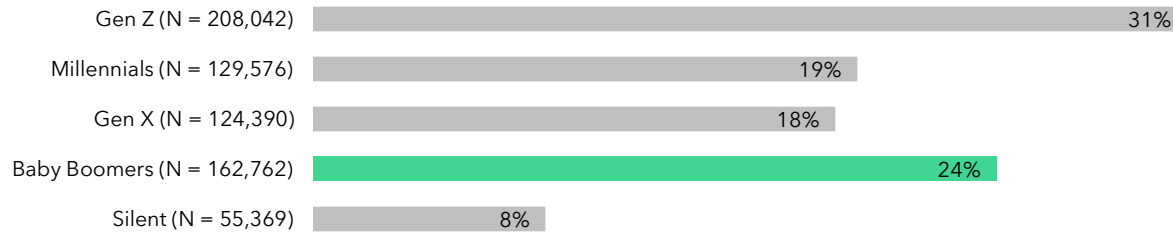
Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 8: The Lehigh Valley's population increased by 4.9% between 2010 and 2020, compared to the population in the Greenville-Anderson MSA that increased by 13.2%.



Source: Emsi Burning Glass Q2.2021 Dataset.

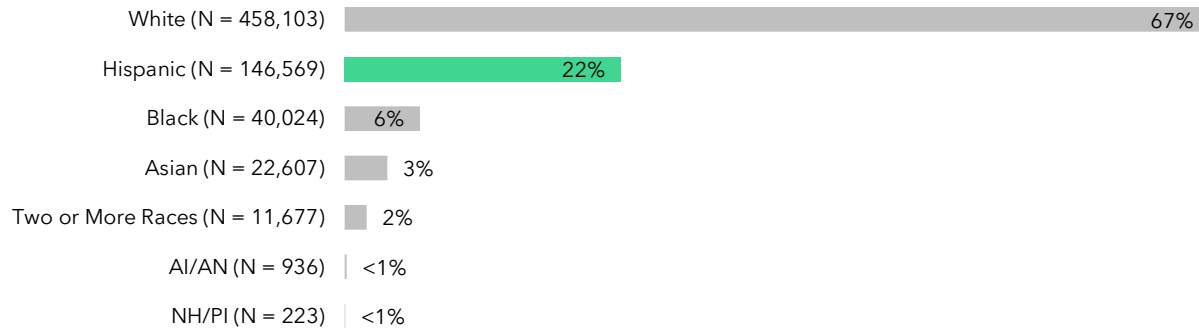
Figure 9: Baby Boomers, who are likely to retire within the next decade, accounted for nearly one quarter of the Lehigh Valley's population in 2020.



The Silent generation was born between 1925 and 1945. Baby Boomers were born between 1946 and 1964. Gen X was born between 1965 and 1980. Millennials were born between 1981 and 1996. Gen Z was born after 1997.

Source: Emsi Burning Glass Q2.2021 Dataset.

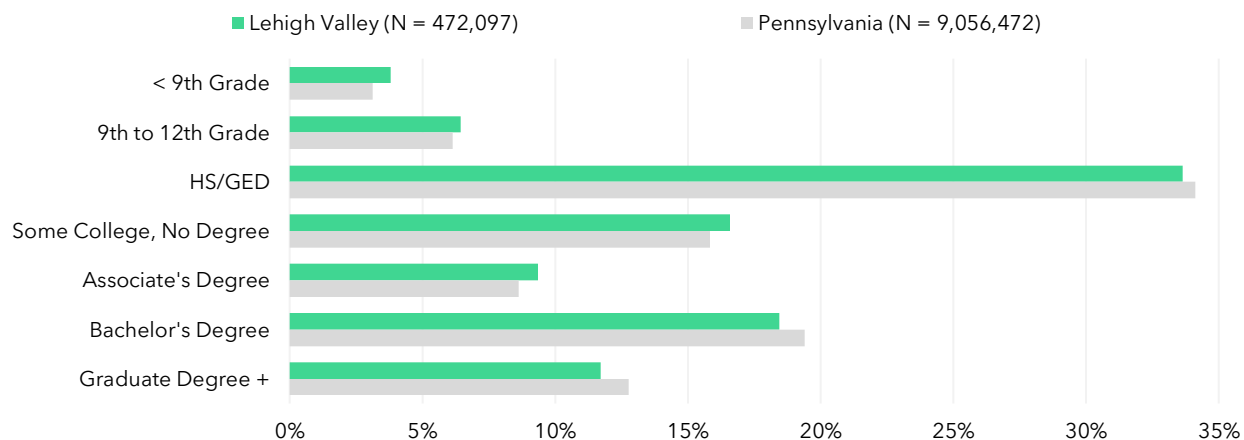
Figure 10: Hispanics account for 22% of the 2020 population.



AI/AN refers to American Indian or Alaskan Native, and NH/PI refers to Native Hawaiian or other Pacific Islander.

Source: Emsi Burning Glass Q2.2021 Dataset.

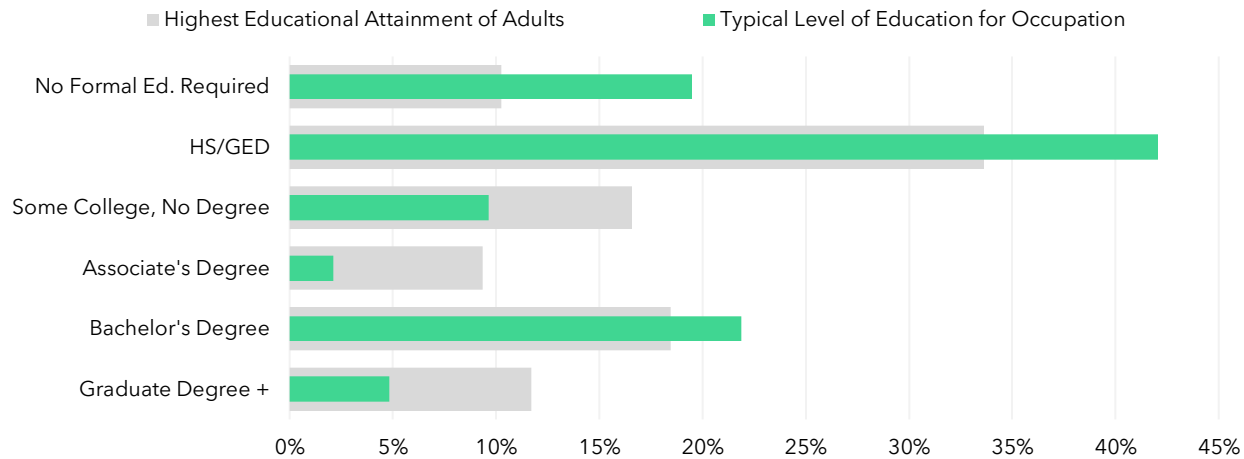
Figure 11: In 2020, the highest educational attainments of Lehigh Valley adults (25 years and above) were similar to those in Pennsylvania.



HS/GED refers to a high school diploma or Test of General Educational Development.

Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 12: Adults (25 years and above) in the Lehigh Valley are more likely to have “some college, no degree” and an associate’s degree relative to the types of education typically required for jobs in the Lehigh Valley



Source: Emsi Burning Glass Q2.2021 Dataset.

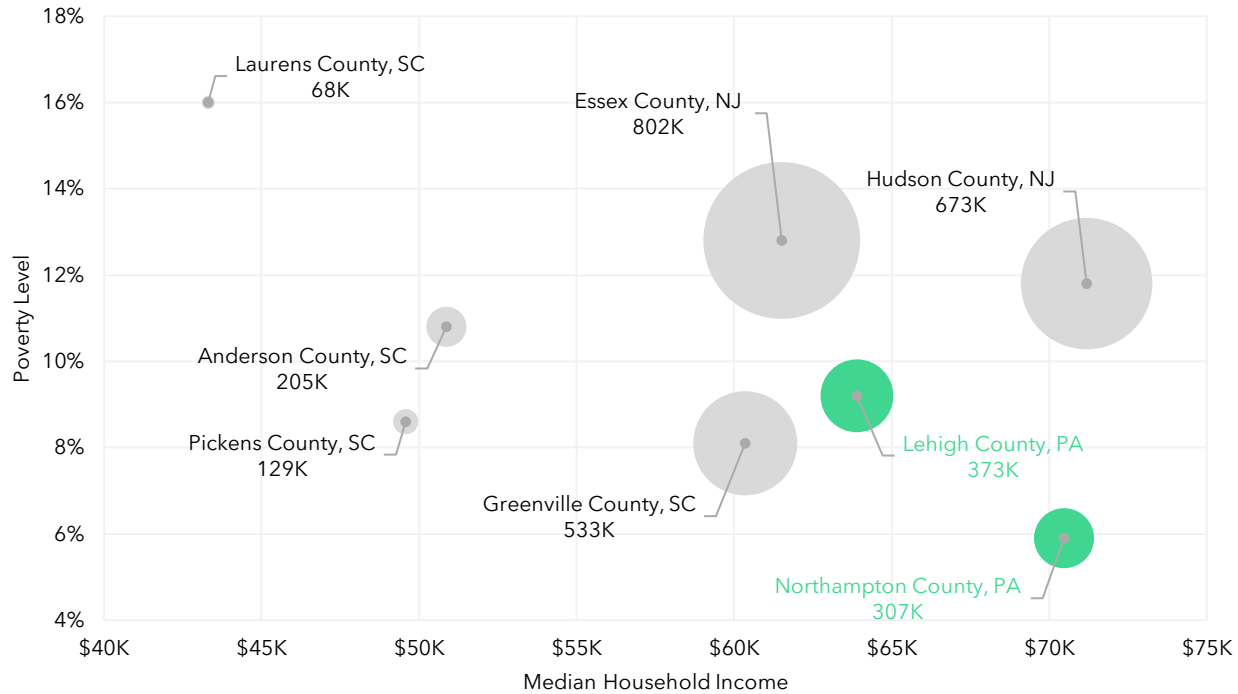
Table 1: Several Lehigh and Northampton County socioeconomic characteristics 2020

| Region | Population | Median Age | Housing Units | Median House Value | COL Index | MHI | Poverty Level |
|------------------------|------------|------------|---------------|--------------------|-----------|----------|---------------|
| Essex County, NJ | 802,481 | 37.6 | 317,314 | \$386,000 | 129.3 | \$61,510 | 12.8% |
| Hudson County, NJ | 672,657 | 35.3 | 282,039 | \$378,000 | 148.6 | \$71,189 | 11.8% |
| Greenville County, SC | 532,555 | 38.2 | 211,100 | \$183,800 | 94.3 | \$60,351 | 8.1% |
| Lehigh County, PA | 372,888 | 39.1 | 146,145 | \$208,200 | 103.6 | \$63,897 | 9.2% |
| Northampton County, PA | 307,251 | 42.2 | 123,159 | \$219,800 | 104.4 | \$70,471 | 5.9% |
| Anderson County, SC | 205,348 | 40.8 | 88,209 | \$145,800 | 98.5 | \$50,865 | 10.8% |
| Pickens County, SC | 128,754 | 36.2 | 54,264 | \$147,700 | 99.1 | \$49,573 | 8.6% |
| Laurens County, SC | 67,982 | 40.7 | 31,345 | \$101,200 | 90.7 | \$43,304 | 16.0% |

COL refers to cost of living, and MHI refers to median household income.

Source Emsi Burning Glass Q2.2021 Dataset.

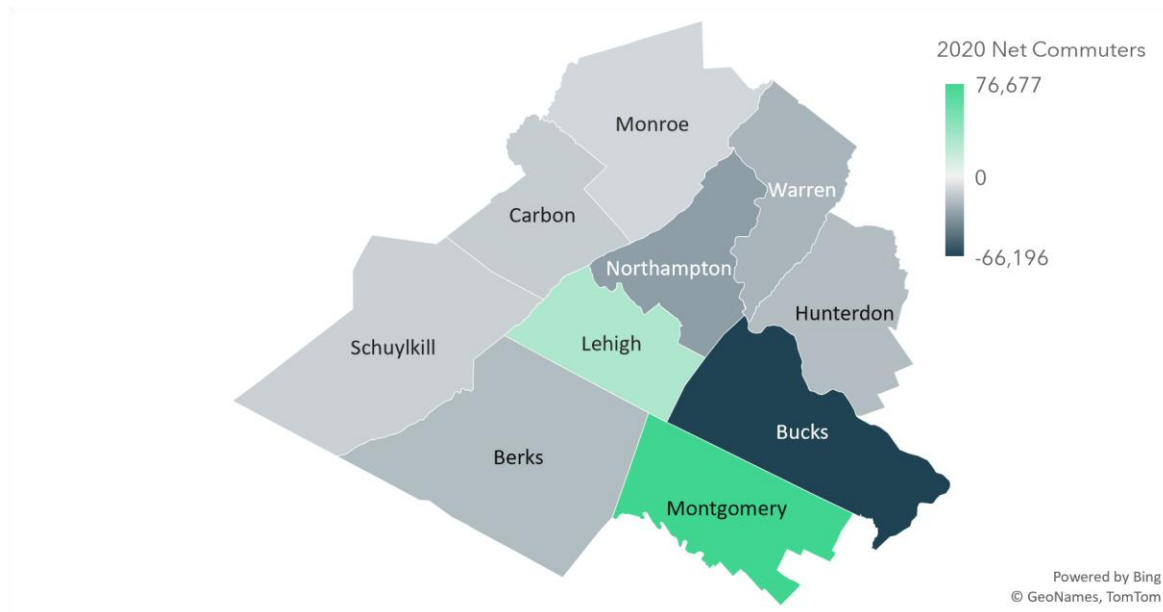
Figure 13: Northampton County had the lowest poverty level, and the Lehigh Valley's median household income was among the highest in the benchmark regions in 2020.



Bubble area represents the region's population in 2020.

Source: Emsi Burning Glass Q2.2021 Dataset.

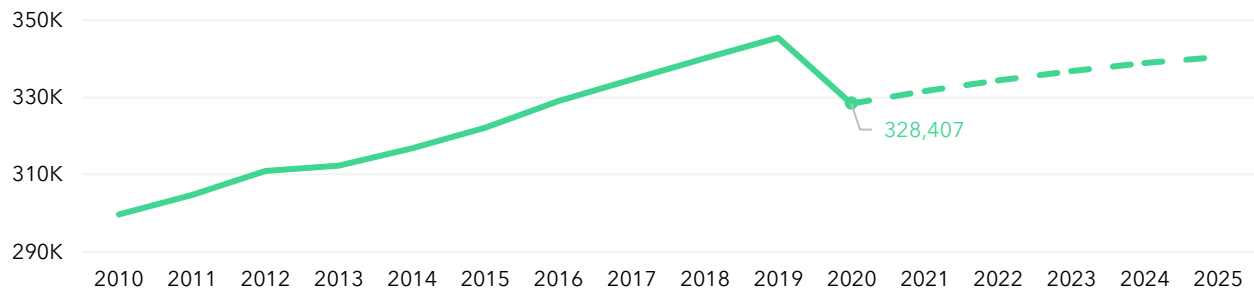
Figure 14: Lehigh County was a net in-commuter region for jobs, whereas Northampton County was a net out-commuter region, based on 2020 jobs in the counties and jobs among the residents living in the counties in 2020.



Source: Emsi Burning Glass Q2.2021 Dataset.

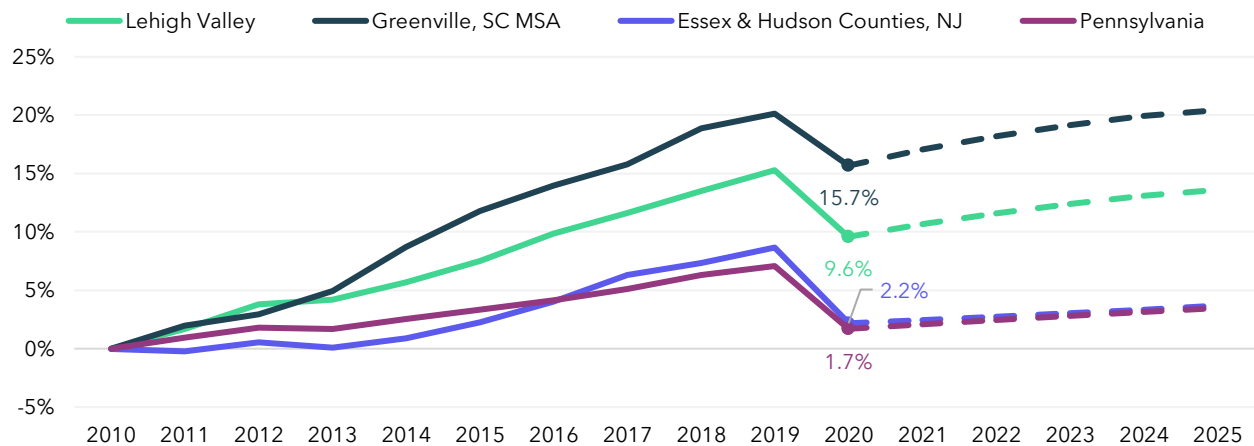
INDUSTRY JOBS

Figure 15: The Lehigh Valley supported 328,407 jobs in 2020.



Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 16: Jobs in the Lehigh Valley increased by nearly 10% between 2010 and 2020, whereas jobs in Pennsylvania increased by nearly 2%.



Source: Emsi Burning Glass Q2.2021 Dataset.

Table 2: The Lehigh Valley's General Medical and Surgical Hospitals sector was the largest employer in 2020, followed by General Warehousing and Storage, which increased by 83% between 2015 and 2020.

| Industry | 2020 Jobs | % Job Change, 2015-2020 | % Job Change, 2020-2025 | Avg. Earnings Per Job | LQ | Payrolled Business Locations |
|--|-----------|-------------------------|-------------------------|-----------------------|-----|------------------------------|
| General Medical and Surgical Hospitals | 17,588 | 8% | 7% | \$78,381 | 1.8 | 10 |
| General Warehousing and Storage | 17,432 | 83% | 17% | \$48,304 | 6.7 | 100 |
| Elementary and Secondary Schools (Local Government) | 15,109 | 4% | 4% | \$86,535 | 1.0 | 237 |
| Local Government, Excluding Education and Hospitals | 9,511 | -4% | -1% | \$82,316 | 0.8 | 149 |
| Offices of Physicians (except Mental Health Specialists) | 9,029 | 11% | 12% | \$142,536 | 1.7 | 358 |
| Colleges, Universities, and Professional Schools | 8,806 | 9% | 5% | \$52,596 | 2.2 | 9 |
| Temporary Help Services | 8,742 | -16% | 1% | \$32,459 | 1.6 | 97 |

| Industry | 2020 Jobs | % Job Change, 2015-2020 | % Job Change, 2020-2025 | Avg. Earnings Per Job | LQ | Payrolled Business Locations |
|--|-----------|-------------------------|-------------------------|-----------------------|-----|------------------------------|
| Full-Service Restaurants | 7,771 | -18% | -6% | \$23,973 | 0.9 | 509 |
| Supermarkets and Other Grocery (except Convenience) Stores | 7,421 | 9% | 6% | \$30,306 | 1.4 | 99 |
| Corporate, Subsidiary, and Regional Managing Offices | 6,956 | -21% | -13% | \$169,813 | 1.5 | 161 |

Industry data are reported at the six-digit NAICS code level. See Attachment 2 for more details on Emsi Burning Glass NAICS.

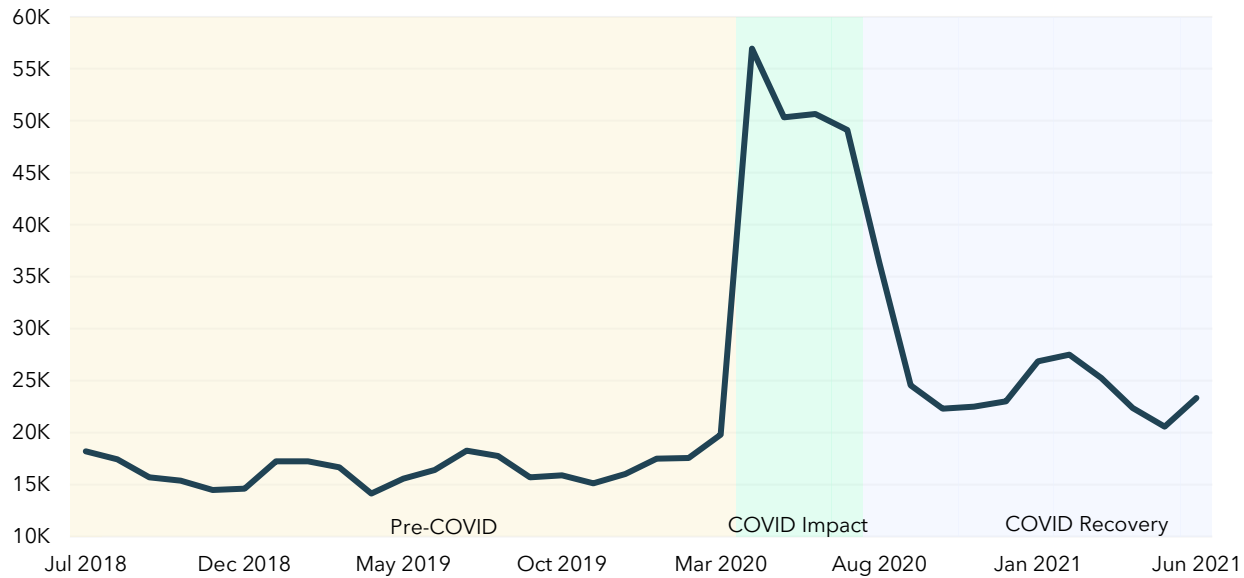
Source Emsi Burning Glass Q2.2021 Dataset.

Table 3: The Lehigh Valley's General Medical and Surgical Hospitals sector had a gross regional product (GRP) of \$1.6 billion in 2020.

| Industry | 2020 Jobs | % Job Change, 2015-2020 | % Job Change, 2020-2025 | Avg. Earnings Per Job | GRP (\$M) |
|--|-----------|-------------------------|-------------------------|-----------------------|-----------|
| General Medical and Surgical Hospitals | 17,588 | 8% | 7% | \$78,381 | \$1,681 |
| Corporate, Subsidiary, and Regional Managing Offices | 6,956 | -21% | -13% | \$169,813 | \$1,402 |
| Offices of Physicians (except Mental Health Specialists) | 9,029 | 11% | 12% | \$142,536 | \$1,384 |
| Elementary and Secondary Schools (Local Government) | 15,109 | 4% | 4% | \$86,535 | \$1,309 |
| General Warehousing and Storage | 17,432 | 83% | 17% | \$48,304 | \$977 |
| Local Government, Excluding Education and Hospitals | 9,511 | -4% | -1% | \$82,316 | \$866 |
| Colleges, Universities, and Professional Schools | 8,806 | 9% | 5% | \$52,596 | \$639 |
| Pipeline Transportation of Refined Petroleum Products | 316 | 2% | 11% | \$296,831 | \$593 |
| Electric Power Distribution | 761 | 9% | 4% | \$166,803 | \$564 |
| Heavy Duty Truck Manufacturing | 1,954 | 20% | -3% | \$89,289 | \$506 |

GRP refers to gross regional product.

Source Emsi Burning Glass Q2.2021 Dataset.

Figure 17: Unemployment in the Lehigh Valley drastically increased in April 2020 and started to recover in September 2020.

Source: Emsi Burning Glass Q3.2021 Dataset.

OCCUPATION OVERVIEW

Table 4: Hand laborers and movers were the largest occupation in the Lehigh Valley in 2020, followed by registered nurses and home health and personal care aides.

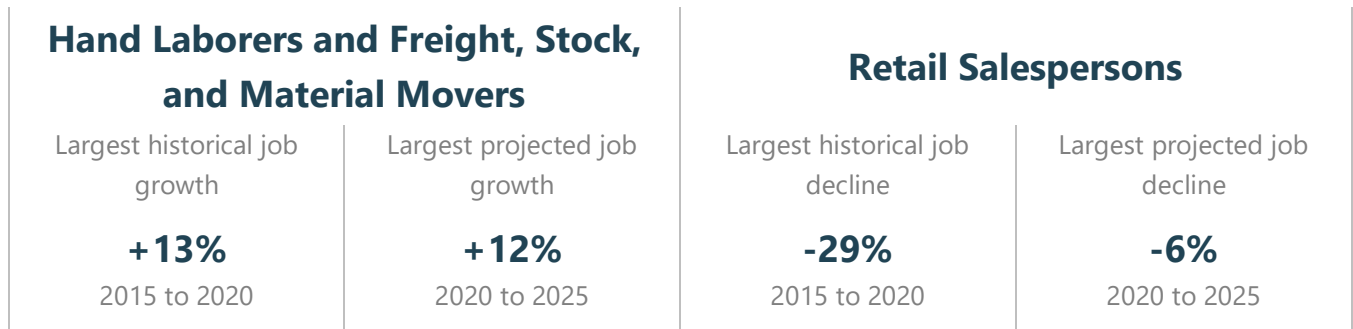
| Occupation | 2020 Jobs | % Job Change, 2015-2020 | % Job Change, 2020-2025 | Remote Worker Index* | Automation Index* | Median Annual Earnings |
|---|-----------|-------------------------|-------------------------|----------------------|-------------------|------------------------|
| Laborers and Freight, Stock, and Material Movers, Hand | 15,561 | 13% | 12% | 25.0 | 117.2 | \$30,529 |
| Registered Nurses | 8,855 | 5% | 7% | 58.7 | 85.3 | \$71,654 |
| Home Health and Personal Care Aides | 7,900 | 25% | 22% | 57.9 | 93.6 | \$26,160 |
| Office Clerks, General | 7,283 | -11% | -2% | 164.1 | 102.0 | \$36,028 |
| Customer Service Representatives | 7,196 | 4% | -3% | 186.0 | 96.4 | \$35,946 |
| Retail Salespersons | 7,170 | -29% | -6% | 87.8 | 93.4 | \$23,323 |
| Cashiers | 6,978 | 0% | -3% | 68.3 | 105.5 | \$23,003 |
| Fast Food and Counter Workers | 6,855 | -20% | 2% | 63.1 | 130.8 | \$21,694 |
| Stockers and Order Fillers | 6,688 | 22% | 7% | 65.0 | 112.3 | \$25,749 |
| Heavy and Tractor-Trailer Truck Drivers | 6,527 | 14% | 8% | 47.1 | 110.1 | \$49,506 |
| Janitors and Cleaners, Except Maids and Housekeeping Cleaners | 5,514 | 4% | 1% | 63.2 | 122.5 | \$31,065 |
| Industrial Truck and Tractor Operators | 5,443 | 39% | 9% | 55.3 | 119.5 | \$37,759 |

| Occupation | 2020 Jobs | % Job Change, 2015-2020 | % Job Change, 2020-2025 | Remote Worker Index* | Automation Index* | Median Annual Earnings |
|---|-----------|-------------------------|-------------------------|----------------------|-------------------|------------------------|
| General and Operations Managers | 4,692 | 52% | 2% | 131.3 | 82.2 | \$102,034 |
| Secretaries and Administrative Assistants, Except Legal, Medical, and Executive | 4,641 | -18% | -4% | 175.2 | 91.4 | \$38,245 |
| Miscellaneous Assemblers and Fabricators | 4,554 | 44% | -2% | 53.9 | 112.6 | \$38,003 |

*The Remote Worker and Automation Indices are 100-based indices, meaning that occupations with an index above 100 have an above average likelihood of remote work or automation, while occupations with an index below 100 have a below average likelihood of remote work or automation, respectively. See Attachment 1 for more details on the Emsi Burning Glass methodology.

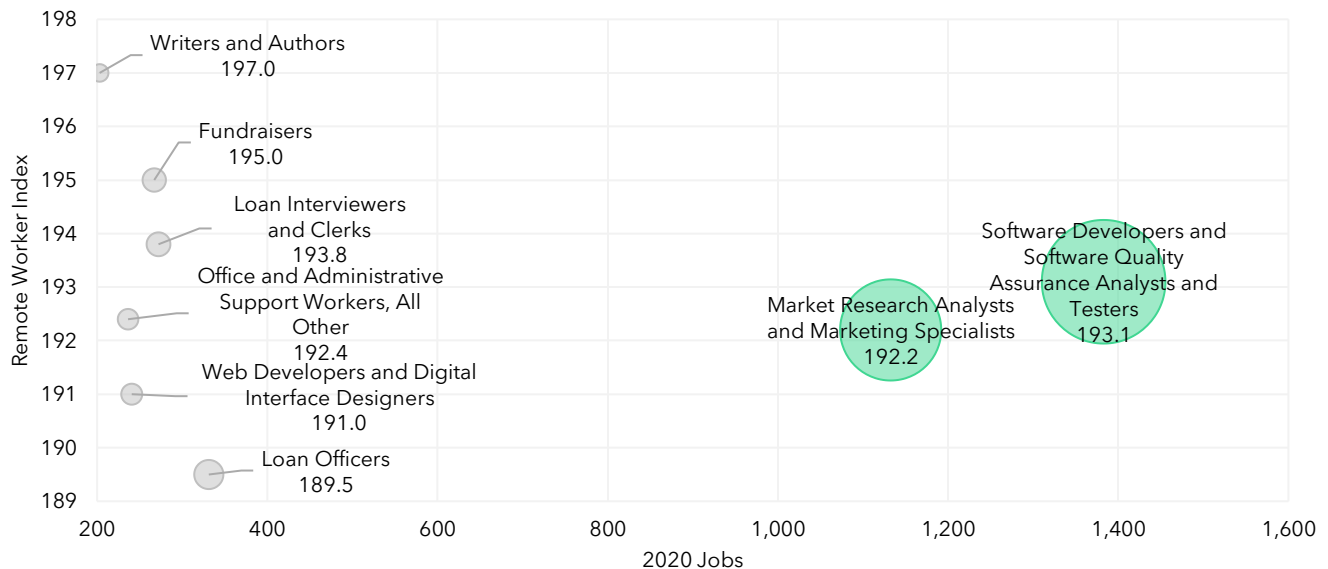
Source Emsi Burning Glass Q2.2021 Dataset.

Table 5: Jobs for hand laborers and movers will continue to grow in the next five years, and jobs for retail salespersons will continue to decline in the Lehigh Valley.



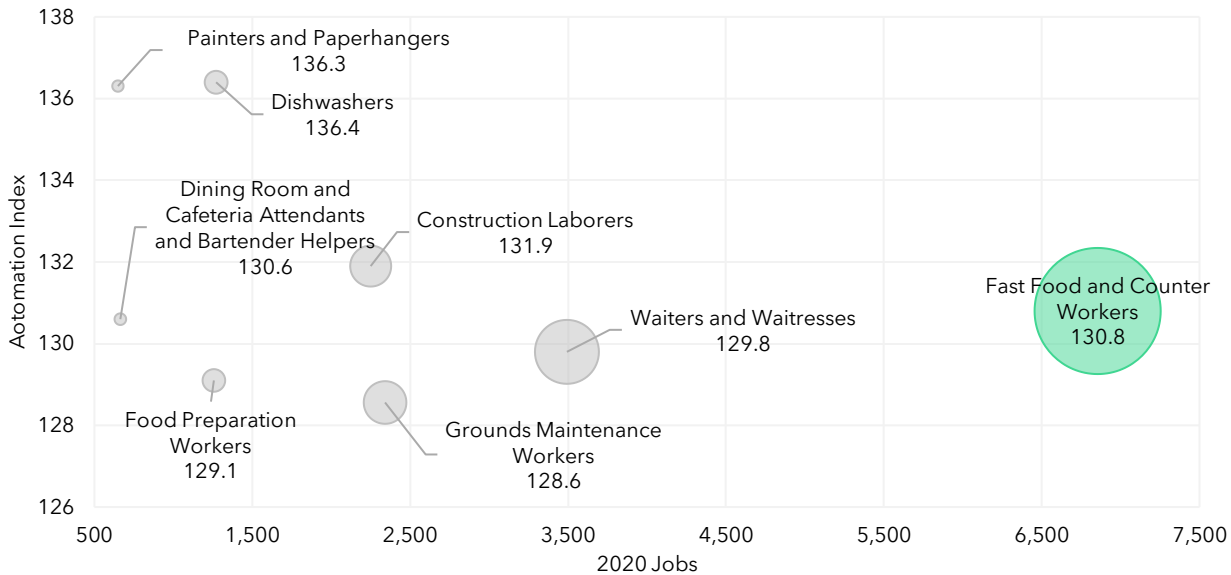
Source Emsi Burning Glass Q2.2021 Dataset.

Figure 18: Software developers and software quality assurance analysts and testers and market research analysts and marketing specialists are two occupations with high remote worker indices employing a substantial number of people in the Lehigh Valley.



The Remote Worker Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of remote work, while occupations with an index below 100 have a below-average likelihood of remote work. See Attachment 1 for more details on the Emsi Burning Glass methodology. Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 19: Fast food and counter workers are among the Lehigh Valley occupations with a high automation index, and the occupation employed a substantial number of people in 2020.

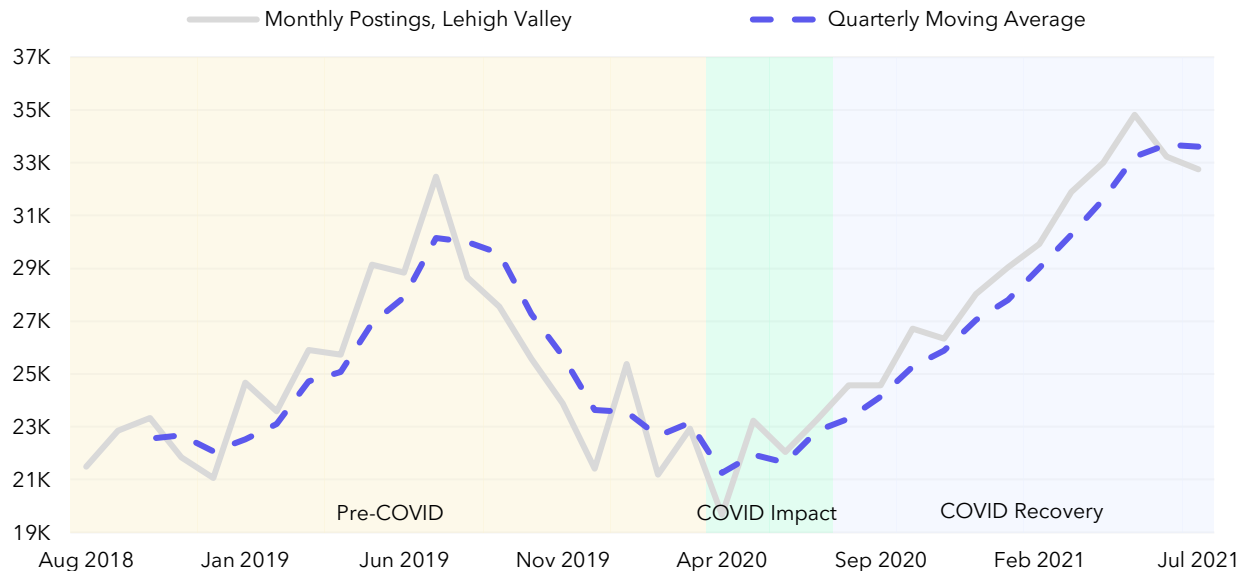


The Automation Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of automation, while occupations with an index below 100 have a below average likelihood of automation. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

JOB POSTINGS

Figure 20: Job postings in the Lehigh Valley have steadily increased since April 2020



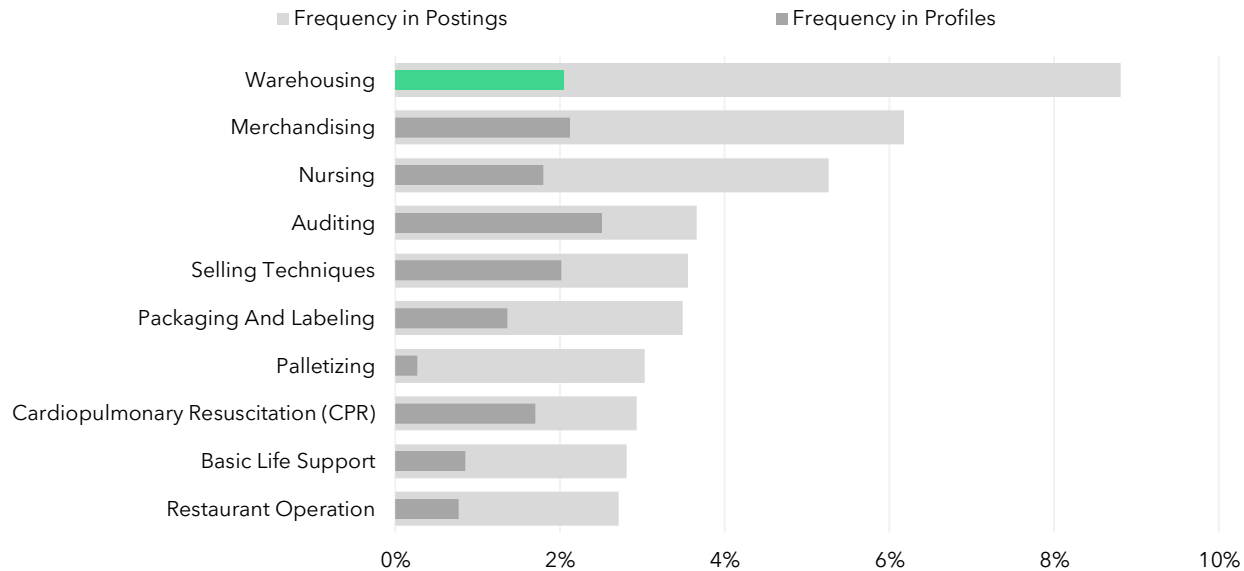
Source: Emsi Burning Glass Q3.2021 Dataset. Quarterly Moving Average is an average over the last 3 months.

Table 6: Heavy and tractor-trailer truck drivers are the most posted for occupations in the Lehigh Valley, and St. Luke's University Health Network is the largest job poster.

| | | |
|---|--|---|
| <p>Heavy and Tractor-Trailer Truck Drivers</p> <p>Most posted for occupation</p> | <p>St. Luke's University Health Network</p> <p>Largest job poster</p> | <p>Administrative and Support and Waste Management and Remediation Services</p> <p>Industry with the most job postings</p> |
|---|--|---|

The Administrative and Support and Waste Management and Remediation Services sector is comprised of 44 industries. The four largest, in terms of Lehigh Valley jobs, are Temporary Help Services, Janitorial Services, Landscaping Services, and Packaging and Labeling Services. Source Emsi Burning Glass Q3.2021 Dataset.

Figure 21: Warehousing, as a skill/experience, appears in 2% of the professional profiles in the Lehigh Valley, but the region's job postings include the skill in nearly 9% of all postings from June 2020-May 2021.



Skills are in descending order of their frequency in job postings. Source: Emsi Burning Glass Q3.2021 Dataset.

ADVANCED MANUFACTURING

Advanced Manufacturing is comprised of 118 six-digit NAICS industries that are in metal product manufacturing; machinery manufacturing; computer and electronic product manufacturing; electrical equipment, appliance, and component manufacturing; transportation equipment manufacturing; and others. For a full list of Advanced Manufacturing NAICS, view Attachment 2: Target Industries. As of 2020, there were 17,605 jobs in Advanced Manufacturing across 360 businesses in the Lehigh Valley. Looking forward to 2025, the number of Advanced Manufacturing jobs in the Lehigh Valley is projected to increase by 7% while jobs in Pennsylvania overall will decline by 1%. Average earnings in Advanced Manufacturing are high in the Lehigh Valley at \$101,471 per job compared to \$85,353 statewide.

Figure 22: About Advanced Manufacturing

| | | | |
|---------------|---|--|-----------------------------------|
| 17,605 | +7% | \$101,471 | 360 |
| 2020 jobs | 2020 to 2025 change in jobs (-1% statewide) | Avg. earnings per job (\$85,353 statewide) | 2020 payrolled business locations |

Source: Emsi Burning Glass Q2.2021 Dataset.

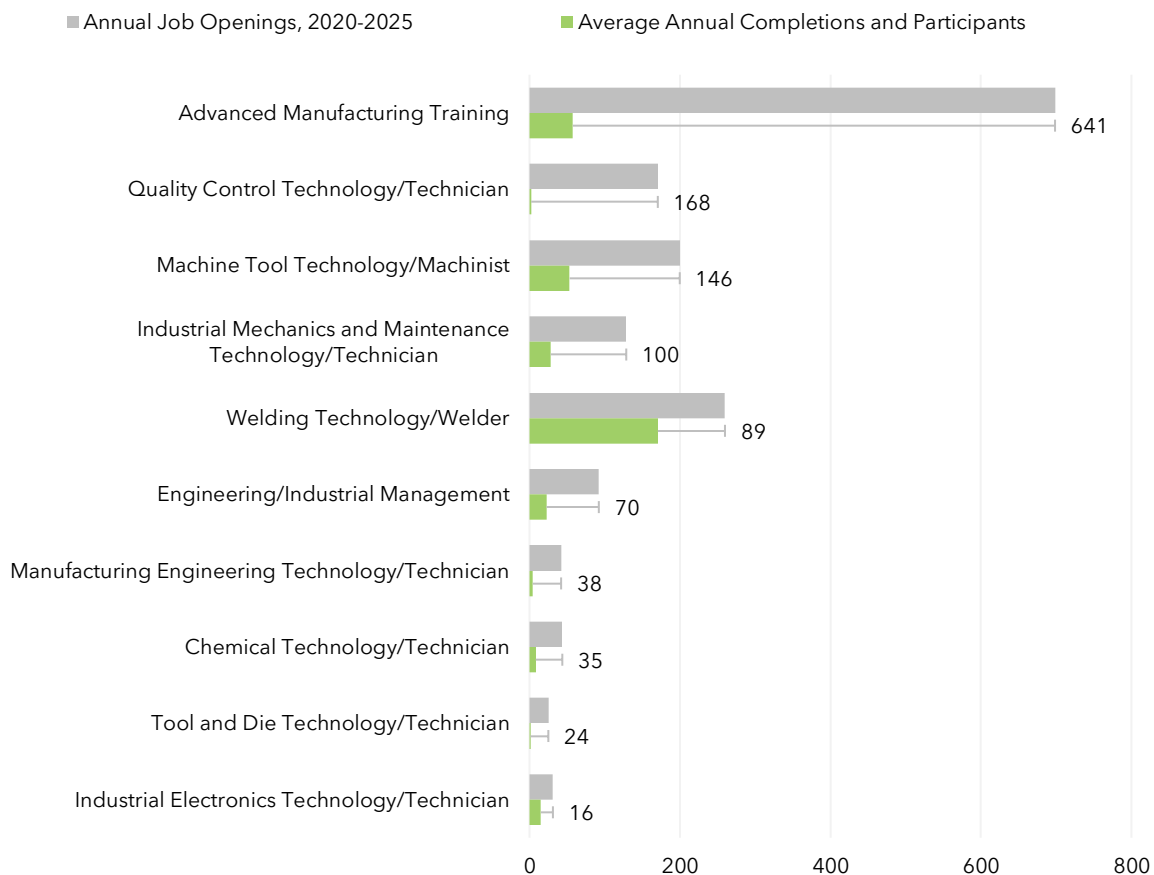
TRENDS

- Lehigh Valley has historically been strong in Advanced Manufacturing and this trend is projected to continue.
- There are several highly concentrated Advanced Manufacturing industries in the Lehigh Valley including Office Supplies (except Paper) Manufacturing with an LQ of 39.6, Heavy Duty Truck Manufacturing (LQ of 29.1), Musical Instrument Manufacturing (LQ of 23.4), and Cement Manufacturing (LQ of 20.8).
- Of the 118 six-digit industries within Advanced Manufacturing, Relay and Industrial Control Manufacturing exhibited the strongest growth between 2015 and 2020, growing by 671 jobs for a growth rate of 423%. This sector also has higher-than-average earnings of \$134,697 per job and is concentrated within the Lehigh Valley (LQ of 9.3).
- Assemblers and Fabricators are the most represented occupation in Advanced Manufacturing with 2,426 jobs in 2020. More than half of the Assemblers and Fabricators in the Lehigh Valley work in Advanced Manufacturing businesses. However, earnings in this occupation rank low with median annual earnings of \$38,003 compared to the regional average of \$68,853 per job for the Lehigh Valley.
- Most Advanced Manufacturing jobs are not likely to be remote except for higher-earning positions such as sales representatives.
- Advanced Manufacturing, as a sector, shows potential for automation. Occupations with the highest likelihood for automation are welders, hand labors and movers, and machinists.
- The Lehigh Valley's Advanced Manufacturing workforce is strongly supported by non-credit, certificate, and degree level programs offered at postsecondary institutions throughout the region. The largest, in terms of completions, is welding.

GAPS

- Based on regional job openings and program completions, there are significant hiring gaps in Advanced Manufacturing. The Advanced Manufacturing Training educational program, which trains for a variety of assembler occupations, has the largest gap with 641 more projected annual job openings than annual program completions. Such data indicate that the Lehigh Valley must look to attract talent from other areas to fill the region's employment needs. Other large gaps include Quality Control Technology/Technician (gap of 168) and Machine Tool Technology/Machinist (gap of 146).

Figure 23: Advanced Manufacturing Training education and training programs have the largest gap between regional job openings and completions among select Advanced Manufacturing programs



Annual Job Openings represent average annual projected openings through 2025 and Average Annual Completions and Participants show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of Advanced Manufacturing-related programs for all award levels and postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

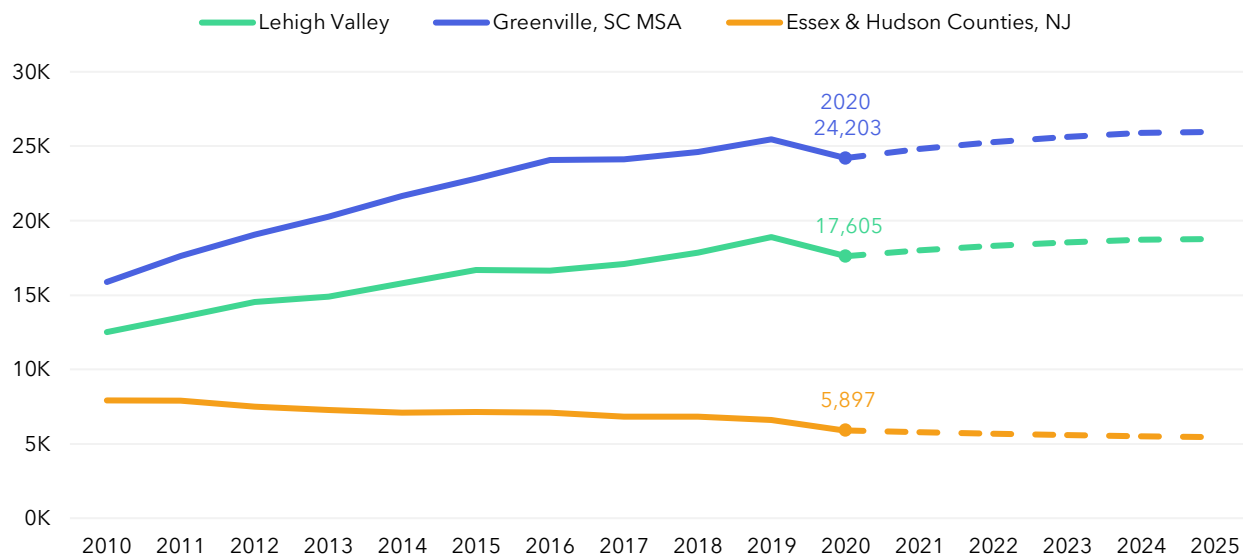
- The most requested skills in the Lehigh Valley's Advanced Manufacturing sector include specialized skills such as repair, hand tools, systems application and products, scheduling, etc. Top baseline skills include communication skills and physical ability, problem solving, and detail-oriented skills.

- In the last year, nearly a quarter (24%) of Advanced Manufacturing job postings were by Stanley Black and Decker, indicating a strong demand to grow/sustain their operations.

OPPORTUNITIES

- The region's strengths in Advanced Manufacturing and Transportation, Warehousing, Logistics, and Wholesale can support the future growth of one another. Businesses in the Lehigh Valley related to Transportation, Warehousing, Logistics, and Wholesale are essential in growing Advanced Manufacturing, based on the region's location just hours from major markets and supply chains in Pittsburgh, Philadelphia, New York, and New Jersey.
- Currently, some occupations within the Advanced Manufacturing sector have low entry level education requirements. With automation and technological advancements on the rise, there is an opportunity for the workforce in the Lehigh Valley to upskill to meet the changing needs of the manufacturing sector and in doing so create higher incomes.
- Workforce demographics indicate that there is a lack of younger workers in Advanced Manufacturing and efforts to expose students to Advanced Manufacturing opportunities to leverage low-debt career opportunities within the Lehigh Valley can help to reinvigorate the workforce.

Figure 24: Advanced Manufacturing supported 17,605 jobs in the Lehigh Valley in 2020.



Source: Emsi Burning Glass Q2.2021 Dataset.

Table 7: Miscellaneous assemblers and fabricators were the most represented occupation in Advanced Manufacturing

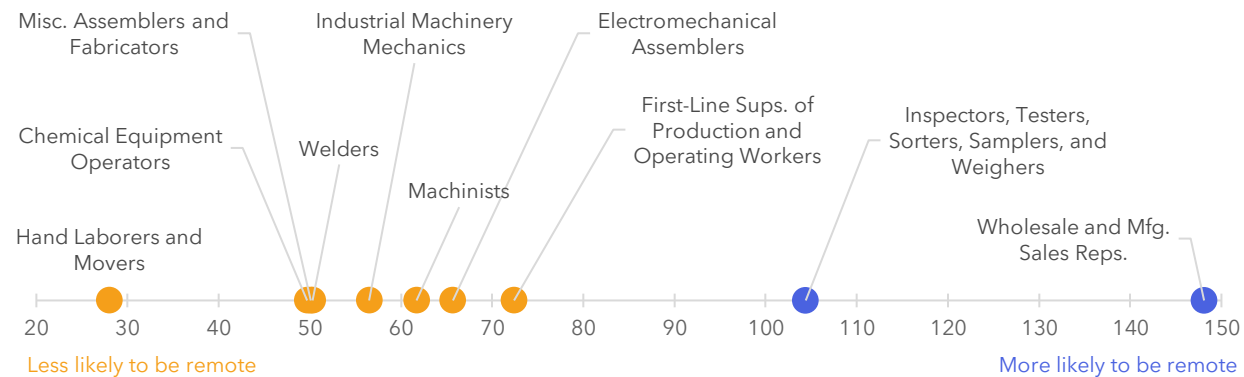
| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|--|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Miscellaneous Assemblers and Fabricators | 2,426 | 39% | 13.8% | \$38,003 | HS/GED |
| Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers | 720 | 8% | 4.1% | \$40,093 | HS/GED |
| First-Line Supervisors of Production and Operating Workers | 672 | 9% | 3.8% | \$64,760 | HS/GED |

| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|--|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Laborers and Freight, Stock, and Material Movers, Hand | 587 | -7% | 3.3% | \$30,529 | No formal ed. Credential |
| Inspectors, Testers, Sorters, Samplers, and Weighers | 417 | -22% | 2.4% | \$40,467 | HS/GED |
| Welders, Cutters, Solderers, and Brazers | 410 | 35% | 2.3% | \$44,908 | HS/GED |
| Industrial Machinery Mechanics | 407 | 30% | 2.3% | \$61,243 | HS/GED |
| Machinists | 402 | -12% | 2.3% | \$49,066 | HS/GED |
| Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products | 373 | 10% | 2.1% | \$71,683 | HS/GED |
| Chemical Equipment Operators and Tenders | 343 | 27% | 1.9% | \$57,026 | HS/GED |

HS/GED refers to a high school diploma or Test of General Educational Development.

Source Emsi Burning Glass Q2.2021 Dataset.

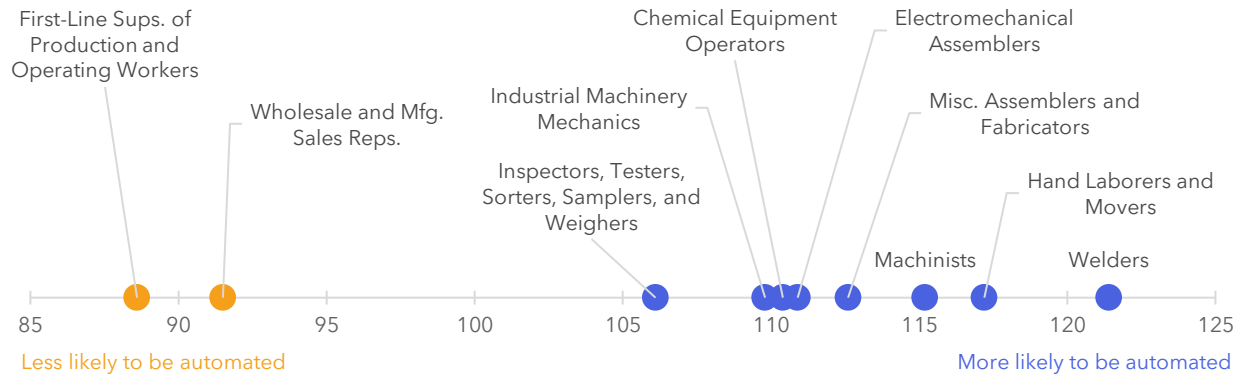
Figure 25: Hand laborers and movers are least likely to be remote of the most represented occupations in Advanced Manufacturing.



The Remote Worker Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of remote work, while occupations with an index below 100 have a below average likelihood of remote work. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 26: First-line supervisors of production and operating workers are least likely to be automated of the most represented occupations in Advanced Manufacturing.



The Automation Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of automation, while occupations with an index below 100 have a below average likelihood of automation. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Table 8: Computer and Information Sciences education and training programs had the most completions among the Advanced Manufacturing-related programs in the Lehigh Valley.

| Program | Non-Credit | Cert. | Assoc. | Bach. | Mast. | PhD | Total |
|---|------------|-------|--------|-------|-------|-----|-------|
| Computer and Information Sciences | 0 | 0 | 37 | 240 | 31 | 2 | 310 |
| Mechanical Engineering & Technologies/Technicians | 0 | 0 | 5 | 167 | 39 | 15 | 227 |
| Electrical and Electronics Engineering & Technology/Technician | 56 | 0 | 7 | 45 | 30 | 8 | 147 |
| Industrial Engineering & Management | 0 | 0 | 0 | 60 | 72 | 7 | 139 |
| Welding Technology/Welder | 75 | 33 | 30 | 0 | 0 | 0 | 138 |
| Chemical Engineering & Technology/Technician | 0 | 0 | 8 | 81 | 8 | 7 | 104 |
| Advanced Manufacturing Training | 58 | 0 | 0 | 0 | 0 | 0 | 58 |
| Machine Tool and Die Technology/Technician/Machinist | 53 | 1 | 0 | 0 | 0 | 0 | 55 |
| Engineering, General & Other | 5 | 0 | 18 | 25 | 0 | 0 | 49 |
| Industrial Electronics & Mechanics and Maintenance Technology | 13 | 3 | 25 | 0 | 0 | 0 | 41 |
| Electromechanical Technology/Electromechanical Engineering Technology | 29 | 1 | 8 | 0 | 0 | 0 | 38 |
| Materials Engineering | 0 | 0 | 0 | 25 | 4 | 5 | 33 |
| Manufacturing Engineering & Technologies/Technicians | 0 | 1 | 4 | 0 | 6 | 0 | 10 |
| Polymer/Plastics Engineering | 0 | 0 | 0 | 0 | 6 | 1 | 7 |

| Program | Non-Credit | Cert. | Assoc. | Bach. | Mast. | PhD | Total |
|---------------------------------------|------------|-------|--------|-------|-------|-----|-------|
| Quality Control Technology/Technician | 0 | 0 | 2 | 0 | 0 | 0 | 2 |

Average Annual Program Completions show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of programs for all award levels at postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

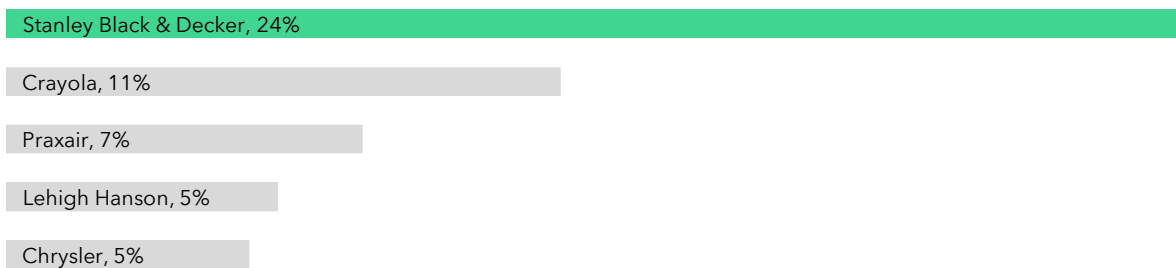
Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

Table 9: Repair was the most requested specialized skill in the Lehigh Valley's Advanced Manufacturing job postings, and communication skills were the most requested baseline skill.

| Specialized Skills | Baseline Skills |
|--|--------------------------|
| Repair | Communication Skills |
| Hand Tools | Physical Abilities |
| System Applications and Products (SAP) | Problem Solving |
| Scheduling | Detail-Oriented |
| Customer Service | Microsoft Office |
| 5S Methodology | Microsoft Excel |
| Forklift Operation | Positive Disposition |
| Machinery | English |
| Welding | Troubleshooting |
| Manufacturing Processes | Teamwork / Collaboration |

Source: Emsi Burning Glass Labor Insight.

Figure 27: Stanley Black and Decker posted about one-quarter of the jobs in the Lehigh Valley for Advanced Manufacturing in the last year.



Source: Emsi Burning Glass Labor Insight.

HEALTH CARE

Health Care is comprised of 29 six-digit NAICS industries in ambulatory health care services, hospitals, and nursing and residential care facilities. Health Care is the largest of the Lehigh Valley's target sectors with 46,570 jobs in 2020. Between 2015 and 2020, the sector grew by 4% and is projected to continue growing by 8% from 2020 to 2025. During that time, the Lehigh Valley's job growth in the Health Care sector is projected to outpace growth across Pennsylvania (6%). Overall, Health Care earnings in the Lehigh Valley are higher than the state average at \$80,413 and \$73,683, respectively.

Figure 28: Health Care

| | | | |
|---------------|---|--|-----------------------------------|
| 46,570 | +8% | \$80,413 | 1,307 |
| 2020 jobs | 2020 to 2025 change in jobs (+6% statewide) | Avg. earnings per job (\$73,683 statewide) | 2020 payrolled business locations |

Source: Emsi Burning Glass Q2.2021 Dataset.

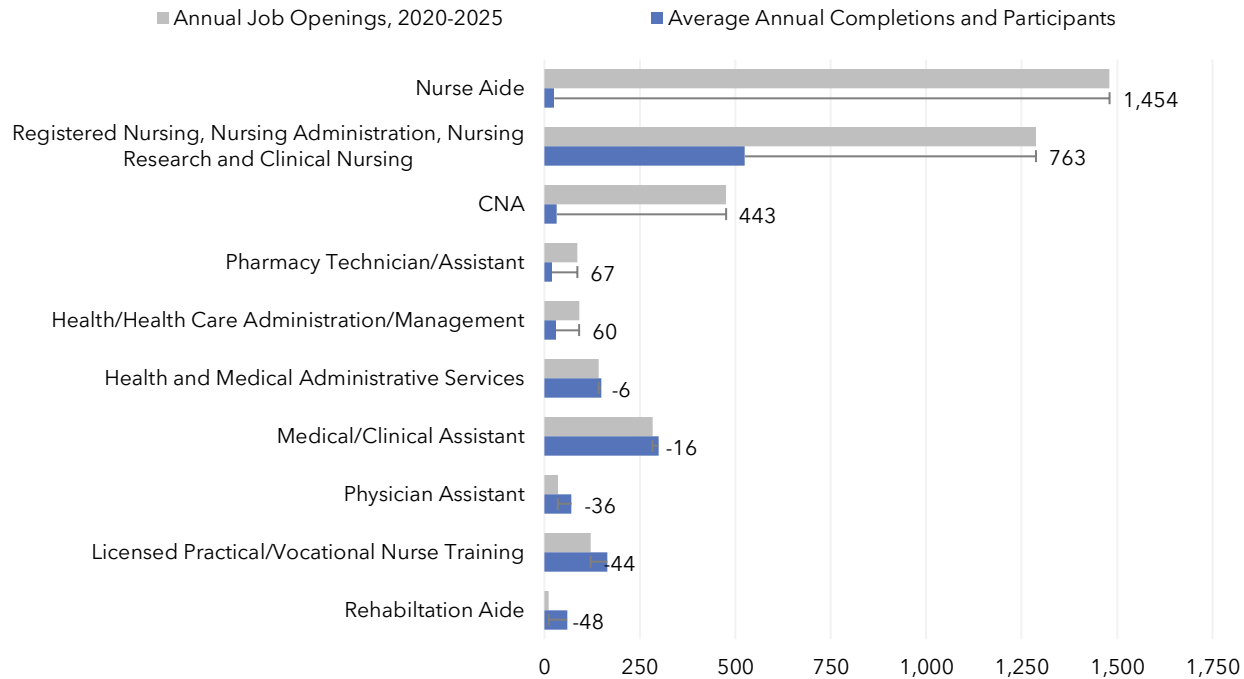
TRENDS

- The Health Care sector has seen the total number of jobs grow over the last five years (4% increase between 2015 and 2020) and it is projected to continue to see growth in total number of jobs over the next five years (8% project growth by 2025).
- Health Care job growth in the Lehigh Valley is consistent with the growth in the Greenville MSA and Essex and Hudson Counties. All geographies experienced a decline in the workforce from 2019 to 2020 followed by gradual growth following the onset of the COVID-19 pandemic.
- Registered Nurses are the largest occupation with 8,105 jobs accounting for 17% of jobs in the sector.
- Other top occupations include Nursing Assistants and Home Health and Personal Care Aides, which earn well below average for the Lehigh Valley with median annual earnings of \$32,769 and \$26,160, respectively.
- Most Health Care occupations are not likely to be remote except for Medical and Health Services Managers, clerks, and administrative assistants.
- Health Care occupations related to patient care are generally not likely to be automated. However, Office Clerks, a business-related occupation in the target sector, are likely to be automated.

GAPS

- Educational completions in the Lehigh Valley are not keeping up with occupational demand in several key programs. The largest gap between regional job openings and completions is in the Nursing Aide program with a gap of 1,454. Other hiring gaps are for Registered Nurses, Certified Nursing Assistants, Pharmacy Technicians, and Health Care Management.

Figure 29: The Nurse Aide program has the largest gap between regional job openings and completions among select Health Care programs.



Annual Job Openings represent average annual projected openings through 2025 and Average Annual Completions and Participants show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of Health Care-related programs for all award levels and postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

CNA refers to certified nursing assistant.

Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

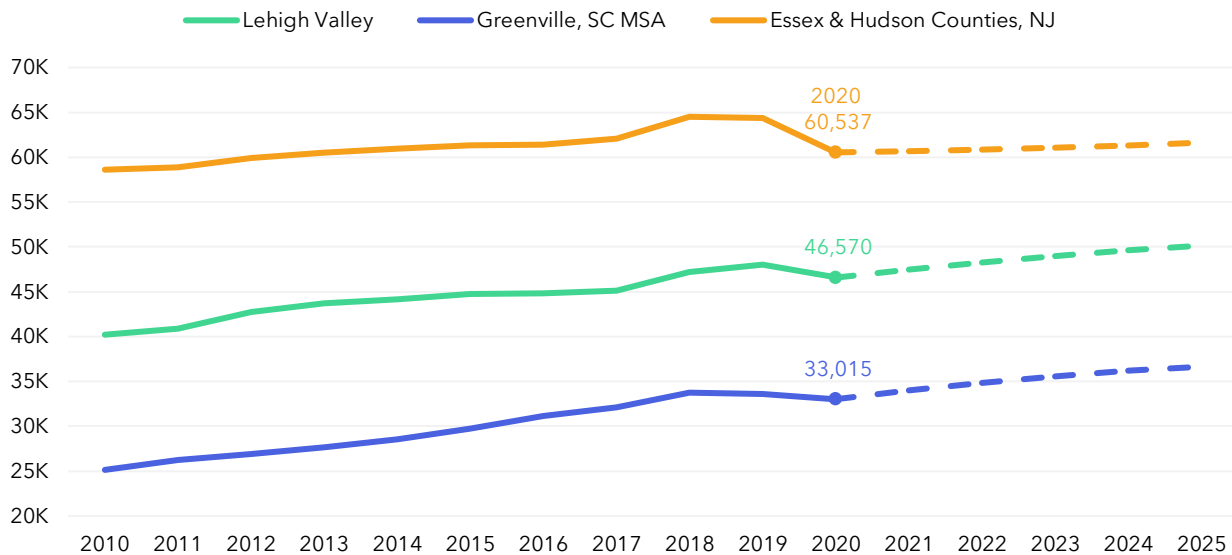
- Job postings in 2020 indicated that CPR, home health, treatment planning, and scheduling were top requested specialized skills in the Lehigh Valley's Health Care sector. Top sought-after baseline skills include computer literacy, communication skills, teamwork/collaboration, and problem solving.
- In 2020, 67% of the Health Care job postings in the Lehigh Valley were focused on three employers: KidsPeace, Bayada Home Health Care, and HCR ManorCare.

OPPORTUNITIES

- The Health Care sector offers a variety of job placements across an array of experience and educational levels. Much of the workforce demand within the sector is focused on hospitals, and therefore, there is an increased need to work directly with their operations to build programs to solve their workforce needs, especially those focused on nurses.
- As of 2020, 6% of the Registered Nurses commuted into the Lehigh Valley for work. With a growing demand for this occupation nationally and regionally, there is a need for employers to increase engagement with both students and faculty to build a network of future nurses within the Lehigh Valley. Such engagement could include on-site Registered Nurse mentors, who work with nursing students during their clinical rotations.

- Specialty Hospitals in the Lehigh Valley have grown 27% in the past five years from 2015 to 2020 and are projected to grow an additional 28% by 2025. Nationally, these operations are projected to grow based on increased demand for cancer treatment, long-term care, and disease care.
- There has been strong job growth for Physicians (as an occupation), which added 571 jobs between 2015 and 2020 for a 45% increase. Physicians have high earnings with median annual earnings of \$213,106 and represent an opportunity for the Lehigh Valley to attract new talent to the region.

Figure 30: Health Care supported 46,570 jobs in the Lehigh Valley in 2020.



Source: Emsi Burning Glass Q2.2021 Dataset.

Table 10: Registered nurses were the most represented occupation in Health Care.

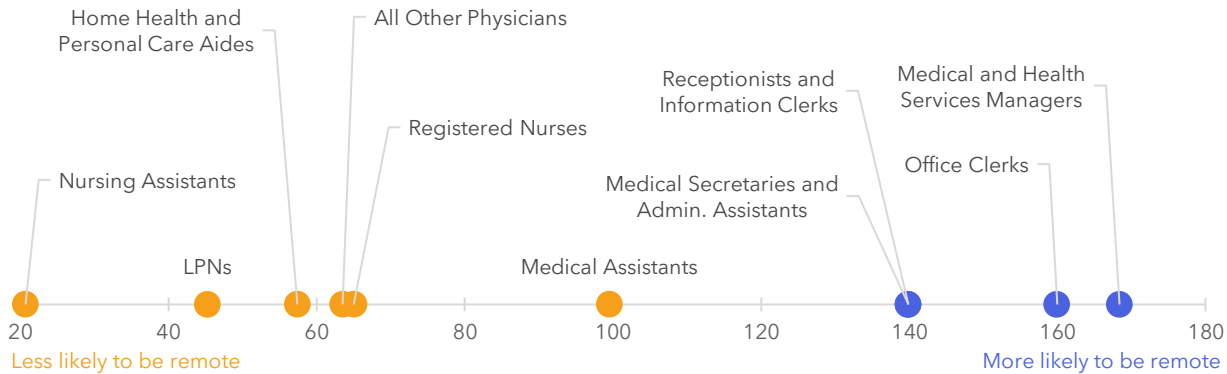
| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|---|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Registered Nurses | 8,105 | 5% | 17% | \$71,654 | Bach. |
| Nursing Assistants | 3,934 | -8% | 8% | \$32,769 | PS nondegree/Cert. |
| Home Health and Personal Care Aides | 3,915 | 7% | 8% | \$26,160 | HS/GED |
| Medical Assistants | 2,074 | 10% | 4% | \$36,093 | PS nondegree/Cert. |
| Physicians, All Other; and Ophthalmologists, Except Pediatric | 1,830 | 45% | 4% | \$213,106 | PhD/Prof. |
| Licensed Practical and Licensed Vocational Nurses | 1,329 | -20% | 3% | \$50,983 | PS nondegree/Cert. |
| Receptionists and Information Clerks | 1,259 | 7% | 3% | \$33,047 | HS/GED |
| Medical Secretaries and Administrative Assistants | 891 | -25% | 2% | \$34,460 | HS/GED |
| Office Clerks, General | 875 | -11% | 2% | \$36,028 | HS/GED |

| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|--------------------------------------|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Medical and Health Services Managers | 670 | 6% | 1% | \$86,145 | Bachelor's degree |

PS nondegree/Cert. refers to a postsecondary nondegree or certificate. HS/GED refers to a high school diploma or Test of General Educational Development.

Source Emsi Burning Glass Q2.2021 Dataset.

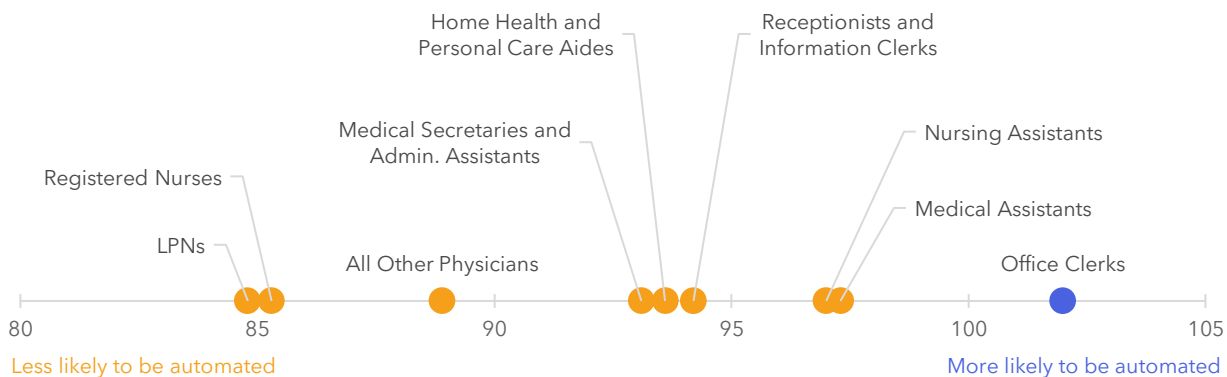
Figure 31: Nursing assistants are least likely to be remote of the most represented occupations in Health Care.



The Remote Worker Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of remote work, while occupations with an index below 100 have a below average likelihood of remote work. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 32: Licensed practical and licensed vocational nurses are least likely to be automated of the most represented occupations in Health Care.



The Automation Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of automation, while occupations with an index below 100 have a below average likelihood of automation. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Table 11: Registered Nursing/Registered Nurse education and training programs have the most completions among the top Health Care-related programs in the Lehigh Valley.

| Program | Non-Credit | Cert. | Assoc. | Bach. | Mast. | PhD | Total |
|--|------------|-------|--------|-------|-------|-----|-------|
| Registered Nurse/Registered Nurse | 0 | 0 | 162 | 307 | 0 | 0 | 469 |
| Computer and Information Sciences | 0 | 0 | 37 | 240 | 31 | 2 | 310 |
| Medical Clinical & Allied Health and Medical Assisting Services | 46 | 192 | 60 | 0 | 0 | 0 | 299 |
| Health Professions and Related Clinical Sciences, Other | 170 | 0 | 0 | 33 | 0 | 0 | 203 |
| Licensed Practical/Vocational Nurse Training | 0 | 165 | 0 | 0 | 0 | 0 | 165 |
| Emergency Care Attendants & Emergency Medical Technology/Technicians | 112 | 3 | 0 | 0 | 0 | 0 | 115 |
| Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing, Other | 0 | 43 | 0 | 33 | 0 | 0 | 75 |
| Physician Assistant | 0 | 0 | 0 | 0 | 71 | 0 | 71 |
| Rehabilitation Aide | 60 | 0 | 0 | 0 | 0 | 0 | 60 |
| Nurse/Nursing Assistant/Aide and Patient Care Assistant | 59 | 0 | 0 | 0 | 0 | 0 | 59 |
| Health Services/Allied Health/Health Sciences, General | 0 | 0 | 29 | 27 | 0 | 0 | 56 |
| Health Information/Medical Records Technology/Technician | 0 | 0 | 44 | 0 | 0 | 0 | 44 |
| Medical Administrative/Executive Assistant and Medical Secretary | 0 | 2 | 37 | 0 | 0 | 0 | 40 |
| Health/Health Care Administration/Management | 0 | 16 | 0 | 10 | 4 | 0 | 30 |
| Pharmacy Technician/Assistant | 20 | 6 | 0 | 0 | 0 | 0 | 25 |

Average Annual Program Completions show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of programs for all award levels at postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

EMT and CNA refer to emergency medical technician and certified nursing assistant.

Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

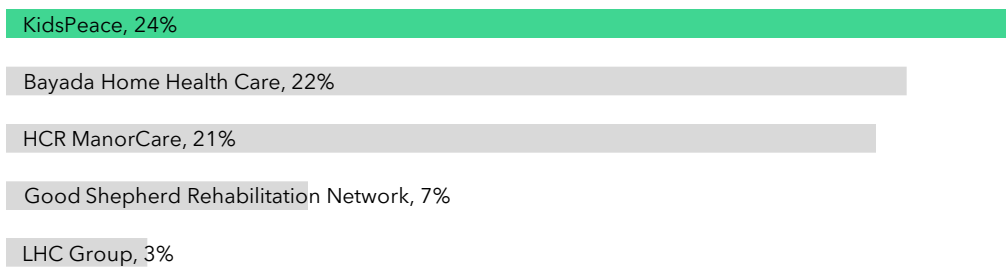
Table 12: CPR was the most requested specialized skill in the Lehigh Valley's Health Care job postings, and computer literacy was the most requested baseline skill.

| Specialized Skills | Baseline Skills |
|-------------------------------------|--------------------------|
| Cardiopulmonary Resuscitation (CPR) | Computer Literacy |
| Home Health | Communication Skills |
| Treatment Planning | Teamwork / Collaboration |
| Scheduling | Problem Solving |
| Patient Care | English |

| Specialized Skills | Baseline Skills |
|---------------------|-----------------------|
| Home Care | Planning |
| Hospice | Time Management |
| Clinical Experience | Bilingual |
| Meal Preparation | Written Communication |
| Case Management | Spanish |

Source: Emsi Burning Glass Labor Insight.

Figure 33: KidsPeace posted about one-quarter of the jobs in the Lehigh Valley for Health Care in the last year .



Source: Emsi Burning Glass Labor Insight.

HIGH VALUE BUSINESS SERVICES

High Value Business Services is comprised of 68 six-digit NAICS industries that cover software publishing; data centers/processing; credit intermediation and related activities; insurance carriers and related activities; professional, scientific, and technical services; management of companies and enterprises; administrative and support services; and others. As of 2020, there were 26,423 High Value Business Services jobs across 1,806 businesses in the Lehigh Valley. While Pennsylvania is anticipated to see a 3% growth in sector jobs between 2020 and 2025, the Lehigh Valley is projected to decline by 5%. The Lehigh Valley also lags the state in sector earnings with weighted average of median occupational earnings in High Value Business Services at \$118,857 per job statewide compared to \$111,332 in the Lehigh Valley.

Figure 34: About High Value Business Services

| | | | |
|---------------|---|---|-----------------------------------|
| 26,423 | -5% | \$111,332 | 1,806 |
| 2020 jobs | 2020 to 2025 change in jobs (+3% statewide) | Avg. earnings per job (\$118,857 statewide) | 2020 payrolled business locations |

Source: Emsi Burning Glass Q2.2021 Dataset.

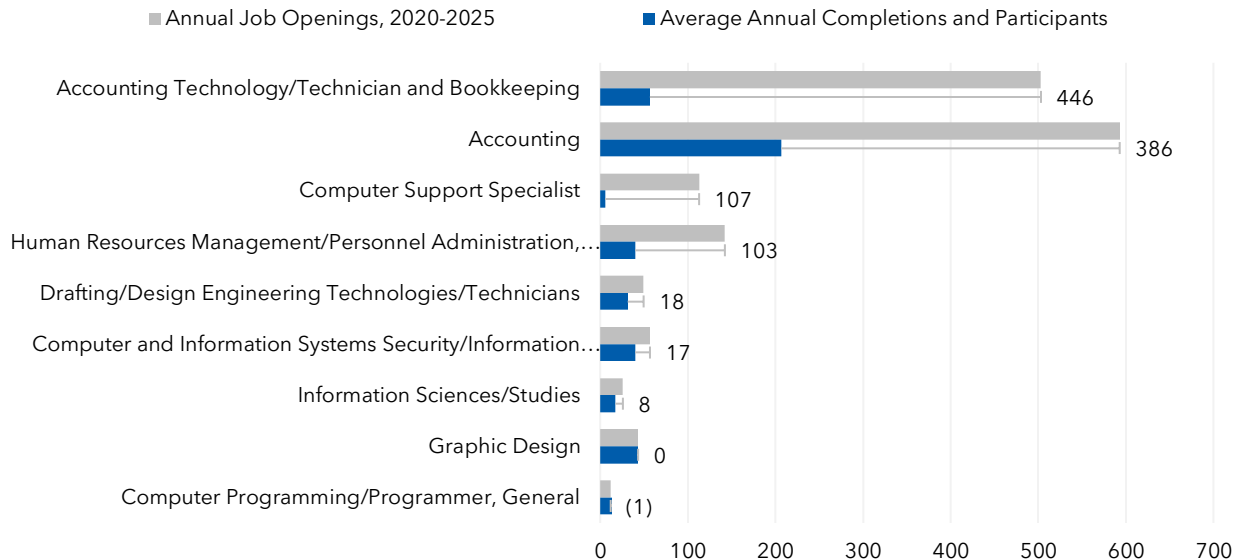
TRENDS

- Jobs in the Lehigh Valley's High Value Business Services have slowly decreased since 2010, whereas jobs in the comparative geographies of Essex and Hudson Counties and the Greenville MSA have slowly increased.
- Customer service representatives are the most represented occupation in High Value Business Services, supporting about one out of every three customer service representative jobs in the Lehigh Valley.
- Many occupations in High Value Business Services are more likely to be remote compared to other sectors.
- The top occupations in High Value Business Services cover a range of educational requirements. Those requiring college degrees are supported in the Lehigh Valley by several educational institutions from which local employers can recruit.

GAPS

- Accounting Technology/Technician and Bookkeeping has the largest hiring gap in High Value Business Services with 446 more projected annual job openings than annual educational program completions.
- Business and Financial Operations is the largest out-commuting occupation in the Lehigh Valley. In 2020, approximately 1,060 Lehigh Valley residents worked in Business and Financial Operations occupations outside the Lehigh Valley.
- Top requested skills in this sector include specialized skills of customer services, sales, customer contract, and scheduling. More baseline requested skills include communication skills, problem solving, teamwork/collaboration, and Microsoft Office.

Figure 35: The Accounting Technology/Technician and Bookkeeping educational and training program has the largest gap between regional job openings and completions among select High Value Business Services programs.



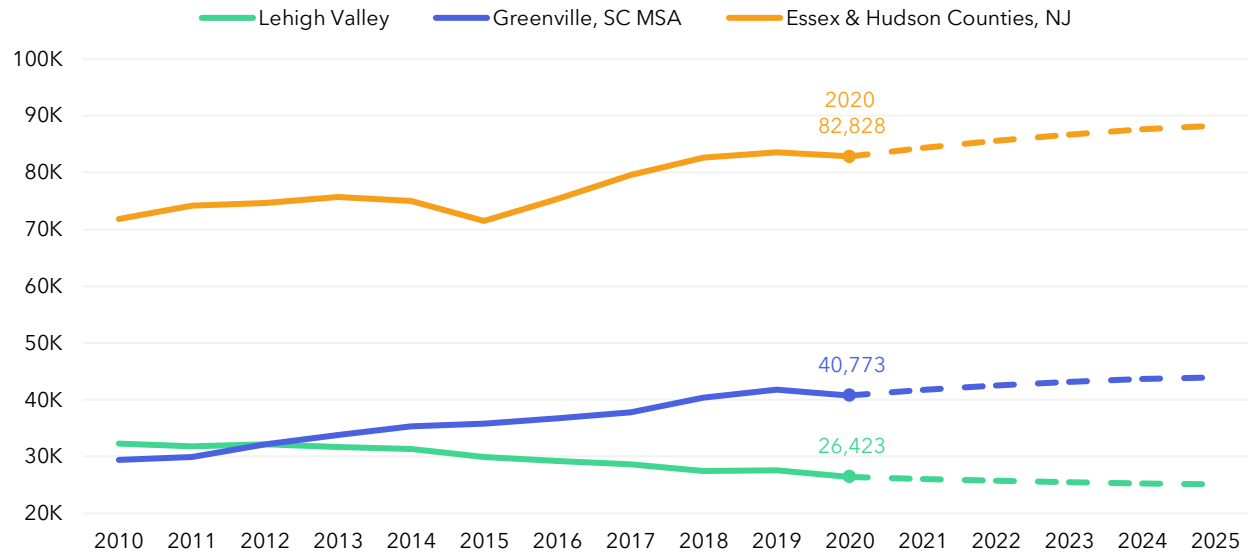
Annual Job Openings represent average annual projected openings through 2025 and Average Annual Completions and Participants show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of High Value Business Services-related programs for all award levels and postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

OPPORTUNITIES

- Software Developers and Software Quality Assurance Analysts and Testers rank as one of the most represented occupations within the sector (857 jobs). In the Lehigh Valley, this occupation grew by 26% from 2015 to 2020 and displayed high earnings with median annual earnings of \$91,588 per job. The occupation is one of the least likely to be automated of the top occupations in the sector, and the occupation is currently supported by educational institutions. Continuing to capture these graduates and encourage residents to pursue jobs in this field will help to support an array of businesses in the Lehigh Valley.
- The Lehigh Valley has several educational institutions that support High Value Business Services. These institutions can be better leveraged to increase engagement with students to take on internship positions and work opportunities in the Lehigh Valley. Efforts to get local employers into classrooms to have discussions with students can also help bridge this gap.
- The national trend of declining number of college graduates, due to population trends and declining 18-year olds comparatively, poses a challenge to the High Value Business Services sector under traditional hiring requirements. There is a need to shift hiring requirements to encompass non-traditional education and experience to expand the local talent pool within the Lehigh Valley.

Figure 36: High Value Business Services supported nearly 26,500 jobs in the Lehigh Valley in 2020.



Source: Emsi Burning Glass Q2.2021 Dataset.

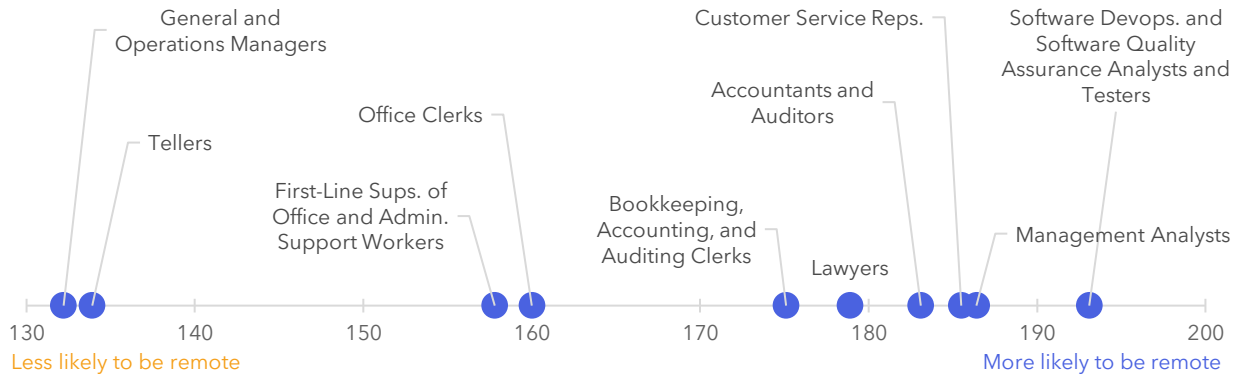
Table 13: Customer service representatives were the most represented occupation in High Value Business Services.

| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|---|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Customer Service Representatives | 2,219 | -13% | 8% | \$35,946 | HS/GED |
| Accountants and Auditors | 1,119 | 8% | 4% | \$68,462 | Bach. |
| Tellers | 1,044 | -2% | 4% | \$33,297 | HS/GED |
| Software Developers and Software Quality Assurance Analysts and Testers | 857 | 26% | 3% | \$91,588 | Bach. |
| General and Operations Managers | 802 | 24% | 3% | \$102,034 | Bach. |
| Office Clerks, General | 712 | -36% | 3% | \$36,028 | HS/GED |
| Lawyers | 668 | 3% | 3% | \$129,922 | PhD/Prof. |
| First-Line Supervisors of Office and Administrative Support Workers | 655 | -33% | 2% | \$57,144 | HS/GED |
| Management Analysts | 648 | -7% | 2% | \$91,588 | Bach. |
| Bookkeeping, Accounting, and Auditing Clerks | 628 | -11% | 2% | \$41,215 | Some college, no degree |

HS/GED refers to a high school diploma or Test of General Educational Development.

Source Emsi Burning Glass Q2.2021 Dataset.

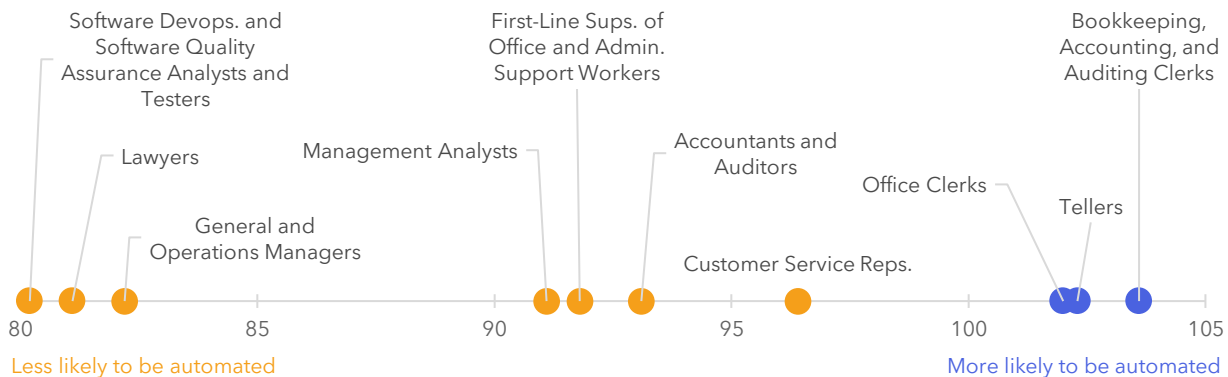
Figure 37: General and operations managers are least likely to be remote of the most represented occupations in High Value Business Services, but the occupation's Remote Worker index still falls above the 100-value threshold.



The Remote Worker Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of remote work, while occupations with an index below 100 have a below average likelihood of remote work. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 38: Software developers and software quality assurance analysts and testers are least likely to be automated of the most represented occupations in High Value Business Services.



The Automation Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of automation, while occupations with an index below 100 have a below average likelihood of automation. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Table 14: Business Administration, Finance, and Accounting programs had the most completions among the top High Value Business Services-related programs in the Lehigh Valley.

| Program | Non-Credit | Cert. | Assoc. | Bach. | Mast. | PhD | Total |
|---|------------|-------|--------|-------|-------|-----|-------|
| Business Administration, Management, Operations, and Managerial Economics | 0 | 1 | 115 | 802 | 199 | 2 | 1,119 |
| Computer and Information Sciences | 0 | 0 | 37 | 240 | 31 | 2 | 310 |
| Finance, General | 0 | 0 | 0 | 275 | 7 | 0 | 283 |
| Accounting & Accounting Technology/Technician and Bookkeeping | 3 | 8 | 38 | 188 | 18 | 0 | 255 |

| Program | Non-Credit | Cert. | Assoc. | Bach. | Mast. | PhD | Total |
|---|------------|-------|--------|-------|-------|-----|-------|
| Business/Commerce, General | 0 | 4 | 131 | 31 | 15 | 0 | 181 |
| Marketing/Marketing Management, General | 0 | 0 | 6 | 103 | 2 | 0 | 112 |
| Computer Systems Networking and Telecommunications | 21 | 0 | 49 | 0 | 0 | 0 | 70 |
| Web Page, Digital/Multimedia and Information Resources Design | 36 | 9 | 7 | 0 | 0 | 0 | 52 |
| Graphic Design | 0 | 0 | 35 | 7 | 0 | 0 | 43 |
| Computer and Information Systems Security/Information Assurance | 0 | 0 | 20 | 16 | 3 | 0 | 40 |
| Information Technology | 0 | 0 | 0 | 38 | 0 | 0 | 38 |
| Human Resources Management/Personnel Administration | 0 | 5 | 12 | 13 | 4 | 0 | 34 |
| Computer Engineering, General | 0 | 0 | 0 | 24 | 4 | 1 | 29 |
| Drafting and Design Technology/Technician, General | 18 | 0 | 3 | 0 | 0 | 0 | 22 |
| Computer Support Specialist | 0 | 0 | 15 | 0 | 0 | 0 | 15 |

Average Annual Program Completions show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of programs for all award levels at postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

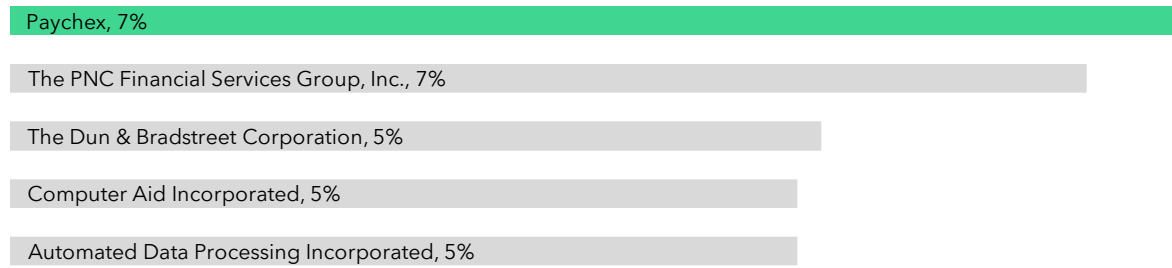
Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

Table 15: Customer service was the most requested specialized skill in the Lehigh Valley's High Value Business Services job postings, and communication skills were the most requested baseline skill.

| Specialized Skills | Baseline Skills |
|--------------------------------|----------------------------------|
| Customer Service | Communication Skills |
| Sales | Problem Solving |
| Customer Contact | Teamwork / Collaboration |
| Scheduling | Microsoft Office |
| Logistics | Organizational Skills |
| Occupational Health and Safety | Detail-Oriented |
| Risk Management | Building Effective Relationships |
| Prospective Clients | English |
| Product Knowledge | Written Communication |
| Project Management | Troubleshooting |

Source: Emsi Burning Glass Labor Insight.

Figure 39: Paychex and The PNC Financial Services Group, Inc both posted 7% of the jobs in the Lehigh Valley for High Value Business Services in the last year.



Source: Emsi Burning Glass Labor Insight.

LIFE SCIENCE RESEARCH AND MANUFACTURING

Life Science Research and Manufacturing sector is comprised of 20 six-digit NAICS industries in pharmaceutical and medicine manufacturing; navigational, measuring, electromedical, and control instruments manufacturing; medical equipment and supplies manufacturing; professional and commercial equipment and supplies merchant wholesalers; scientific research and development services; and medical and diagnostic laboratories. Life Science Research and Manufacturing is the smallest of the target sectors with 6,207 jobs in the Lehigh Valley in 2020. As of 2020, there are 174 Life Science Research and Manufacturing business locations within the Valley. Between 2020 and 2025, the Lehigh Valley can expect to grow the sector 5%, aligning with state growth. Average earnings per job are \$116,285 in the Lehigh Valley, lagging the state average of \$139,030.

Figure 40: About Life Science Research and Manufacturing

| | | | |
|--------------|---|---|-----------------------------------|
| 6,207 | +5% | \$116,285 | 174 |
| 2020 jobs | 2020 to 2025 change in jobs (+5% statewide) | Avg. earnings per job (\$139,030 statewide) | 2020 payrolled business locations |

Source: Emsi Burning Glass Q2.2021 Dataset.

TRENDS

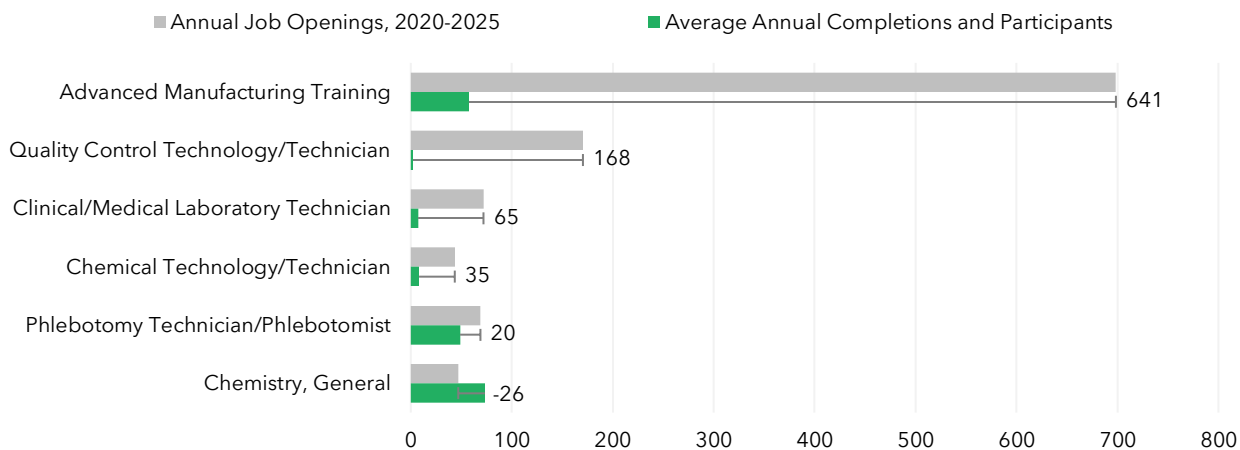
- Life Science Research and Manufacturing job growth in the Lehigh Valley outpaces sector growth in the comparative regions of the Greenville MSA and Essex and Hudson Counties. Looking forward to 2025, the sector is expected to continue gaining jobs in the Lehigh Valley while the comparative regions are anticipated to experience a decline.
- Packaging and Filling Machine Operators and Tenders and Miscellaneous Assemblers and Fabricators grew at 157% and 90%, respectively between 2015 and 2020. With lower educational requirements of high school diplomas and their equivalent, these positions can more readily grow talent. However, low median annual earnings of \$38,000-\$39,000 per job have led to retention challenges.
- The most represented occupations in the target sector are Clinical lab technicians, Assemblers and fabricators, Phlebotomists, and Packaging and filling machine operators, together representing about 20% of Life Science Research and Manufacturing jobs.
- Life Science Research and Manufacturing jobs have a lower propensity for automation than Advanced Manufacturing jobs, based on the need for many positions to be in a lab or involved in sales.
- Customer service representatives are the most likely occupation within the sector to be remote.
- For programs related to Life Science Research and Manufacturing, Chemistry and Chemical Engineering have a regional hiring surplus, meaning annual program completions surpass the projected number of annual job openings in the Lehigh Valley for Chemical Technicians, Chemists, Chemical Engineers, and Industrial Engineers.

- Medical and Botanical Manufacturing has grown nearly 300% from 2015 to 2020, adding 204 jobs. Growth is projected to continue into 2025, and the Lehigh Valley can expect to add 158 new positions for a growth of 39%.

GAPS

- Advanced Manufacturing Training has the largest hiring gap in Life Science Research and Manufacturing, with 641 more projected annual job openings than annual program completions.
- Another key training program for this sector is Clinical/Medical Laboratory Technician, which has a gap of 65. The program trains for Clinical Laboratory Technicians, an occupation with 964 jobs in the Lehigh Valley and 72 annual projected job openings. However, the program graduates less than 10 students annually, all of which are at the associate degree level.

Figure 41: Clinical/Medical Laboratory Technician education and training programs have the largest gap between regional job openings and completions among select Life Science Research and Manufacturing programs



Annual Job Openings represent average annual projected openings through 2025 and Average Annual Completions and Participants show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of Life Science Research and Manufacturing-related programs for all award levels and postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

- The highest-earning sector in Life Science Research and Manufacturing is Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) with average earnings per job of \$191,263. This sector has historically declined within the Lehigh Valley and is projected to continue declining into 2025.
- Thermo Fisher Scientific posted two out of every three jobs in Life Science Research and Manufacturing indicating a strong need for new talent to support their operations.

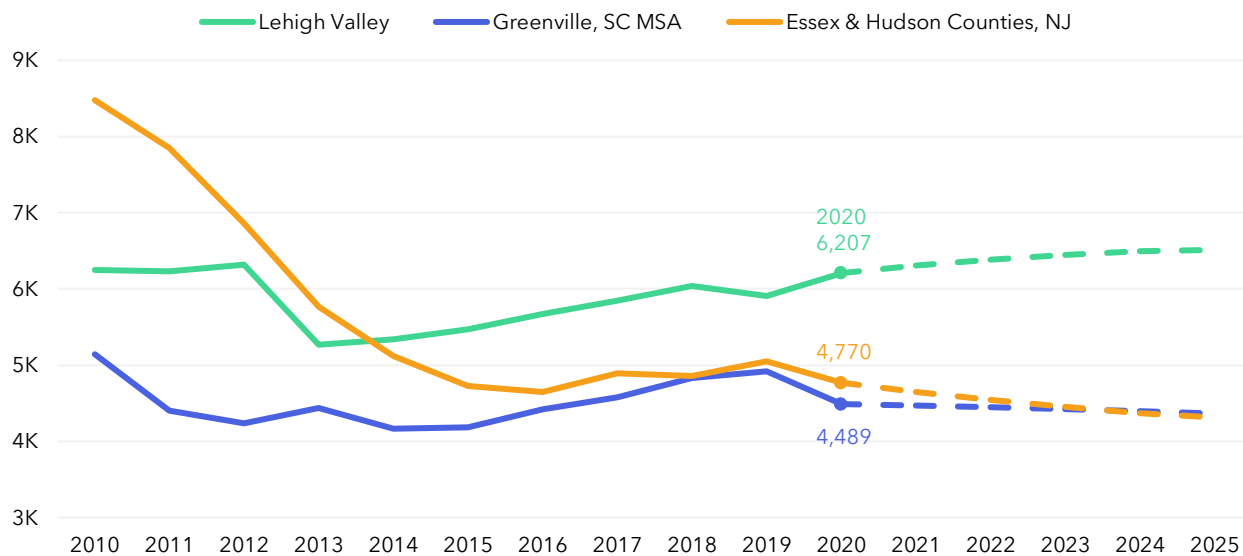
OPPORTUNITIES

- The Lehigh Valley's strength in Health Care and Manufacturing are also assets to growing the region's Life Science Research and Manufacturing industries.
- Surgical and Medical Instrument Manufacturing is highly concentrated in the Lehigh Valley with a location quotient of 5.0, indicating it is five times more prevalent in the Lehigh Valley than the nation.

This concentration of 1,401 jobs in 2020 is comprised of three business operations. There are opportunities to further support these operations and develop support services.

- The Lehigh Valley is projected to experience a hiring surplus for the Chemistry and Chemical Engineering programs, based on job demand and educational completions. About 70% to 80% of the programs' completions are at the bachelor's degree level, and most of the remaining completions are for graduate degrees. Life Science Research and Manufacturing businesses can hire these well-educated and skilled students from local universities, retaining talent in the Lehigh Valley.
- Like the other sectors, General and Operations Managers is a top earning occupation within Life Sciences Research and Manufacturing. This is an occupation that based on skills and practices can for some companies and under certain environments be performed remotely. The Lehigh Valley can attract and leverage out-of-region talent to help fulfill some of the regional workforce needs. Additionally, workforce organizations in the Lehigh Valley can work to support organizations in need of these high earning positions to assist in training to grow workers from within

Figure 42: Life Science Research and Manufacturing supported 6,207 jobs in the Lehigh Valley in 2020.



Source: Emsi Burning Glass Q2.2021 Dataset.

Table 16: Clinical laboratory technologists and technicians were the most represented occupation in Life Science Research and Manufacturing.

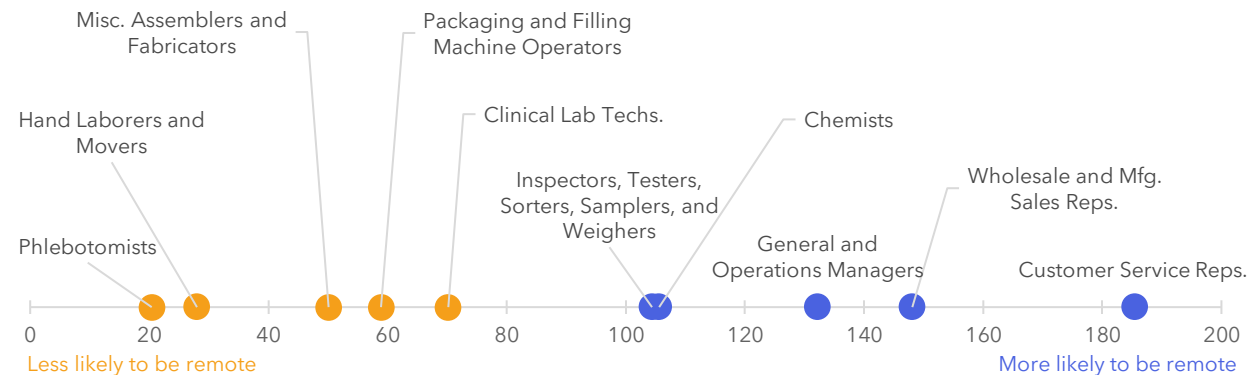
| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|---|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Clinical Laboratory Technologists and Technicians | 314 | 11% | 5% | \$52,146 | Bach. |
| Miscellaneous Assemblers and Fabricators | 301 | 90% | 5% | \$38,002 | HS/GED |
| Phlebotomists | 257 | -1% | 4% | \$38,043 | PS nondegree/Cert. |
| Packaging and Filling Machine Operators and Tenders | 254 | 157% | 4% | \$38,896 | HS/GED |
| Customer Service Representatives | 213 | 14% | 3% | \$35,942 | HS/GED |

| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|--|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Inspectors, Testers, Sorters, Samplers, and Weighers | 184 | -1% | 3% | \$40,477 | HS/GED |
| General and Operations Managers | 137 | 71% | 2% | \$102,024 | Bach. |
| Laborers and Freight, Stock, and Material Movers, Hand | 128 | 27% | 2% | \$30,534 | No formal ed. credential |
| Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products | 128 | 27% | 2% | \$71,677 | HS/GED |
| Chemists | 122 | 13% | 2% | \$69,389 | Bach. |

HS/GED refers to a high school diploma or Test of General Educational Development. PS nondegree/Cert. refers to a postsecondary nondegree or certificate.

Source Emsi Burning Glass Q2.2021 Dataset.

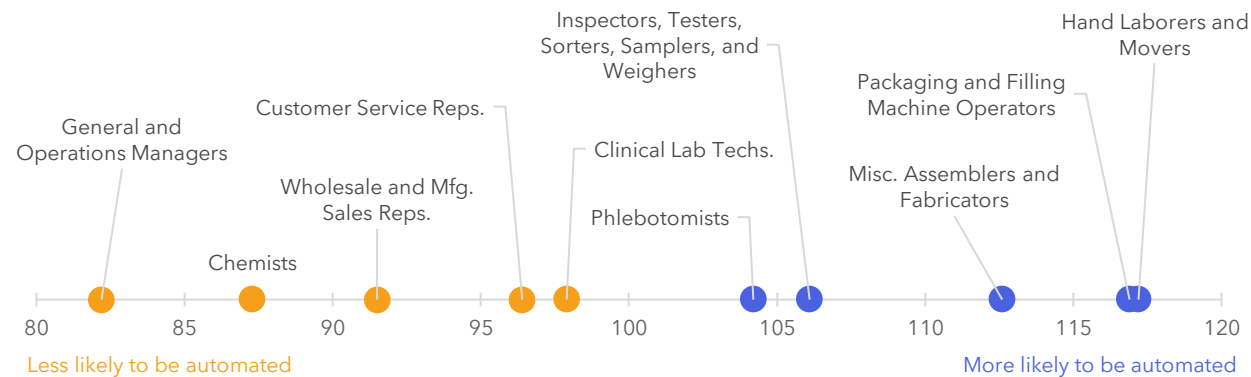
Figure 43: Phlebotomists are least likely to be remote of the most represented occupations in Life Science Research and Manufacturing.



The Remote Worker Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of remote work, while occupations with an index below 100 have a below average likelihood of remote work. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 44: General and operations managers are least likely to be automated of the most represented occupations in Life Science Research and Manufacturing.



The Automation Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of automation, while occupations with an index below 100 have a below average likelihood of automation. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Table 17: Business Administration, Management, Operations, and Managerial Economics programs had the most completions among the top Life Science Research and Manufacturing-related programs in the Lehigh Valley.

| Program | Non-Credit | Cert. | Assoc. | Bach. | Mast. | PhD | Total |
|---|------------|-------|--------|-------|-------|-----|-------|
| Business Administration, Management, Operations, and Managerial Economics | 0 | 1 | 115 | 802 | 199 | 2 | 1,119 |
| Computer and Information Sciences | 0 | 0 | 37 | 240 | 31 | 2 | 310 |
| Finance, General | 0 | 0 | 0 | 275 | 7 | 0 | 283 |
| Health Professions and Related Clinical Sciences, Other | 170 | 0 | 0 | 33 | 0 | 0 | 203 |
| Business/Commerce, General | 0 | 4 | 131 | 31 | 15 | 0 | 181 |
| Chemical and Biomolecular Engineering | 0 | 0 | 0 | 81 | 12 | 7 | 100 |
| Chemistry & Chemical Technology/Technician | 0 | 0 | 17 | 52 | 9 | 4 | 82 |
| Advanced Manufacturing Training | 58 | 0 | 0 | 0 | 0 | 0 | 58 |
| Bioengineering and Biomedical Engineering | 0 | 0 | 0 | 48 | 4 | 1 | 54 |
| Phlebotomy Comprehensive (Phlebotomy Technician/Phlebotomist) | 21 | 28 | 0 | 0 | 0 | 0 | 49 |
| Engineering, General/Other | 5 | 0 | 18 | 25 | 0 | 0 | 49 |
| Management Sciences and Quantitative Methods | 0 | 0 | 0 | 5 | 19 | 0 | 23 |
| Entrepreneurship/Entrepreneurial Studies | 11 | 4 | 0 | 0 | 0 | 0 | 15 |
| Clinical/Medical Laboratory Technician | 0 | 0 | 7 | 0 | 0 | 0 | 7 |
| Project Management | 0 | 0 | 0 | 0 | 7 | 0 | 7 |

Average Annual Program Completions show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of programs for all award levels at postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

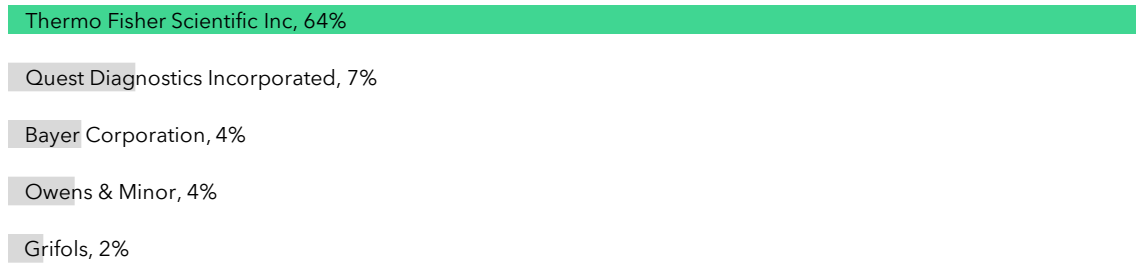
Table 18: Packaging was the most requested specialized skill in the Lehigh Valley's Life Science Research and Manufacturing job postings, and communication skills were the most requested baseline skill.

| Specialized Skills | Baseline Skills |
|--------------------------|--------------------------|
| Packaging | Communication Skills |
| Manufacturing Principles | Teamwork / Collaboration |
| Cancer knowledge | Problem Solving |

| Specialized Skills | Baseline Skills |
|------------------------------------|------------------------|
| Project Management | Microsoft Excel |
| Biotechnology | Physical Abilities |
| Good Manufacturing Practices (GMP) | Organizational Skills |
| Environmental Protection | Computer Literacy |
| Scheduling | Detail-Oriented |
| Clinical Trials | Planning |
| Budgeting | Microsoft Word |

Source: Emsi Burning Glass Labor Insight.

Figure 45: Thermo Fisher Scientific posted about two-thirds of the jobs in the Lehigh Valley for Life Science Research and Manufacturing in the last year.



Source: Emsi Burning Glass Labor Insight.

TRANSPORTATION, WAREHOUSING, LOGISTICS, AND WHOLESALE

Transportation, Warehousing, Logistics, and Wholesale is comprised of 40 six-digit NAICS industries in wholesale trade; rail transportation; truck transportation; support activities for transportation; and warehousing and storage. In 2020, the Lehigh Valley was home to 36,460 Transportation, Warehousing, Logistics, and Wholesale jobs across 790 businesses. This sector experienced the strongest growth of the sectors growing by 49% from 2015 to 2020. Transportation, Warehousing, Logistics, and Wholesale is projected to grow by 14% in the Lehigh Valley from 2020 to 2025, growing over three times as fast as state growth (4%). Many of the jobs held in this sector have low barriers to entry and are met with lower-than-average wages for the Lehigh Valley at \$60,101. Earnings are higher across the Commonwealth of Pennsylvania at \$71,746 per job.

Figure 46: About Transportation, Warehousing, Logistics, and Wholesale

| | | | |
|---------------|---|--|-----------------------------------|
| 36,460 | +14% | \$60,101 | 790 |
| 2020 jobs | 2020 to 2025 change in jobs (+4% statewide) | Avg. earnings per job (\$71,746 statewide) | 2020 payrolled business locations |

Source: Emsi Burning Glass Q2.2021 Dataset.

TRENDS

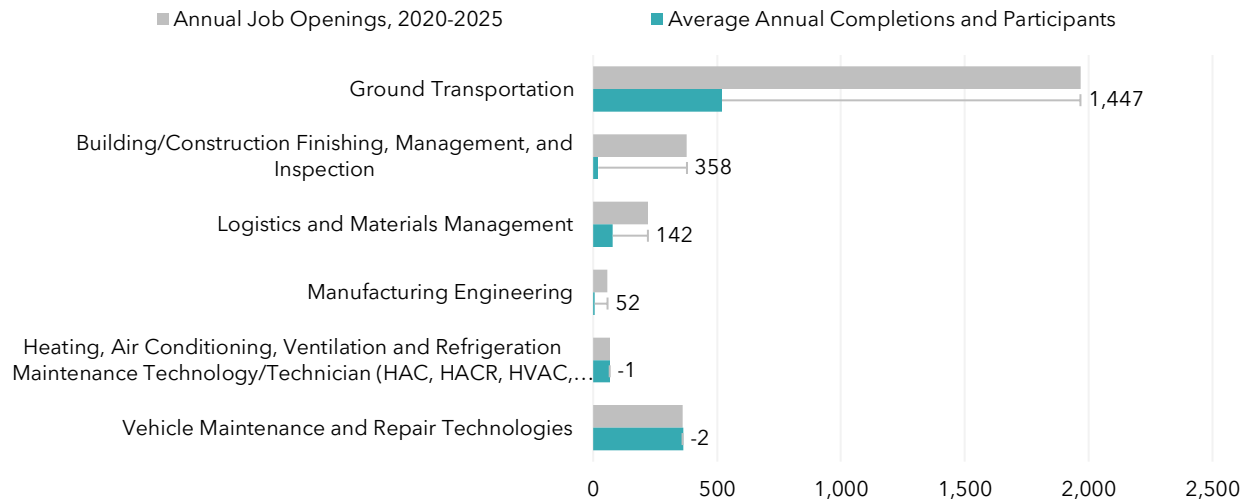
- Transportation, Warehousing, Logistics, and Wholesale has exhibited strong historical growth and will continue to outpace other target industries in the Lehigh Valley.
- Entry level positions in Transportation, Warehousing, Logistics, and Wholesale are typically unskilled and associated with modest earnings.
- Hand laborers and movers are the most represented occupation in the target sector, and Transportation, Warehousing, Logistics, and Wholesale support 60% of their jobs in the Lehigh Valley.
- The target sector's need for Packaging and filling machine operators, Hand laborers, and Movers, and Truck drivers increases the potential movement towards automation.
- Transportation and Material Moving occupations attract the greatest number of in-commuters from outside the region. The Lehigh Valley supported about 46,000 jobs for Transportation and Material Moving occupations in 2020, and about 3,600 of those jobs were held by workers from outside the Lehigh Valley.

GAPS

- Ground Transportation has the largest hiring gap in the Lehigh Valley's Transportation, Warehousing, Logistics, and Wholesale sector. The program area is comprised of three non-credit programs, including Truck and Bus Driver/Commercial Vehicle Operation, primarily supported by Lehigh Career & Technical Institute. If historic educational output remains constant, the Lehigh Valley will need nearly 1,500 more workers every year to fill the program area's job openings.

- Other top lagging occupational fields include Building/Construction Finishing, Management, and Inspection and Logistics and Materials Management.

Figure 47: Ground Transportation education and training programs have the largest gap between regional job openings and completions among select Transportation, Warehousing, Logistics, and Wholesale programs.



Annual Job Openings represent average annual projected openings through 2025 and Average Annual Completions and Participants show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of Transportation, Warehousing, Logistics, and Wholesale-related programs for all award levels and postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

HACVR refers to heating, air conditioning, ventilation, and refrigeration.

Source: Emsi Burning Glass Q2.2021 Dataset and LVEDC.

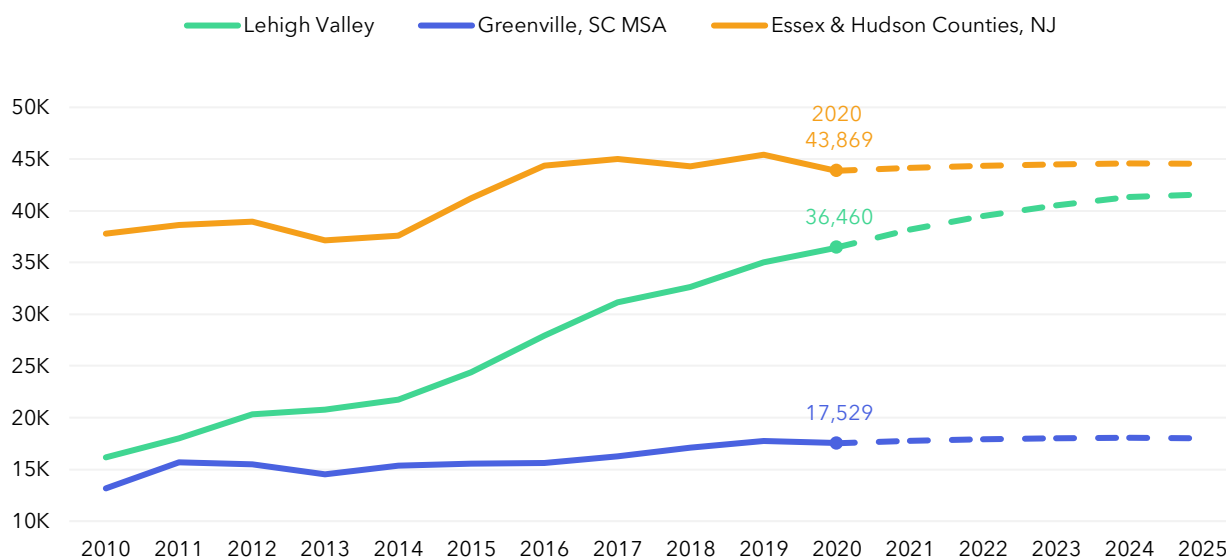
- According to job postings, communication skills are the most requested baseline skill. The top sought-after specialized skills include sorting, scheduling, forklift operation, and customer service.
- In 2020, FedEx Ground posted 30% of the jobs in the Lehigh Valley within the Transportation, Warehousing, Logistics, and Wholesale sector. Hosting regular check-ins with larger employers can help workforce organizations within the Lehigh Valley understand talent needs and trends.

OPPORTUNITIES

- The Lehigh Valley's Transportation, Warehousing, Logistics, and Wholesale sector has grown significantly since 2010, and the region's job figures are comparable to those of Essex and Hudson Counties. At nearly an hour's driving distance away, the Lehigh Valley offers cost competitive sites and labor that can be further leveraged to draw additional jobs to the Valley.
- Computer and Computer Peripheral Equipment and Software Merchant Wholesalers have exceptionally high earnings of \$237,152 per job and have displayed significant growth of 125% from 2015 to 2020. Looking forward, the sector is expected to gain an additional 15 jobs by 2025, for a growth of 20%. Computer and Computer Peripheral Equipment and Software Merchant Wholesalers is not well concentrated within the Lehigh Valley with an LQ of 0.2 and represents an opportunity to support growth and leverage local educational institutions for talent based on recent regional growth and projected national growth.

- General and Operations Managers in the sector grew by 244 jobs between 2015 and 2020, for a growth of 103%. The occupation's typical entry level of education is bachelor's degree with high median annual earnings of \$102,034. For certain industries and within certain companies and under the right conditions, General and Operations Managers' functions can be performed remotely or in a hybrid in-person and remote model. However, remote and hybrid work for General and Operations Managers is more challenging and less common within Transportation, Warehousing, Logistics, and Wholesale industries as well as Manufacturing. Therefore, the opportunity for this growing, high wage occupation is for helping companies train and promote from within, retaining talent coming from regional higher education, and attracting talent to the region.
- A strong demand for Commercial Driver's License (CDL) drivers in the Lehigh Valley will continue, seeing that General Freight Trucking industries are anticipated to increase by 403 jobs between 2020 and 2025. Moreover, there is a strong need to ensure certified drivers are employed in local operations to fulfill the region's employer demand.

Figure 48: Transportation, Warehousing, Logistics, and Wholesale supported nearly 36,500 jobs in the Lehigh Valley in 2020.



Source: Emsi Burning Glass Q2.2021 Dataset.

Table 19: Hand laborers and freight, stock, and material movers were the most represented occupation in Transportation, Warehousing, Logistics, and Wholesale in the Lehigh Valley in 2020.

| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|--|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Laborers and Freight, Stock, and Material Movers, Hand | 9,391 | 50% | 26% | \$30,529 | No formal ed. credential |
| Heavy and Tractor-Trailer Truck Drivers | 4,707 | 23% | 13% | \$49,506 | PS nondegree/Cert. |
| Industrial Truck and Tractor Operators | 4,054 | 80% | 11% | \$37,759 | No formal ed. credential |
| Stockers and Order Fillers | 2,935 | 173% | 8% | \$25,749 | HS/GED |
| Light Truck Drivers | 1,645 | 102% | 5% | \$33,226 | HS/GED |

| Occupation | Jobs in Industry | % Job Change, 2015-2020 | % of Jobs in Industry | Median Annual Earnings | Typical Entry Level Education |
|--|------------------|-------------------------|-----------------------|------------------------|-------------------------------|
| Shipping, Receiving, and Inventory Clerks | 1,145 | 78% | 3% | \$36,613 | HS/GED |
| First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors | 1,099 | 71% | 3% | \$64,188 | HS/GED |
| Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products | 978 | 29% | 3% | \$71,683 | HS/GED |
| Customer Service Representatives | 764 | 23% | 2% | \$35,946 | HS/GED |
| Packers and Packagers, Hand | 629 | 2% | 2% | \$27,940 | No formal ed. credential |

PS nondegree/Cert. refers to a postsecondary nondegree or certificate. HS/GED refers to a high school diploma or Test of General Educational Development.

Source Emsi Burning Glass Q2.2021 Dataset.

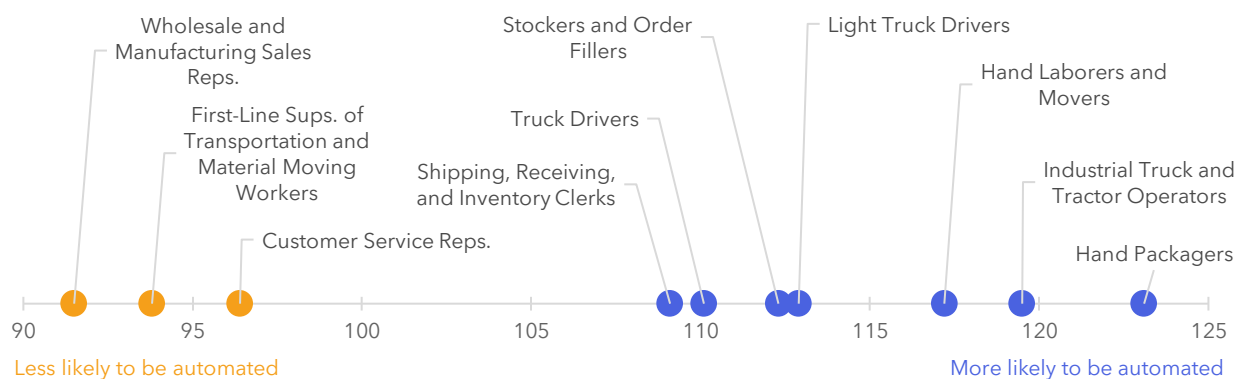
Figure 49: Hand laborers and freight, stock, and material movers are least likely to be remote of the most represented occupations in Transportation, Warehousing, Logistics, and Wholesale.



The Remote Worker Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of remote work, while occupations with an index below 100 have a below average likelihood of remote work. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Figure 50: Wholesale and manufacturing sales representatives, except technical and scientific products are least likely to be automated of the most represented occupations in Transportation, Warehousing, Logistics, and Wholesale.



The Automation Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of automation, while occupations with an index below 100 have a below average likelihood of automation. See Attachment 1 for more details on the Emsi Burning Glass methodology.

Source: Emsi Burning Glass Q2.2021 Dataset.

Table 20: Truck and Bus Driver/Commercial Vehicle Operator and Instructor educational programs have the most completions among the top Transportation, Warehousing, Logistics, and Wholesale-related programs in the Lehigh Valley.

| Program | Non-Credit | Cert. | Assoc. | Bach. | Mast. | PhD | Total |
|--|------------|-------|--------|-------|-------|-----|-------|
| Truck and Bus Driver/Commercial Vehicle Operation | 324 | 120 | 0 | 0 | 0 | 0 | 444 |
| Automobile/Automotive Mechanics Technology/Technician | 289 | 5 | 22 | 0 | 0 | 0 | 317 |
| Computer and Information Sciences | 0 | 0 | 37 | 240 | 31 | 2 | 310 |
| Industrial Engineering & Management | 0 | 0 | 0 | 60 | 72 | 7 | 139 |
| Logistics, Materials, and Supply Chain Management | 79 | 0 | 0 | 30 | 8 | 0 | 117 |
| Heating, Air Conditions, Ventilation and Refrigeration Maintenance Technology/Technician | 67 | 4 | 12 | 0 | 0 | 0 | 83 |
| Construction/Heavy Equipment/Earthmoving Equipment Operation | 56 | 0 | 0 | 0 | 0 | 0 | 56 |
| Autobody/Collision and Repair Technology/Technician | 56 | 0 | 0 | 0 | 0 | 0 | 56 |
| Industrial Electronics & Mechanics and Maintenance Technology | 13 | 3 | 25 | 0 | 0 | 0 | 41 |
| Building/Property Maintenance and Management | 21 | 0 | 0 | 0 | 0 | 0 | 21 |
| Sales, Distribution, and Marketing Operations, General | 21 | 0 | 0 | 0 | 0 | 0 | 21 |
| Logistics Forklift | 20 | 0 | 0 | 0 | 0 | 0 | 20 |
| Small Engines & Gas Engines/Recreational Vehicle Repair | 12 | 0 | 0 | 0 | 0 | 0 | 12 |
| Medium/Heavy Vehicle and Truck Technology/Technician | 10 | 0 | 0 | 0 | 0 | 0 | 10 |
| Manufacturing Engineering & Technology/Technician | 0 | 1 | 4 | 0 | 6 | 0 | 10 |

Average Annual Program Completions show an annual average of the last five years (2016-2020) for accredited programs and three years (2018-2020) for non-credit programs. The data includes a selection of programs for all award levels at postsecondary institutions in the Lehigh Valley, as well as Kutztown University in Berks County and East Stroudsburg University based in Monroe County. Non-credit program participants are from Bethlehem Area Vo-Tech School, Career Institute of Technology, Lehigh Carbon Community College, Lehigh Career & Technical Institute, and Northampton Community College.

HACVR refers to heating, air conditioning, ventilation, and refrigeration.

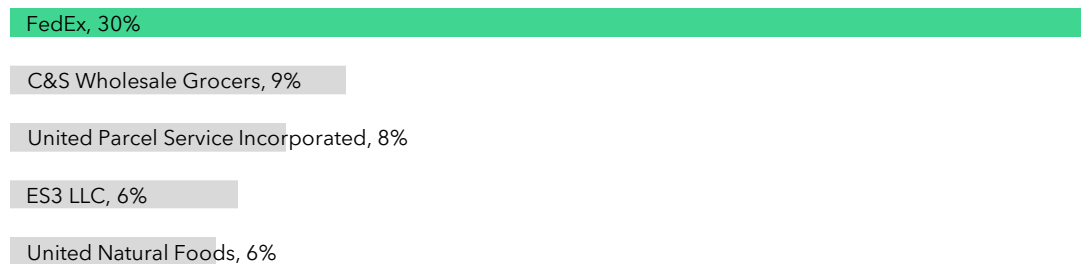
Source: Data provided by LVEDC.

Table 21: Sorting was the most requested specialized skill in the Lehigh Valley's Transportation, Warehousing, Logistics, and Wholesale job postings, and communication skills were the most requested baseline skill.

| Specialized Skills | Baseline Skills |
|----------------------|--------------------------|
| Sorting | Communication Skills |
| Scheduling | Physical Abilities |
| Forklift Operation | Microsoft Office |
| Customer Service | Microsoft Excel |
| Repair | Detail-Oriented |
| Lifting Ability | English |
| Packaging | Planning |
| Customer Contact | Teamwork / Collaboration |
| Logistics | Computer Literacy |
| Warehouse Operations | Written Communication |

Source: Emsi Burning Glass Labor Insight.

Figure 51: FedEx posted 30% of the jobs in the Lehigh Valley for Transportation, Warehousing, Logistics, and Wholesale in the last year.



Source: Emsi Burning Glass Labor Insight.



ATTACHMENT 1: GLOSSARY

American Community Survey Data

The American Community Survey (ACS) is a nationwide survey designed to provide communities a fresh look at how they are changing. It is a critical element in the Census Bureau's decennial census program. The ACS collects information such as age, race, income, commute time to work, home value, veteran status, and other important data. As with the 2010 decennial census, information about individuals remains confidential. ACS is published every year instead of every ten years. Collecting data every year provides more up-to-date information throughout the decade about the US population at the local community level. About 3.5 million housing unit addresses are selected annually, across every county in the nation.

The Self-Employed Class of Worker includes all people who consider self-employment a significant part of their income and/or taking a significant part of their time. Emsi Burning Glass (EBG) largely bases job counts, hourly earnings, and projections for these unincorporated self-employed jobs on responses to the ACS (with additional input from other sources). EBG also uses ACS to construct sector and occupation diversity data, which provides demographic breakouts of the workers in a given sector or occupation. We also publish many of the social and economic indicators that the ACS gathers and distributes through their various application programming interfaces (APIs).

Automation Index

EBG's Automation Index analyzes the potential automation risk of occupations in the US based on job task content—derived from O*NET work activities. Combining that data with the Frey and Osborne findings at the occupation level, we identify which job tasks are 'at risk' and which are resilient. We also incorporate data to identify where occupations cluster in industries facing disruption, and where workers' skills mean their nearest job options are also facing automation risk. This is a 100-based index, meaning that occupations with an automation index above 100 have an above average risk of automation, while occupations with an automation index below 100 have a below average risk of automation.

The automation index is unavailable for Legislators, Military, and Unclassified occupations, so they are excluded from aggregate indexes for higher-level occupations.

Average Earnings Per Job (Industry)

Also called "average earnings per worker", average earnings are the result of total pre-tax industry earnings divided by same-year industry employment. Earnings are defined as labor-related personal income—that is, income from work. Income from stock dividends or interest, rents, Social Security, and other non-work sources are not included. Average earnings are the sum of wages and salaries, and supplements.

Source: BLS's QCEW dataset (wages and salaries), BEA (supplements).

Baseline Skills

Baseline skills are foundational skills such as problem-solving, organization, and collaboration. These skills are also often referred to as employability or soft skills.

Bureau of Economic Analysis (BEA)

The BEA publishes data primarily used in EBG's Input-Output modeling. BEA data is also used to help calculate earnings in some cases, and to provide employment estimates in key areas that BLS sources don't cover. Major sources from the BEA that appear in EBG data include:

- State Personal Income/Local Area Personal Income (SPI/LPI)
- Make and Use Tables (MUTs)
- National Income and Product Accounts (NIPA)
- Gross State Product/GDP by State (GSP)

Bureau of Labor Statistics (BLS)

The Bureau of Labor Statistics is the principal federal agency responsible for measuring labor market activity, working conditions, and price changes in the economy. Its mission is to collect, analyze, and disseminate essential economic information to support public and private decision making. The BLS is the major source of employment and earnings data in the United States. Major BLS datasets used by EBG include:

- Quarterly Census of Employment and Wages (QCEW)
- Occupational Employment Statistics (OES)
- National Industry-Occupation Employment Matrix (NIOEM)

Center for Workforce Information and Analysis (CWIA)

CWIA is a bureau staffed by statisticians, analysts, and economists within the Pennsylvania Department of Labor and Industry designated by the Governor's Office as the primary source of labor market information for the commonwealth. CWIA's mission is to produce and provide timely, objective, and credible workforce and economic statistics and analysis to help make informed policy, business, and career decisions that strengthen Pennsylvania's economic security.

Source: CWIA.

CIP-to-SOC Mapping

The CIP-to-SOC mapping connects educational programs with target occupations, showing potential higher ed talent pipelines into occupations. EBG's CIP-to-SOC mapping is based on the National Center for Education Statistics' CIP-to-SOC mapping. EBG has made modifications to the mapping to make it more useful.

Classification of Instructional Programs (CIP)

A standard numerical code for a post-secondary course of study, developed and defined by the US Department of Education's National Center for Education Statistics. The classification of instructional programs provides a taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completions activity.

Class of Worker (CoW)

Class of worker categorizes jobs according to the type of employment of the worker. This variable identifies whether the respondent is a salaried employee of a business or is self-employed. For various reasons, EBG further splits each of these categories in two, resulting in four classes of worker in EBG Data.

QCEW Employees: The Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) dataset is the best source for job counts data in the United States. This quarterly near-census of workers is a byproduct of unemployment insurance reporting, which businesses are required to file monthly. QCEW covers 95% of the positions held by employees in the United States.

Non-QCEW Employees: The remaining 5% of employment not covered by QCEW occurs marginally in specific industries and is accounted for in other government datasets. EBG collects employment data for these industries and puts it in the Non-QCEW Employees Class of Worker. In other words, these jobs are held by employees of businesses, but for various reasons they are not covered by unemployment insurance and therefore aren't counted in QCEW.

Self-Employed: This Class of Worker includes job counts for work we typically think of as constituting self-employment. The data comes from the Census' American Community Survey and counts respondents who list self-employment as their primary source of income.

Extended Proprietors: This Class of Worker contains miscellaneous job counts recorded by the BEA that exceed counts reported in American Community Survey data. Many of these jobs are incidental self-employment that does not constitute a primary source of income (e.g., selling handmade goods on Etsy). It's important to note that, although the goal of this Class of Worker is to account for miscellaneous income from labor, it inherently contains miscellaneous income from capital as well (since the BEA looks at profits rather than earnings).

This analysis captures the entire employed workforce, plus self-employed persons, and uses the QCEW Employees, non-QCEW Employees, and Self-Employed classes in conjunction.

Cost of Living Index

The Cost of Living (COL) Index comes annually from the Council for Community and Economic Research (C2ER) and provides a baseline for understanding how regional costs of living compare to the nation and to each other. The index is comprised of six major categories: grocery items, housing, utilities, transportation, health care, and miscellaneous goods and services. An index below 100 means the region has a lower cost of living, whereas an index above 100 means it is more expensive to live.

Demographic Data

The demographic data in this report is compiled from several sources using a specialized process. Sources include annual population estimates and population projections from the US Census Bureau, and birth and mortality rates from the US Health Department.

Educational Attainment Data

EBG's educational attainment numbers are based on EBG's demographic data and the American Community Survey. Educational attainment data cover only the population aged 25 years or more and indicate the highest level achieved.

EBG Job Postings

Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography.

Establishments (Payrolled Business Location)

Also referred to as a "Payrolled Business Location", an establishment is a single physical location of some type of economic activity (a business), used for reporting purposes in government data sources. A single company may have multiple establishments. As an example, a single company with its corporate office in New York, a paper manufacturing plant in Georgia, and fifteen warehouses in various cities would comprise a total of seventeen establishments, and each establishment would be classified according to its own type of activity. In this case, three different industries would be used:

- Corporate, subsidiary, and regional managing offices
- Paper (except newsprint) mills
- General warehousing and storage

Source: QCEW.

Gross Regional Product (GRP)

Gross Regional Product (GRP) is simply GDP for the region of study. More commonly, GRP is GDP for any region smaller than the United States, such as a state or metro. GRP measures the final market value of all goods and services produced in the region of study. GRP is the sum of total industry earnings, taxes on production and imports, and profits, less subsidies ($GRP = \text{earnings} + \text{TPI} + \text{profits} - \text{subsidies}$).

Source: EBG data based primarily on data from the Bureau of Economic Analysis (BEA) and the Quarterly Census of Employment and Wages (QCEW) from the Bureau of Labor Statistics (BLS).

Industry Data

EBG industry data have various sources depending on the class of worker. (1) For QCEW Employees, EBG primarily uses the QCEW (Quarterly Census of Employment and Wages), with supplemental estimates from County Business

Patterns. (2) Non-QCEW employees data are based on a number of sources including QCEW, Current Employment Statistics, County Business Patterns, BEA State and Local Personal Income reports, the National Industry-Occupation Employment Matrix (NIOEM), the American Community Survey, and Railroad Retirement Board statistics. (3) Self-Employed and Extended Proprietor classes of worker data are primarily based on the American Community Survey, Nonemployer Statistics, and BEA State and Local Personal Income Reports. Projections for QCEW and Non-QCEW Employees are informed by NIOEM and long-term industry projections published by individual states.

Input-Output Data

The input-output model in this report is EBG's gravitational flows multi-regional social account matrix model (MR-SAM). It is based on data from the Census Bureau's Current Population Survey and American Community Survey; as well as the Bureau of Economic Analysis' National Income and Product Accounts, Input-Output Make and Use Tables, and Gross State Product data. In addition, several EBG in-house data sets are used, as well as data from Oak Ridge National Labs on the cost of transportation between counties.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the US Department of Education's National Center for Education Statistics.

Integrated Post-Secondary Education Data System (IPEDS)

The Integrated Postsecondary Education Data System (IPEDS) is a system of interrelated surveys conducted annually by the US Department's National Center for Education Statistics (NCES). IPEDS gathers information from every college, university, and technical and vocational institution that participates in the federal student financial aid programs. The Higher Education Act of 1965, as amended, requires that institutions that participate in federal student aid programs report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid. Many institutions that do not receive federal funding also participate and report their data to IPEDS voluntarily. EBG uses IPEDS data to provide information about postsecondary institutions. Completions include degrees (associate, bachelor's, master's, doctoral), certificates, and any other formal award. In addition, EBG uses the CIP system to create program-to-occupation crosswalks, which map programs of study to occupations and reveal one measure of education supply and demand.

Job

A job is any position in which a worker provides labor in exchange for monetary compensation. This includes those who work as employees for businesses (a.k.a. "wage and salary" employees) and proprietors who work for themselves. EBG reports employment as annual averages. Employment averages represent jobs, not workers, since one individual may hold multiple jobs. Due to limitations of source data, both full- and part-time jobs are included and counted equally, i.e., job counts are not adjusted to full-time equivalents. Geographically, payroll jobs are always reported by the place of work rather than the worker's place of residence. Conversely, self-employed and extended proprietors are always reported by their place of residence. Unpaid family workers and volunteers are excluded from all EBG data.

Source: EBG data based primarily on the Quarterly Census of Employment and Wages (QCEW) from the Bureau of Labor Statistics (BLS) and the Bureau of Economic Analysis (BEA).

Job Opening

A combination of both new jobs and replacement jobs constitutes total job openings. The annual job openings figure is derived by dividing total job openings by the number of years in the user's selected timeframe. For example, an occupation showing 130 job openings between 2016 and 2026 would result in an annual job openings figure of 13.

Source: EBG's proprietary employment data, combined with occupation-specific percentages from the US Bureau of Labor Statistics Employment Projections program.

Labor Market Information (LMI)

Labor Market Information (LMI) is reported on two levels: traditional or government LMI, and real-time LMI. Traditional LMI is data about the labor market that is collected and published by public sources (such as the Bureau of Labor Statistics, the US Census, and the Bureau of Economic Analysis) for standardized industries and occupations. Real-time LMI is data taken from online job postings and profiles and is not governed by any one entity.

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region "unique." For example, if the leather products manufacturing industry accounts for 10% of jobs in your area but 1% of jobs nationally, then the area's leather-producing industry has an LQ of 10. So, in your area, leather manufacturing accounts for a larger than average "share" of total jobs—the share is 10 times larger than normal.

Source: EBG's proprietary employment data.

LEHD Origin-Destination Employment Statistics

LEHD Origin-Destination Employment Statistics (LODES) are the job data that are delivered in the OnTheMap application. As with previous versions of data released in OnTheMap, LODES Version 7 is a partially synthetic dataset that describes geographic patterns of jobs by their employment locations and residential locations as well as the connections between the two locations.

Source: Census Bureau.

Median Household Income (MHI)

Median household income (MHI) refers to the distribution of household income into two equal groups, one having incomes above the median, and other having incomes below the median. A household is defined as persons classified as members of a married-couple family, other family type, or as an unrelated individual. Their monthly family income, therefore, represents the sum of all cash income received by the individual and/or other family

members. It may represent income from employment, assets (such as CD's, rental property, savings accounts), and other sources (such as Social Security, Aid to Families with Dependent Children, pensions, state unemployment compensation, and so on).

EBG's MHI comes from the five-year ACS data and includes data for individual counties, MSAs, states, and the nation. EBG does not provide MHI when aggregating regions, since one cannot create a new median by averaging the medians of those individual regions. ACS five-year data has a two-year lag between when the data is collected and when it is released (i.e., a late 2017 EBG data run would include 2011-2015 ACS data).

Source: Census Bureau, Median Household Income.

Metropolitan Statistical Area (MSA)

A metropolitan statistical area is an area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core. According to the United States Census Bureau, each metropolitan statistical area must have at least one urbanized area of 50,000 or more inhabitants. Pending approval, this minimum population threshold will increase to 100,000 according to the recommendations of the Metropolitan and Micropolitan Statistical Area Standards Review Committee.

Source: Census Bureau.

Net Commuters

Net Commuters is the difference between the occupational residents in a region and the occupational employment in a region. For a region in which more workers live than there are jobs in the region, net commuting is negative (i.e., the net result is that workers commute out of the region for work). For a region in which there are more jobs than there are resident workers, net commuting is positive (i.e., the net result is that workers commute into the region for work).

Commuting patterns are derived from the Census Bureau's LED LODS dataset. These commuting patterns are applied to final EBG industry job counts (from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) dataset) to create an industry-based commuting/industry-by-residence dataset. This industry-based set is transformed to occupations through staffing patterns, resulting in occupation-based commuting/occupation-by-residence data.

North American Industry Classification System (NAICS)

The North American Industry Classification System (NAICS) is the standard federal system for classifying business establishments. Each establishment is assigned a six-digit code and category title, organizing them primarily by similar production processes into five levels: sectors, subsectors, industry groups, industries, and national industries (national industries are specific to one or more of the United States, Canada, and Mexico). Codes are hierarchical: less detailed categories are derived by removing digits from the end of more detailed codes.

Example:

23: Construction (sector)

236: Construction of Buildings (subsector)

2362: Nonresidential Building Construction (industry group)

23622: Commercial and Institutional Building Construction (industry)

236220: Commercial and Institutional Building Construction (national industry which in this case is identical to its parent industry)

The NAICS classification is updated every five years to better reflect economic realities. EBG's data are a departure from the federal classification system, seeing that public and private sector jobs are reported separately. For more information about EBG's methodology, visit our Knowledge Base article:

<https://kb.emsidata.com/methodology/how-do-ems-naics-differ-from-standard-naics>

Occupation

The term occupation refers to professions or careers in the workforce. In EBG data, occupations are differentiated from jobs, as jobs show the count of positions held within a certain occupation. For example, Health Educators would be considered an occupation; in a report focused on the Minneapolis-St. Paul-Bloomington, MN MSA, there might be 970 currently held jobs for Health Educators.

Occupation Data

EBG occupation employment data are based on final EBG industry data and final EBG staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EBG earnings by industry.

Occupation Residence Data

This data comes from the Census LODES data, specifically from Origin and Destination (OD) data, Regional Area Characteristics (RAC), and Workforce Area Characteristics (WAC) data which EBG applies to our occupation jobs figures.

Occupational Information Network (O*NET)

The Occupational Information Network (O*NET) database contains hundreds of standardized and occupation-specific descriptors on almost 1,000 occupations covering the entire US economy. The database, which is available to the public at no cost, is continually updated from input by a broad range of workers in each occupation. Every occupation requires a different mix of knowledge, skills, and abilities, and is performed using a variety of activities and tasks. These distinguishing characteristics of an occupation are described by the O*NET Content Model, which is one of the data sources of the EBG Remote Worker Index. The O*NET database is developed under the sponsorship of the US Department of Labor/Employment and Training Administration (USDOL/ETA) through a grant to the North Carolina Department of Commerce.

Source: O*NET OnLine, National Center for O*NET Development.

OnTheMap

The OnTheMap version used in this analysis is the sixth generation of OnTheMap, a web-based mapping and reporting application that shows where workers are employed and where they live. It also provides companion reports on age, earnings, industry distributions, race, ethnicity, educational attainment, and sex. Based on 2002-2018 LEHD Origin Destination Employment Statistics (LODES), OnTheMap is a unique resource for mapping the travel patterns of workers and identifying small-area workforce characteristics. The project is supported by the Employment and Training Administration (ETA) at the US Department of Labor.

Source: US Census Bureau. (2021). LEHD Origin-Destination Employment Statistics (2002-2018) [computer file]. Washington, DC: US Census Bureau, Longitudinal-Employer Household Dynamics Program [distributor], accessed in July 2021 at <https://onthemap.ces.census.gov>. LODES 7.5 [version].

Pennsylvania Center for Workforce Information & Analysis (PA CWIA)

CWIA is a bureau staffed by statisticians, analysts, and economists within the PA Department of Labor & Industry designated by the Governor's Office as the primary source of labor market information for the commonwealth. Our mission is to produce and provide timely, objective, and credible workforce and economic statistics and analysis to help our customers make informed policy, business and career decisions that strengthen Pennsylvania's economic security. We hope you find the information contained in this website useful and informative.

Source: <https://www.workstats.dli.pa.gov/Pages/default.aspx>

Posting Intensity

Posting Intensity is the ratio of total to unique (deduplicated) job postings. A higher than average posting intensity can mean that employers are putting more effort than normal into hiring that position. Posting intensity is available by occupation, by job title, by company, and by region.

Poverty Levels

The Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered "in poverty". The official poverty thresholds do not vary geographically, but they are updated for inflation using the Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps).

Source: Census Bureau.

Qualifications

In EBG data, the term “qualifications” refers to the certifications decided on by a third-party entity (school, government, industry, etc.) that acknowledges a body of skills and abilities (e.g., MBA, Certified Registered Nurse). For example, a job posting for a registered nurse may state that the qualifications for the position include a Bachelor of Science in Nursing from an accredited university and a nursing license from the state nursing board.

Quarterly Census of Employment and Wages (QCEW)

Quarterly Census of Employment and Wages (QCEW) is a dataset published by the Bureau of Labor Statistics (BLS). QCEW is the backbone of EBG’s core LMI data, providing establishment counts, monthly employment, and quarterly wages, by NAICS industry, by county, and by ownership sector, for the entire United States. These data are aggregated to annual levels, to higher industry levels (NAICS industry groups, sectors, and supersectors), and to higher geographic levels (nation, state, and metropolitan statistical area). EBG produces a slightly modified form of the BLS QCEW dataset:

- EBG provides estimates for suppressed data (roughly 60% of QCEW data points are suppressed)
- EBG alters the NAICS classification of public-sector employment to make it more compatible with other data sources
- EBG transforms the data to use consistent county and NAICS definitions from 2001 to the present; original QCEW data does not use consistent definitions year-to-year

Remote Worker Index

EBG’s Remote Worker Index analyzes the likelihood that occupations in the US can be remote based on job task content—derived from O*NET work activities. We combine that data with postings for remote jobs. The Remote Worker Index is a 100-based index, meaning that occupations with an index above 100 have an above average likelihood of remote work, while occupations with an index below 100 have a below average likelihood of remote work.

The index is unavailable for Legislators, Military, and Unclassified occupations, so they are excluded from aggregate indexes for higher-level occupations.

Resident Workers

Unlike the majority of EBG data, resident worker data is presented in terms of where workers live rather than where they work. For instance, though ZIP code 85042 might have 50 software developers working in the region, there might only be 25 software developers who live there. This data is helpful in demonstrating workforce availability and helping companies locate the talent they need.

Source: This data comes from the Census’ LODES program and is most commonly used in their On The Map tool. Within the LODES dataset, EBG makes particular use of the Origin and Destination (OD) data, Regional Area Characteristics (RAC), and Workforce Area Characteristics (WAC) data to produce occupation by residence data.

Methodology Overview: QCEW is the foundation of EBG employment data for both industries and occupations. This is because the US lacks a comprehensive census-based (administrative records as opposed to surveys) source for

occupation data, so EBG produces occupation data by running industry data through a regional staffing pattern derived from the OES survey data. This essentially uses the strengths of all available data, the numerical accuracy of QCEW and the less reliable occupation detail of OES to create a synthetic dataset of detailed occupational estimates. To create occupation by residence data, EBG also includes LODES as an input to the model to first convert industry data from place of work to place of residence before applying the staffing pattern to generate occupation data. LODES can lag behind other sources by 2-3 years, so we create a commuting pattern specific to each year of EBG employment data to model the employment from place of work to place of residence. The commuting pattern is adjusted to the matching year of industry employment before being applied (e.g.: to produce 2020 occupation by place of residence data, the industry commuting pattern from the closest year of LODES data is adjusted to match the 2020 industry data and is then run through a 2020 staffing pattern).

Specialized Skills

Specialized skills, also referred to as hard or technical skills, require specific domain knowledge or technical training.

Staffing Pattern

Staffing patterns show the occupational makeup of an industry in percentages. For example, a (simplified) staffing pattern for the industry “Hospitals” might show that 10% of jobs in the hospitals industry are occupied by surgeons, 15% by general practitioners, 20% by nurses, 5% by information technology support staff, 5% by janitors, 1% by chief executives, and so on.

Source: Primarily the national OES staffing pattern, combined with projections from the National Industry-Occupation Employment Matrix and EBG’s proprietary employment data.

Standard Occupation Classification (SOC)

The Standard Occupational Classification (SOC) system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of about 775 detailed occupations according to their occupational definition. To facilitate classification, detailed occupations are combined to form about 450 broad occupations, about 95 minor groups, and 23 major groups. Detailed occupations in the SOC with similar job duties, and in some cases skills, education, and/or training, are grouped together. The SOC system uses hyphenated codes to divide occupations into four levels: major groups, minor groups, broad occupations, and detailed occupations.

Example:

29-0000: Healthcare practitioners and technical occupations (major group)

29-1000: Health diagnosing and treating practitioners (minor group)

29-1020: Dentists (broad occupation)

29-1021: Dentists, general (detailed occupation)

The SOC classification system was updated in 2010, and the update to the 2018 classification is currently happening across various government LMI datasets.

Total Job Postings

Total Job Postings is the total and unduplicated number of online vacancies scraped from over 100,000 websites. Deduplication is the process of identifying duplicate job postings and only counting one of the duplicates. The total posting count is the count of postings before the deduplication process. The unique posting count is the count of postings after the deduplication process. For example, if a user runs a report that returns 12 total job postings and 2 unique postings, this means that the 12 postings contained 10 duplicates and only 2 unique job advertisements.

Typical Entry Level of Education

The education level most often needed to enter an occupation. Typical entry level of education is reported at the national level, so alternate paths to employment may exist in a region of study.

Source: BLS' Education and training assignments by detailed occupation.

Underemployment

Underemployment data helps communities identify the portions of their population who are underutilizing their skills or time. There are three types of underemployment:

- Over-skilled
- Under-paid
- Low hours

Example:

15% of region A's population has a high school diploma. 34% of jobs only require a typical entry level education of a high school diploma. This means that 19% of the region's working age population would be over-skilled and have a higher degree than necessary for these jobs.

Sources: Population educational attainment level by county (ACS data from the Census). Typical entry level education by occupation (BLS).

Unemployment Data

This data comes from the Characteristics of the Insured Unemployed (CIU), Local Area Unemployment Statistics (LAUS; BLS), EBG final industry/occupation data, and Current Population Survey (CPS, Census).

Unique Job Postings

Unique Job Postings is the number of deduplicated job vacancy advertisements scraped from over 100,000 websites. Deduplication is the process of identifying duplicate job postings and only counting one of the duplicates. The unique posting count is the count of postings after the deduplication process has taken place. The total posting count is the count of postings before deduplication. For example, if a user runs a report that returns 12 total job

postings and 2 unique job postings, this means that the 12 postings contained 10 duplicates and only 2 unique job advertisements.



Attachment 2: Target Sectors

The North American Industry Classification System (NAICS) is the standard federal system for classifying business establishments. Each establishment is assigned a six-digit code and category title, organizing them primarily by similar production processes into five levels: sectors, subsectors, industry groups, industries, and national industries (national industries are specific to the US, Canada, and Mexico). Codes are hierarchical: less detailed categories are derived by removing digits from the end of more detailed codes, and the system is updated every five years to better reflect economic realities.

EMSI BURNING GLASS (EBG) NAICS

No real-world public data source uses purely “standard” NAICS, including EBG. EBG differs from standard NAICS codes in the following:

- EBG combines all industry data under 111 (Crop Production) and 112 (Animal Production) into single detailed codes: 111000 and 112000, respectively. This is due to the general lack of detailed and complete agricultural employment data present in QCEW, the EBG primary source of industry data. Roughly 75% of data points for the agricultural NAICS for sub-national geographies are suppressed. Users looking for more detailed data for these industries are encouraged to check QCEW, as more data may be available for their region.
- EBG uses a single code, 482110 (Rail Transportation), as an aggregate of NAICS 482111 and 482112. The BLS does not provide information for these NAICS, and EBG gathers this data from the Railroad Retirement Board, which uses NAICS 482110.
- In EBG data, 491110 (Postal Service) represents private-sector United States Postal Service (USPS) contractors only. Actual USPS establishments are found in Emsi code 901149.
- EBG does not have data for 541120 (Offices of Notaries), because the BLS does not report any data for that category.
- EBG creates a separate hierarchy for public-sector establishments under code 90 (Government), as explained below.

GOVERNMENT NAICS

Quarterly Census of Employment and Wages (QCEW) data include an ownership flag that indicates ownership by private firm, or federal, state, or local government. Establishments with each ownership type can be found throughout most NAICS in the hierarchy (e.g., state-run sewage treatment facilities found in standard NAICS 221320, alongside privately-owned facilities). Following the conventions of Current Employment Statistics (CES), Occupational Employment Statistics (OES), and BEA data sources, EBG re-classifies all government-run establishments into the appropriate Government NAICS:

90: Government

901: Federal Government

9011: Federal Government, Civilian

90114: US Postal Service

901149: US Postal Service

- 90119: Federal Government, Civilian, excluding Postal Service
 - 901199: Federal Government, Civilian, excluding Postal Service
- 9012: Federal Government, Military
 - 90120: Federal Government, Military
 - 901200: Federal Government, Military
- 902: State Government
 - 9026: Education and Hospitals (State Government)
 - 90261: Education (State Government)
 - 902611: Elementary and Secondary Schools (State Government)
 - 902612: Colleges, Universities, and Professional Schools (State Government)
 - 902619: All Other Schools and Educational Support Services (State Government)
 - 90262: Hospitals (State Government)
 - 902622: Hospitals (State Government)
 - 9029: State Government, excluding Education and Hospitals
 - 90299: State Government, excluding Education and Hospitals
 - 902999: State Government, excluding Education and Hospitals
- 903: Local Government
 - 9036: Education and Hospitals (Local Government)
 - 90361: Education (Local Government)
 - 903611: Elementary and Secondary Schools (Local Government)
 - 903612: Colleges, Universities, and Professional Schools (Local Government)
 - 903619: All Other Schools and Educational Support Services (Local Government)
 - 90362: Hospitals (Local Government)
 - 903622: Hospitals (Local Government)
 - 9039: Local Government, excluding Education and Hospitals
 - 90399: Local Government, excluding Education and Hospitals
 - 903999: Local Government, excluding Education and Hospitals

Under this hierarchy, the state-run sewage treatment plant would be found in NAICS 902999, “State Government, excluding Education and Hospitals.” Similarly, federal-government-run establishments in the “Courts” industry

(NAICS 922110 in the standard classification) would be classified in NAICS 901199, “Federal Government, Civilian” in the EBG hierarchy. Again, a local community college, classified in NAICS 611210 in standard NAICS, would be found in NAICS 903612, “Colleges, Universities, and Professional Schools (Local Government)”.

Therefore, in EBG data, all establishments in the main NAICS hierarchy (all sectors other than 90) are privately owned, including 611 (Educational Services) and 62 (Health Care and Social Assistance). In addition, all establishments in NAICS 92 are reclassified under NAICS 90 (broken out above).

Because EBG utilizes other datasets (CES, BEA sources, OES) that use the above Government NAICS hierarchy, EBG follows the same convention.

TARGET INDUSTRY COMPOSITION

Table A1: Advanced Manufacturing is comprised of 118 industries

| Industry | NAICS Code |
|--|------------|
| Corrugated and Solid Fiber Box Manufacturing | 322211 |
| Other Paperboard Container Manufacturing | 322219 |
| Paper Bag and Coated and Treated Paper Manufacturing | 322220 |
| Stationery Product Manufacturing | 322230 |
| All Other Converted Paper Product Manufacturing | 322299 |
| Industrial Gas Manufacturing | 325120 |
| Synthetic Dye and Pigment Manufacturing | 325130 |
| Other Basic Inorganic Chemical Manufacturing | 325180 |
| All Other Basic Organic Chemical Manufacturing | 325199 |
| Plastics Material and Resin Manufacturing | 325211 |
| Synthetic Rubber Manufacturing | 325212 |
| Artificial and Synthetic Fibers and Filaments Manufacturing | 325220 |
| Fertilizer (Mixing Only) Manufacturing | 325314 |
| Paint and Coating Manufacturing | 325510 |
| Adhesive Manufacturing | 325520 |
| Explosives Manufacturing | 325920 |
| Custom Compounding of Purchased Resins | 325991 |
| Photographic Film, Paper, Plate, and Chemical Manufacturing | 325992 |
| All Other Miscellaneous Chemical Product and Preparation Manufacturing | 325998 |
| Cement Manufacturing | 327310 |

| Industry | NAICS Code |
|--|------------|
| Ready-Mix Concrete Manufacturing | 327320 |
| Concrete Block and Brick Manufacturing | 327331 |
| Other Concrete Product Manufacturing | 327390 |
| Cut Stone and Stone Product Manufacturing | 327991 |
| Ground or Treated Mineral and Earth Manufacturing | 327992 |
| Mineral Wool Manufacturing | 327993 |
| All Other Miscellaneous Nonmetallic Mineral Product Manufacturing | 327999 |
| Iron and Steel Mills and Ferroalloy Manufacturing | 331110 |
| Iron and Steel Pipe and Tube Manufacturing from Purchased Steel | 331210 |
| Rolled Steel Shape Manufacturing | 331221 |
| Other Aluminum Rolling, Drawing, and Extruding | 331318 |
| Iron Foundries | 331511 |
| Steel Investment Foundries | 331512 |
| Steel Foundries (except Investment) | 331513 |
| Aluminum Foundries (except Die-Casting) | 331524 |
| Other Nonferrous Metal Foundries (except Die-Casting) | 331529 |
| Iron and Steel Forging | 332111 |
| Nonferrous Forging | 332112 |
| Powder Metallurgy Part Manufacturing | 332117 |
| Metal Crown, Closure, and Other Metal Stamping (except Automotive) | 332119 |
| Fabricated Structural Metal Manufacturing | 332312 |
| Plate Work Manufacturing | 332313 |
| Metal Window and Door Manufacturing | 332321 |
| Sheet Metal Work Manufacturing | 332322 |
| Ornamental and Architectural Metal Work Manufacturing | 332323 |
| Other Metal Container Manufacturing | 332439 |
| Machine Shops | 332710 |
| Precision Turned Product Manufacturing | 332721 |

| Industry | NAICS Code |
|---|------------|
| Bolt, Nut, Screw, Rivet, and Washer Manufacturing | 332722 |
| Industrial Valve Manufacturing | 332911 |
| Fluid Power Valve and Hose Fitting Manufacturing | 332912 |
| Other Metal Valve and Pipe Fitting Manufacturing | 332919 |
| Fabricated Pipe and Pipe Fitting Manufacturing | 332996 |
| All Other Miscellaneous Fabricated Metal Product Manufacturing | 332999 |
| Food Product Machinery Manufacturing | 333241 |
| Semiconductor Machinery Manufacturing | 333242 |
| Printing Machinery and Equipment Manufacturing | 333244 |
| Other Industrial Machinery Manufacturing | 333249 |
| Optical Instrument and Lens Manufacturing | 333314 |
| Other Commercial and Service Industry Machinery Manufacturing | 333318 |
| Air and Gas Compressor Manufacturing | 333912 |
| Measuring, Dispensing, and Other Pumping Equipment Manufacturing | 333914 |
| Conveyor and Conveying Equipment Manufacturing | 333922 |
| Power-Driven Handtool Manufacturing | 333991 |
| Industrial Process Furnace and Oven Manufacturing | 333994 |
| Fluid Power Cylinder and Actuator Manufacturing | 333995 |
| Fluid Power Pump and Motor Manufacturing | 333996 |
| Scale and Balance Manufacturing | 333997 |
| All Other Miscellaneous General Purpose Machinery Manufacturing | 333999 |
| Electronic Computer Manufacturing | 334111 |
| Computer Terminal and Other Computer Peripheral Equipment Manufacturing | 334118 |
| Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing | 334220 |
| Other Communications Equipment Manufacturing | 334290 |
| Semiconductor and Related Device Manufacturing | 334413 |
| Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing | 334416 |
| Printed Circuit Assembly (Electronic Assembly) Manufacturing | 334418 |

| Industry | NAICS Code |
|--|------------|
| Other Electronic Component Manufacturing | 334419 |
| Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing | 334511 |
| Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables | 334513 |
| Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals | 334515 |
| Other Measuring and Controlling Device Manufacturing | 334519 |
| Electric Lamp Bulb and Part Manufacturing | 335110 |
| Residential Electric Lighting Fixture Manufacturing | 335121 |
| Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing | 335122 |
| Other Lighting Equipment Manufacturing | 335129 |
| Power, Distribution, and Specialty Transformer Manufacturing | 335311 |
| Motor and Generator Manufacturing | 335312 |
| Switchgear and Switchboard Apparatus Manufacturing | 335313 |
| Relay and Industrial Control Manufacturing | 335314 |
| Noncurrent-Carrying Wiring Device Manufacturing | 335932 |
| All Other Miscellaneous Electrical Equipment and Component Manufacturing | 335999 |
| Automobile Manufacturing | 336111 |
| Heavy Duty Truck Manufacturing | 336120 |
| Motor Vehicle Body Manufacturing | 336211 |
| Truck Trailer Manufacturing | 336212 |
| Travel Trailer and Camper Manufacturing | 336214 |
| Motor Vehicle Gasoline Engine and Engine Parts Manufacturing | 336310 |
| Motor Vehicle Electrical and Electronic Equipment Manufacturing | 336320 |
| Motor Vehicle Transmission and Power Train Parts Manufacturing | 336350 |
| Motor Vehicle Seating and Interior Trim Manufacturing | 336360 |
| Motor Vehicle Metal Stamping | 336370 |
| Other Motor Vehicle Parts Manufacturing | 336390 |
| Aircraft Manufacturing | 336411 |
| Aircraft Engine and Engine Parts Manufacturing | 336412 |

| Industry | NAICS Code |
|--|------------|
| Other Aircraft Parts and Auxiliary Equipment Manufacturing | 336413 |
| Motorcycle, Bicycle, and Parts Manufacturing | 336991 |
| All Other Transportation Equipment Manufacturing | 336999 |
| Jewelry and Silverware Manufacturing | 339910 |
| Sporting and Athletic Goods Manufacturing | 339920 |
| Doll, Toy, and Game Manufacturing | 339930 |
| Office Supplies (except Paper) Manufacturing | 339940 |
| Sign Manufacturing | 339950 |
| Gasket, Packing, and Sealing Device Manufacturing | 339991 |
| Musical Instrument Manufacturing | 339992 |
| Fastener, Button, Needle, and Pin Manufacturing | 339993 |
| Broom, Brush, and Mop Manufacturing | 339994 |
| Burial Casket Manufacturing | 339995 |
| All Other Miscellaneous Manufacturing | 339999 |

Source: Data provided by LVEDC.

Table A2: High Value Business Services is comprised of 68 industries

| Industry | NAICS Code |
|--|------------|
| Software Publishers | 511210 |
| Data Processing, Hosting, and Related Services | 518210 |
| Commercial Banking | 522110 |
| Savings Institutions | 522120 |
| Credit Unions | 522130 |
| Sales Financing | 522220 |
| Consumer Lending | 522291 |
| Real Estate Credit | 522292 |
| All Other Nondepository Credit Intermediation | 522298 |
| Mortgage and Nonmortgage Loan Brokers | 522310 |
| Financial Transactions Processing, Reserve, and Clearinghouse Activities | 522320 |

| Industry | NAICS Code |
|--|------------|
| Other Activities Related to Credit Intermediation | 522390 |
| Direct Life Insurance Carriers | 524113 |
| Direct Health and Medical Insurance Carriers | 524114 |
| Direct Property and Casualty Insurance Carriers | 524126 |
| Direct Title Insurance Carriers | 524127 |
| Other Direct Insurance (except Life, Health, and Medical) Carriers | 524128 |
| Reinsurance Carriers | 524130 |
| Offices of Lawyers | 541110 |
| Title Abstract and Settlement Offices | 541191 |
| All Other Legal Services | 541199 |
| Offices of Certified Public Accountants | 541211 |
| Payroll Services | 541214 |
| Architectural Services | 541310 |
| Landscape Architectural Services | 541320 |
| Engineering Services | 541330 |
| Drafting Services | 541340 |
| Building Inspection Services | 541350 |
| Geophysical Surveying and Mapping Services | 541360 |
| Surveying and Mapping (except Geophysical) Services | 541370 |
| Testing Laboratories | 541380 |
| Interior Design Services | 541410 |
| Industrial Design Services | 541420 |
| Graphic Design Services | 541430 |
| Other Specialized Design Services | 541490 |
| Custom Computer Programming Services | 541511 |
| Computer Systems Design Services | 541512 |
| Computer Facilities Management Services | 541513 |
| Other Computer Related Services | 541519 |

| Industry | NAICS Code |
|--|------------|
| Administrative Management and General Management Consulting Services | 541611 |
| Human Resources Consulting Services | 541612 |
| Marketing Consulting Services | 541613 |
| Process, Physical Distribution, and Logistics Consulting Services | 541614 |
| Other Management Consulting Services | 541618 |
| Environmental Consulting Services | 541620 |
| Other Scientific and Technical Consulting Services | 541690 |
| Advertising Agencies | 541810 |
| Public Relations Agencies | 541820 |
| Media Buying Agencies | 541830 |
| Media Representatives | 541840 |
| Outdoor Advertising | 541850 |
| Direct Mail Advertising | 541860 |
| Advertising Material Distribution Services | 541870 |
| Other Services Related to Advertising | 541890 |
| Offices of Bank Holding Companies | 551111 |
| Offices of Other Holding Companies | 551112 |
| Corporate, Subsidiary, and Regional Managing Offices | 551114 |
| Office Administrative Services | 561110 |
| Document Preparation Services | 561410 |
| Telephone Answering Services | 561421 |
| Telemarketing Bureaus and Other Contact Centers | 561422 |
| Private Mail Centers | 561431 |
| Other Business Service Centers (including Copy Shops) | 561439 |
| Collection Agencies | 561440 |
| Credit Bureaus | 561450 |
| Repossession Services | 561491 |
| Court Reporting and Stenotype Services | 561492 |

| Industry | NAICS Code |
|-------------------------------------|-------------------|
| All Other Business Support Services | 561499 |

Source: Data provided by LVEDC.

Table A3: Life Science Research and Manufacturing is comprised of 20 industries

| Industry | NAICS Code |
|--|-------------------|
| Medicinal and Botanical Manufacturing | 325411 |
| Pharmaceutical Preparation Manufacturing | 325412 |
| In-Vitro Diagnostic Substance Manufacturing | 325413 |
| Biological Product (except Diagnostic) Manufacturing | 325414 |
| Electromedical and Electrotherapeutic Apparatus Manufacturing | 334510 |
| Analytical Laboratory Instrument Manufacturing | 334516 |
| Surgical and Medical Instrument Manufacturing | 339112 |
| Surgical Appliance and Supplies Manufacturing | 339113 |
| Dental Equipment and Supplies Manufacturing | 339114 |
| Ophthalmic Goods Manufacturing | 339115 |
| Dental Laboratories | 339116 |
| Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers | 423450 |
| Ophthalmic Goods Merchant Wholesalers | 423460 |
| Testing Laboratories | 541380 |
| Research and Development in Nanotechnology | 541713 |
| Research and Development in Biotechnology (except Nanobiotechnology) | 541714 |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) | 541715 |
| Research and Development in the Social Sciences and Humanities | 541720 |
| Medical Laboratories | 621511 |
| Diagnostic Imaging Centers | 621512 |

Source: Data provided by LVEDC.

Table A4: Transportation, Warehousing, Logistics, and Wholesale is comprised of 40 industries

| Industry | NAICS Code |
|--|-------------------|
| Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers | 423310 |
| Brick, Stone, and Related Construction Material Merchant Wholesalers | 423320 |
| Roofing, Siding, and Insulation Material Merchant Wholesalers | 423330 |
| Other Construction Material Merchant Wholesalers | 423390 |
| Photographic Equipment and Supplies Merchant Wholesalers | 423410 |

| Industry | NAICS Code |
|---|------------|
| Office Equipment Merchant Wholesalers | 423420 |
| Computer and Computer Peripheral Equipment and Software Merchant Wholesalers | 423430 |
| Other Commercial Equipment Merchant Wholesalers | 423440 |
| Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers | 423450 |
| Ophthalmic Goods Merchant Wholesalers | 423460 |
| Other Professional Equipment and Supplies Merchant Wholesalers | 423490 |
| Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers | 423610 |
| Household Appliances, Electric Housewares, and Consumer Electronics Merchant Wholesalers | 423620 |
| Other Electronic Parts and Equipment Merchant Wholesalers | 423690 |
| Drugs and Druggists' Sundries Merchant Wholesalers | 424210 |
| General Line Grocery Merchant Wholesalers | 424410 |
| Packaged Frozen Food Merchant Wholesalers | 424420 |
| Dairy Product (except Dried or Canned) Merchant Wholesalers | 424430 |
| Confectionery Merchant Wholesalers | 424450 |
| Fish and Seafood Merchant Wholesalers | 424460 |
| Meat and Meat Product Merchant Wholesalers | 424470 |
| Fresh Fruit and Vegetable Merchant Wholesalers | 424480 |
| Other Grocery and Related Products Merchant Wholesalers | 424490 |
| Electronic Shopping and Mail-Order Houses | 454110 |
| Scheduled Freight Air Transportation | 481112 |
| Rail transportation | 482110 |
| General Freight Trucking, Local | 484110 |
| General Freight Trucking, Long-Distance, Truckload | 484121 |
| General Freight Trucking, Long-Distance, Less Than Truckload | 484122 |
| Used Household and Office Goods Moving | 484210 |
| Specialized Freight (except Used Goods) Trucking, Local | 484220 |
| Specialized Freight (except Used Goods) Trucking, Long-Distance | 484230 |
| Freight Transportation Arrangement | 488510 |

| Industry | NAICS Code |
|---|------------|
| Packing and Crating | 488991 |
| All Other Support Activities for Transportation | 488999 |
| Couriers and Express Delivery Services | 492110 |
| General Warehousing and Storage | 493110 |
| Refrigerated Warehousing and Storage | 493120 |
| Farm Product Warehousing and Storage | 493130 |
| Other Warehousing and Storage | 493190 |

Source: Data provided by LVEDC.

Table A5: Health Care is comprised of 29 industries

| Industry | NAICS Code |
|---|------------|
| Offices of Physicians (except Mental Health Specialists) | 621111 |
| 493 Offices of Physicians, Mental Health Specialists | 621112 |
| Offices of Dentists | 621210 |
| Offices of Chiropractors | 621310 |
| Offices of Optometrists | 621320 |
| Offices of Mental Health Practitioners (except Physicians) | 621330 |
| Offices of Physical, Occupational and Speech Therapists, and Audiologists | 621340 |
| Offices of Podiatrists | 621391 |
| Offices of All Other Miscellaneous Health Practitioners | 621399 |
| Family Planning Centers | 621410 |
| Outpatient Mental Health and Substance Abuse Centers | 621420 |
| Kidney Dialysis Centers | 621492 |
| Freestanding Ambulatory Surgical and Emergency Centers | 621493 |
| All Other Outpatient Care Centers | 621498 |
| Home Health Care Services | 621610 |
| Ambulance Services | 621910 |
| Blood and Organ Banks | 621991 |
| All Other Miscellaneous Ambulatory Health Care Services | 621999 |

| Industry | NAICS Code |
|--|------------|
| General Medical and Surgical Hospitals | 622110 |
| Psychiatric and Substance Abuse Hospitals | 622210 |
| Specialty (except Psychiatric and Substance Abuse) Hospitals | 622310 |
| Nursing Care Facilities (Skilled Nursing Facilities) | 623110 |
| Residential Intellectual and Developmental Disability Facilities | 623210 |
| Residential Mental Health and Substance Abuse Facilities | 623220 |
| Continuing Care Retirement Communities | 623311 |
| Assisted Living Facilities for the Elderly | 623312 |
| Other Residential Care Facilities | 623990 |

Source: Data provided by LVEDC.

APPENDIX II: LEHIGH VALLEY TALENT SURVEY

OVERVIEW

Camoin Associates, Emsi Burning Glass, Lehigh Valley Economic Development Corporation (LVEDC), and the Workforce Board Lehigh Valley (WBLV) conducted a survey to assess and understand labor force gaps and challenges within Lehigh Valley. The Lehigh Valley Talent Survey was distributed directly to a combined list of Lehigh Valley business contacts generated by LVEDC and WBLV, as well as sent via email and newsletter announcement through LVEDC, WBLV, and their partners' networks.

The Lehigh Valley Talent Survey was opened from July 13, 2021 to September 7, 2021 and received a total of 350 responses. Of those respondents, 270 completed the survey in its entirety. Of the responses, 305 respondents indicated they are either employers in Lehigh or Northampton County (Lehigh Valley) or located within Lehigh, Northampton, or Lehigh and Northampton Counties and were analyzed in detail below. The 305 employers that provided input in this survey represent 2.0% of all payrolled businesses in Lehigh and Northampton Counties. This analysis examines labor force gaps and challenges across Lehigh Valley employers as well as for the target sectors of:

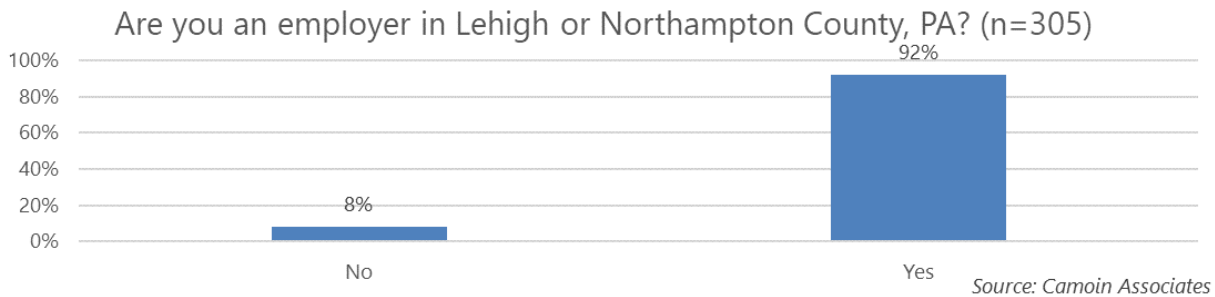
- Manufacturing (103 respondents in Lehigh Valley, representing 13.2% of the total Advanced Manufacturing employers in Lehigh Valley)
- High Value Business Services (61 respondents, 3.4% of employers)
- Life Science Research and Manufacturing (11 respondents, 6.4% of employers)
- Transportation, Warehousing, Logistics, and Wholesale (19 respondents, 2.4% of employers)
- Health Care (49 respondents, 3.8% of employers)

Multiple efforts through multiple channels were made to obtain input overall and within each of the target sectors. Additionally, the results were used to provide initial input that was then further investigated through sector focus groups, target phone calls, and detailed analysis of supply and demand data. The survey data proved to be both useful and representative of the Lehigh Valley economy when examined and used in combination with all the methods of input and analysis.

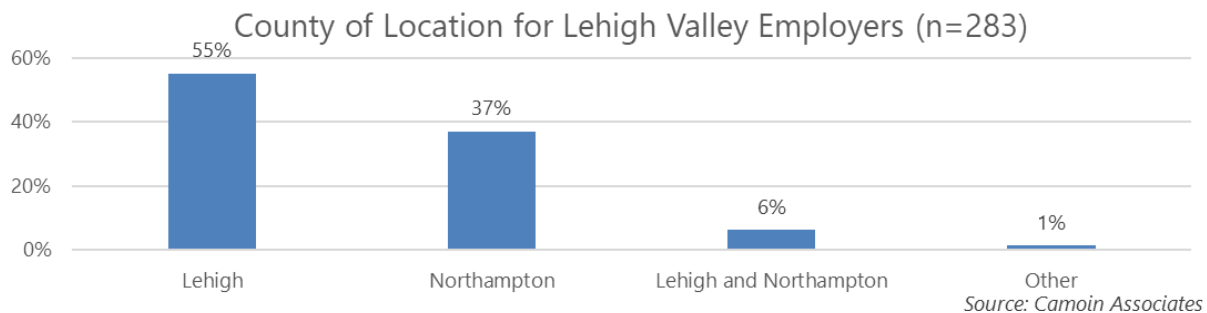
LEHIGH VALLEY EMPLOYER BREAKDOWN

The Lehigh Valley Talent Survey intended to capture input from Lehigh Valley businesses. Due to the nature of survey distribution through business lists and membership organizations, businesses located in nearby counties were also captured in the survey. Survey respondents were asked two questions to verify their input. Respondents were asked if they are an employer in Lehigh or Northampton County, PA (Lehigh Valley) and to confirm their county of location. Respondents that responded they are not an employer in Lehigh or Northampton County, PA, and indicated they were in counties other than Lehigh or Northampton were excluded from the subsequent analysis for Lehigh Valley businesses. Excluding those 39 respondents, 280 respondents indicated they are either employers in Lehigh or Northampton County (Lehigh Valley) or located within Lehigh, Northampton, or Lehigh and Northampton

Counties. For this analysis, we consider these respondents to represent Lehigh Valley Employers. Approximately 92% of the 305 survey respondents are in Lehigh or Northampton County.¹⁰



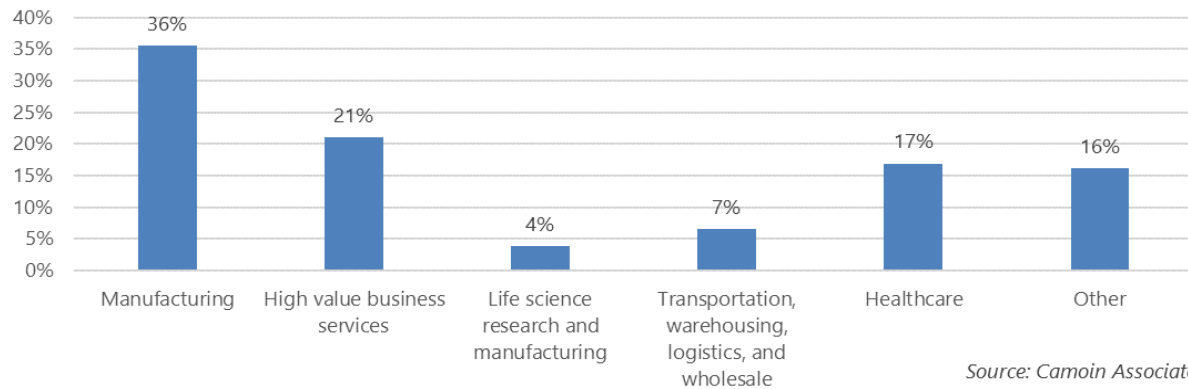
Of the 305 survey respondents, 283 provided input on the count on which they are located. For Lehigh Valley employers, 99% indicated they are in either Lehigh County, Northampton County, or Lehigh and Northampton Counties. Over half (55%) of Lehigh Valley employers surveyed are in Lehigh County compared to 37% in Northampton County. Approximately 1% indicated they are in other counties, indicating their operations may have more than one location or the survey respondent responded with their county of residence.



¹⁰ Note: For the charts in this section, n = the number of survey respondents that answered the question.

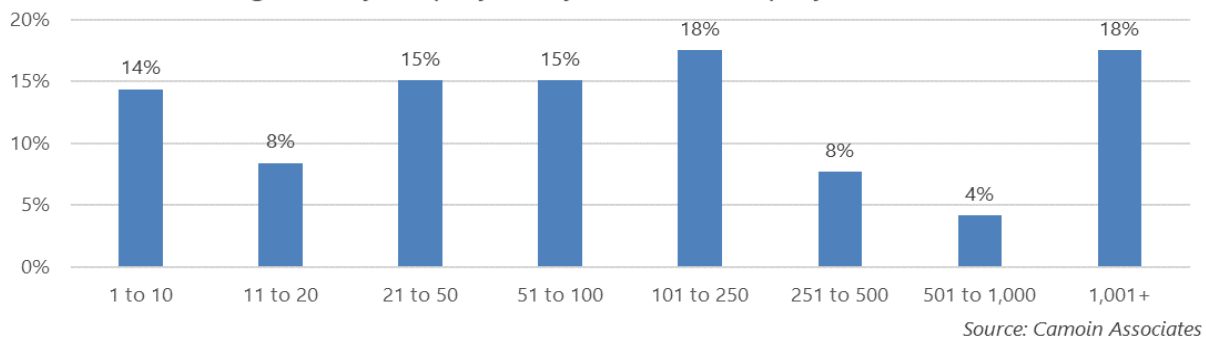
Of the 305 Lehigh Valley employers that completed the survey, 290 provided information on the sector of their establishment. Respondents were able to select their sector or provide a description. Data in this category was cleaned including updating target sectors for respondents that provided services within the target sectors to provide the most accurate survey data. Approximately 36% of Lehigh Valley employers work within Manufacturing, 21% within High Value Business Services, 17% in Health Care, 7% in Transportation, Warehousing, Logistics, and Wholesale, and 4% in Life Science Research and Manufacturing. Of the 16% that indicated other sectors, some represented utilities, furniture stores, restaurants and hospitality, education, nonprofits, etc.

Lehigh Valley Employers by Industry Sector (n=290)



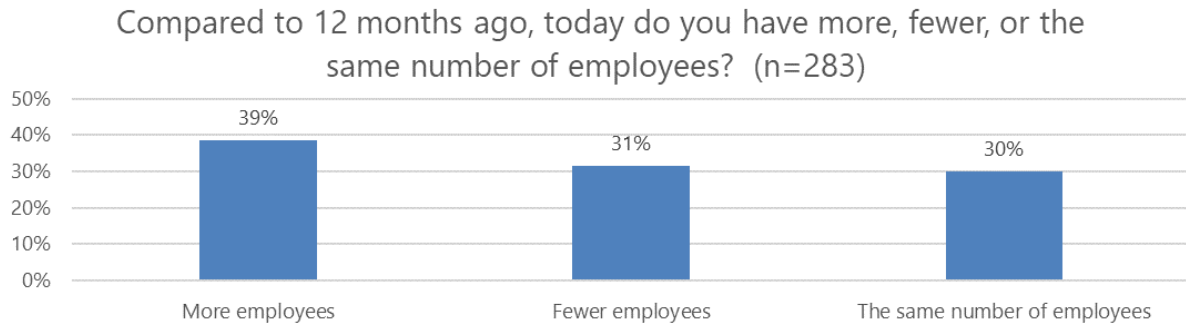
The survey collected responses from businesses across a range of business sizes. Approximately 18% of Lehigh Valley employer respondents have 1,001+ full time employees, 18% have 101 to 250, 15% have 21 to 50, and 15% have over 51 to 100 employees. Businesses with 501 to 1,000 employees were the smallest represented business size with 4% of Lehigh Valley employers.

Lehigh Valley Employers by Full-time Employees (n=285)



EMPLOYEE RETENTION AND HIRING

Of the Lehigh Valley employers surveyed, 39% indicated they had gained employees in the last 12 months, 31% had fewer employees, and 30% had the same number of employees.



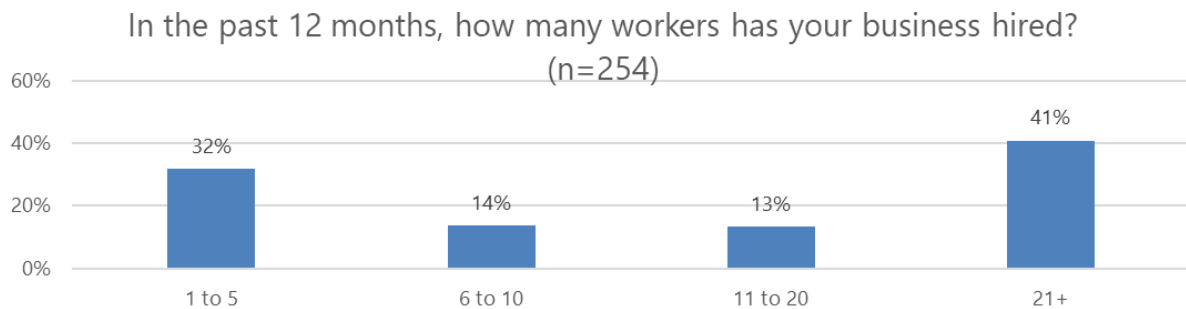
Source: Camoin Associates

Approximately, 91% of the Lehigh Valley employers have hired workers in the last 12 months while 9% have not.



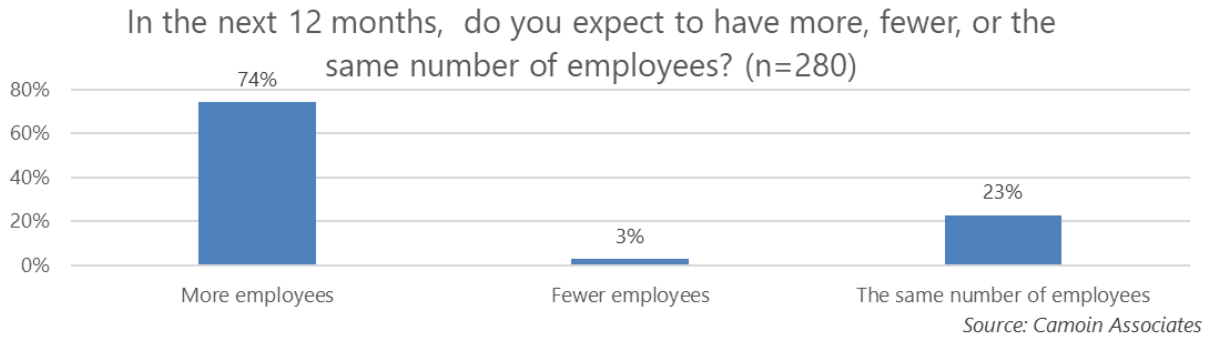
Source: Camoin Associates

Of the 91% of Lehigh Valley employers that have hired workers, 41% indicated they have hired 21 or more workers. 32% have hired 1 to 5 workers, 14% have hired 6 to 10 and 13% have hired 11 to 20.

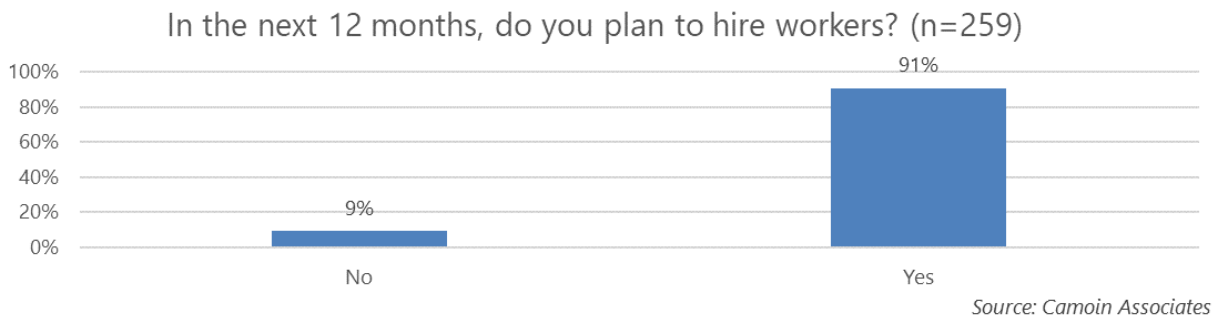


Source: Camoin Associates

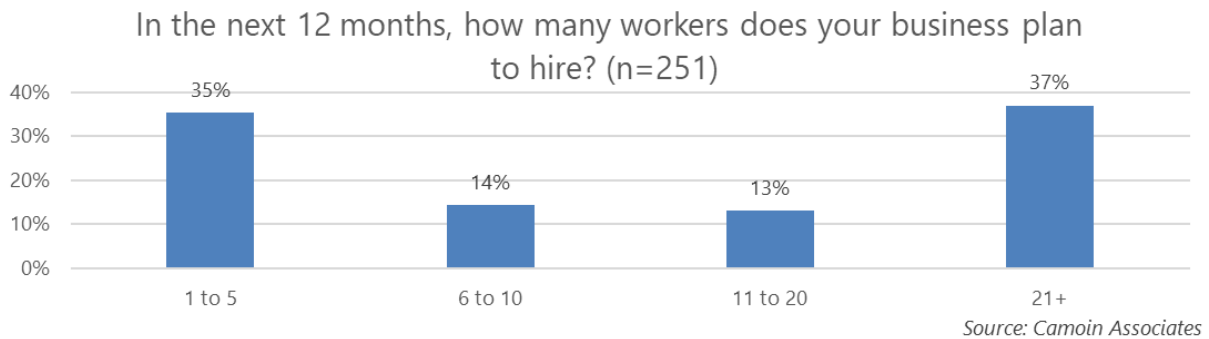
The majority of Lehigh Valley employers (74%), expect to have more employees in the next 12 months. Approximately 23% expect to have the same number of employees and 3% expect to have fewer employees. The businesses that indicate they anticipated to have fewer employees predominately fall within Health Care and High Value Business Services sectors.



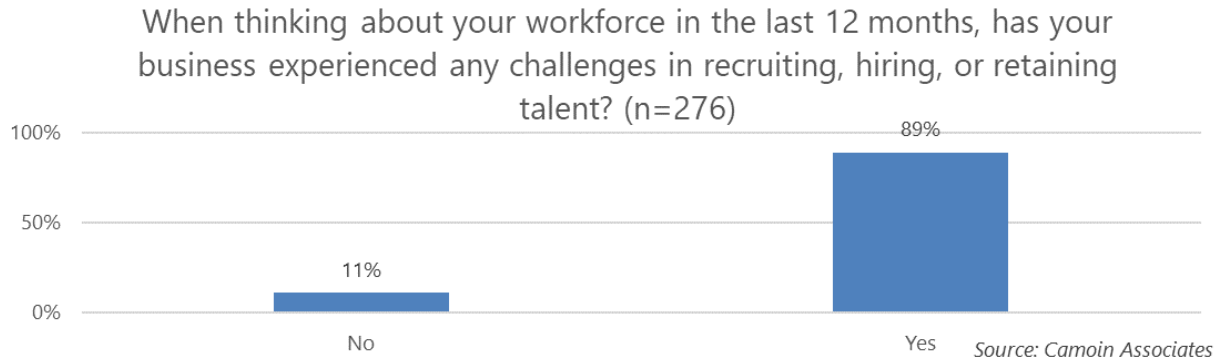
The majority (91%) of Lehigh Valley employers anticipate hiring workers in the next 12 months.



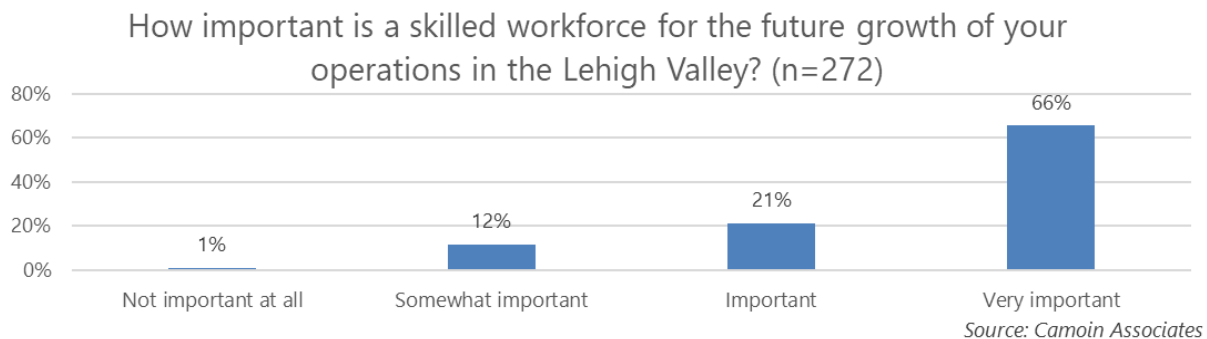
Of the Lehigh Valley employers that plan on hiring workers in the next 12 months, 37% expect to hire 21 or more, 35% anticipate hiring 1 to 5, 14% anticipate hiring 6 to 10, and 13% anticipate hiring 11 to 20.



Approximately 89% of Lehigh Valley employers surveyed have experienced challenges in recruiting, hiring, or retaining talent in the last 12 months. Respondents were asked “which specific occupations do you find difficult to recruit, hire, or retain?”, and provided open-ended comments. Nearly a quarter of respondents cited manufacturing/production workers being in short supply. Employer needs are wide-ranging, however, with reported shortages of general and skilled laborers, drivers, engineers, medical, and other professional workers.



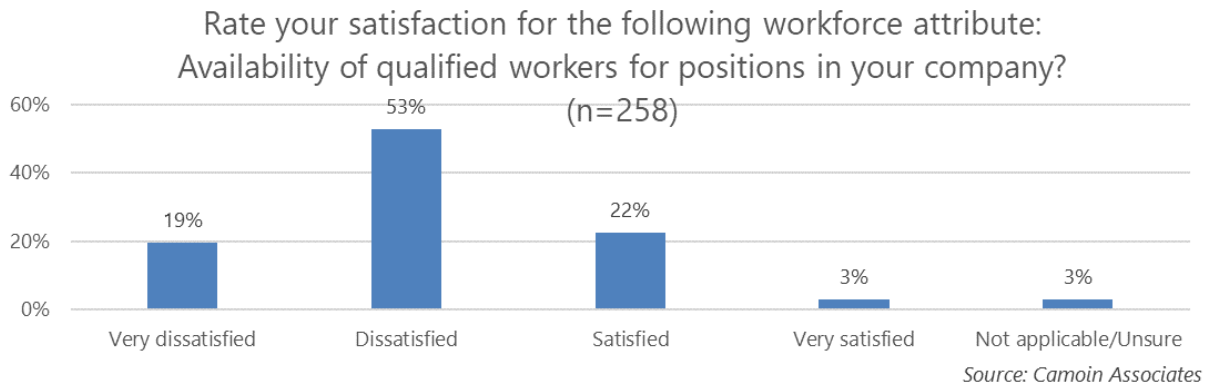
Lehigh Valley employers were asked, “how important is a skilled workforce for the future growth of your operations in the Lehigh Valley.” Approximately 66% indicated it is very important with an additional 21% indicating it is important.



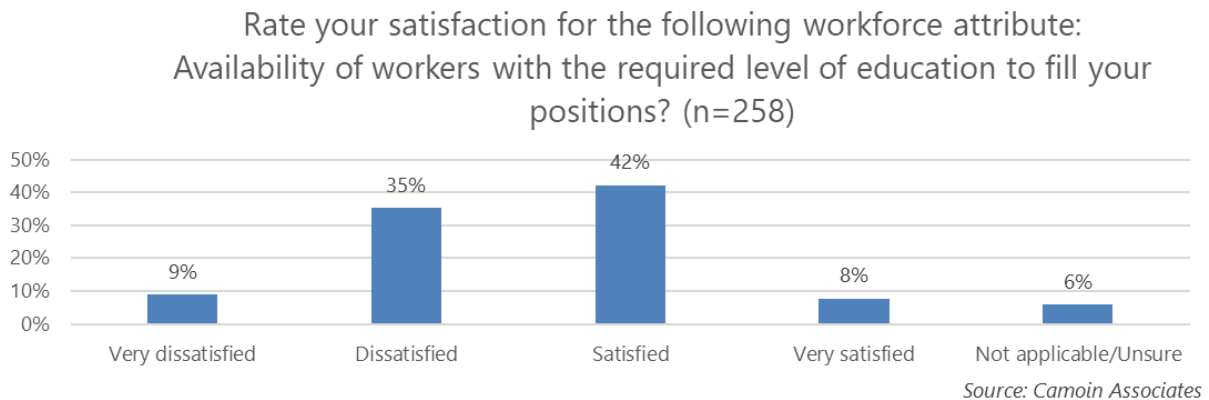
SATISFACTION WITH WORKFORCE ATTRIBUTES

Lehigh Valley employers were asked to rate their satisfaction with specific workforce attributes or characteristics. A total of 258 Lehigh Valley employers provided ratings. Overall, Lehigh Valley employers are largely dissatisfied with the current availability of workers in regard to the number of workers, career experience, and skills.

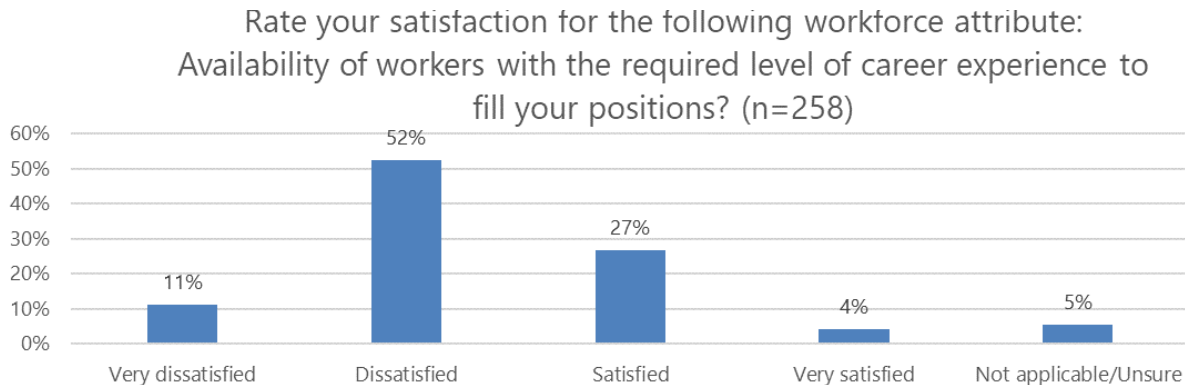
Approximately 72% of Lehigh Valley employers had negative sentiments including being dissatisfied or very dissatisfied with the availability of qualified workers for positions in their companies. Of those that are dissatisfied or very dissatisfied, respondents noted the pool of talent available is very slim and response to recruiting efforts have been poor.



With regard to the availability of workers with the required level of education to fill positions, 50% of Lehigh Valley employers had positive sentiments including being satisfied or very satisfied while 44% had negative sentiments. Of the workforce attributes, education had the highest very satisfied rating at 7%.

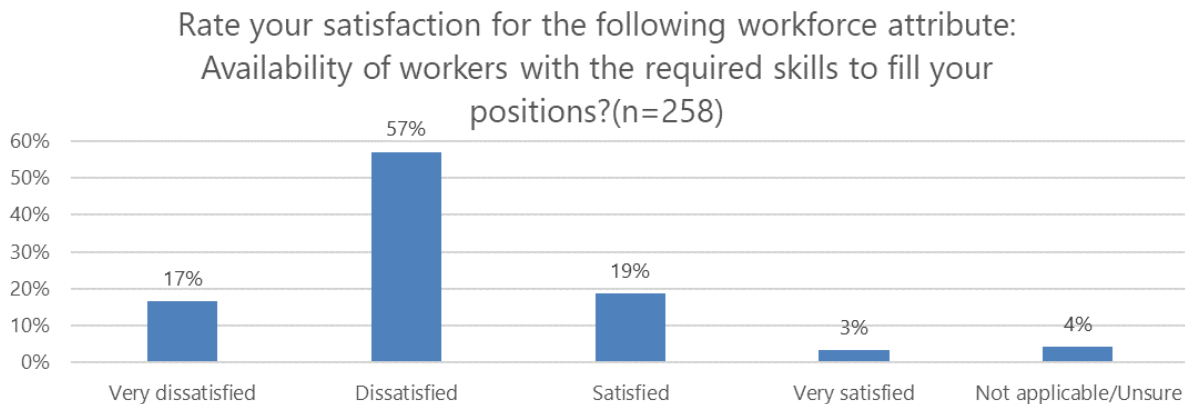


Lehigh Valley employers are largely dissatisfied (52%) or very dissatisfied (11%) with the availability of workers with the required level of career experience to fill positions.



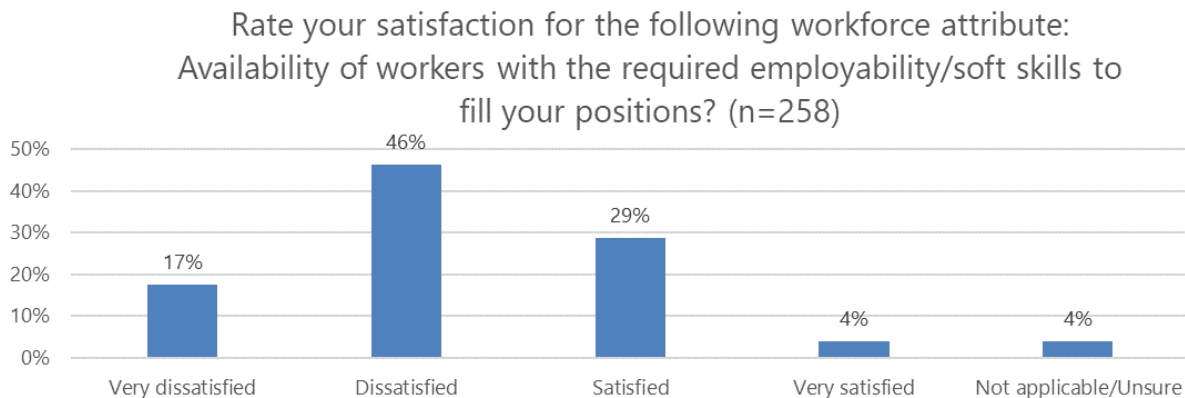
Source: Camoin Associates

Approximately 75% of Lehigh Valley employers have negative sentiments with availability of workers with the required skills to fill positions.



Source: Camoin Associates

Lehigh Valley employers are slightly more satisfied with the level of employability/ soft skills among the available workforce compared to hard/technical skills. Approximately 64% of Lehigh Valley employers have negative sentiments towards the available workforce's employability/ soft skills while 33% have positive sentiments.



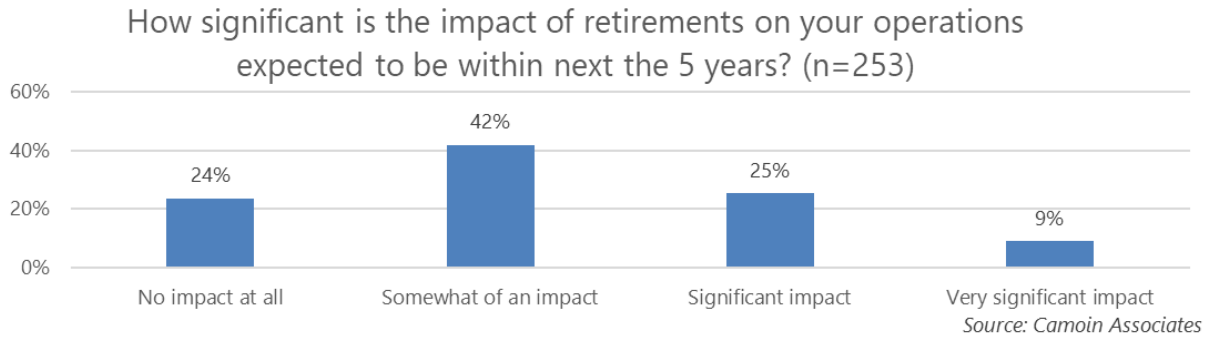
Source: Camoin Associates

Survey respondents provided comments regarding their satisfaction ratings for workforce attributes, of which were synthesized into major themes including:

- The most common comments cited an overall shortage of workers. This ranged from entry level jobs to construction, CNC operators, welders, and forklift operators to managers, engineers, and bankers. Some responses included:
 - We have entry level jobs posted, as well as senior executive jobs posted.
 - Always had trouble finding upper management talent, marketing and product design. Now even have trouble finding decent warehouse people and customer service
 - 1.5 year ago, if I posted for a Warehouse worker, I would have 100 applicants in the span of 2 days. Now, I have ZERO.
- The second most common were those saying that, of the available candidates, many lacked the experience or skills the company needs. Some responses included:
 - We offer CNA training but do not get many applicants for these positions and there are not enough certified Nursing Assistants
 - We teach skills, but especially difficult to find candidates for the positions that require skills.
 - They are not available - we are training anyone we find to keep our production going
- Respondents indicated that there is a shortage of communications and soft skills, among the workforce. Some responses included:
 - Communication and overall job awareness skills are rare and require coaching
 - Colleges don't teach "soft skills", so employers are essentially retraining workers over and over again, just to have them leave in a couple months many times
 - The workers we do have are sorely lacking in people skills, normal respect for others and organization and cleanliness skills.
- Several respondents expressed frustration with the level of commitment on the part of their employees. Some responses included:
 - Employees today see the employer/employee relationship as something that is at their convenience. They have a high level of expectations from the employer but don't seem to want to deliver the same back.
 - Need dedicated workers that respect working hours
 - ZERO work ethic
- There were also several respondents citing the availability of unemployment insurance as a deterrent to people applying for jobs. Some responses included:
 - People would rather collect unemployment benefits than work
 - Workers are not available because they are getting "free" money from the government.
 - Recruitment has been very difficult. Too many people are collecting unemployment and surplus federal dollars and do not wish to work.

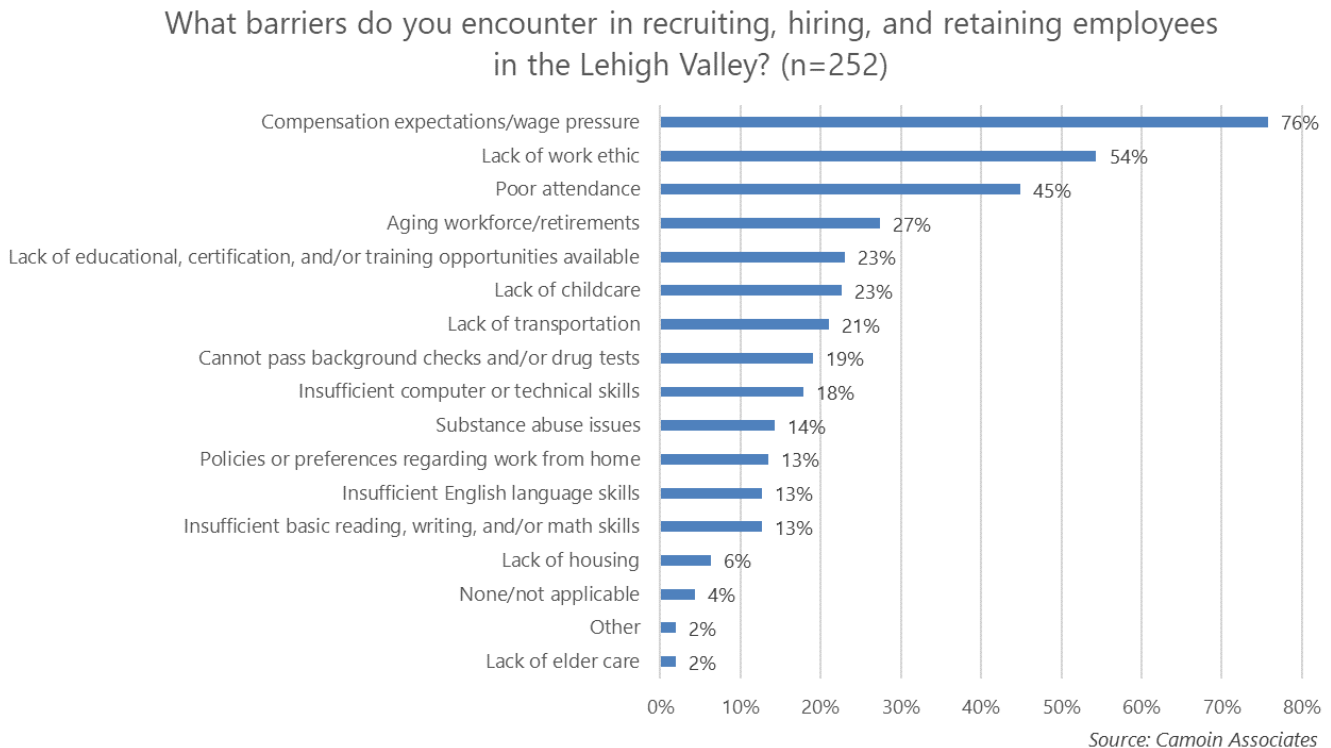
IMPACTS OF RETIREMENTS ON OPERATIONS

Approximately, 9% of Lehigh Valley employers surveyed anticipate that retirements will have a very significant impact on their operations within the next 5 years. Nearly a quarter (24%) do not expect retirements to have an impact on their operations at all.



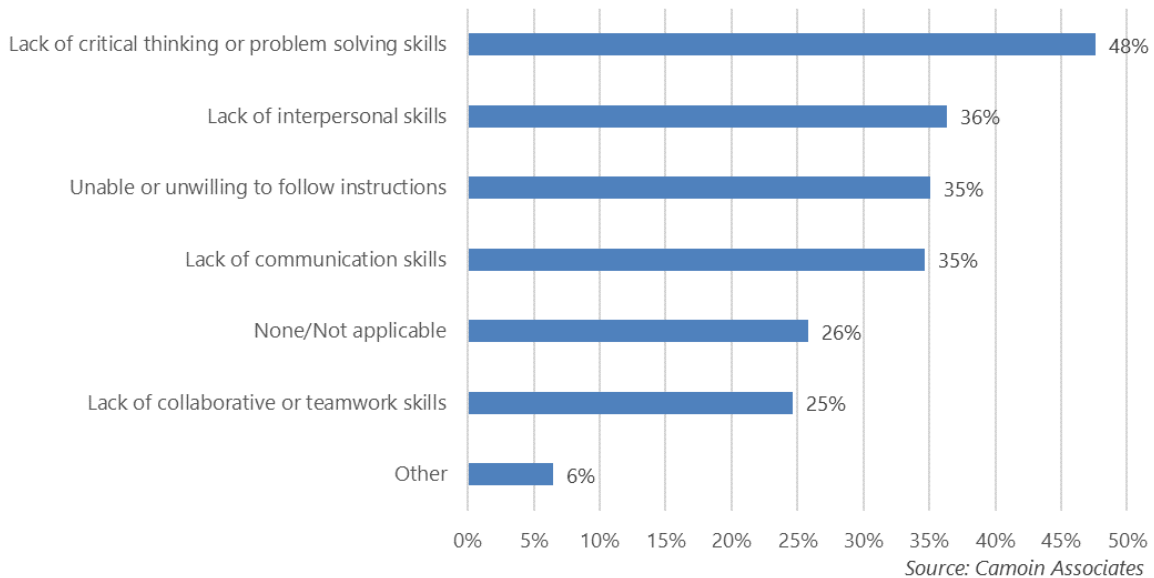
CHALLENGES IN RECRUITING, HIRING, AND RETAINING EMPLOYEES

Survey respondents were asked to select the barriers they encounter in recruiting, hiring, and retaining employees. The biggest barrier to recruiting, hiring, and retaining employees in the Lehigh Valley is compensation expectations/wage pressures with 76% of Lehigh Valley employers selecting that barrier. Other top barriers include lack of work ethic (54% of business), poor attendance (45%), and aging workforce/retirements (27%). Respondents were also able to add in "Other" barriers which included lack of driver license/public transportation, people not applying, COVID, entitled workers, health insurance, lack of basic professional office skills, not having technical skills, etc.



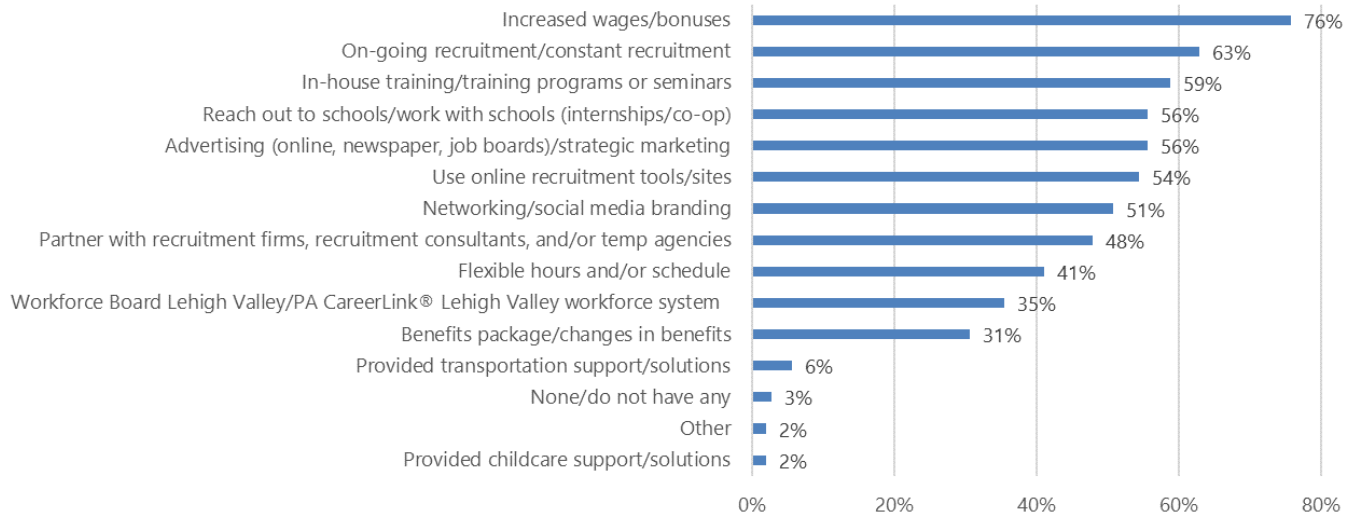
Top employability challenges businesses face when recruiting, hiring, and retaining employees in Lehigh Valley include lack of critical thinking or problem solving skills (48% of businesses), lack of interpersonal skills (36%), and lack of communication skills (35%). Other challenges respondents noted included emotional intelligence, technical skills and experiences, attendance/no-shows, lack of motivation and commitment, lack of professional office skills, lack of workers overall, etc.

What employability skill challenges do you encounter in recruiting, hiring, and retaining employees in the Lehigh Valley? (n=248)



Lehigh Valley employers indicated solutions their operations have used to overcome recruitment, hiring, and retention barriers. Of the 248 Lehigh Valley employers that provided input, 76% indicated increased wages/bonuses. Other top solutions include on-going recruitment/constant recruitment (63%), in-house training/training programs or seminars (59%) and reach out to schools/work with schools (internships/co-op) (56%). Other solutions include paying medical benefits, working from home, free food, utilizing non-citizen workers, and recruiting work from outside the region.

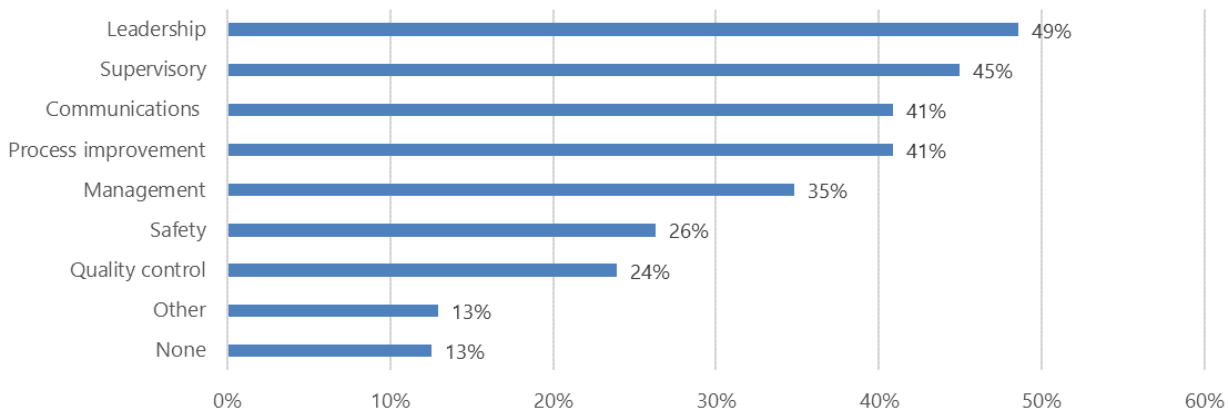
What solutions has your business created or identified to overcome recruitment, hiring, and retention barriers? (n=248)



Source: Camoin Associates

Lehigh Valley employers indicated that there is a need for workforce training and education to support future growth. Top areas of workforce training and education needed are leadership (49%), supervisory (45%), communications (41%), and process improvement (41%). Other noted areas for workforce training and education including technical training, welding, math, and verbal skills, building maintenance, CDL, analysis, warehousing, etc.

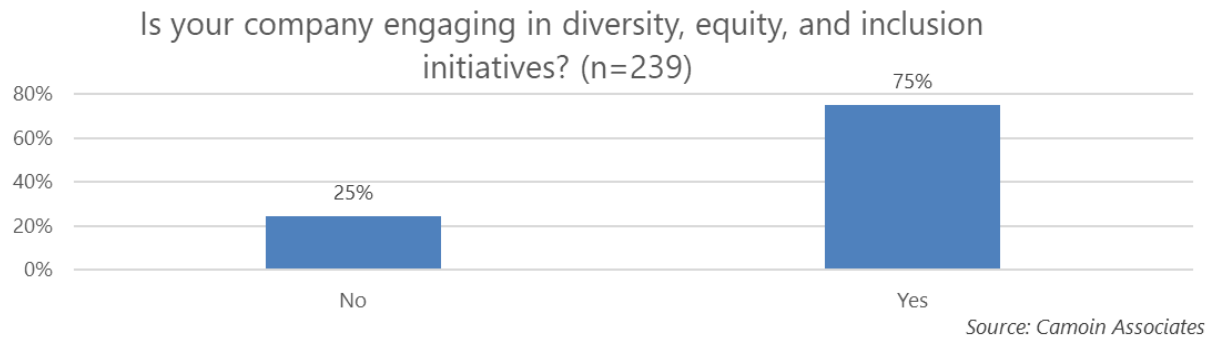
What specific workforce training and education do you need to support future growth of your business? (n=247)



Source: Camoin Associates

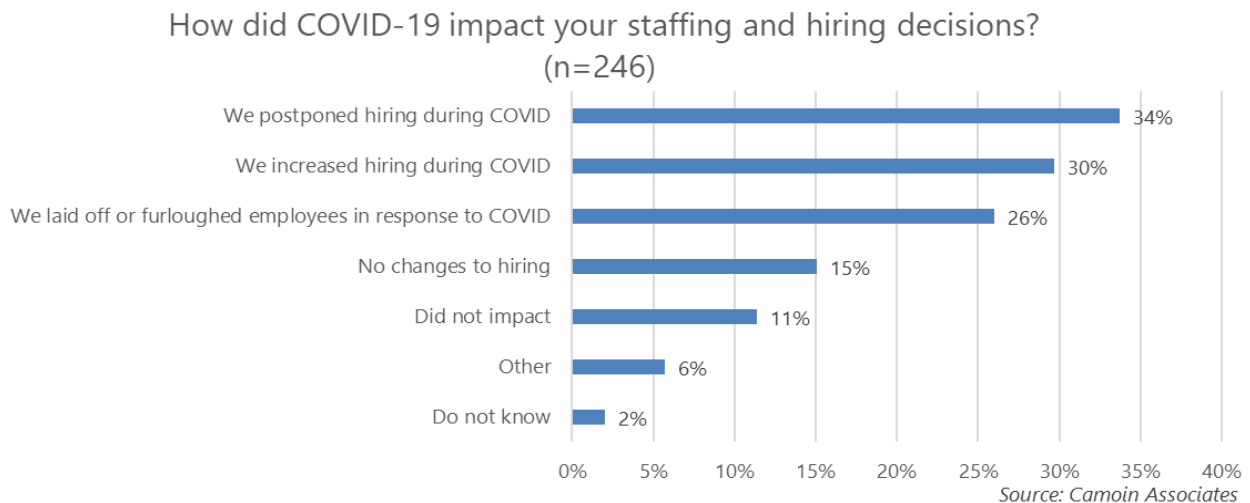
DIVERSITY, EQUITY, AND INCLUSION

Approximately 75% of Lehigh Valley employers are engaging in diversity, equity, and inclusion initiatives. Many survey respondents were enthusiastic about reporting their diversity, equity, and inclusion policies. These included hiring a diversity, equity and inclusion officer or setting up teams, diversity training, and implementing new hiring policies. Many outlined how these policies were already embedded into their culture while some are in the process of shaping new policies, many with the guidance of an outside consultant.

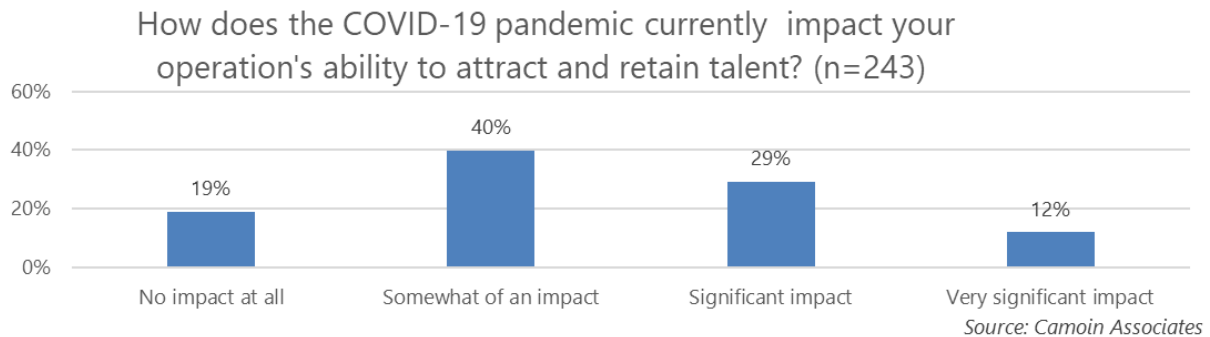


COVID-19 IMPACTS

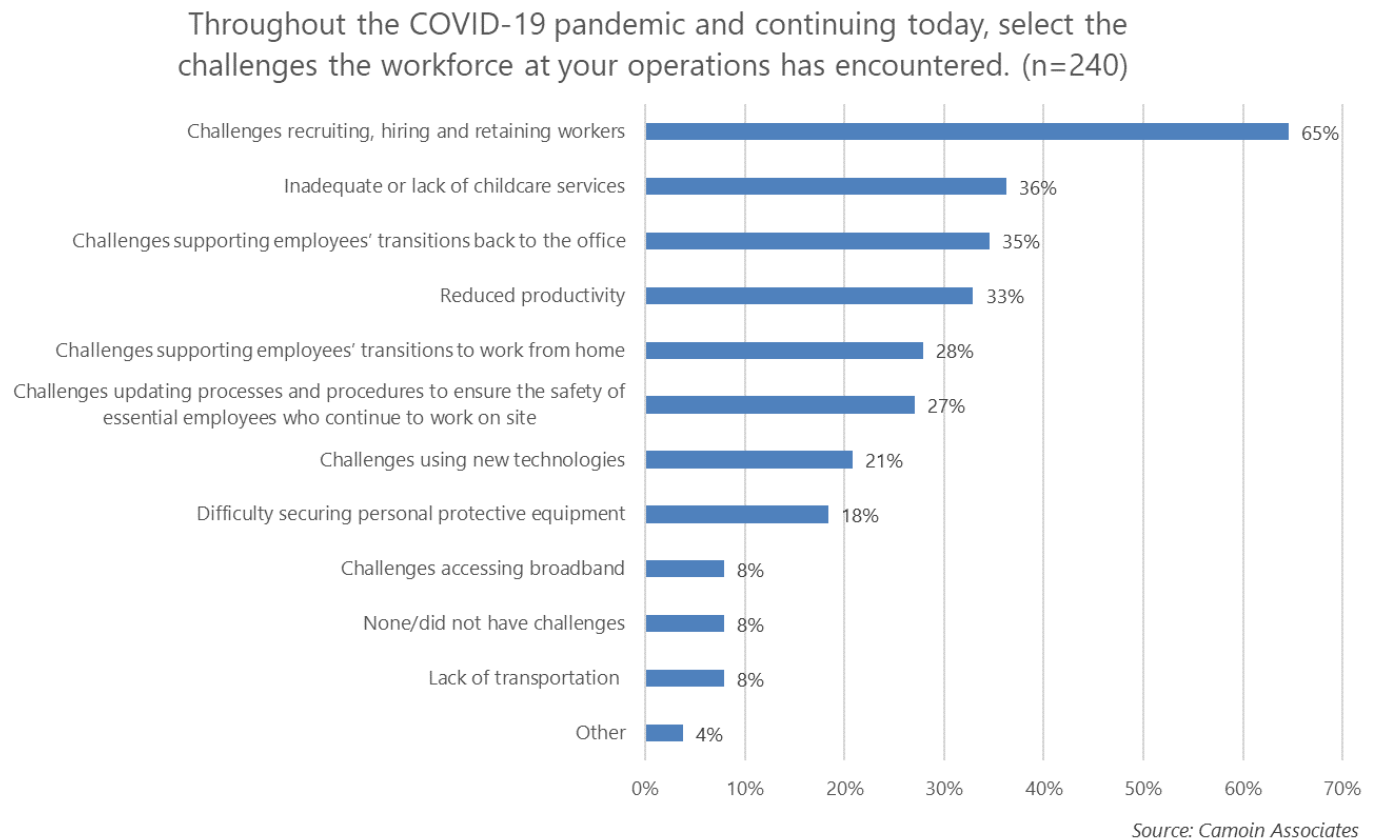
Lehigh Valley employers were asked how COVID-19 impacted their staffing and hiring decisions. Over a third (34%) of Lehigh Valley employers postponed hiring during COVID, while 30% increased hiring during COVID. Approximately 26% laid off or furloughed employees in response to COVID. Of the 15% of businesses that had no changes to hiring, the majority fell within the manufacturing (35%) or High Value Business Services sectors (30%).



As of Summer, 2021, 29% of Lehigh Valley employers indicated the COVID-19 pandemic was significantly impacting their operations' ability to attract and retain talent while an additional 12% indicated it is having a very significant impact.

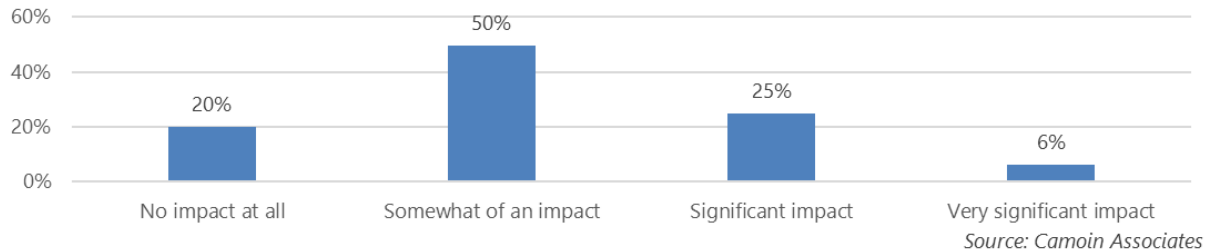


Lehigh Valley employers were asked to select the challenges that the workforce at their operations has encountered throughout the COVID-19 pandemic and continuing today. Approximately 65% of Lehigh Valley employers indicated they face challenges recruiting, hiring, and retaining workers. Other top workforce challenges include inadequate or lack of childcare services (36%), challenges supporting employees' transition back to the office (35%), and reduced productivity (33%). Other responses include supply chain, losing clients due to COVID restrictions, unemployment incentives, lost work due to illness, and exposure to COVID.



Overall, 50% of Lehigh Valley employers anticipate that the COVID-19 pandemic will have somewhat of an impact over the next 12 months. A quarter (25%) anticipate it will have a significant impact and 6% anticipate it will have a very significant impact.

Overall, how is the COVID-19 pandemic expected to impact the outlook for your operations over the next 12 months? (n=238)

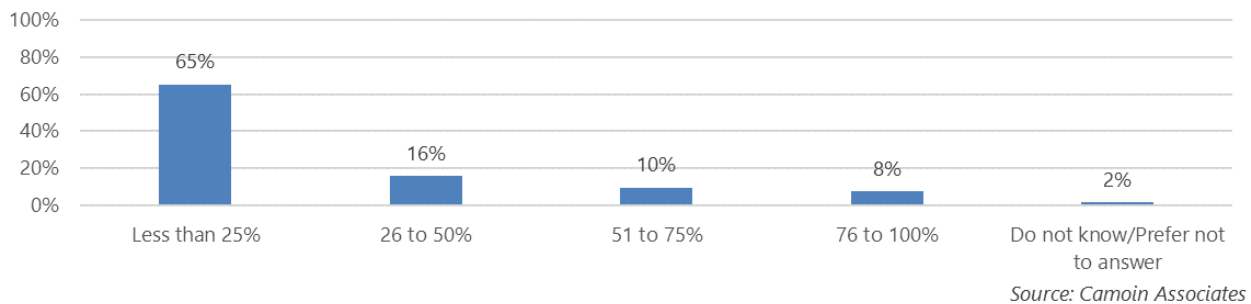


WORK FROM HOME/REMOTE WORK

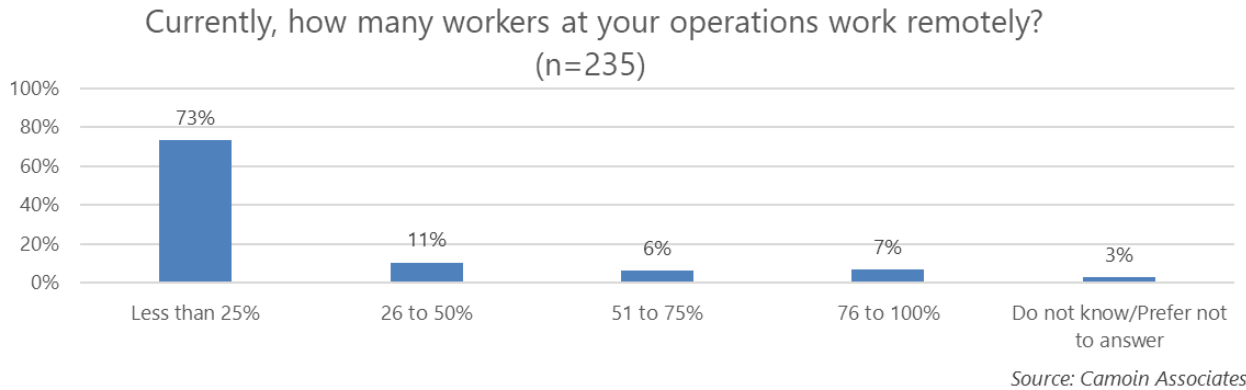
Lehigh Valley employers were asked about current and future remote working trends. Overall, most Lehigh Valley employers have a small percentage of workers that can work from home/remotely currently and this is expected to continue over the next 12 months.

The majority (65%) of Lehigh Valley employers indicated that less than 25% of their workers perform duties that could be entirely or mostly done at home.

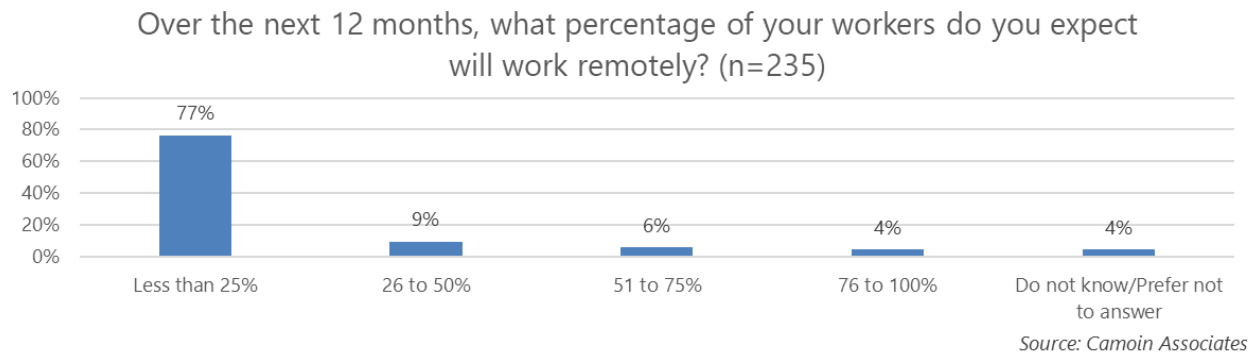
Approximately what percentage of workers at your operations performs duties that could be entirely or mostly done at home? (n=240)



Currently, 73% of Lehigh Valley employers have less than 25% of their workforce working remotely. Only 7% of Lehigh Valley employers indicated that 76-100% of their workers are currently working remotely. The majority of the businesses (61%) with 76-100% of their workforce working remotely are within the High Value Business Services sector.



Looking forward over the next 12 months, there is an anticipated slight increase in remote work across Lehigh Valley employers. Businesses with less than 25% of their workforce working remotely expect to increase from 73% of workers working remotely currently to 77% over the next 12 months. Similarly, 4% of Lehigh Valley employers anticipate 76-100% of their workforce will work remotely, down from 7% for current operations.



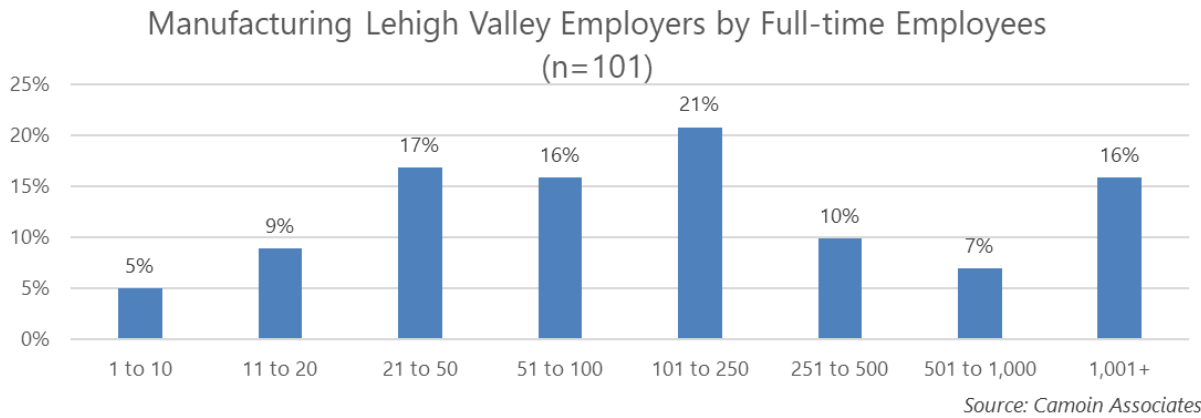
TARGET INDUSTRY SURVEY ANALYSIS

For the Talent Supply and Industry Sector Analysis and Strategic Action Plan Review and Validation project, we are interested in understanding labor force gaps and challenges that impact Lehigh Valley businesses in the target industries of: (1) Manufacturing, (2) High Value Business Services, (3) Life Science Research and Manufacturing; (4) Transportation, Warehousing, Logistics, and Wholesale; and (5) Health Care.

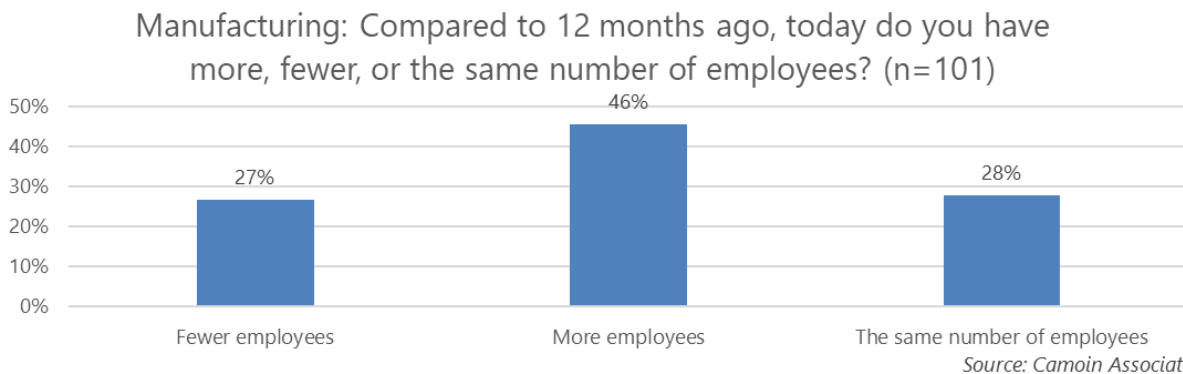
MANUFACTURING

The Lehigh Valley Talent Study received responses from 103 Manufacturing employers in Lehigh Valley of which 14 partially completed the survey. The following are findings from those respondents.

Manufacturing employers that responded to the survey cover a range of businesses sizes from 1 to 10 employees (5% of respondent businesses) to over 1,000 (16%). The most prevalent Manufacturing business size was 101 to 250 employees with 21% of respondents.



Approximately 46% of Manufacturing employers in Lehigh Valley have more employees compared to 12 months ago compared to 27% that have fewer employees.



In the last 12 months, 92% of Manufacturing employers in Lehigh Valley hired workers. Approximately 48% of Manufacturing employers hired 21 or more employees in the last 12 months. Approximately 22% of employers hired between 1 to 5 employees in the last 12 months.

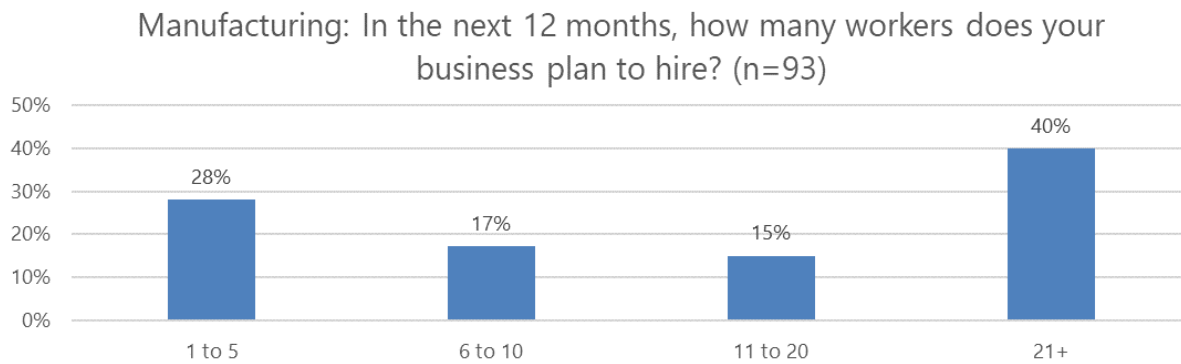


The majority of Manufacturing employers (85%) in Lehigh Valley expect to have more employees in the next 12 months.



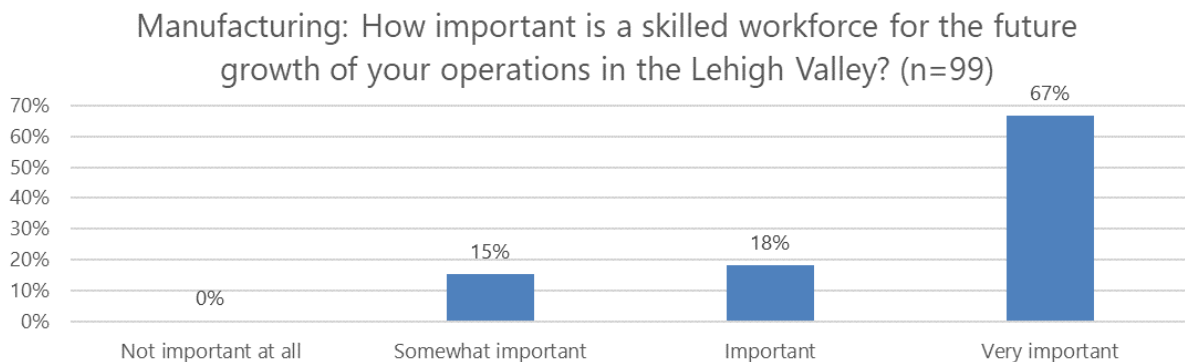
Source: Camoin Associates

Approximately 92% of Lehigh Valley Manufacturing employers plan to hire workers over the next 12 months. Approximately 40% of those employers planning on hiring in the next 12 months plan to hire 21 or more employees.



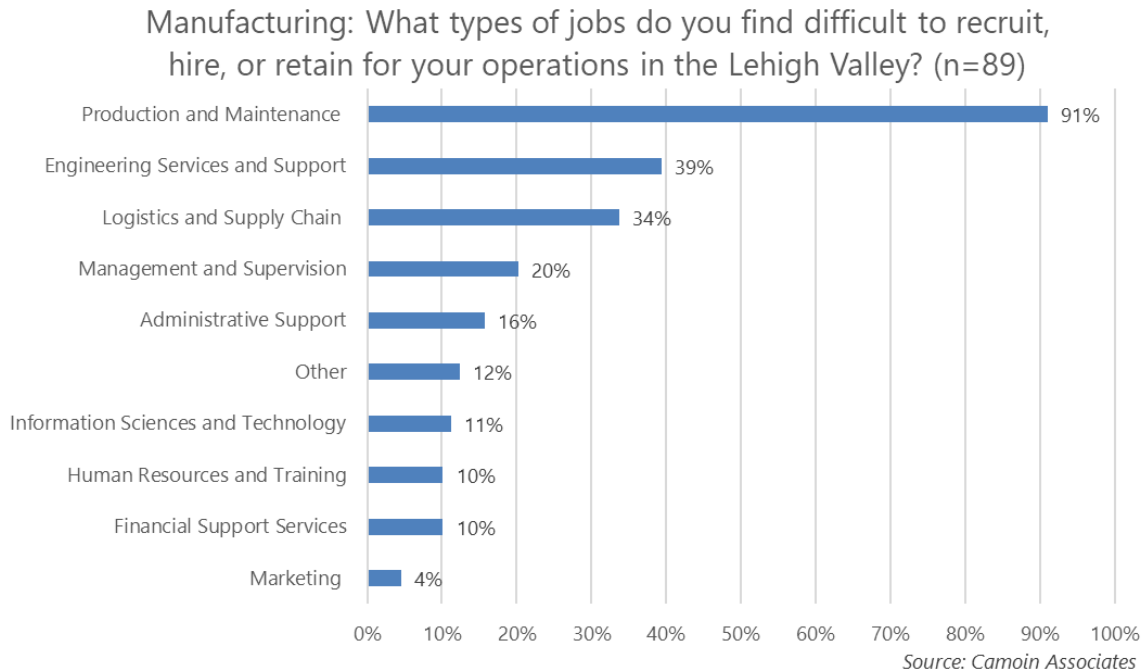
Source: Camoin Associates

Of the Manufacturing employers in Lehigh Valley surveyed, 90% have experienced challenges in recruiting, hiring, or retaining talent. Two-thirds (67%) of Manufacturing employers think a skilled workforce is very important to the future growth of their operations while an additional 18% find it important.



Source: Camoin Associates

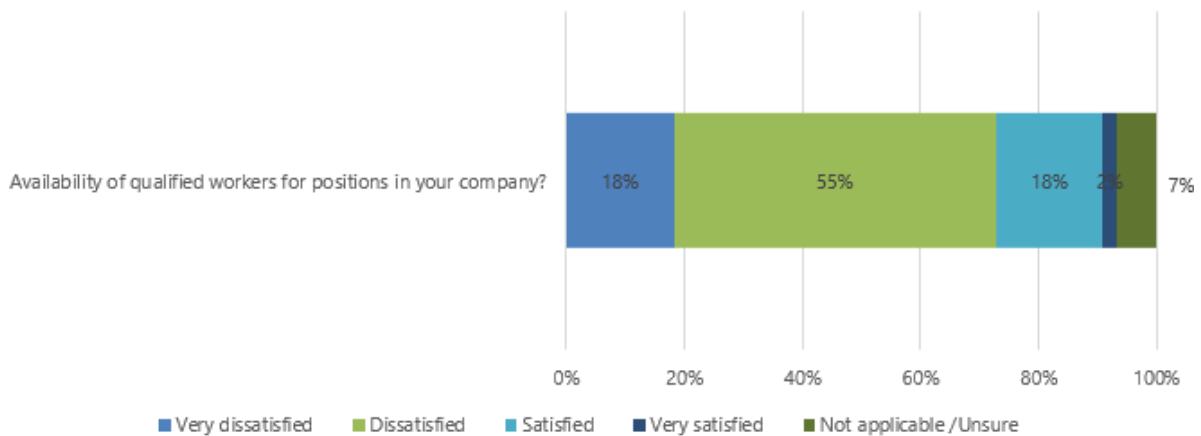
The top positions that Manufacturing employers in the Lehigh Valley have difficulty recruiting, hiring, or retaining are production and maintenance with 91% of employers having difficulty. Other top positions that employers have difficulty recruiting, hiring, or retaining are engineering services and support (39%), logistics and supply chain (34%), and management and supervision (20%). Approximately 12% of employers indicated other jobs that are difficult to recruit, hire, or retain which include sales, customer service, machinists, truck drivers, quality assurance, entry level manufacturing, etc.



Manufacturing employers in Lehigh Valley are the most satisfied with the education of their workforce. They are the least satisfied with the availability of qualified workers for positions in their companies and their career experience. Respondents indicated that the pool of talent is slim and open positions receive few applicants even compared to a few years ago. Several respondents commented on larger organizations in the region attracting larger amounts of employees with higher benefits.

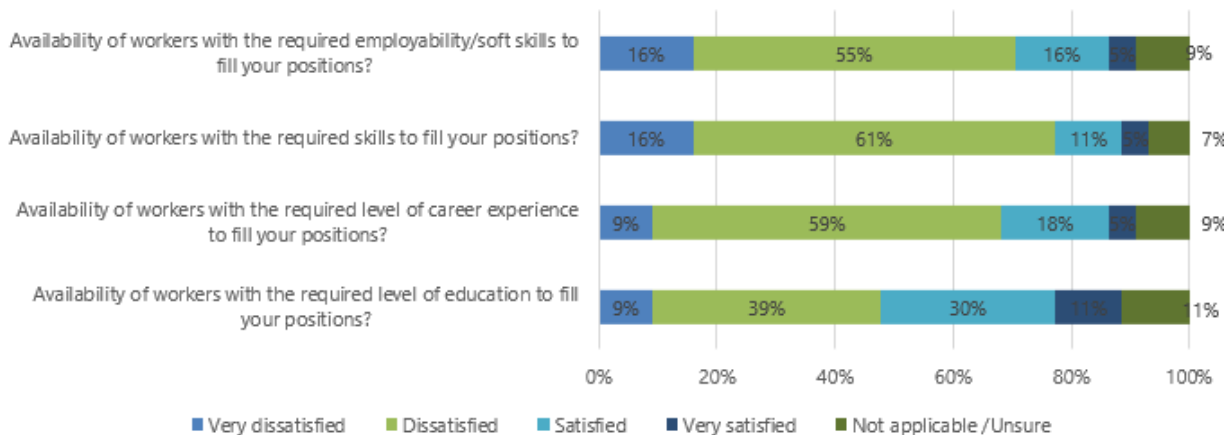
Based on respondent feedback from Manufacturer employers, many feel that students leave high school without the ability to perform simple math, read tape measures, etc. which is negatively impacting their pool of applicants for entry level positions. Others indicated that finding workers with specific education on machining, CNC, woodworking, etc. is hard to find. Other Manufacturers are experiencing a challenge in finding employees in packaging and leadership positions.

Manufacturing: Lehigh Valley Employer Satisfaction (n=44)



Source: Camoin Associates

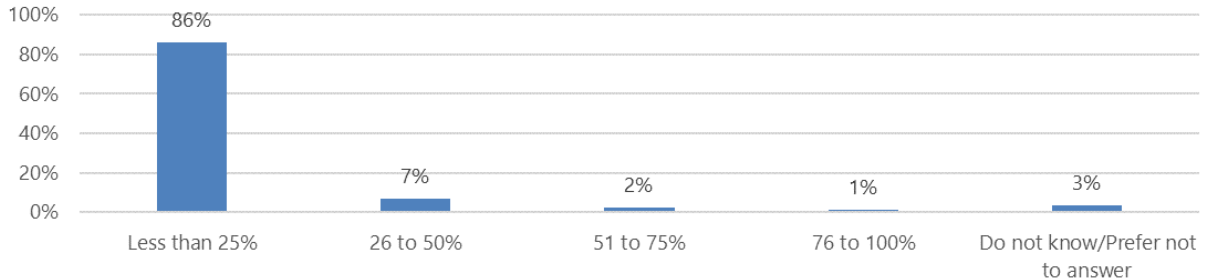
Manufacturing: Lehigh Valley Employer Satisfaction for Workforce Attributes (n=44)



Source: Camoin Associates

Remote work is not prevalent in Manufacturing. Approximately 86% of Manufacturing employers in Lehigh Valley expect less than 25% of their workforce to work remotely.

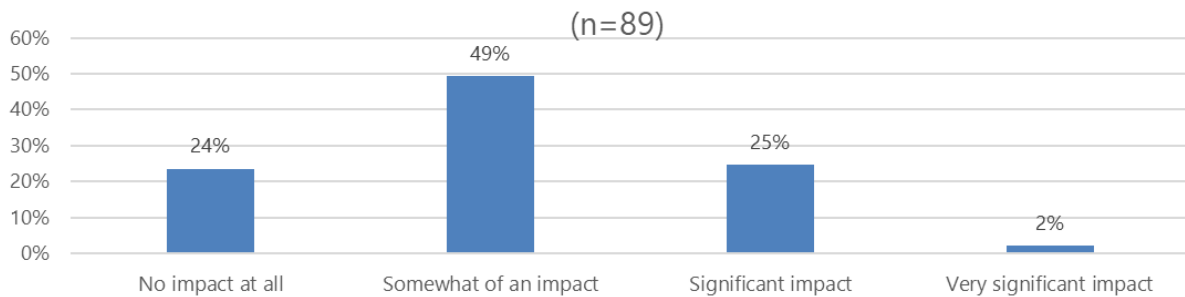
Manufacturing: Over the next 12 months, what percentage of your workers do you expect will work remotely? (n=86)



Source: Camoin Associates

Over the next 12 months, few Manufacturing employers in the Lehigh Valley expect the COVID-19 pandemic to have a very significant impact on their operations at 7%. Another 24% expect the pandemic will have no impact at all on their operations. Some Manufacturing employers indicated that their supply chains are currently still disrupted from the pandemic, increasing prices, and making it difficult to source materials and arrange for transportation.

Manufacturing: Overall, how is the COVID-19 pandemic expected to impact the outlook for your operations over the next 12 months? (n=89)

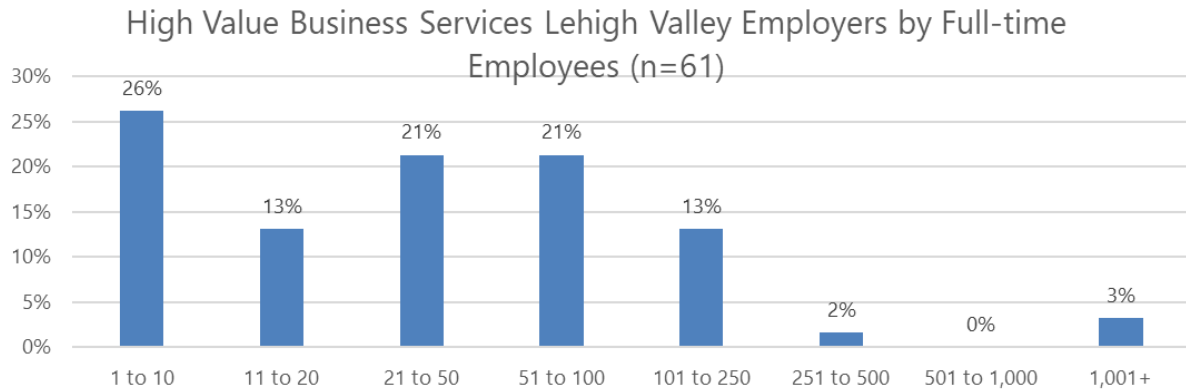


Source: Camoin Associates

HIGH VALUE BUSINESS SERVICES

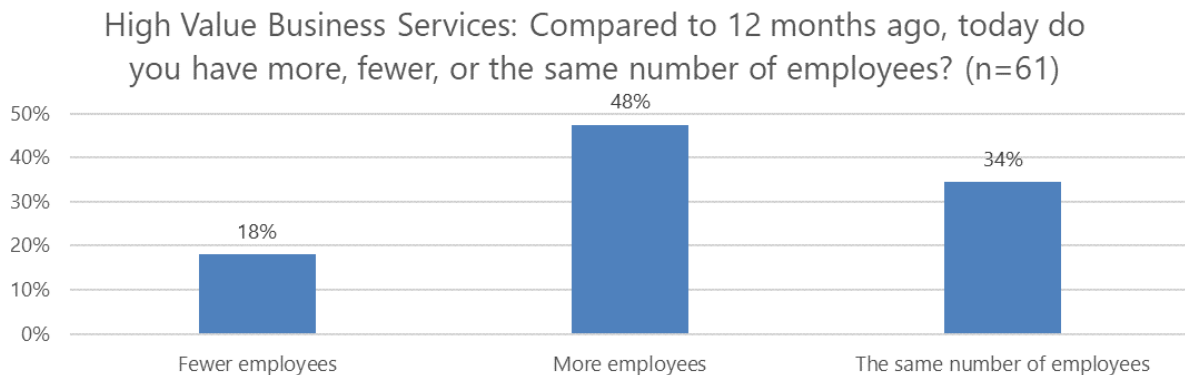
The Lehigh Valley Talent Study received responses from 61 High Value Business Service employers in Lehigh Valley of which 15 partially completed the survey. The following are findings from those respondents.

High Value Business Service employers in Lehigh Valley are largely comprised of businesses with 250 or fewer employees. Approximately 26% are businesses with 1 to 10 employees.



Source: Camoin Associates

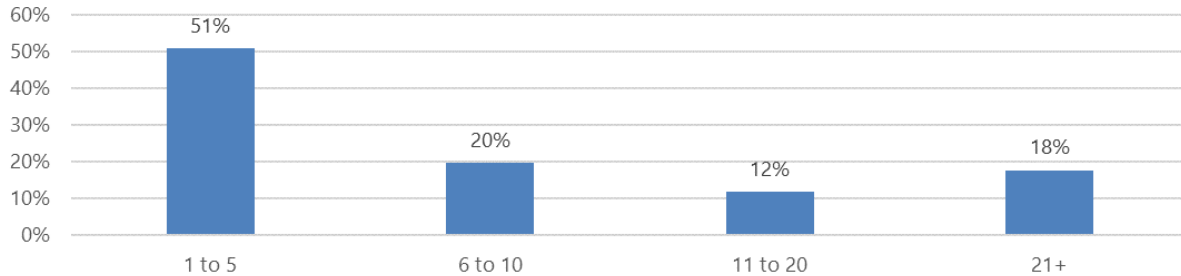
Approximately 48% of High Value Business Services employers in Lehigh Valley have more employees compared to 12 months ago compared to 18% that have fewer employees.



Source: Camoin Associates

In the last 12 months, 85% of High Value Business Services employers in Lehigh Valley hired workers. Aligning with smaller business sizes, 51% of High Valley Business Services employers hired 1 to 5 employees in the past 12 months. Approximately 20% of employers hired between 6 and 10 employees and 12% of employers hired between 11 and 20 employees in the last 12 months.

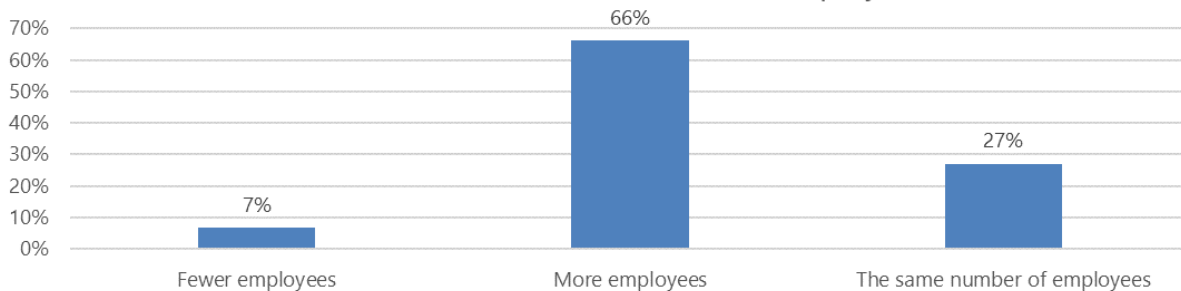
High Value Business Services: In the past 12 months, how many workers has your business hired? (n=51)



Source: Camoin Associates

Approximately 66% of High Value Business Services employers in the Lehigh Valley expect to have more employees in the next 12 months while 7% expect to have fewer.

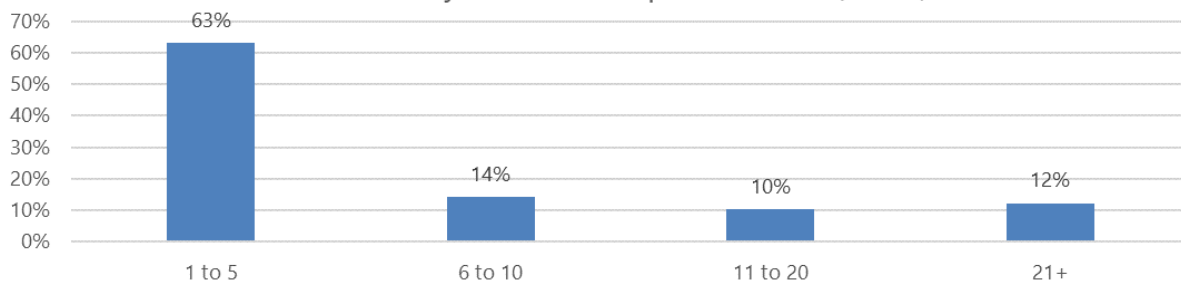
High Value Business Services: In the next 12 months, do you expect to have more, fewer, or the same number of employees? (n=59)



Source: Camoin Associates

Approximately 85% of Lehigh Valley High Value Business Services employers plan to hire workers over the next 12 months. Approximately 63% of those employers planning on hiring in the next 12 months plan to hire 1 to 5 employees. High Value Business Services employers indicated they are interested in resources to aid in job postings and hiring.

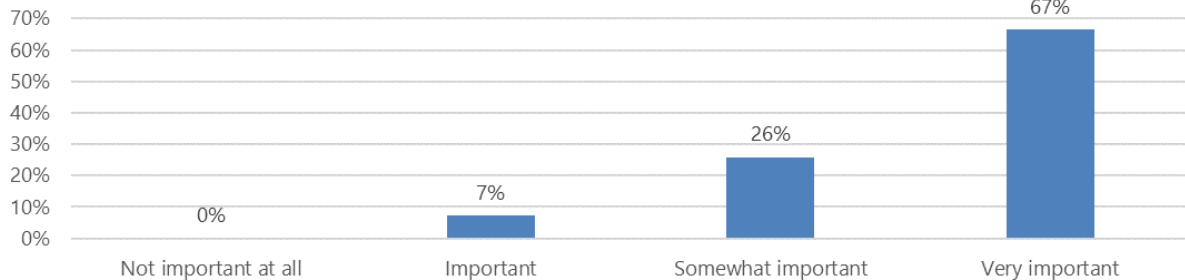
High Value Business Services: In the next 12 months, how many workers does your business plan to hire? (n=49)



Source: Camoin Associates

Of the High Value Business Services employers in Lehigh Valley surveyed, 86% have experienced challenges in recruiting, hiring, or retaining talent. Two-thirds (67%) of High Value Business Services employers think a skilled workforce is very important to the future growth of their operations while an additional 26% find it important.

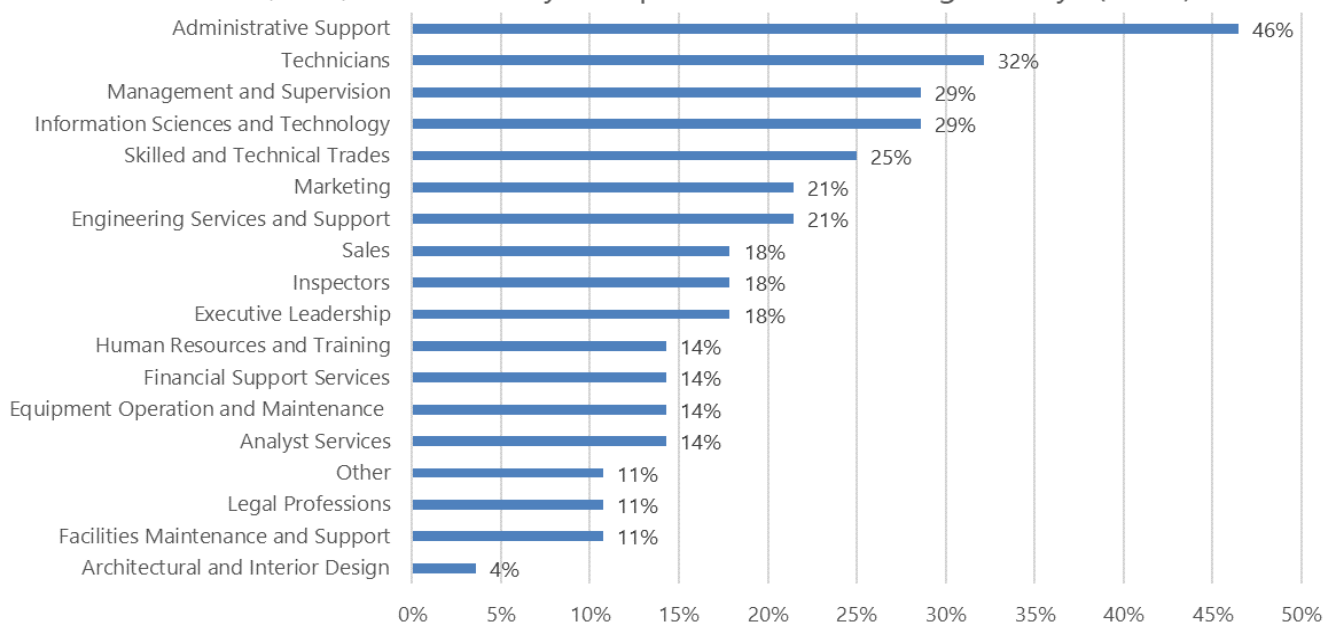
High Value Business Services: How important is a skilled workforce for the future growth of your operations in the Lehigh Valley? (n=54)



Source: Camoin Associates

The top positions that High Value Business Services employers in the Lehigh Valley have difficulty recruiting, hiring, or retaining are administrative support (46%), technicians (32%), management and supervision (29%), and information sciences and technology (29%). Approximately 11% of employers indicated other jobs that are difficult to recruit, hire, or retain which include experienced loan personnel, bankers, customer service, scientific, land surveyors, etc.

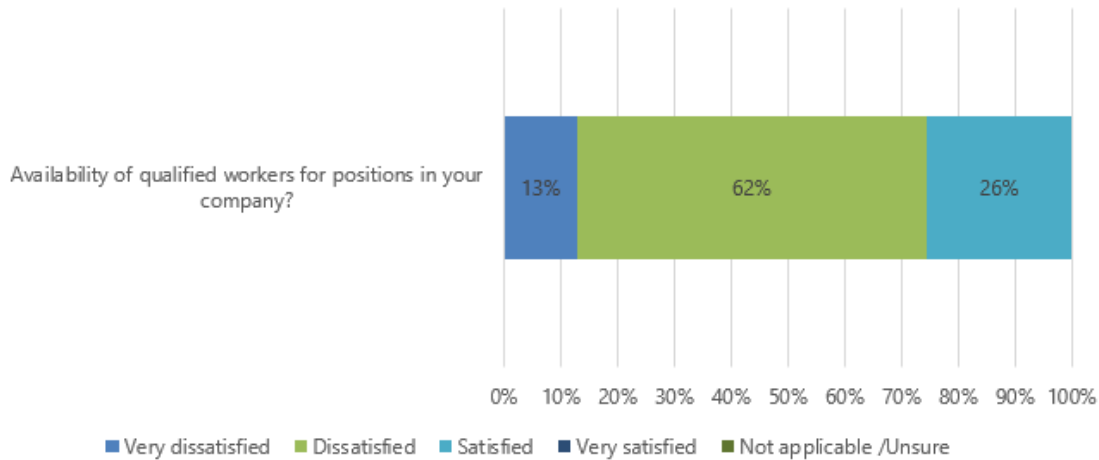
High Value Business Services: What types of jobs do you find difficult to recruit, hire, or retain for your operations in the Lehigh Valley? (n=28)



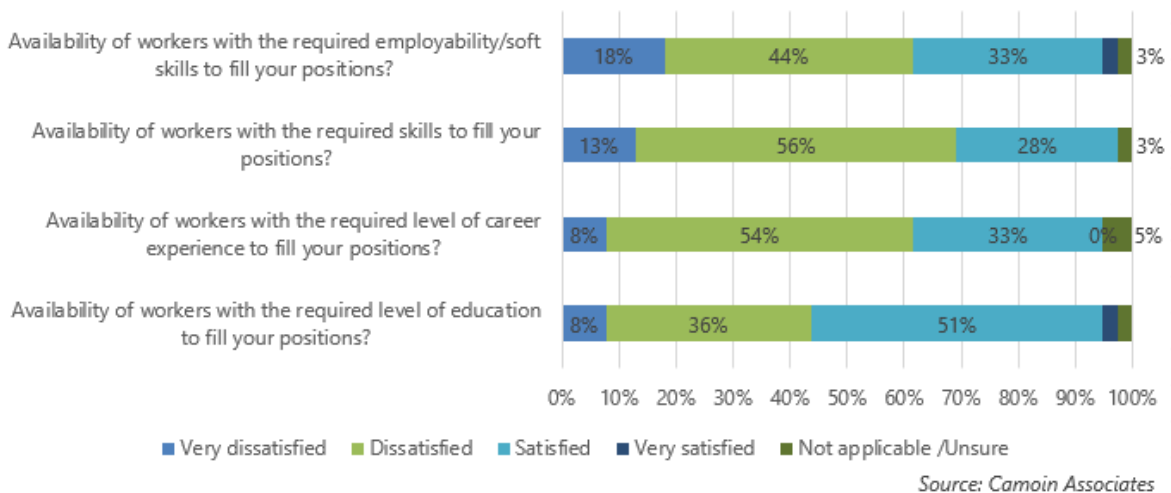
Source: Camoin Associates

High Value Business Services employers in Lehigh Valley are the most satisfied with the education of their workforce. They are the least satisfied with the availability of qualified workers for positions in their companies and their skillsets including technical and employability/ soft skills. Respondents indicated that the labor pool of experienced workers is limited and diminishing in quality. Overall, there are not enough people with appropriate levels of experience and certification within the Lehigh Valley and nationally. Others comments on the poor work ethic among the current workforce and lack of employability/ soft skills such as communicating with clients and coworkers which requires employers to retain workers multiple times. However, respondents noted that workers with the right experience and skill set are often retained.

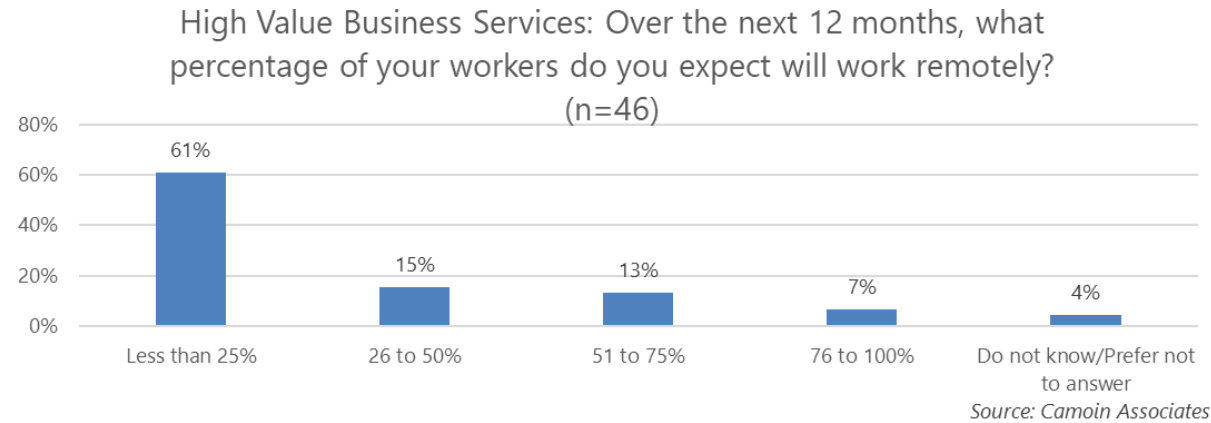
High Value Business Services: Lehigh Valley Employer Satisfaction (n=39)



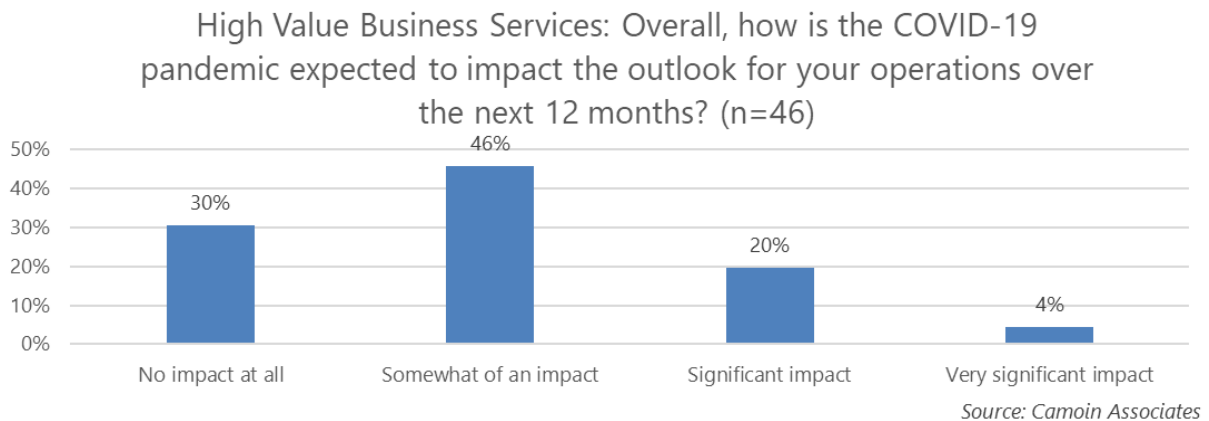
High Value Business Services: Lehigh Valley Employer Satisfaction for Workforce Attributes (n=39)



The majority of the High Value Business Services workforce in Lehigh Valley does not expect to work remotely over the next 12 months. Approximately 61% of employers in Lehigh Valley expect less than 25% of their workforce to work remotely. Respondents indicate that training, productivity, leadership, professional development, collaboration, and fellowship have been challenging while working remotely.



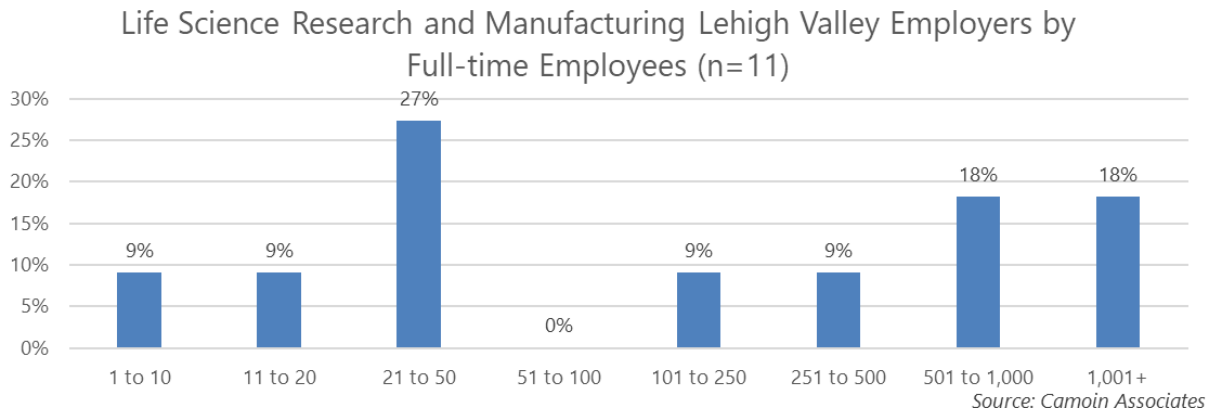
Over the next 12 months, few High Value Business Services employers in the Lehigh Valley expect the COVID-19 pandemic to have a very significant impact on their operations at 4%. Approximately 30% expect the pandemic will have no impact at all on their operations. Some High Value Business Services employers noted that supply chain issues and challenges with hiring are associated with the pandemic and expected to persist.



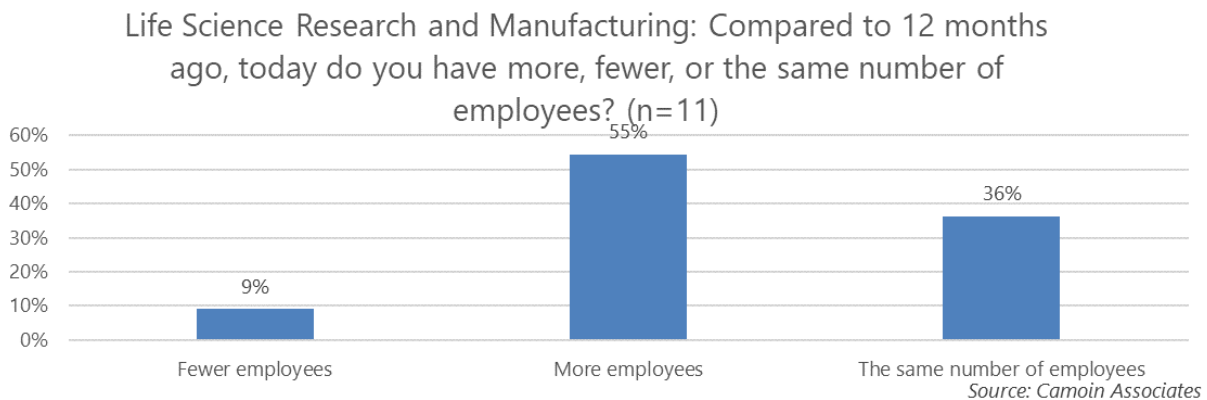
LIFE SCIENCE RESEARCH AND MANUFACTURING

The Lehigh Valley Talent Study received responses from 11 Life Science Research and Manufacturing employers in Lehigh Valley of which there were none that partially completed the survey. The following are findings from those respondents.

Life Science Research and Manufacturing employers that responded to the survey comprised small to medium to large businesses. The only business size the survey did not input from Life Science Research and Manufacturing employers was those with 51 to 100 employees. The most prevalent Life Science Research Manufacturing business size was 31 to 50 employees with 27% of respondents.

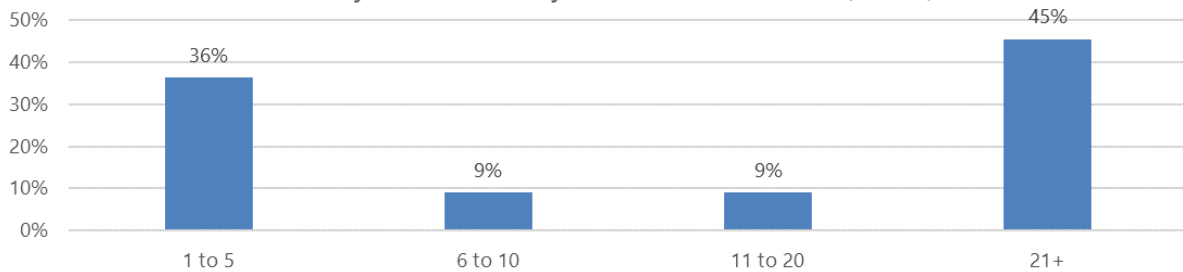


Approximately 55% of Life Science Research and Manufacturing employers in Lehigh Valley have more employees compared to 12 months ago compared to 9% that have fewer employees.



In the last 12 months, all the Life Science Research and Manufacturing employers in Lehigh Valley surveyed hired workers. Approximately 45% of Life Science Research and Manufacturing employers hired 21 or more employees in the last 12 months. The employers that hired 21 or more employees in the Lehigh Valley were larger companies with 251 or more employees. Approximately 46% of employers hired between 1 to 5 employees in the last 12 months, of which all these employers had less than 50 employees.

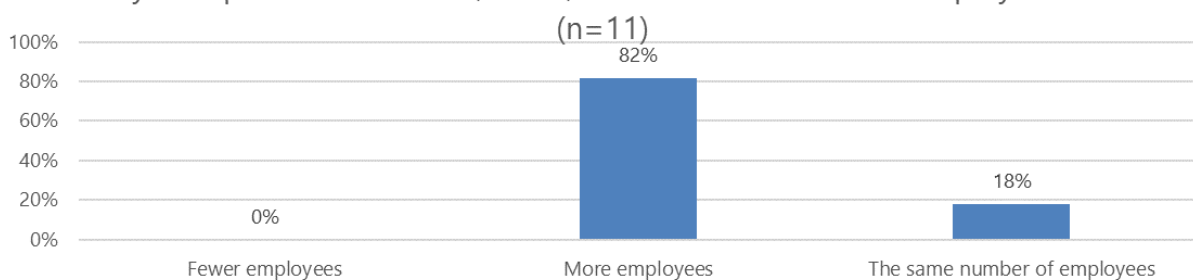
Life Science Research and Manufacturing: In the past 12 months, how many workers has your business hired? (n=11)



Source: Camoin Associates

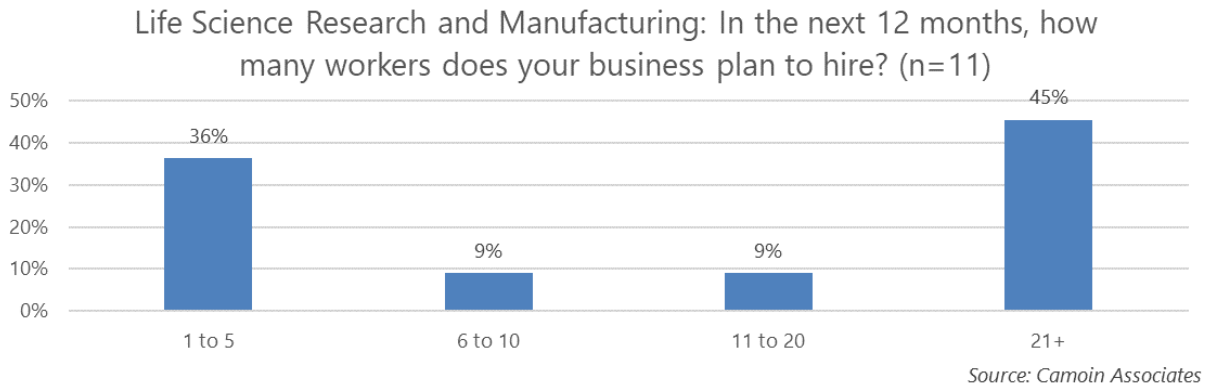
There are no Life Science Research and Manufacturing employers in Lehigh Valley that anticipate having fewer employees in the next 12 months. Approximately 82% of employers expect to have more employees in the next 12 months while 18% expect to have the same number of employees.

Life Science Research and Manufacturing: In the next 12 months, do you expect to have more, fewer, or the same number of employees? (n=11)

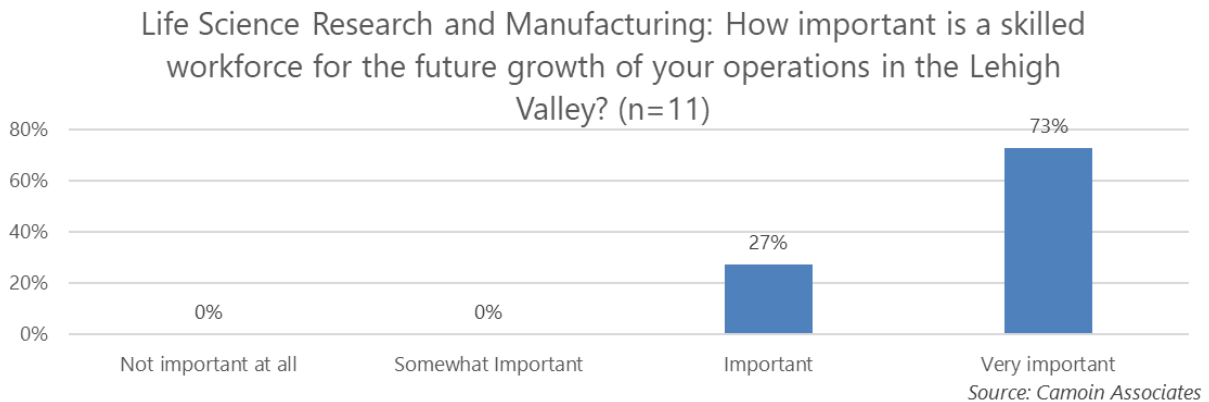


Source: Camoin Associates

All of Lehigh Valley Life Science Research and Manufacturing employers surveyed plan to hire workers over the next 12 months. Approximately 45% of those employers planning on hiring in the next 12 months plan to hire 21 or more employees and another 36% plan to hire 1 to 5 employees. Similar to past hiring trends, larger employers with over 250 employees plan to hire 21 + employees and smaller employers with less than 50 employees plan to hire 1 to 5 employees.

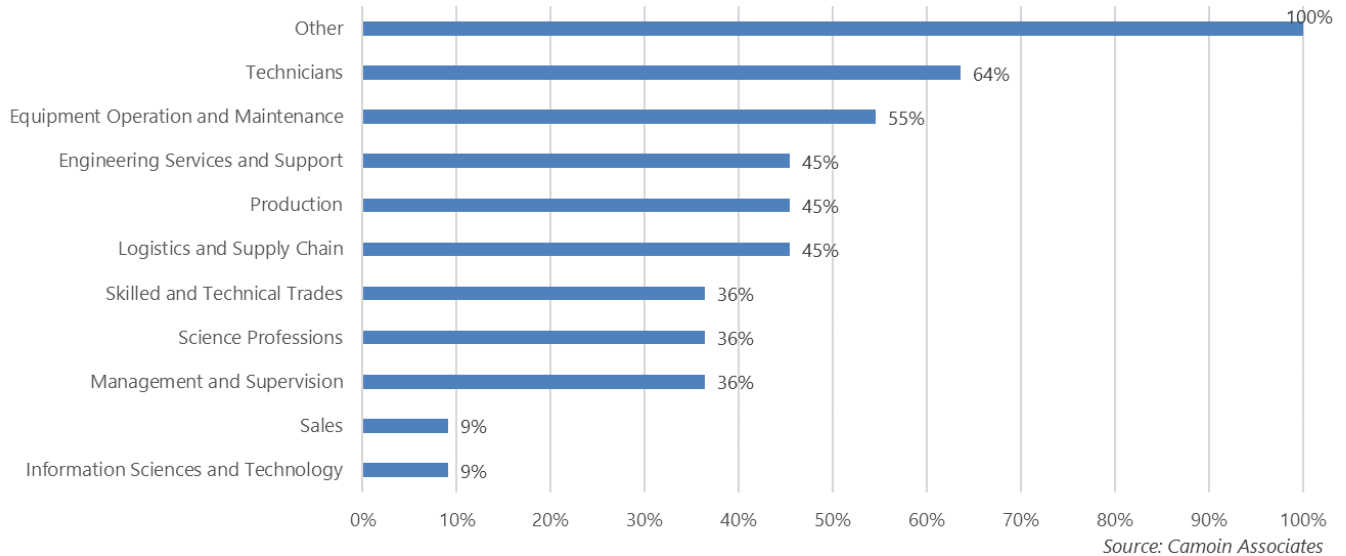


Of the Life Science Research and Manufacturing employers in Lehigh Valley surveyed, all of them have experienced challenges in recruiting, hiring, or retaining talent. Approximately 73% of Manufacturing employers think a skilled workforce is very important to the future growth of their operations while an additional 27% find it important.



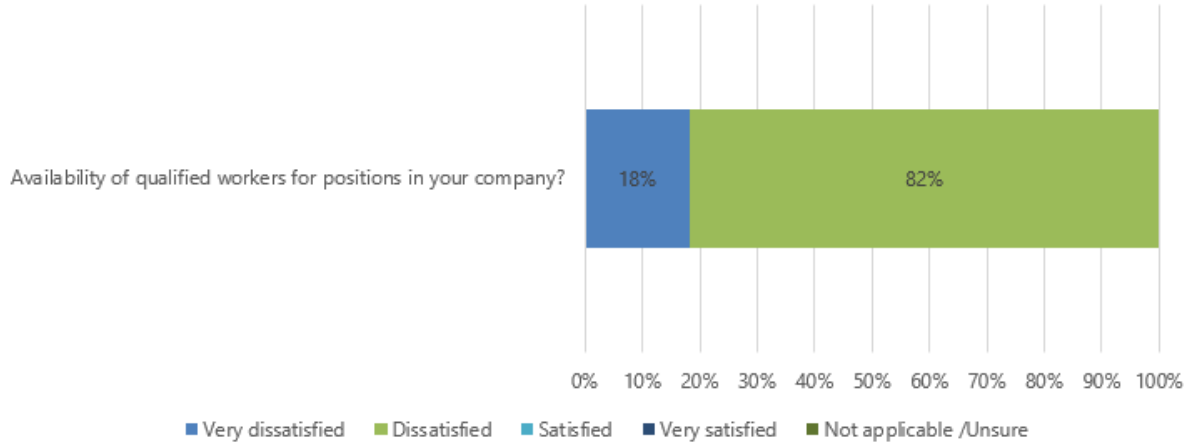
Each surveyed Life Science Research and Manufacturing employer provided specific input into the positions they have difficulty recruiting, hiring, or retaining. Responses included entry level technicians, mechatronics, lab workers, quality control and assurance, manufacturing, engineering, volume production labor, regulatory affairs, warehouse support, service technicians, etc. Other top jobs that they have difficulty recruiting, hiring, or retaining include technicians (64%), equipment operation and maintenance (55%), and engineering services and support (45%), production (45%), and logistics and supply chain (45%).

Life Science Research and Manufacturing: What types of jobs do you find difficult to recruit, hire, or retain for your operations in the Lehigh Valley? (n=11)

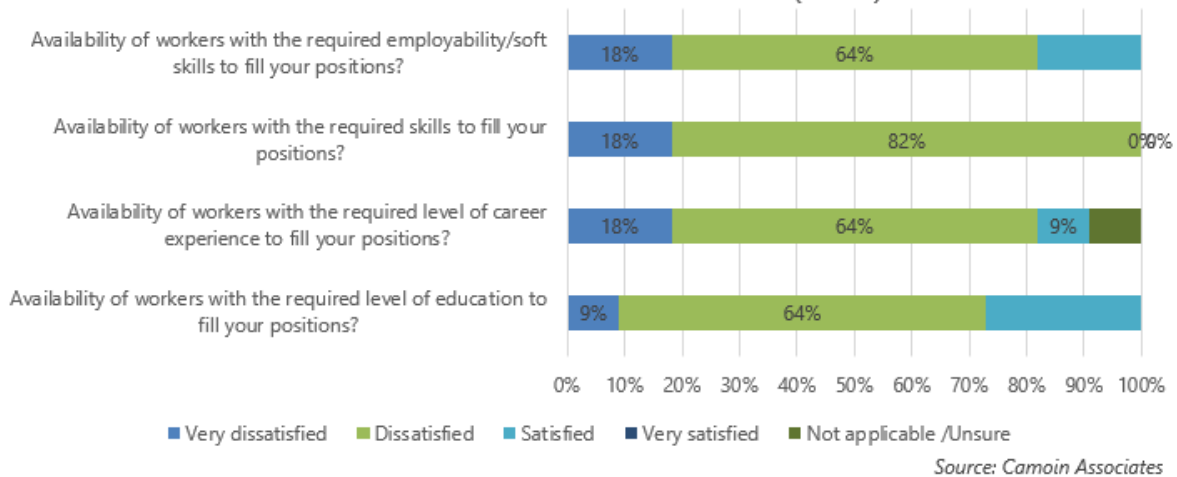


Life Science Research and Manufacturing employers in Lehigh Valley are the most satisfied with the education of their workforce and employability/soft skills. Some employers comment that the level of education among potential candidates in the region is adequate. Respondents indicated that there is a supply and demand problem of talent in Lehigh Valley which results from several employers looking for the same type of talent. Several respondents commented that the current workforce lacks motivation, commitment, and trade skills. Others indicated that they are relocating people to Lehigh Valley due to a lack of education and work experience in the workforce in the area.

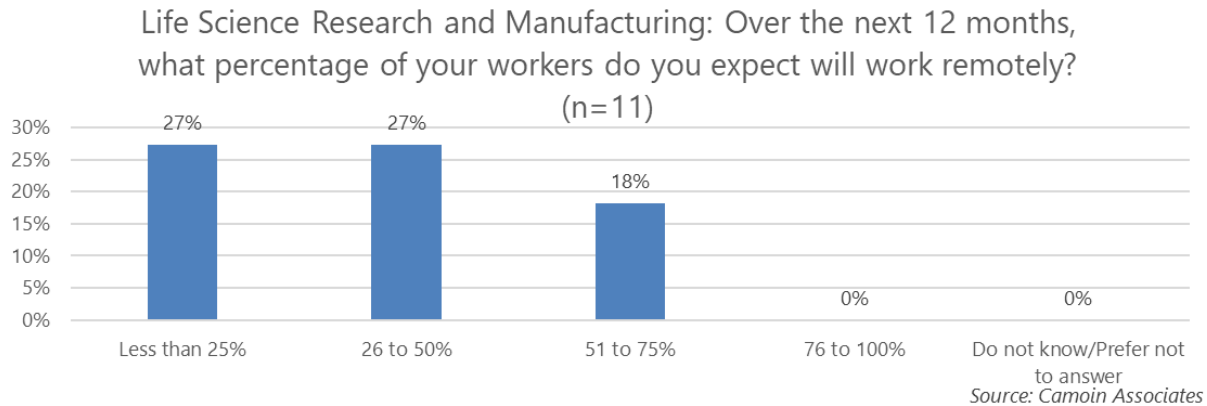
Life Science Research and Manufacturing: Lehigh Valley Employer Satisfaction (n=11)



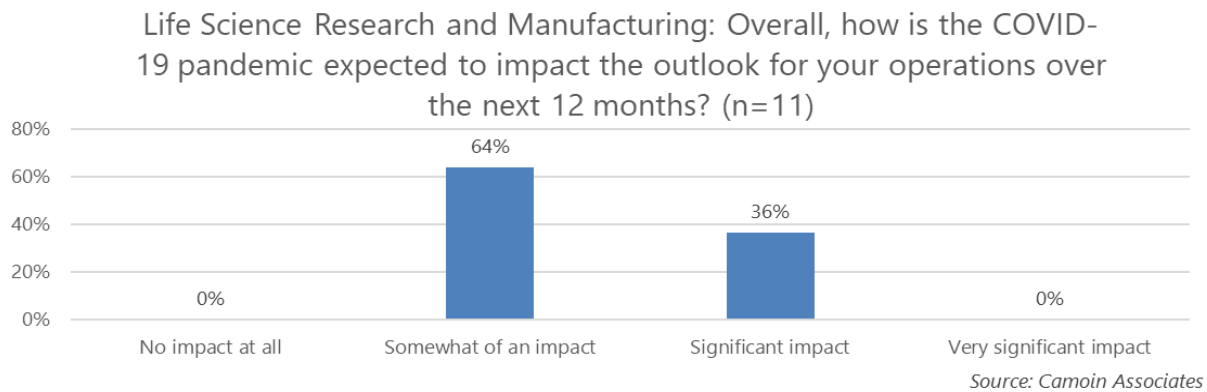
Life Science Research and Manufacturing: Lehigh Valley Employer Satisfaction for Workforce Attributes (n=11)



Approximately 27% of Life Science Research and Manufacturing employers in Lehigh Valley expect less than 25% of their workforce to work remotely with another 27% expecting 26% to 50% of their workforce to work remotely. Compared to their current staffing levels, remote work is expected to decrease across Life Science Research and Manufacturing employers in Lehigh Valley.



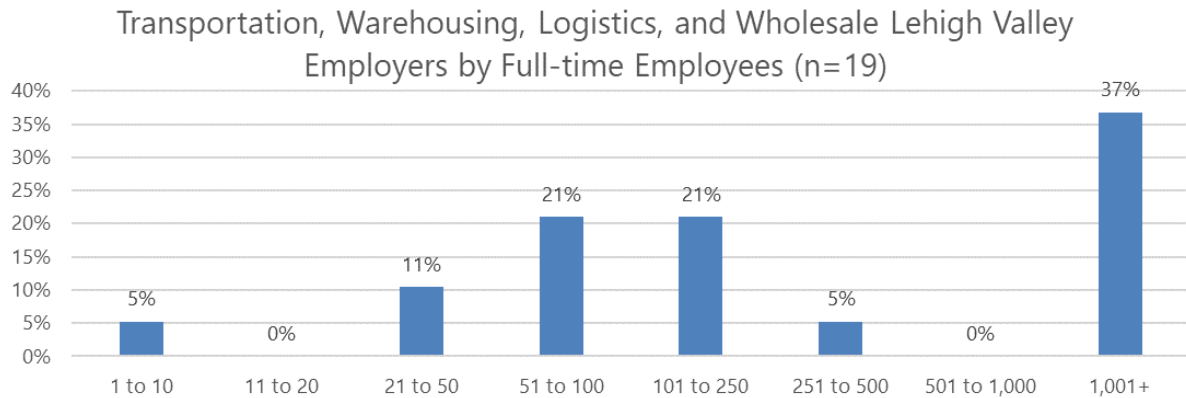
Over the next 12 months, the Life Science Research and Manufacturing employers in the Lehigh Valley expect the COVID-19 pandemic to have somewhat to a significant impact at 64% and 36%, respectively.



TRANSPORTATION, WAREHOUSING, LOGISTICS, AND WHOLESALE

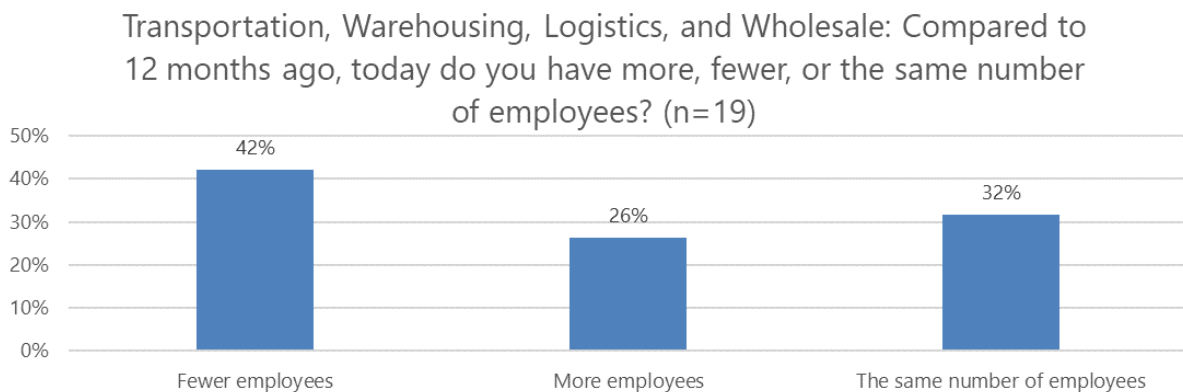
The Lehigh Valley Talent Study received responses from 19 Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley of which 1 partially completed the survey. The following are findings from those respondents.

The survey captured Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley with 1,001 + employees (37%), 21 to 500 employees (58%), and 1 to 10 employees (5%).



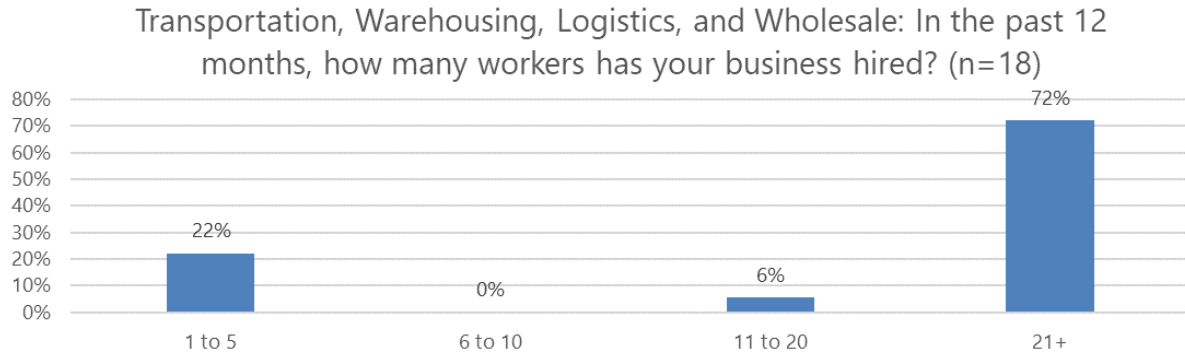
Source: Camoin Associates

Approximately 42% of Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley have fewer employees compared to 12 months ago.



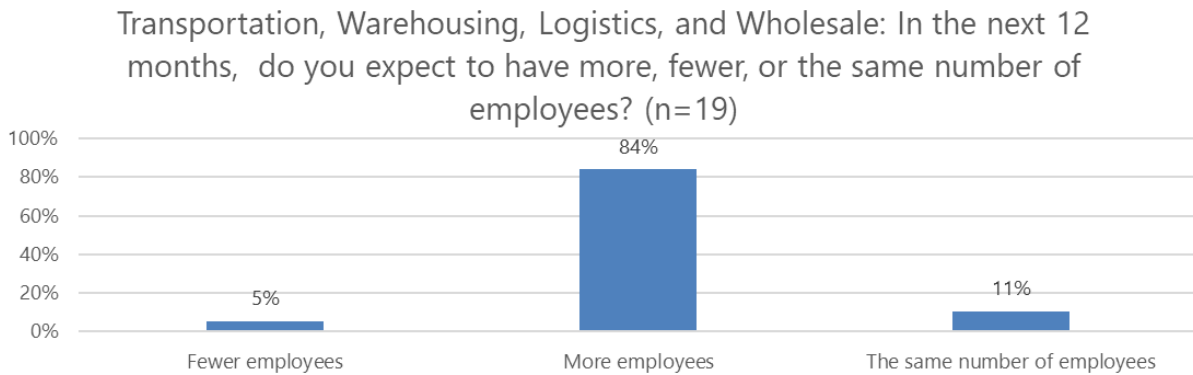
Source: Camoin Associates

In the last 12 months, all the surveyed Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley hired workers. The majority of Transportation, Warehousing, Logistics, and Wholesale employers (72%) hired 21 or more employees in the last 12 months. Approximately 22% of employers hired between 1 to 5 employees in the last 12 months.



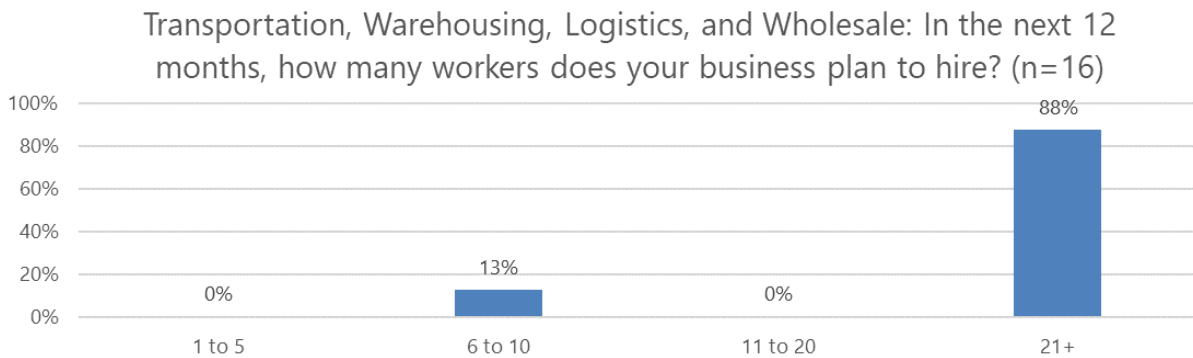
Source: Camoin Associates

The majority of Transportation, Warehousing, Logistics, and Wholesale employers (84%) in Lehigh Valley expect to have more employees in the next 12 months.



Source: Camoin Associates

Approximately 94% of Lehigh Valley Transportation, Warehousing, Logistics, and Wholesale employers plan to hire workers over the next 12 months. Approximately 88% of those employers planning on hiring in the next 12 months plan to hire 21 or more employees.

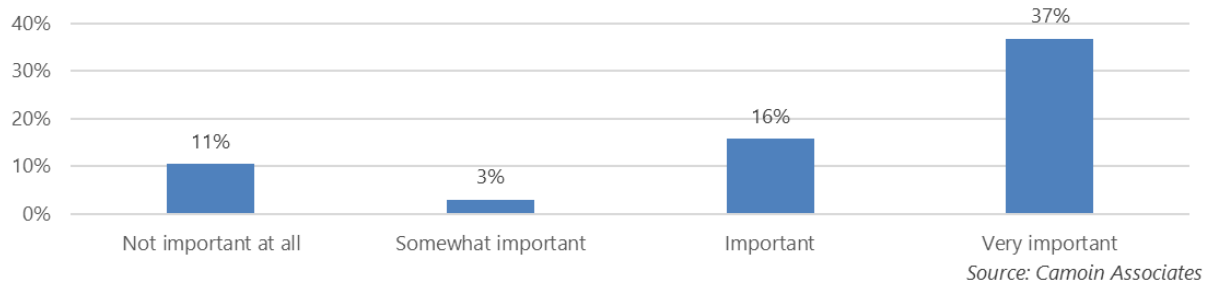


Source: Camoin Associates

All the surveyed Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley have experienced challenges in recruiting, hiring, or retaining talent. In regard to a skilled workforce, not all

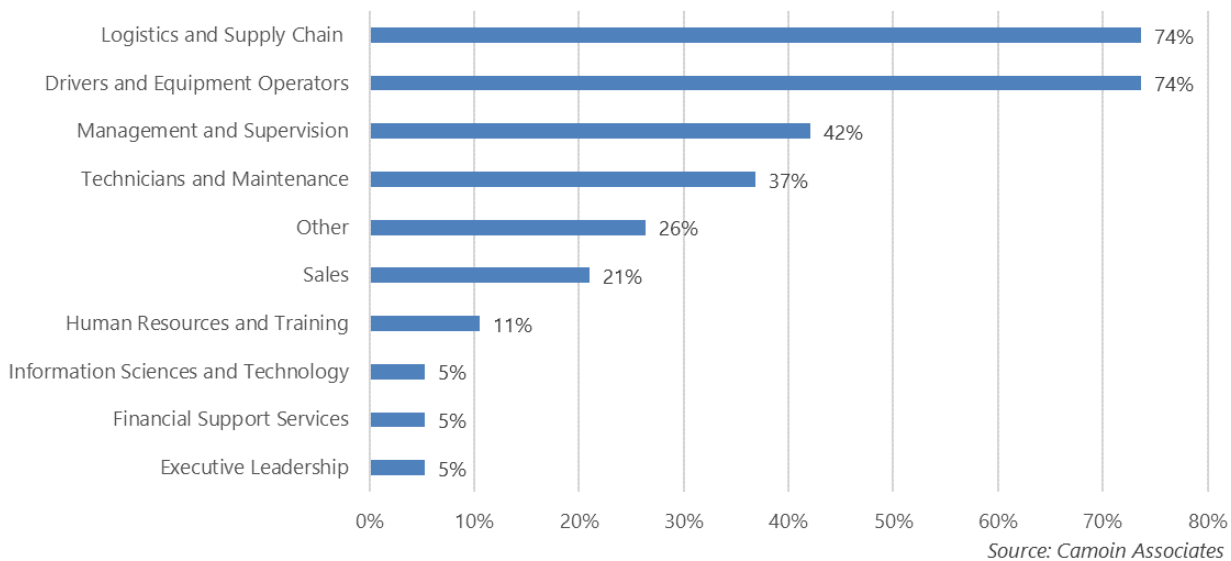
Transportation, Warehousing, Logistics, and Wholesale employers think a skilled workforce is important to the future growth of their operations. Approximately 37% of employers find a skilled workforce very important to the future of their operations while another 16 find it important.

Transportation, Warehousing, Logistics, and Wholesale: How important is a skilled workforce for the future growth of your operations in the Lehigh Valley? (n=19)



The top positions that Transportation, Warehousing, Logistics, and Wholesale employers in the Lehigh Valley have difficulty recruiting, hiring, or retaining logistics and supply chain (79%), drivers and equipment operators (74%), and management and supervisor (42%). Approximately 26% of employers indicated other jobs that are difficult to recruit, hire, or retain which include general unskilled workers, production workers, transportation, general laborers, packers, and package handlers.

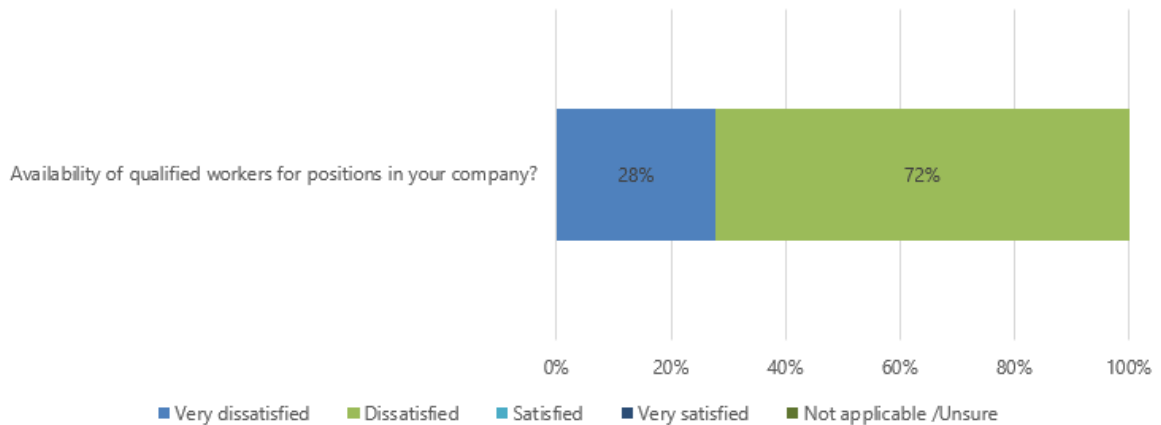
Transportation, Warehousing, Logistics, and Wholesale: What types of jobs do you find difficult to recruit, hire, or retain for your operations in the Lehigh Valley? (n=19)



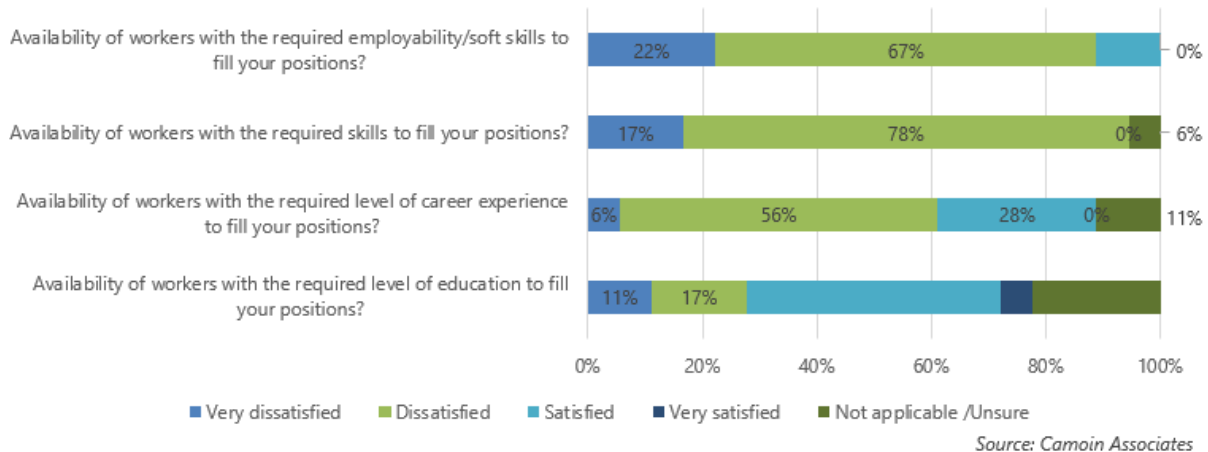
The following are results from the Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley rating their satisfaction with workforce attributes. Overall, employers are the most satisfied with the education of their workforce and career experience. Transportation, Warehousing, Logistics, and Wholesale employers are the least satisfied with the availability of qualified workers for positions in their companies. Respondents indicated that they often have to take what they can get regardless of attributes and that this sector is overlooked by many workers. Others note that they must train incoming workers in-house which decreased the bandwidth of the operations.

Based on feedback from respondents in Transportation, Warehousing, Logistics, and Wholesale there is a consensus that the candidate pool is lacking based on the current economic climate. Employers are currently finding it difficult to get applicants to show up to interviews and get past the first day of work. Other challenges in the Transportation, Warehousing, Logistics, and Wholesale sector include rising costs of operations including leases and personnel.

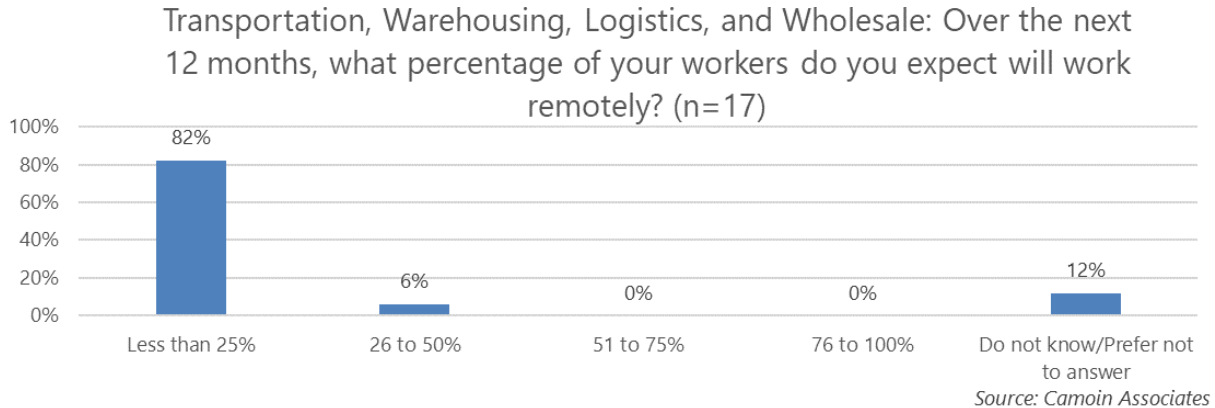
Transportation, Warehousing, Logistics, and Wholesale:
Lehigh Valley Employer Satisfaction (n=18)



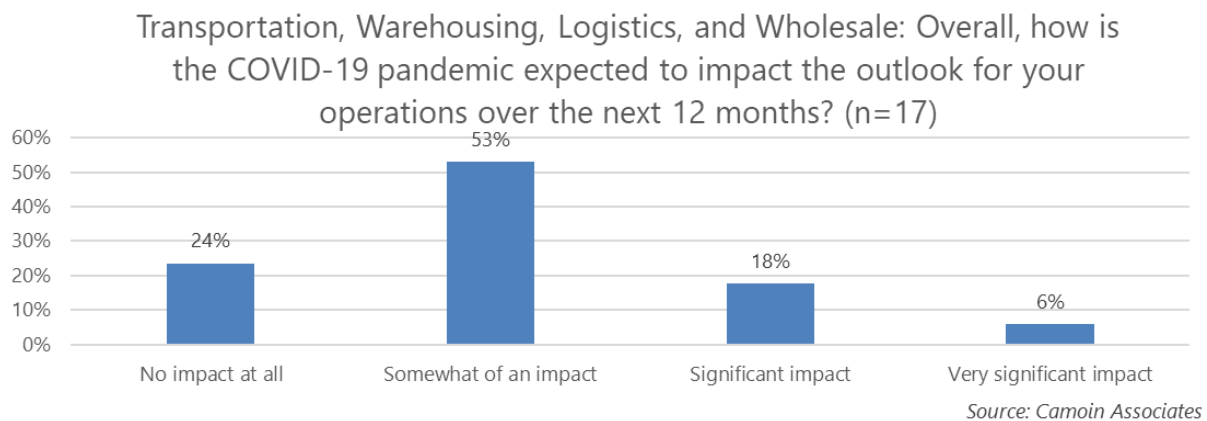
Transportation, Warehousing, Logistics, and Wholesale:
Lehigh Valley Employer Satisfaction for Workforce Attributes (n=18)



Remote work is less prevalent in Transportation, Warehousing, Logistics, and Wholesale compared to the other target sectors. The Transportation, Warehousing, Logistics, and Wholesale employers in Lehigh Valley do not expect to have a large remote workforce with 82% of employers indicating they expect less than 25% of their workforce to work remotely.



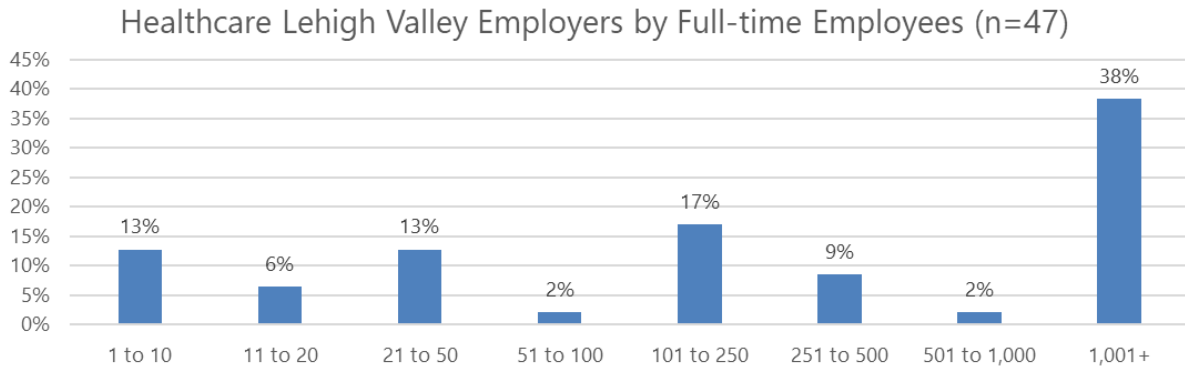
Over the next 12 months, few Transportation, Warehousing, Logistics, and Wholesale employers in the Lehigh Valley expect the COVID-19 pandemic to have a very significant impact on their operations at 6%. Another 24% expect the pandemic will have no impact at all on their operations.



HEALTH CARE

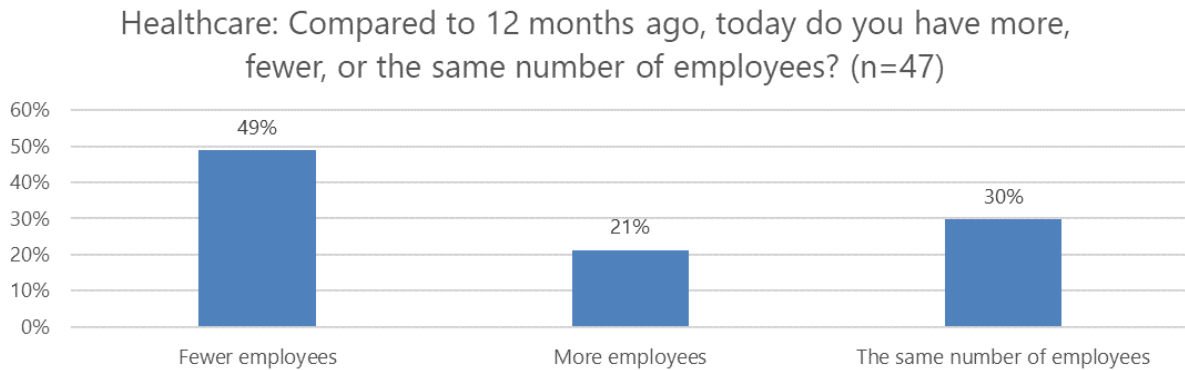
The Lehigh Valley Talent Study received responses from 49 Health Care employers in Lehigh Valley of which 11 partially completed the survey. The following are findings from those respondents.

Health Care employers in Lehigh Valley captured in this survey comprise a variety of businesses sizes. Approximately 38% of Lehigh Valley Health Care employers have over 1,000 employees.



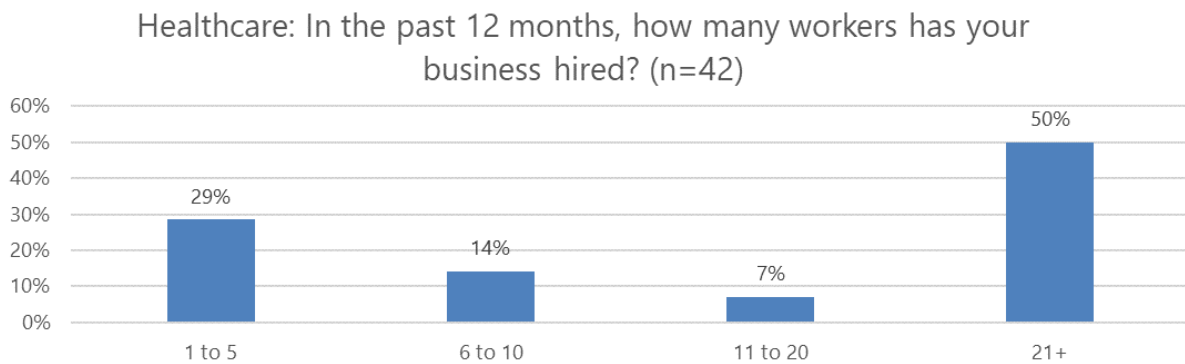
Source: Camoin Associates

Nearly half (49%) of Health Care employers in Lehigh Valley have fewer employees compared to 12 months ago.



Source: Camoin Associates

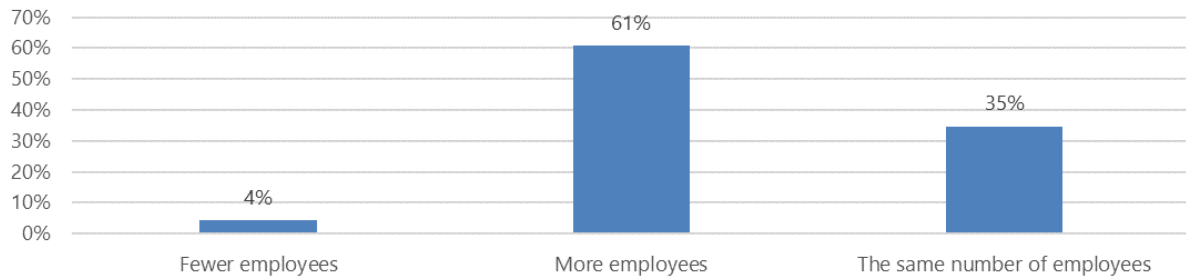
In the last 12 months, 91% of Health Care employers in Lehigh Valley hired workers indicating an employee retention challenge. Coinciding with the large Health Care businesses, half (50%) of Health Care employers hired 21 or more employees in the last 12 months. All the Health Care businesses that indicated hiring 21 or more employees have 50 or more full time employees.



Source: Camoin Associates

The majority of Health Care employers in Lehigh Valley (61%) expect to have more employees in the next 12 months.

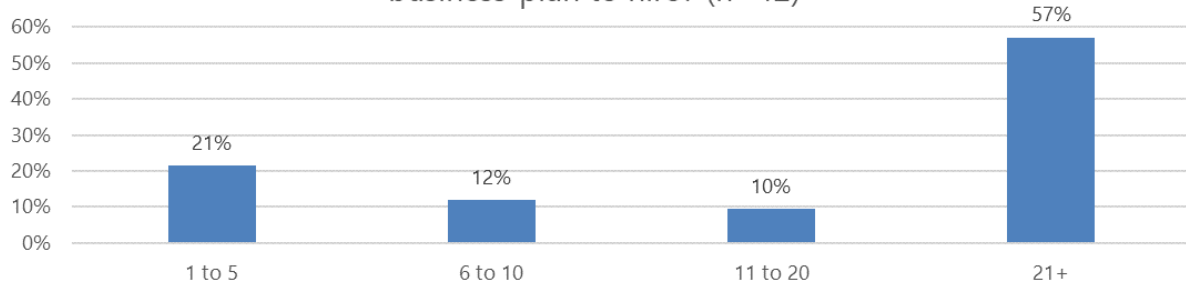
Healthcare: In the next 12 months, do you expect to have more, fewer, or the same number of employees? (n=46)



Source: Camoin Associates

Approximately 91% of Lehigh Valley Health Care employers plan to hire workers over the next 12 months. Similar to previous hiring trends, 57% of Health Care employers plan to hire 21 or more employees.

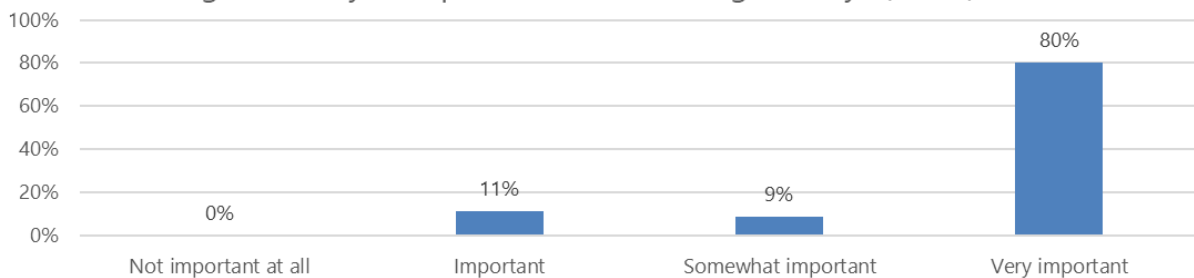
Healthcare: In the next 12 months, how many workers does your business plan to hire? (n=42)



Source: Camoin Associates

Approximately 89% of Health Care employers in Lehigh Valley have experienced challenges in recruiting, hiring, or retaining talent. Additionally, all the Health Care employers indicated that a skilled workforce is important for the future growth of their operations with 80% indicating it is very important.

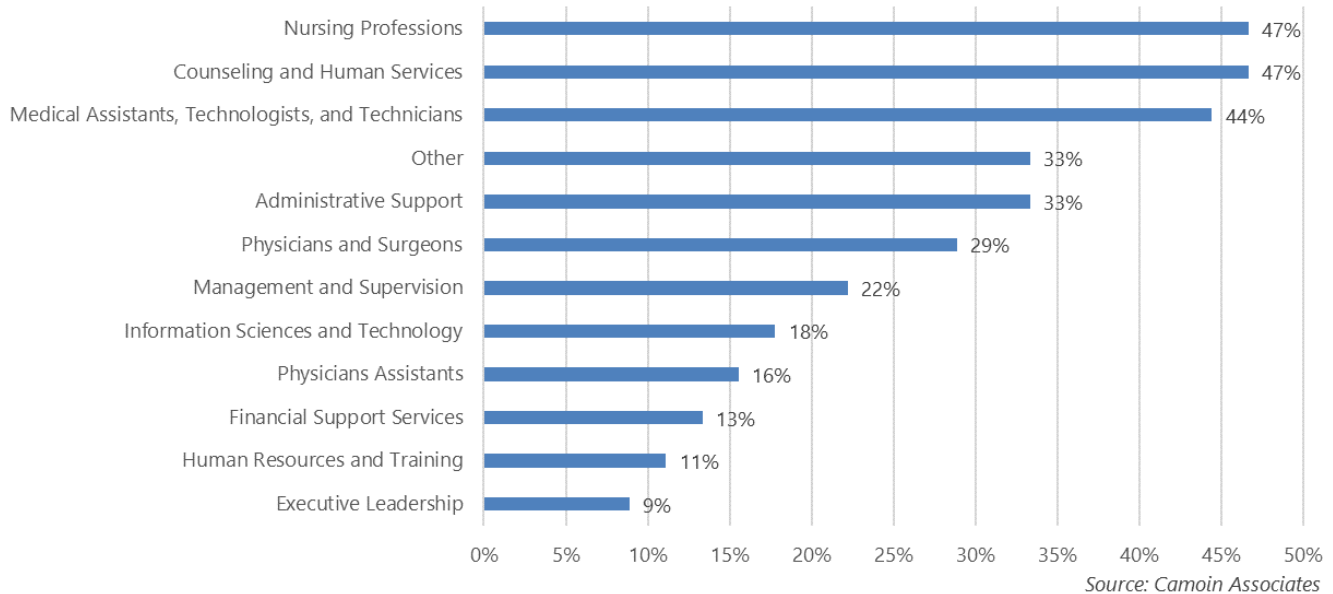
Healthcare: How important is a skilled workforce for the future growth of your operations in the Lehigh Valley? (n=45)



Source: Camoin Associates

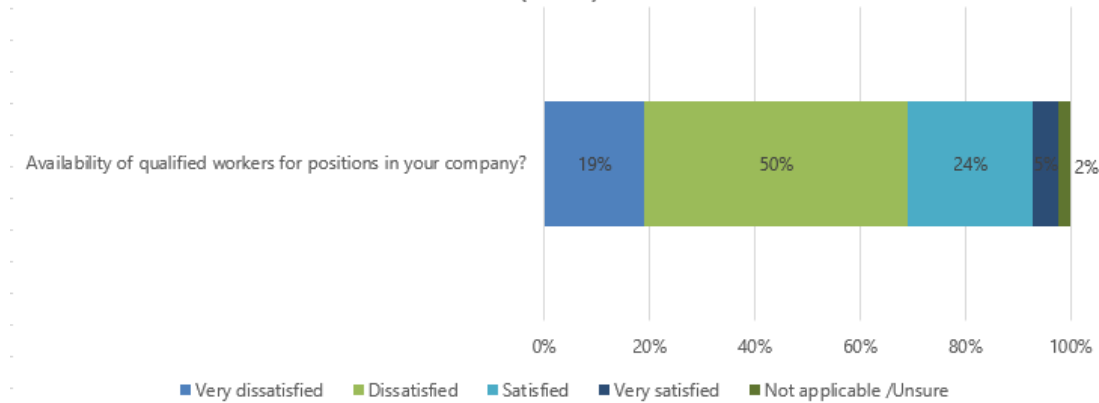
The top positions that Lehigh Valley Health Care employers have difficulty recruiting, hiring, or retaining are nursing professions (47%), counseling and human services (47%), and medical assistants, technologists, and technicians (44%). Health Care employers in Lehigh Valley indicated that licensed therapists, mental health workers, behavioral health staff, direct care, residential staff, psychiatrists, emergency medical technicians, paramedics, and entry-level workers are difficult to recruit, hire, or retain. Difficulties in recruiting are exacerbated by high competition salaries, the flexibility of remote/work from home, and wages in Lehigh Valley.

Healthcare: What types of jobs do you find difficult to recruit, hire, or retain for your operations in the Lehigh Valley? (n=41)

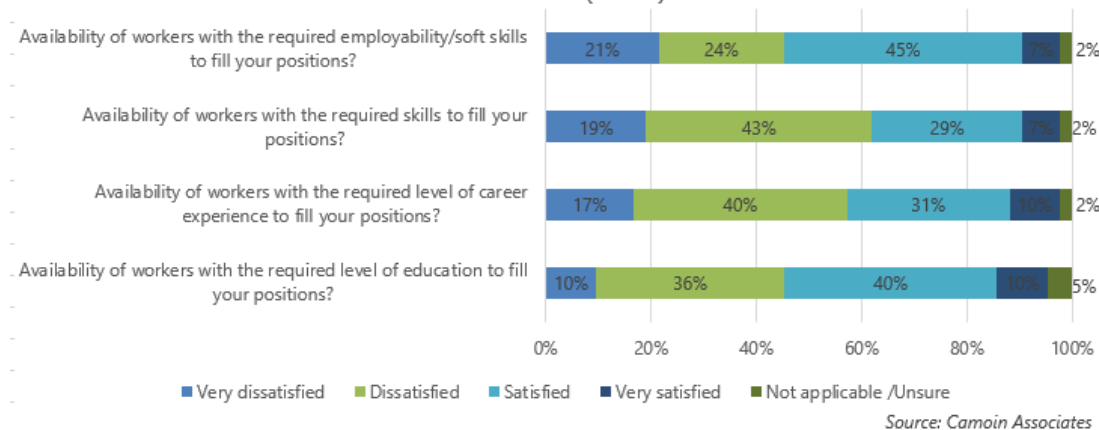


Health Care employers in Lehigh Valley rated their satisfaction with workforce attributes. Overall, Health Care employers are the most satisfied with the education of their workforce and employability/soft skills. Health Care employers are the least satisfied with the availability of qualified workers for positions in their companies. Respondents indicated that there is a small pool of candidates and that there is a greater demand for seasoned candidates than there is for new candidates.

Healthcare: Lehigh Valley Employer Satisfaction for Workforce Quality
(n=42)

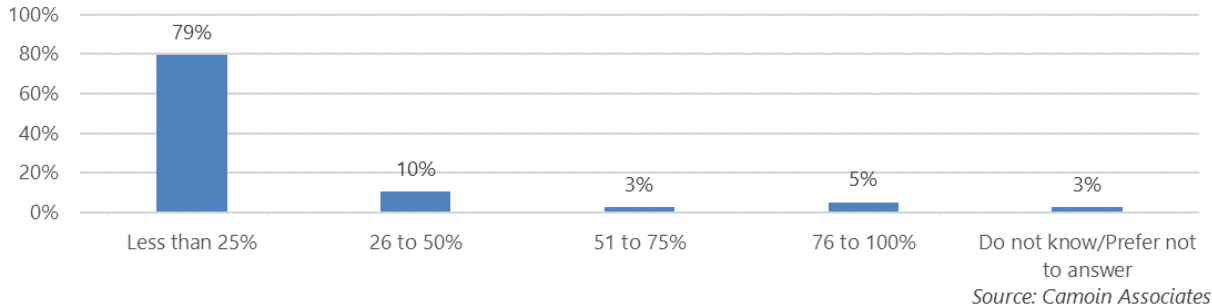


Healthcare: Lehigh Valley Employer Satisfaction for Workforce Attributes (n=42)



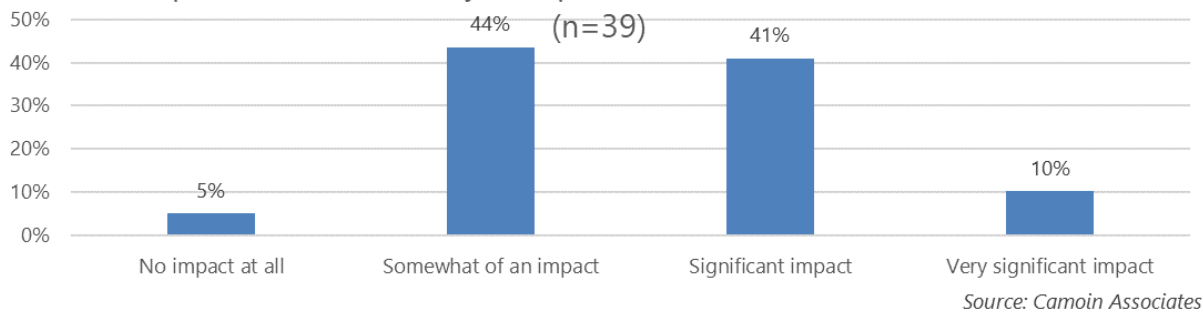
Looking forward, Health Care employers in Lehigh Valley do not expect to have a large remote workforce with 79% of employers indicating they expect less than 25% of their workforce to work remotely.

Healthcare: Over the next 12 months, what percentage of your workers do you expect will work remotely? (n=39)



Over the next 12 months, approximately half of Health Care employers in the Lehigh Valley expect the COVID-19 pandemic to have a significant to a very significant impact on their operations. Another 44% expect the pandemic will have somewhat of an impact on their operations.

Healthcare: Overall, how is the COVID-19 pandemic expected to impact the outlook for your operations over the next 12 months? (n=39)



RESPONDENT COMMENTS

Respondents were also provided a space for additional thoughts and comments. Major themes of the comment section include:

- Expressions of frustration the shortage of workers. Much of this is attributed to unemployment insurance benefits which are seen as a disincentive for workers to enter the job market.
- More general statements around the difficult business environment and the importance of training were also common.
- Respondents noted the importance of small businesses and recognized their importance in the local economy.
- Finally, there were instances of thanks, requests for additional information, and requests for assistance in filling jobs.

APPENDIX III: REVIEW OF PREVIOUS WORK

Camoin and Emsi Burning Glass reviewed previously completed studies and data to inform the 2021 Talent Supply and Industry Sector Analysis and Strategic Action Plan. The following were reviewed to inform the project team on what already exists on the talent market in the Lehigh Valley:

- Center for Workforce Information & Analysis data, county profiles, and job reports <https://www.workstats.dli.pa.gov/Pages/default.aspx>
- Development Counsellors International' *A View from Corporate America Winning Strategies in Economic Development Marketing*, 2020
- Garner Economics LLC's Lehigh Valley Economic Development Corporation Employer Survey, 2021
- *Lehigh Valley Education & Talent Supply Report*, 2018
- Lehigh Valley WDA, Occupational Employment 2018-2028 Long-Term Projections
- McKinsey Global Institute's *The Future of work after COVID-19*, 2021
- MDB Insight's *Lehigh Valley Talent Supply and Industry Sector Analysis and Strategic Action Plan*, 2018
- National Governors Association's *State Roadmap for Workforce Recovery*, 2021
- Oxford Economic's *Bridging the Workforce Gap: Lehigh Valley Workforce & Economic Development Strategy*, 2014
- Pennsylvania's PREP and Engage's *COVID-19 Business Analysis*, 2020
- Pennsylvania's State System of Higher Education Foundation's *Prepared4PA Survey Report*, 2020



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