



# Southwest Central Indiana Occupational Needs Assessment Life Sciences Sector Report

April 2017

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## Introduction and Purpose

The purpose of this Occupational Needs Assessment (ONA) report is to highlight the education and workforce needs of the Life Sciences Sector in the greater Southwest Central Indiana (SWCI) region.

There are similarities between life sciences partners in the region, their respective workforce needs, and the characteristics of their employees. Additionally, they all share concerns about the availability and quality of talent both for today and for tomorrow. Working collaboratively as a sector within the region will impact the effectiveness of and capacity for implementing targeted initiatives that cultivate the highly-skilled workforce the sector needs to flourish in SWCI. This report will guide Regional Opportunity Initiatives, Inc. (ROI) in the implementation of education and workforce initiatives in the SWCI region. It is our hope that it will also serve to support others in our region, and beyond, in tailoring initiatives to meet the specific needs of the students, families, educators and employers who call Southwest Central Indiana home.

This report represents the results of data collected from two sources: quantitative analyses completed by Thomas P. Miller and Associates (TPMA) and a qualitative analysis conducted by ROI staff that entailed semi-structured interviews with life sciences leaders focusing on workforce needs. The information in this report is not a broad labor statistic survey. Rather, it is a first step in developing targeted strategies specific to the needs of employers in our 11-county region.

## Life Sciences: A Thriving Sector in SWCI

The Life Sciences Sector is thriving in Indiana. The state is a national leader in life sciences sector employment with a significant concentration of activity in the greater Bloomington area. The 2016 bi-annual report from Biotechnology Industry Organization (BIO) and TEconomy identified Bloomington as the number one small Metropolitan Statistical Area (MSA) in the Medical Devices and Equipment category in the country for specialized employment concentration. Drugs and Pharmaceuticals employment is ranked 4th in the country and the Bioscience-Related Distribution subsector ranks 10th. The sector is strong and continues to grow in our state and region.

The Life Sciences Sector represents a significant specialization for the SWCI region. Surgical and Medical Instrument Manufacturing comprises 74% of the sector, and Pharmaceutical Preparation Manufacturing accounts for 24%<sup>1</sup>. Employment within the sector has seen growth over the past five years.

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<sup>1</sup> The industry designations used throughout this report align with the National American Industry Classification System.

Twenty-one establishments constitute the Life Sciences Sector across the region. The companies include large, mid, and small employers specializing in everything from surgical and medical device manufacturing to research and development firms specializing in biotechnology. Ninety-eight percent of those establishments are located in Monroe and Owen Counties, as seen in Figure 1. Commuting is a way of life for millions of people in America, and the residents of SWCI are no different. Commuting patterns indicate that employers travel from many surrounding counties to support life sciences employers in these two counties. Thanks to transportation advancements like I-69, residents in the Southwest Central Indiana region can take advantage of the employment opportunities available for highly skilled, high-paying jobs while living in communities throughout the region. The high concentration of life sciences companies in the region is an opportunity for job-seekers who might otherwise have to travel to larger employment centers.

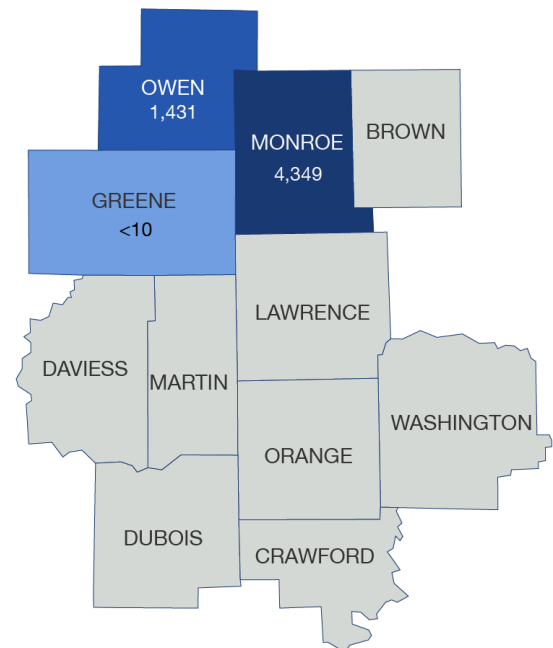


Figure 1: Density of Life Sciences Jobs in SWCI (not including medical laboratories)

The relevance of the employment concentration of life sciences establishments in the SWCI region is best articulated using location quotients. A location quotient is a ratio that compares a region, sector, occupation, or demographic group to other communities across the nation. When measuring industry concentration, a location quotient of greater than 1 indicates a larger share of area employment than other industries in the nation. Surgical and Medical Instrument Manufacturing significantly outpaces most communities across the country with a high location quotient of 32.60. Pharmaceutical Preparation Manufacturing also exceeds the norm with a quotient of 6.18.

The 2016 BIO/TEconomy report detailed location quotients in the Medical Devices and Equipment subsector using Metropolitan Statistical Areas across the country. Bloomington, IN had the highest at 25.16 followed by: Flagstaff, AZ (17.94), Niles-Benton Harbor, MI (13.59), Glens Falls, NY (12.73), Sumter, SC (7.83), Kalamazoo-Portage, MI (7.78) and Boulder, CO (7.33). These data points highlight a unique competitive advantage that the SWCI region can and should capitalize upon.

## Life Sciences Workforce Needs in SWCI

Life sciences jobs in the SWCI region primarily derive from the surgical and medical instrument manufacturing and pharmaceutical preparation manufacturing subsectors. Products manufactured in these subsectors include devices designed for a broad range of medical uses. They include arterial stents, kidney stone retrieval devices, balloon catheters, central venous catheters, research and contract manufacturing for pharmaceuticals. From conception, design, and approval to manufacturing and marketing, these industries account for 5,874 jobs at facilities across the sector. Medical laboratories, while shown in Figure 2, are typically plasma

centers and blood withdrawal locations, and were not a focus of analysis in the Occupational Needs Assessment

It should be noted that the employment statistics provided do not include secondary jobs or indirect employment that can be attributed to a healthy Life Sciences Sector. Secondary employment includes suppliers, service providers, and government jobs required to support an employer and its workforce. When included, the impact of the sector is even more significant.



Figure 2: Distribution of Life Sciences Jobs by Subsector in SWCI

### Jobs Difficult to Fill in SWCI Life Sciences Sector

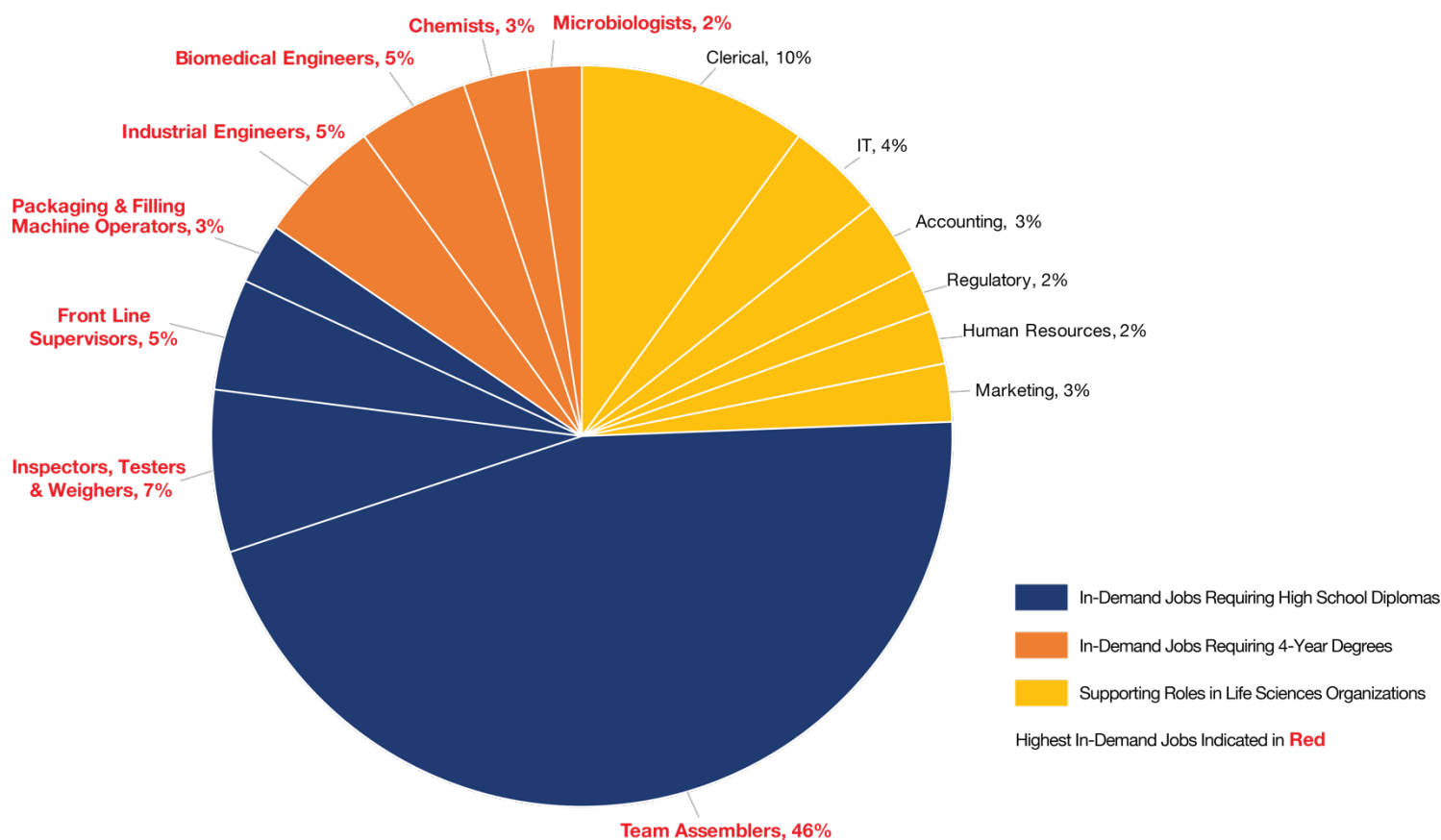
Of the more than 5,800 jobs within the Life Sciences Sector in SWCI, the largest percentage are in the production category. Of those production jobs, most are entry-level positions. Figure 3 outlines the key occupations in the Life Sciences Sector in the SWCI region with those jobs in greatest demand marked in red.

Team assemblers represent the greatest hiring challenge for SWCI life sciences employers. The Occupational Information Network (O\*NET) describes this entry-level role:

*“As the name implies, team assemblers share responsibility for assembling an entire product or component of a product with a production team. Team assemblers can perform all tasks conducted by the team in the assembly process and rotate through all or most of them rather than being assigned to a specific task on a permanent basis.”*

Beyond team assemblers, many types of jobs make up the Life Sciences Sector and the required prerequisite for education ranges significantly with engineering and scientific roles requiring a minimum of a bachelor’s degree. As seen in Figure 3, however, over 60% of the in-demand jobs in the sector require only a high school diploma and the ability to pass a drug test. This presents both a challenge and an opportunity for the region. On the one hand,

Figure 3: Percentage of In-Demand Life Sciences Jobs in SWCI



employers have indicated that it is tough to fill the positions that require only a high school diploma because candidates lack certain soft skills. This has led many employers to lament that the pool of available entry-level talent is dry across the region. On the other hand, there are many displaced or under-credentialed adults across the region that need an opportunity to re-enter the world of work. While the wages are lower for many of these entry-level positions, many employers offer compelling work incentives to expand employees' skill-sets and provide pathways for growth-oriented careers and wage increases. A great example of this in practice is the recently announced *My Cook Pathway* partnership between Cook Medical, Ivy Tech Community College - Bloomington, and Broadview Learning Center's adult education programming.

*Approximately 700 jobs will become available each year over the next 5 years.*



Life Sciences Sector employers invest in their workforce by offering opportunities for training and advancement. Once an employee is hired into an entry-level position there are many paths for advancement to higher-paying jobs if performance is proven. Tuition reimbursement and in-house training opportunities are available through many of the employers. Additionally, multiple life sciences employers in the sector are partnering with entities like Ivy Tech and Vincennes University to grow their own talent pools. These programs offer employers the opportunity to tailor programs for upskilling the existing workforce through certificate and high school equivalency programs that allow employees to work while obtaining a credential or degree.

The Life Sciences Sector seems poised for continued growth. Taking into consideration the current environment, past performance, and hiring strategies of sector employers, it is estimated that approximately 700 jobs will become available each year over the next 5 years. This projection is based upon anticipated attrition and growth.

Employers report both the capacity and desire for more significant growth *in the region*. One limiting factor to achieving this growth is the quality and quantity of available workforce to fill key positions.

## Life Sciences Sector Wages

Wages in the Life Sciences Sector generally exceed those found in other private sector jobs. The former governor of Indiana, Mike Pence, reported in 2014 that “Indiana is second in the nation, behind California, in exports of life sciences products at a value of more than \$9.7 billion. The average job in Indiana’s medical device companies pays 56 percent more than the average wage in Indiana.”<sup>2</sup> Average annual earnings (including wages, salaries, profits, benefits, and other compensation) in the Life Sciences Sector is calculated to be **\$74,914**.

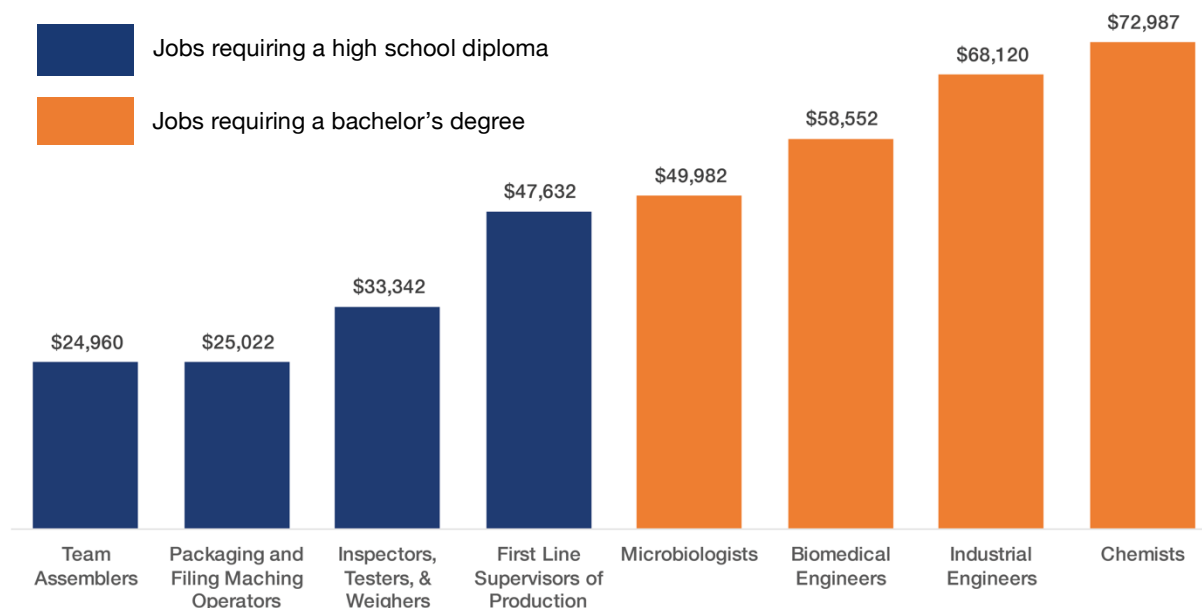


Figure 4: Median Annual Earnings among In-Demand Life Sciences Jobs in SWCI (not including profits, benefits, or other compensation)

<sup>2</sup> Source: “Medical Device Tax Hampers Innovation” Fort Wayne Journal Gazette, January 10, 2017

Looking specifically at several job classifications in high demand, the median hourly rate for a biomedical engineer in Indiana, which requires a bachelor's degree, is \$28.15, the equivalent of \$58,552 per year. Typical wages for positions requiring a high school diploma are much lower. Team assemblers earn on average \$12.00 per hour, which is equivalent to \$24,960 per year, irrelevant of length of employment.

### Knowledge, Skills, and Abilities of Life Sciences Occupations

The need for highly-skilled and specialized workers in the life sciences industry will continue and likely grow. Increasingly, employers are finding applicants with some or all the technical knowledge needed but lacking the necessary soft skills. While these competencies are alternately termed soft skills, work ethic and employability skills, the ideas behind each are often similar and include self-management skills, social and communication abilities, language skills, personal habits, cognitive or emotional empathy, time management, teamwork and leadership traits.

An analysis of Knowledge, Skills and Abilities (KSAs) required for employment in the top life sciences related occupations was a component of the ONA. The word cloud in Figure 5 includes each of the KSAs needed to be successful in top life sciences occupations. Those most frequently required appear in the largest font.



Figure 5: Knowledge, Skills, and Abilities Needed to Be Successful in Top Life Sciences Occupations



The top skills needed in life sciences occupations include:

- Oral comprehension
- Oral expression
- Mathematics
- Engineering & technology
- Production & processing
- Critical thinking
- Reading comprehension

The inclusion of oral comprehension and oral expression as needed skills speaks to the critical need for strong communication skills in the Life Sciences Sector. Surprisingly, oral communication skills are more frequently required than mastery of the written expression skill sets. This may be a result of the team oriented nature of the work as evidenced by the description of the role played by team assemblers earlier in this report. In fact, the Coalition of State Bioscience Institutes (CSBI) annual report identified communication as the most important soft skill for employees. The need to communicate well across disciplines in a fast-paced, global environment is important.

Life sciences is a highly-regulated sector. Strident oversight from the Federal Drug Administration (FDA) and other countries regulatory agencies, results in frequently changing policies and procedures. Therefore, the ability to adapt to change is critical for employees working in the sector. Every position within these companies, from production and operations to research and development, requires employees to be cognizant of how the procedures and policies in place affect their roles. For instance, engineers coming out of college may expect to spend much of their time on the design of products or machines, but in a highly-regulated environment, a good portion of time may be devoted to making sure regulations and proper procedures are being followed.

The ideal life sciences employee will come to a new job equipped with well-developed soft skills, including communication and adaptability. On the other hand, technical training for entry-level jobs in the life sciences industry is typically handled by the employer. This training often involves introducing the employees to the reality of working in a regulated facility and/or a sterile (or aseptic) environment. For instance, a production worker may need to dress in a special suit over their clothes when handling materials, or a production worker may need to wear a hair net and face mask when assembling a medical device.

*The Indiana Department of Workforce Development specifies five elements of employability skills: mindsets, self-management skills, learning strategies, social skills, and workplace skills.*

A career in the Life Sciences Sector is within reach for many across Southwest Central Indiana. For individuals who can communicate effectively, think critically, solve problems, and thrive in a highly-regulated environment, a career in the life sciences industry can be an attractive path toward an engaging and rewarding lifetime of work. In addition, many employers do not require a great deal of pre-developed knowledge regarding the industry prior to employment. If an individual wishes to expedite their employment, or attain a more specialized position within the field, strategic educational decisions can help.

## Life Sciences Education Opportunities

There are 27 public school districts in the SWCI region. Students coming out of many of those K-12 programs are not making their way into positions at life sciences companies in the region. STEM education, critical in all aspects of life sciences employment, is not consistent through the region and, some say, severely lacking in its effectiveness of preparing young people for employment in the sector.

Pathways from high schools into SWCI life sciences workforce are also not appropriately aligned. Annually, there are roughly 200 life sciences openings for candidates with a high school diploma and 3,726 students graduating from high school in the region. Yet, our life sciences employers are finding it hard to fill entry-level positions. Discerning how to better prepare students for employment and match students with employment opportunities in the sector is a challenge in SWCI.

Programs available, such as Interdisciplinary Cooperative Education (ICE), Jobs for America's Graduates (JAG), and Project Lead the Way (PLTW), provide a head start toward a path to employment or post-secondary education following high school. However, not enough students are participating in or completing these programs and advancing into life sciences careers. Often the curriculum is not well aligned with the knowledge and skills necessary for employment. For instance, Project Lead the Way (PLTW) Biomedical Sciences pathway has the potential to prepare students for education and careers in life sciences, but employers indicate that the curriculum is not specifically aligned to the direct needs of local jobs. Furthermore, very few school districts in the region offer PLTW Biomedical as a pathway. In those schools that do, few students persist to complete the entire sequence of courses.

In the past, there have been students in the region enrolled in a full biotechnology pathway. As of 2015, however, no students in the region had fulfilled the requirements to be considered a concentrator in biotechnology. However, the expansion of a biotechnology sequence of high school dual credit courses developed by Ivy Tech – Bloomington is showing promise. Multiple districts are participating in this initiative, which has the potential for creating a pipeline of ready students for



Engineering  
37



Biomedical  
11



Biotechnology  
0

*Figure 6: Number of High School Students Completing Pathways in 2015-2016*

either entry into the workforce or a postsecondary pathway.

The 2016 Indiana Life Work Study report by TEconomy looked at higher education outcomes in the state. “While we retain more than half of all health profession graduates (60 percent in-state; 10 percent out-of-state), our retention rates for engineering, biological science, and computer and information sciences graduates are all significantly lower with only 33-49 percent of in-state student graduates and only 5-6 percent of out-of-state student graduates working in Indiana.” The same report tells us that while Indiana University ranks 3rd among all states in the number of undergraduate out-of-state students, many of them are leaving the state for other opportunities.

### **Credentials Needed for In-Demand Life Sciences Jobs**

As has been stated previously (Figure 3) several key positions in the sector do not require a post-secondary degree. However, there is also demand for employees with a bachelor’s degree or higher. While some of those degrees are offered locally, employers need to recruit from outside the region to meet the need for highly technical positions such as engineering. Employers indicated that to find qualified talent for engineering positions, they must typically look to Rose-Hulman University, Purdue University, University of Louisville, and even Georgia Tech — all outside of the SWCI region. Indiana University in Bloomington has established an Intelligent Systems Engineering degree program, which will include bioengineering pathways. This program launched officially in the fall of 2016 for both bachelor’s and doctorate programs. While early, local employers are optimistic about this program and are working with the university to encourage alignment with regional employment needs.

During our interviews, employers expressed a need for training and certification programs in:

- Aseptic Manufacturing
- Good Manufacturing Practices (GMP)
- Regulatory Affairs

Numerous employers mentioned the challenges associated with familiarizing employees at all levels with the complexities of working in a highly-regulated environment, i.e., following written procedures, documents, work, etc.

Ivy Tech - Bloomington offers several life sciences programs and frequently partners with

*Good Manufacturing Practices (GMP) and Good Clinical Practices (GCP) are specific guidelines that employees, in many of the organizations, will be asked to follow. Training for these guidelines can result in a certificate that is transferable to any company in the country who works under those same regulations.*

regional life sciences companies to host trainings in lab facilities at the Indiana Life Sciences Institute. Local companies have donated equipment for use in Institute labs, which are frequently used. However, one of the challenges identified is the lack of students entering and completing degree programs for the sector. To meet the true needs of employers, education and industry need to be better aligned. High school programs, post-secondary certifications, and degrees will need to be adjusted to better meet demand. With accurate information, schools will be able to counsel students on available pathways in the SWCI region that can lead to a livable wage and fulfilling work.

## Highlights from Interviews with SWCI Life Sciences Employers

Sector specialists for ROI conducted interviews with employers in the region. The Life Sciences Sector interviews included representatives from all the subsectors represented in this region. Questions were asked about the realities of running a business in the SWCI region. A synopsis of responses is provided in the following sections.

### Location Strengths and Challenges

The Life Sciences Sector in our region is diverse. The landscape is dominated by several larger companies that employ more than 500 employees each. However, the region is ripe for entrepreneurs in the life sciences arena.

SWCI has a healthy mix of privately-held companies and a few publicly-traded organizations which enhance the quality of industry diversity in the sector. Many of the smaller companies benefit from connections with the larger, more established companies in SWCI. Forming a regionally aligned, industry-driven Life Sciences Sector partnership will only strengthen those connections.

Employers were asked to share their thoughts on how a location in SWCI impacts their ability to do business. In general, employers perceive SWCI as providing a supportive environment for life sciences companies.

- The fact that there is a concentration of similar companies in the region is identified as a strength from an industry support perspective.
- The high concentration of companies can also prove to be a pain point because of the competition for qualified employees.
- SWCI is a difficult place to attract and retain talent. Even with a strong presence of life sciences companies, employees are compelled to move to another part of the state or country, often to other life sciences companies, because the quality of place is lacking for young professionals in our region. However, employees often move back to the region and into the workforce once they begin to raise families.

| Location Strengths  | Location Challenges   |
|---|---|
| <p>“ Positive and competitive life sciences environment”</p> <p>“ Stability of direct labor for light industrial workers – high percentage of female employees working in fine motor skilled areas”</p> <p>“ The large life sciences companies provide employment for individuals in many of their surrounding counties and offer growth and security for employees and their families”</p> | <p>“ Almost impossible to hire. Each of the large companies pull employees from one another and we have to hire from outside the region”</p> <p>“ We struggle to find the right skill set and knowledge for work in a regulated environment”</p> <p>“ Location plays a major role in whether employees stay or leave”</p> |

Figure 7: Excerpts from Employer Interviews Addressing Regional Location Strengths & Challenges

## Workforce Strengths and Challenges

Employers were asked to describe workforce strengths and pain points, attraction and retention tools, how competitive they view the market, and what their future workforce needs might be.

Because there are several life sciences companies in SWCI, employees transfer from one company to another bringing a certain level of experience with them. These transfers tend to be hardworking and technically proficient employees.

Employer interviews identified common workforce strengths across the sector including:

- Loyalty,
- Strong work ethic,
- Dedication, and
- Passion for their craft.

***“We have a dedicated workforce that is passionate about the products they manufacture.”***

Challenges identified by employers include a lack of common soft skills and work ethic skills including:

- Communication,
- Dependability,
- Adaptability, and
- Self-motivation.

Employees suggested that soft skill and work ethic training should be woven into the curriculum of K-12 schools and career centers.

When asked about workforce pain points, employers reported the following:

- Attendance issues often lead to termination,
- Inability of employees in adapting to the complexity of the work and/or regulations,
- Competition for workforce results in employee job-hopping and wage pressure,
- An aging workforce will need to be replaced in the coming years,
- Lack of leadership skills is evident; and
- Limited opportunities for advancement cause employees to go elsewhere.

### **Views on Engagement Between Education and Industry**

The level of engagement between industry and educators in the region is very situational with the quality and frequency varying from company to company. All the larger companies have interactions with post-secondary institutions for internship and co-op opportunities. For smaller organizations, it is difficult to have staff devoted to developing relationships with post-secondary institutions, but their workforce needs are significant and they would derive benefit from a closer association. Employers expressed a desire to work more closely with regional post-secondary institutions regarding certificate programs and career pathways.

Regarding K-12, most employers mentioned a need for STEM related education to be a greater focus in SWCI schools, with the suggestion to start that exposure early. There was strong interest for increasing opportunities for industry interaction with students through field trips, career fairs and a speaker series. Life sciences employers expressed an interest in providing more information about careers at a much earlier age.

Employers are looking to K-12 schools to provide employability and basic technical skills for employees coming directly into the workforce. For example, strong math and critical thinking skills are necessary for most entry-level positions. In addition, employers need a workforce

***“There are not enough workers in our region. We plan to grow but are concerned about where we will find the necessary workforce to make those growth plans a reality.”***



possessing the ability to collaborate, communicate effectively, problem solve, and adapt to work in regulated environments.

## Future Employer Needs

The Life Sciences Sector in SWCI is robust, secure and continues to grow. The outlook for employees seeking a lifelong career in a fulfilling industry is incredibly promising. There are, and will continue to be, attractive opportunities for individuals to move directly from high school into a job with advancement potential. Employers often offer education benefits to help employees skill up and prepare for increased responsibilities. Employees coming out of a degree or certificate program will find similar opportunities for ongoing education and advancement.

The employers in the sector need to be more creative when considering how to skill-up, attract, and retain employees in the SWCI region. Some local life sciences companies are moving toward Lean Manufacturing practices which require employees to be creative problem-solvers in helping the organization eliminate waste from their processes. Additionally, to continue to grow, one large employer mentioned needing a creative and innovative team that can look for the next new or related products to add to the pipeline.

When asked what educators and the community could do to support the Life Sciences Sector, employers shared these common strategies:

|                  |  |
|------------------|--|
| <b>EDUCATION</b> | <ul style="list-style-type: none"><li>● Offer more STEM opportunities to students at an earlier age, such as elementary and middle school.</li><li>● Prepare entry-level workers for detailed, highly-regulated and technical assembly jobs.</li><li>● Facilitate partnerships between schools and industry. Help to make the connections.</li><li>● Train students in work ethic and employability skills so they are prepared to begin training on job function as soon as they onboard.</li></ul> |
| <b>COMMUNITY</b> | <ul style="list-style-type: none"><li>● Bring awareness to the community about the life sciences sector.</li><li>● Assist in helping employers network within the sector and community to find the resources needed to grow.</li><li>● Help prospective employees understand the benefits of living in the region.</li></ul>   |

Figure 8: Strategies Employers Identified to Support the Life Sciences Sector in SWCI

## Conclusion

# ALIGNED SWCI **READY** SCHOOLS. COMMUNITIES. EMPLOYERS.

The information compiled in this report reflects the need for an industry-driven approach to creating a local, sustainable workforce. SWCI is uniquely positioned to maintain and grow its position as a national leader in the Life Sciences Sector. The concentration of companies seen in SWCI is rare. The life sciences products that are being created locally by residents of SWCI are changing and saving lives around the globe. Sector employees report being very proud and passionate about their jobs and understand the importance of their work. Creating better-aligned educational pathways into the workforce with prepared and passionate employees will be important to sustaining the pride and economic benefit the Life Sciences Sector brings to our region.

Working together – industry, education, and community – we can prepare SWCI for outcomes that heretofore have not been achieved or achievable. An aligned Southwest Central Indiana can ensure the prosperity this region's assets tell us is possible.

## Appendix

### Quantitative Data Collection

The quantitative data was collected by TPMA. It examines industries, occupations, and real-time job postings in the Life Sciences Sector in Southwest Central Indiana. The purpose of the quantitative analysis is to augment the qualitative data obtained through the employer interviews and to provide a foundation for discussion of occupation and skill needs in the region. To collect this data, TPMA used the North American Industry Classification System (NAICS) and the Standard Occupation Classification (SOC) systems, both of which are standard data collection systems used by all statistical gathering agencies of the federal government. NAICS is used by federal statistical agencies to classify business establishments for collecting, analyzing, and publishing data related to U.S. businesses. Similarly, the SOC system is used by federal agencies to classify workers into occupational categories for the purposes of collecting, calculating, and disseminating data.

The industries in the Life Sciences Cluster were taken from NAICS codes identified in *Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana*, which was completed by Batelle's Technology Partnership Practice in June 2014. Three industries did not have any jobs located in the region and therefore were not included in this report. The industries were Biological Product (except Diagnostic) Manufacturing (325414), Dental Equipment and Supplies Manufacturing (339114), and Medicinal and Botanical Manufacturing (325411).

Except where otherwise indicated, TPMA used EMSI Analyst, data version 2016.2, to gather information on education outcomes and occupation openings in Southwest Central Indiana. EMSI uses data from the national Integrated Postsecondary Education Data System (IPEDS) database, which is published by the U.S. Department of Education's National Center for Education Statistics. IPEDS organizes this data into a taxonomy called the Classification of Instructional Programs (CIP) system. EMSI 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. There are limitations to the IPEDS data. For one, the most recent completion data available is 2015. Additionally, the National Center for Education Statistics collects data from postsecondary education institutions. Thus, the data and this analysis do not account for training programs provided by non-postsecondary education institutions. Further, in recent years Ivy Tech has moved away from reporting regional campus-level data to IPEDS and only reports data for the system statewide.

### Qualitative Data Collection

Twenty-one organizations from the Life Sciences Sector were invited to participate in the qualitative component of the ONA. The selected organizations were chosen based on size, county location, and industry type. The goal of the selection process was to ensure a balance among participating organizations reflective of the composition of the life sciences employers in the region. The final participant count included 12 organizations and 17 leaders in those organizations. These life sciences companies ranged from 2 -53 years old. Following is the breakdown of how long the organizations have been established:

- 42% have been established 20 years or longer
- 16% have been established 10-19 years
- 42% have been established less than 10 years

Most of the organizations were local to the region

- 75% of the businesses were locally headquartered
- 25% were headquartered outside of the region

The number of employees for the participating organizations ranged from 1-2400 employees.

The breakdown is as follows:

- 50% had 1-99 employees
- 0% had 100-249
- 17% had 250-499 employees
- 33% had 500+ employees

### **A Note on KSAs**

Knowledge, skills, and abilities are used to measure qualities that will set one candidate apart from another. Per the U.S Office of Personnel Management, knowledge is a body of information applied directly to the performance of a function. Skill is an observable competence to perform a learned psychomotor activity. Ability is the power to perform an observable activity. KSAs are sometimes referred to as competencies.

## KSA for Key Occupations in Life Sciences Per SOC Codes

Key occupations are among the top ten most prevalent occupations in terms of number of jobs within the sector. This is not a comprehensive list of all the jobs in the sector, only those that appear most frequently in job postings.

### ***Team Assemblers***

| Occupation Description   | Sample Job Titles  | Entry Level Education and Median Hourly Earnings  |
|--|--|---|
| Work as part of a team having responsibility for assembling an entire product or component of a product. Team assemblers can perform all tasks conducted by the team in the assembly process and rotate through all or most of them rather than being assigned to a specific task on a permanent basis. May participate in making management decisions affecting the work. Includes team leaders who work as part of the team. | Assembler, Assembly Associate, Assembly Line Machine Operator, Assembly Line Worker, Assembly Operator, Certified Composites Technician (CCT), Fabricator, Machine Operator, Operator Technician, Production Associate | HS Diploma<br><br>\$12.00/hour  |
| Top Knowledge Required   | Top Abilities Required   | Top Skills Required   |
| Production and Processing<br>Education and Training<br>English Language<br>Engineering and Technology<br>Mathematics   | Coordination<br>Speaking<br>Critical Thinking<br>Monitoring<br>Writing   | Oral Comprehension<br>Multi-limb Coordination<br>Information Ordering<br>Oral Expression<br>Control Precision |

### ***Inspectors, Testers, Sorters, Samplers, and Weighers***

| Occupation Description  | Sample Job Titles   | Entry Level Education and Median Hourly Earnings   |
|---|---|--|
| Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment. | Inspector, Picker / Packer, Quality Assurance Auditor, Quality Assurance Inspector, Quality Assurance Technician, Quality Auditor, Quality Control Inspector, Quality Control Technician, Quality Inspector, Quality Technician | HS Diploma<br><br>\$16.03/hour   |
| Top Knowledge Required  | Top Abilities Required  | Top Skills Required  |
| Production and Processing<br>Mathematics<br>English Language<br>Education and Training<br>Computers and Electronics   | Critical Thinking<br>Reading Comprehension<br>Operation Monitoring<br>Monitoring<br>Active Listening  | Oral Comprehension<br>Oral Expression<br>Near Vision<br>Written Comprehension<br>Deductive Reasoning |

***Industrial Engineers***

| <b>Occupation Description</b>   | <b>Sample Job Titles</b>   | <b>Entry Level Education and Median Hourly Earnings</b>   |
|---|--|---|
| Design, develop, test, and evaluate integrated systems for managing industrial production processes, including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination. | Engineer, Engineering Manager, Industrial Engineer, Manufacturing Specialist, Operations Engineer, Plant Engineer, Process Engineer, Production Engineer, Supply Chain Engineer, Tool Engineer | Bachelor's Degree<br><br>\$32.75  |
| <b>Top Knowledge Required</b>   | <b>Top Abilities Required</b>  | <b>Top Skills Required</b>  |
| Engineering and Technology<br>Production and Processing<br>Mechanical<br>Design<br>Mathematics  | Reading Comprehension<br>Critical Thinking<br>Monitoring<br>Complex Problem Solving<br>Writing   | Written Expression<br>Oral Expression<br>Written Comprehension<br>Oral Comprehension<br>Problem Sensitivity |

***First-Line Supervisors of Production and Operating Workers***

| <b>Occupation Description</b>  | <b>Sample Job Titles</b>  | <b>Entry Level Education and Median Hourly Earnings</b>   |
|--|---|---|
| Directly supervise and coordinate the activities of production and operating workers, such as inspectors, precision workers, machine setters and operators, assemblers, fabricators, and plant and system operators. | Assembly Supervisor, Department Manager, Manufacturing Supervisor, Molding Supervisor, Plant Manager, Production Manager, Production Supervisor, Shift Supervisor, Supervisor | HS Diploma<br><br>\$22.90/hour  |
| <b>Top Knowledge Required</b>  | <b>Top Abilities Required</b>   | <b>Top Skills Required</b>  |
| Mechanical<br>Production and Processing<br>Engineering and Technology<br>Administration and Management<br>Computers and Electronics  | Speaking<br>Management of Personnel Resources<br>Coordination<br>Critical Thinking<br>Speaking  | Oral Expression<br>Deductive Reasoning<br>Oral Comprehension<br>Written Expression<br>Written Comprehension |



**Biomedical Engineers**

| Occupation Description  | Sample Job Titles  | Entry Level Education and Median Hourly Earnings   |
|---|--|--|
| Apply knowledge of engineering, biology, and biomechanical principles to the design, development, and evaluation of biological and health systems and products, such as artificial organs, prostheses, instrumentation, medical information systems, and health management and care delivery systems. | Biomedical Electronics Technician, Biomedical Engineer, Biomedical Engineering Director, Biomedical Engineering Technician, Biomedical Equipment Technician (BMET), Biomedical Manager, Biomedical Technician, Clinical Engineer, Professor, Research Engineer | Bachelor's Degree<br><br>\$28.15/hour  |
| Top Knowledge Required  | Top Abilities Required   | Top Skills Required  |
| Engineering and Technology<br>Biology<br>Mathematics<br>Design<br>Computers and Electronics   | Reading Comprehension<br>Science<br>Mathematics<br>Active Learning<br>Critical Thinking  | Deductive Reasoning<br>Oral Comprehension<br>Written Comprehension<br>Problem Sensitivity<br>Oral Expression |

**Packaging and Filling Machine Operators and Tenders**

| Occupation Description  | Sample Job Titles  | Entry Level Education and Median Hourly Earnings   |
|---|--|--|
| Operate or tend machines to prepare industrial or consumer products for storage or shipment. Includes cannery workers who pack food products. | A-Operator, Adjuster/Packer, Bundler, Chemical Operator, Closing Machine Operator, Fabrication Technician, Filler Operator, Machine Operator, Packaging Operator, Packing Machine Operator | H.S. Diploma<br><br>\$12.03/hour   |
| Top Knowledge Required  | Top Abilities Required   | Top Skills Required  |
| Production and Processing<br>Mechanical<br>Mathematics<br>English Language<br>Customer and Personal Service                                   | Operation Monitoring<br>Operation and Control<br>Coordination<br>Reading Comprehension<br>Monitoring   | Control Precision<br>Finger Dexterity<br>Manual Dexterity<br>Near Vision<br>Auditory Attention |

### ***Microbiologists***

| <b>Occupation Description</b>   | <b>Sample Job Titles</b>   | <b>Entry Level Education and Median Hourly Earnings</b>  |
|---|--|--|
| Investigate the growth, structure, development, and other characteristics of microscopic organisms, such as bacteria, algae, or fungi. Includes medical microbiologists who study the relationship between organisms and disease or the effects of antibiotics on microorganisms. | Bacteriologist, Clinical Laboratory Scientist, Clinical Microbiologist, Microbiological Analyst, Microbiological Laboratory Technician, Microbiologist, Microbiology Laboratory Manager, Professor of Microbiology, Quality Control Microbiologist (QC Microbiologist), Study Director | Bachelor's Degree<br><br>\$24.03/hour  |
| <b>Top Knowledge Required</b>   | <b>Top Abilities Required</b>  | <b>Top Skills Required</b>   |
| Biology<br>English Language<br>Chemistry<br>Education and Training<br>Mathematics   | Reading Comprehension<br>Active Learning<br>Science<br>Writing<br>Critical Thinking  | Inductive Reasoning<br>Problem Sensitivity<br>Oral Comprehension<br>Near Vision<br>Oral Expression |

### ***Chemists***

| <b>Occupation Description</b>   | <b>Sample Job Titles</b>   | <b>Entry Level Education and Median Hourly Earnings</b>   |
|---|--|---|
| Conduct qualitative and quantitative chemical analyses or experiments in laboratories for quality or process control or to develop new products or knowledge. | Air Quality Chemist, Analytical Chemist, Chemical Laboratory Scientist, Chemist, Forensic Chemist, Forensic Scientist, Quality Control Chemist (QC Chemist), Research Chemist, Scientist | Bachelor's Degree<br><br>\$35.09/hour   |
| <b>Top Knowledge Required</b>   | <b>Top Abilities Required</b>  | <b>Top Skills Required</b>  |
| Chemistry<br>Mathematics<br>Engineering and Technology<br>Production and Processing<br>Education and Training   | Science<br>Reading Comprehension<br>Writing<br>Mathematics<br>Active Listening   | Oral Comprehension<br>Oral Expression<br>Written Comprehension<br>Deductive Reasoning<br>Written Expression |



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