ESSENTIAL:

THE IMPACT OF THE HEALTHCARE AND LIFE SCIENCES SECTOR IN INDIANA

April 2022

Produced for: BioCrossroads Produced by: TEConomy Partners, LLC.

TECONOMY PARTNERS LLC



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Prologue

In Indiana, we see the benefits of having a strong healthcare and life sciences sector every day. It accounts for one in every ten jobs in the state, provides an annual economic impact of \$150 billion, and is present in the substantial assets spanning the corporate, university and philanthropic sectors. This sector did not grow up overnight and is not limited to the central part of the state where you will find national and global leaders in pharmaceuticals (Eli Lilly and Co), diagnostics (Roche Diagnostics), and agbioscience (Elanco and Corteva). Travel to the northern part of the state and you will find Warsaw, the Orthopedics Capital of the World[®] - a cluster representing 45% of the global orthopedic market for total joint replacements that traces its beginnings back to Revra DePuy in 1895, J. O. Zimmer in 1927 and Dane Miller's Biomet in 1977. To the south, entrepreneurial companies have turned into worldwide leaders in life sciences including Hill-Rom in Batesville, IN growing in 1929 when Bill Hillenbrand had the idea to bring the home into the hospital; the Cook Group in Bloomington, IN founded by Bill Cook in 1963 initially focused on tools for minimally invasive medical devices; and Mead Johnson which has operated a manufacturing plant for Enfamil infant nutrition formula in Evansville, IN for more than 100 years. Throughout the state, our hospital systems ensure access to high-quality healthcare while also contributing to overall economic vitality.

Healthcare and life sciences start with research, but do not end there. Hoosiers working in healthcare and life sciences may be found providing care in hospitals and your doctor's office; working in manufacturing facilities making orthopedic implants, stents, or producing life-saving medicines, such as insulin and cancer treatments; providing general business support as office workers in accounting, administration, or marketing; at construction sites building or refurbishing facilities; or in academic or corporate laboratories. From investments in facilities, equipment, research, talent, and connections through BioCrossroads, Indiana's healthcare and life sciences industry has a substantial collective impact on not just the economic vitality of Indiana, but also the health of its citizens.

In this series of reports, TEConomy Partners, LLC. looks at different parts of our state and details how these investments drive our economy and how they help provide benefits to Indiana's other sectors including manufacturing, technology, and retail. We look at the State of Indiana as well as a more focused look at key economic regions, including Northeast Indiana, South Bend-Elkhart, the Wabash Heartland, Metro Indianapolis, the Indiana Uplands, and Southwest Indiana.

This is an important and timely report. And certainly, it is appropriate here to thank those whose efforts have made it possible: Lilly Endowment Inc. and the Richard M. Fairbanks Foundation, through generous grants to the CICP Foundation on behalf of BioCrossroads, provided the essential funding; the many members of the healthcare and life sciences community, including manufacturing, transportation, and logistics; leaders at our major research universities and government agencies; our consultants at TEConomy Partners, who know both Indiana and the innovation sector well and drew on their substantial expertise to provide a helpful and comprehensive study; as well as our professional teams at BioCrossroads and CICP.

It is said that "What Indiana Makes, Makes Indiana." Hoosiers working in healthcare and life sciences are discovering, making, and delivering treatments and cures to improve the quality of life for those of us in Indiana - and people all over the world - all while driving Indiana's economy. Please join us on this journey to learn more about how the life sciences and healthcare sector make our communities.

Sincerely,

Patricia A. Martin President and CEO, BioCrossroads April 2022



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Introduction

This regional profile presents quantitative analysis of the current position, recent performance, economic impacts, and overall importance of the healthcare and life sciences sector in in Indiana as an economic driver. The assessment spans the industry's three core elements or pillars of healthcare, industrial life sciences, and academic life sciences R&D (Figure 1).

In addition to the economic impacts presented in this regional profile, it is critical to further consider the broader and truly extensive functional impacts—those that cannot easily or readily be measured in dollars and cents or jobs—generated by the healthcare and life sciences sector presented in Figure 2. In pursuing their

Figure 1: Three Core Elements of the Healthcare and Life Sciences Sector



missions to advance health and well-being, healthcare and life sciences organizations and the sector writ large, undertake a wide range of activities and thus generate a broad variety of functional impacts. Ultimately, they can be seen to converge around four primary functional benefit domains:

- Provision of Clinical Healthcare Working to sustain the physical health of populations served.
- Innovation and Economic Development Producing products and services needed and valued by society which in turn generate employment, economic output, exports, and public sector revenues.
- Education and Human Capital Development Advancing basic and applied knowledge and building the know-how and skills necessary within the health and life sciences workforce.
- Societal Well-being and Quality-of-life Securing public health and building equitable, diverse, and resilient communities with robust livability, quality-of-place, and quality-of-life.

Figure 2: The Functional Impacts of the Healthcare and Life Sciences Sector



Regional Healthcare and Life Sciences Industry

SIZE AND STRUCTURE OF THE INDUSTRY

Healthcare and life sciences firms combine to employ more than 380,000 in Indiana. The industrial life sciences segment accounts for nearly 56,000 of these jobs, with significant and varied strengths and concentrations in pharmaceutical and medical device manufacturing, as well as biomedical distribution and commercial R&D that reflects the state's status as a leading national life sciences hub. The state is home to major multi-national employers such as Eli Lilly & Company, Elanco Animal Health, Roche Diagnostics, Labcorp (Covance), and others. These large and varied employers and their smaller counterparts combine to make up an outsized and in fact highly "specialized" concentration of jobs in the state that is 61% more concentrated compared with the national average for the industrial life sciences (location quotient of 1.61).

Healthcare and life sciences act as major drivers of the state economy and high-quality jobs. The sector has seen rapid 9.5% job growth since 2015, well outpacing overall private sector growth of 1.5%. Average wages in the industry are more than \$70,000 annually, well above those for their private sector counterparts.

Healthcare and Life Sciences Subsectors	Indiana Employment
Life Sciences	55,802
Biomedical Manufacturing	42,053
Pharmaceutical Manufacturing	19,044
Medical Instruments, Devices, and Supplies Manufacturing	21,443
Other Key Supporting Industries	1,566
Biomedical Distribution	9,487
Biomedical Research & Development (Industry, NEC)	4,262
Healthcare	324,631
Hospitals	154,199
Physician and Other Health Practitioner Offices	109,965
Medical Testing	6,280
Ambulatory Healthcare Services	34,186
Outpatient Care Centers	20,000
Total	380,433

Table 1: Indiana Healthcare and Life Sciences Industry Employment by Subsector, 2020

Source: TEConomy analysis of 2020 U.S. Bureau of Labor Statistics QCEW Data enhanced by Emsi.

Table 2: Indiana Healthcare and Life Sciences Industry, 2020

LS/HC Major Sector	Establishments, 2020	Employment, 2020	Location Quotient, 2020	Employment Change, 2015-2020	Average Wages, 2020
Healthcare	10,201	324,631	1.05	8.9%	\$63,510
Life Sciences	2,055	55,802	1.61	13.3%	\$111,842
HC/LS Total	12,255	380,433	1.11	9.5%	\$70,599
Total Regional Employment	172,587	3,869,262	1.00	1.5%	\$46,791

Source: TEConomy analysis of 2020 U.S. Bureau of Labor Statistics QCEW Data enhanced by Emsi.

In a production-intensive state, the more than 42,000 industrial life sciences manufacturing jobs in Indiana account for 8% of all state manufacturing jobs (Figure 3).

Figure 3: Indiana Life Sciences Manufacturing Employment Compared to Total Manufacturing, 2020



Indiana's life sciences industry is especially diverse in its strengths—the state is one of just 10 nationally that has a "specialized" employment concentration (a location quotient of 1.20 or greater) in three or more of the five major industry subsectors tracked by TEConomy and BIO. For Indiana its specialized subsectors include drugs and pharmaceuticals, medical device manufacturing, and agricultural feedstock and industrial biosciences.

Source: TEConomy analysis of 2020 U.S. Bureau of Labor Statistics QCEW Data enhanced by Emsi.



COMPARATIVE IMPORTANCE OF THE INDUSTRY

Healthcare and life sciences represent a leading sector in Indiana (Figure 4). When compared against other major industries, the sector is second largest in terms of total statewide jobs.

The strong value-adding nature of healthcare and life sciences, and its value to the state as an outsized economic driver is evident in the sector's contribution to Indiana's GDP (Figure 5). As one of the world's most R&D- and innovation-intensive advanced industries, healthcare and life sciences, including academic life sciences research, punches well above its weight in its contributions to economic growth and state/regional wealth generation. In Indiana, the industry accounts for 9.6% of private sector jobs but contributes to 14.5% of state GDP.





Source: TEConomy analysis of Indiana IMPLAN impact model and Emsi data.



Figure 5: Indiana Healthcare and Life Sciences Gross Regional Product Compared to Other Industries, 2020

Source: TEConomy analysis of Indiana IMPLAN impact model and Emsi data.



Regional Healthcare and Life Sciences Ecosystem

Indiana has a supportive and robust healthcare and life sciences innovation ecosystem across numerous key elements for advancing the industry. Highlights from the statewide ecosystem assessment include:

- In 2020, Indiana's colleges and universities combined to spend \$750.6 million in life sciences-related R&D expenditures.
- Funding from NIH to Indiana institutions, representing the gold standard in biomedical research, has totaled \$1.04 billion over the latest 3-year period.
- Among Indiana colleges and universities, 23% of postsecondary graduates received a degree in a STEM-related field in 2020, contributing not only to healthcare and life sciences industry talent pipelines but also to broader advanced industry workforce and talent needs.
- High-growth potential healthcare and life sciences companies are being funded across the state with 122 companies receiving VC investments of \$918 million in the latest 3-year period, and an additional 33 companies receiving federal SBIR/STTR awards that totaled nearly \$27 million.
- Indiana is a key site for clinical trials with 5,278 active trials utilizing statewide site locations since 2019.

CASE STUDY:

Indiana CTSI

The Indiana Clinical and Translational Sciences Institute (CTSI) is a statewide collaboration of Indiana University, Purdue University, and the University of Notre Dame, as well as public and private partnerships, focused on the translation of scientific discoveries in the lab into clinical trials and new patient treatments in Indiana and elsewhere. The Indiana CTSI is one of 61 such Institutes formed nationally, established through an award from the NIH and supplemented by funding from the state, the three universities, and public and private partnerships.

The CTSI provides a partnering vehicle with the private sector and has brought together the research universities in collaborations with Eli Lilly and Company and Cook Group, as well as healthcare institutions such as Eskenazi Health. Among its partnership efforts is the Strategic Pharma-Academic Research Consortium Funding Program (SPARC), which the Indiana CTSI spearheaded and now leads. The consortium involves three other NIH-funded CTSAs – Ohio State University, Northwestern University, and Washington University – and its industry partners include Eli Lilly and Co. and Takeda Pharmaceuticals International Inc. The first grants from SPARC provided over \$1.9 million to advance research on autoimmune disease at several medical research universities across the Midwest. Another Indiana CTSI public-private partnership effort is with Covance for a Phase I clinical trials unit.

Indiana CTSI reports that, since its founding in 2008, it has assisted more than 7,200 researchers and trained more than 600 future scientists across the state.

Regional Healthcare and Life Sciences Impacts

To estimate the economic importance of the Indiana healthcare and life sciences sector an IMPLAN economic impact model representing the state of Indiana was developed and used for this analysis. The sector's 380,433 healthcare and life science employees (direct effect) and more than \$750 million in related academic research at Indiana's universities are used to drive the various sectors of the model to estimate additional direct, indirect, and induced effects and total impacts. The economic impact model (based upon input-output analysis) estimates the flow of goods and services between sectors and between inputs and final demand (indirect effects). Additionally, the spending of wages within the regional economy by the employees of these sectors are also captured (induced effects). This spending and re-spending of dollars within the economy is described as the "ripple effect" and when combined across all three types of effects provides an estimate of the total impacts. Impact effects are estimated for employment, labor income, value added, output, and tax revenues (federal and state/local estimated separately, see text box for the definitions of each of these).

The results of the full economic impact analysis, shown in Table 3, capture the 383,161 direct healthcare and life sciences jobs (including estimated academic research jobs) within Indiana, and how the spending of the sector's institutions and actors ripple through the broader regional economy. The more than \$56 billion in value added to the state economy, as discussed with Figure 5, appears as the direct effect in Table 3. Combined, the components and subsectors of the healthcare and life sciences sector are estimated to generate direct output of nearly \$99 billion in 2020. Importantly, considering the number of public and non-profit institutions captured within, the sector generates nearly \$1.8 billion in state and local tax revenues annually (including taxes of all types).

Economic Impact Measures

- Employment or the total number of jobs analyzed and estimated; includes the direct jobs captured as part of the healthcare and life sciences sector and indirect/induced jobs generated and supported through purchases and expenditures.
- Labor Income, also known as total compensation, is the total amount of income—including salaries, wages, and benefits (individual and company payments)—received by employees, proprietors, and other supplier and supported workers in the economy.
- Value Added captures the difference between an industry's total output and the cost of its intermediate inputs; sometimes referred to as the industry or sector's "contribution to GDP."
- Output, also known as production, sales, or business volume, is the total value of goods and services produced by the healthcare and life sciences sector in the economy along with the value of goods and services produced throughout the regional economy due to the ripple effects of sector spending. For public/non-profit entities, such as universities and hospitals, expenditures, rather than revenue, are often the truest measure of this economic activity. The total output impacts are often referred to as the total economic impact.
- State/Local and Federal Government Tax Revenues includes the estimated revenues to federal and state/local governments from all sources as a result of the direct, indirect, and induced impacts estimated.

Table 3: Economic Impact of the Indiana Healthcare and Life Sciences Industry, 2020

Impact Type	Employment	Labor Income (\$M)	Value Added (\$M)	Output (\$M)	State & Local Tax Revenues (\$M)	Federal Tax Revenues (\$M)
Direct Effect	383,161	\$33,643.06	\$56,101.77	\$98,678.67	\$1,774.42	\$6,674.32
Indirect Effect	161,632	\$9,169.69	\$13,939.27	\$26,512.10	\$933.24	\$1,777.45
Induced Effect	170,023	\$6,979.44	\$14,155.94	\$24,945.53	\$1,545.87	\$1,561.65
Total Impact	714,816	\$49,792.19	\$84,196.99	\$150,136.30	\$4,253.53	\$10,013.42
Multiplier	1.87	1.48	1.50	1.52		

Source: TEConomy analysis of Indiana IMPLAN impact model.



From a total impact perspective, **the Indiana healthcare and life sciences sector generates and supports more than \$150 billion—every \$1 of direct output generates an additional \$0.52 within the state economy.** This economic impact also generates and supports additional employment in the region. A total of **nearly 715,000 Indiana jobs are supported by the sector** with the non-direct additional employment almost equally split between indirect (supplier) and induced jobs. Every job within the Indiana healthcare and life sciences sector supports 0.87 additional jobs in the state economy.

While these numbers seem impressive at face value, the importance of Indiana's healthcare and life sciences sector to the broader state and many regional economies is more fully appreciated through the metrics in Figure 6. As shown in the figure, the sector supports at least 17% of the state economy across the four major impact metrics.

CASE STUDY:

IU Health

IU Health has the largest network of physicians in Indiana and is a key partner in the education and training of physicians and other health professionals with the IU School of Medicine. Spanning the gamut of medicine from family practice to advanced specialty care practices, IU Health has more than 1,500 board certified/eligible physicians and operates across 200 locations statewide. With \$7 billion in 2020 revenues, IU Health has a significant economic footprint in Indiana, with the majority of its operations located in the Central Indiana region.

IU Health has been significantly expanding and upgrading its facilities and infrastructure in recent years.

IU Health is also working to secure regional healthcare resiliency across Indiana by developing several small hospitals and niche "critical access hospitals" in key strategic locations across the state. Examples include the \$30 million investment by IU Health in a small hospital in Frankfort, Indiana, and expansion of capabilities and facilitates at Ball Memorial in Muncie. Between three and five critical access hospitals are planned – forming important points in a hub and spoke model, where significant local care can be delivered with more serious or complex cases transferred to the central IU Health core in Indianapolis.

IU Health – By the Numbers

- >30,000 personnel
- >1,500 physicians
- 1,174 residents and fellows
- 2,708 beds
- 118,019 admissions
- 110,445 surgery cases
- 1,569 research studies



Figure 6: Indiana Healthcare and Life Sciences Impacts Share of Regional Economy, 2020

Source: TEConomy analysis of Indiana IMPLAN impact model.



Major Capital Projects: Investments and Impacts

Maintaining and operating a world class health and life sciences ecosystem requires building, maintaining, expanding, and upgrading a large base of physical infrastructure and capital equipment. In reviewing major investments made in recent years within the state of Indiana it is readily evident that industry, healthcare systems, and universities have been making a significant commitment to enhancing and expanding operations. Recent major projects announced and underway by the end of 2020 are shown below.

These projects comprise more than 4.0 million square feet of construction with a total investment of more than \$5.5 billion. These investments add to the health and life sciences capacities and capabilities in the state, while also generating significant economic impacts through the development and construction activities. These investments supported nearly 11,000 jobs in 2020.

Organization/Project	\$ Investment	Completion Year
Eli Lilly and Company, Lilly Technology Center expansion/enhancement	\$400 million	2022
Community Hospital Network, East Campus Redevelopment	\$175 million	2020
IU Health, Riley Hospital for Children-Maternity and Newborn Health	\$142 million	2020
Franciscan Health, Orthopedic Center of Excellence (Carmel)	\$123 million	2022
Lutheran Health Network, Lutheran Downtown (Fort Wayne) Hospital	\$118 million	2021
Purdue University, Brunner Purdue Veterinary Medical Hospital Complex	\$108 million	2022
Butler University, science complex additions and enhancements	\$100 million	2022
Elanco Animal Health, new Corporate Headquarters	\$100 million	2023
Goshen Health Systems, new, four-story patient tower	\$80 million	2022
IU Health, West Hospital expansion	\$80 million	2020
Catalent Biologics, new developments at two sites	\$50 million	2021
Baxter BioPharma Solutions, expansion of sterile fill/finish facilities	\$50 million	2022
TOTALS FOR ABOVE PROJECT EXAMPLES	\$589 million	

Major Indiana Healthcare and Life Science-Related Capital Projects

Source: TEConomy Partners analysis of data developed and provided by BioCrossroads and additional web research.

Conclusion

This statewide profile readily demonstrates that healthcare and life sciences represent a significant economic engine for Indiana; moreover, they also play a central role in providing economic and social resilience for the region on an ongoing basis and during public health emergencies. The state benefits greatly from the long-term investments that have been made by key private sector corporations such as Lilly, Cook Medical, Roche Diagnostics, Baxter, Elanco and others and public sector and non-profit organizations such as IU Health, regional medical systems, research universities, colleges, and community colleges, and signature Indiana initiatives such as the Clinical and Translational Sciences Institute (CTSI) and the Indiana Biosciences Research Institute (IBRI) creating a comprehensive healthcare and life sciences ecosystem – an ecosystem that spans a complete range of activity from basic and translational research, through each step in the value added development and production of products, technologies, and services onwards into distribution and their use in the marketplace.

The operations of this value-chain in the state are well supported by talent development programs and higher education programs that supply the well-educated and skilled talent needed to fill demands across the sector. Similarly, the state is attracting the capital resources needed to develop, scale, and grow healthcare and life sciences enterprises—though like most regions of the country continued growth in resources are necessary.

The sector is expected to continue to grow, however, this growth could be dependent on how the ecosystem responds to forces of change and the opportunities presented for growth in healthcare products and services rooted in new technologies in genomics, gene editing, regenerative medicine, radiopharmaceuticals, synthetic biology, advanced health data analytics, personalized medicine, and other emerging fields of opportunity. Ongoing investment will be needed, and attention paid to sustaining and optimizing the regional ecosystem conditions to continue to allow the sector to thrive.

Information presented within the report leads to the following key conclusions:

- · Healthcare and life sciences represent a significant advanced industry for the state of Indiana economy.
- The sector, including academic life sciences research, directly employs more than 383,000 in the state and supports a further 332,000 Indiana jobs through its indirect and induced expenditure impacts.
- The direct jobs supported demonstrate high average wages across the state of over \$70,000 (over \$20,000 higher than the state's average job), and total compensation levels (wages and benefits) across the industry of nearly \$88,000 per job.
- These impacts are generated by a statewide sector with significant industry presence in pharmaceuticals, diagnostics, contract drug development, medical instruments, biotech, biologistics, and through major clinical healthcare and academic research operations.
- The sector is providing wide ranging functional impacts that collectively provide access to high quality clinical healthcare, an innovation and entrepreneurial pipeline leading to economic development, opportunities for individual advancement through STEM education and high-quality jobs and sustaining a high regional quality of life.

It is clear that past and future Investments in the infrastructure and talent that advance Indiana's life sciences and healthcare capacity represent a fundamental good—enhancing the quality of life for Hoosiers statewide, boosting the state and many regional economies, and providing a proactive means of response in the face of public health emergencies.

THE IMPACT OF THE HEALTHCARE A LIFE SCIENCES SECTOR IN INDIANA

\$150.1 B

total economic impact generated by Indiana's healthcare and life sciences sector

THE HEALTHCARE AND LIFE SCIENCES SECTOR IN INDIANA'S INDIANA IS:



A powerful economic engine for the state

Diverse in its employment opportunities, creating demand for work across R&D, manufacturing, warehousing, distribution, and all business functions that support the value chain.



Growing

The combined healthcare and life sciences sector grew by 9.5% from 2015 to 2020.



Well-rounded and connected

Because of its highly collaborative nature, it assured resiliency during the pandemic.

The functional impacts of the healthcare and life sciences sector on the state of Indiana are those that are a positive impact generated for an economy, society or for individuals through the mission-focused activities of an organization, institution, industry, or specific project including:

- Working to sustain the physical health of populations served.
- Producing products and services needed and valued by society which, in turn, generate employment, economic output, exports, and public sector revenues.
- Advancing basic and applied knowledge and building the know-how and skills necessary within the healthcare and life sciences workforce.
- Securing public health and building equitable, diverse, and resilient communities with robust livability, quality-of-place and quality-of-life.





EFFECT	오오오 Employment	S Output	رچي Gross Regional Product
DIRECT	383,161	\$98.7B	\$56.1B
INDIRECT & INDUCED	331,655	\$51.5B	\$28.1B
TOTAL SUPPORTED IMPACT SHARE OF REGIONAL ECONOMY	17.9%	18.5%	21.8%
			Compared to the next largest direct GRP sectors: \$87.5B Manufacturing \$22.9B Finance & Insurance

\$1 = +52¢

Every \$1 of all goods and services produced by the healthcare and life sciences sector, generates an additional \$0.52 within the Indiana economy. **\$4.254B**

Amount of state and local tax revenue generated and supported by the healthcare and life sciences sector in the Indiana.



