A Strategic Roadmap for Economic Development in Joplin Focused on Healthcare, Health Sciences, and Associated Educational Assets

Prepared for: The Joplin Regional Alliance for Health Care and Health Science (JRAH)
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Executive Summary

There is exciting and visible economic growth and new development occurring in Joplin. While a tornado and its recovery may have defined the last decade of Joplin's development, there is an ongoing "newness" and momentum evident across Joplin that is inspiring, outlined by wide-ranging community investments in new single-family homes and apartments, parks and trails, a high school, and high-profile assets such as the new library and arts center.

Increasingly, Joplin is expanding as a hub for healthcare professions and clinical care. The selection of Joplin by Kansas City University to host a medical school as an arm of the KCU College of Osteopathic Medicine and the establishment of the new KCU College of Dental Medicine are exceptional contributions to the region's healthcare landscape. The modern facilities at Mercy Hospital Joplin and the extensive infrastructure of the Freeman Health System contribute to the robust and excellent healthcare ecosystem.

Moreover, Missouri Southern State University in Joplin is investing $37.5 million for a Health Science Innovation Center. This investment aligns with the university's expanded statewide health and life sciences mission approved by the Missouri Coordinating Board for Higher Education. With the existing higher education options provided by Crowder College, MSSU, KCU, and other institutions in the broader MOKAN region, Joplin is expanding a notable system to advance education opportunities for current and emerging healthcare and health science careers.

It is evident that the Joplin region recognizes the potential for further economic development through the growth and convergence of assets in the health industry and higher education sector. To address this opportunity, representatives of multiple major stakeholder organizations formed the Joplin Regional Alliance for Healthcare and Health Science (JRAH). The primary objective of JRAH is to develop a strategic plan to guide the long-term growth of Joplin's healthcare and health science sectors and to maximize economic development opportunities at the intersection of "eds and meds." To this end, JRAH retained the services of specialized economic development consultants at TEConomy Partners to undertake an in-depth situational assessment leading to the development of the strategic action plan profiled herein.



Assessment Findings

The situational assessment involved using quantitative analytics to assess the regional economy and the performance of relevant industry businesses. In addition, multiple qualitative interviews with key stakeholders representing business assets, regional businesses, local government, higher education, and healthcare provider organizations were performed. The data and information collected informed a strengths, weaknesses, opportunities, and threats (SWOT) assessment of the region for eds and meds development. The analysis confirmed that Joplin's health and biomedical industry stands out as an established regional strength and a key driver of overall employment growth.

From 2017 through 2021, the health and biomedical industry in the MOKAN region grew by 21%, rapidly outpacing the U.S. growth rate of 5.2%. The higher education sector is also emerging as a regional strength with a complete continuity of educational options. The higher education sector grew employment by 1.3% in the Joplin region from 2017-2021, bucking national trends as the U.S. average saw a 4.5% decline across the sector.

Joplin is relatively unique for a region of its size, in that it is home to higher education leading to certificates, associate, bachelors, graduate degrees, and professional medicine and dentistry degrees. Stakeholders repeatedly mentioned the responsiveness of Crowder College to regional training needs and the promise of unique, innovative, and collaborative programs such as the KCU/MSSU Accelerated Partnership, Crowder–MSSU Partnerships, and the MOSO CAPS Program.

Although the region has many identified strengths and opportunities, it also faces limited population growth and a tight labor market. With unemployment falling below 3% for the first half of 2023, economic development efforts need to concentrate on meeting the needs of existing employers through workforce development that improves the skills, training, and educational attainment of the regional population. These efforts should improve the community's health, boosting labor force participation and productivity.

Strategic Recommendations

The in-depth assessment of the region, along with the evaluation of healthcare and higher education assets, resulted in the identification of three overarching opportunity areas:

Table ES-1: Recommended Strategic Focus Areas

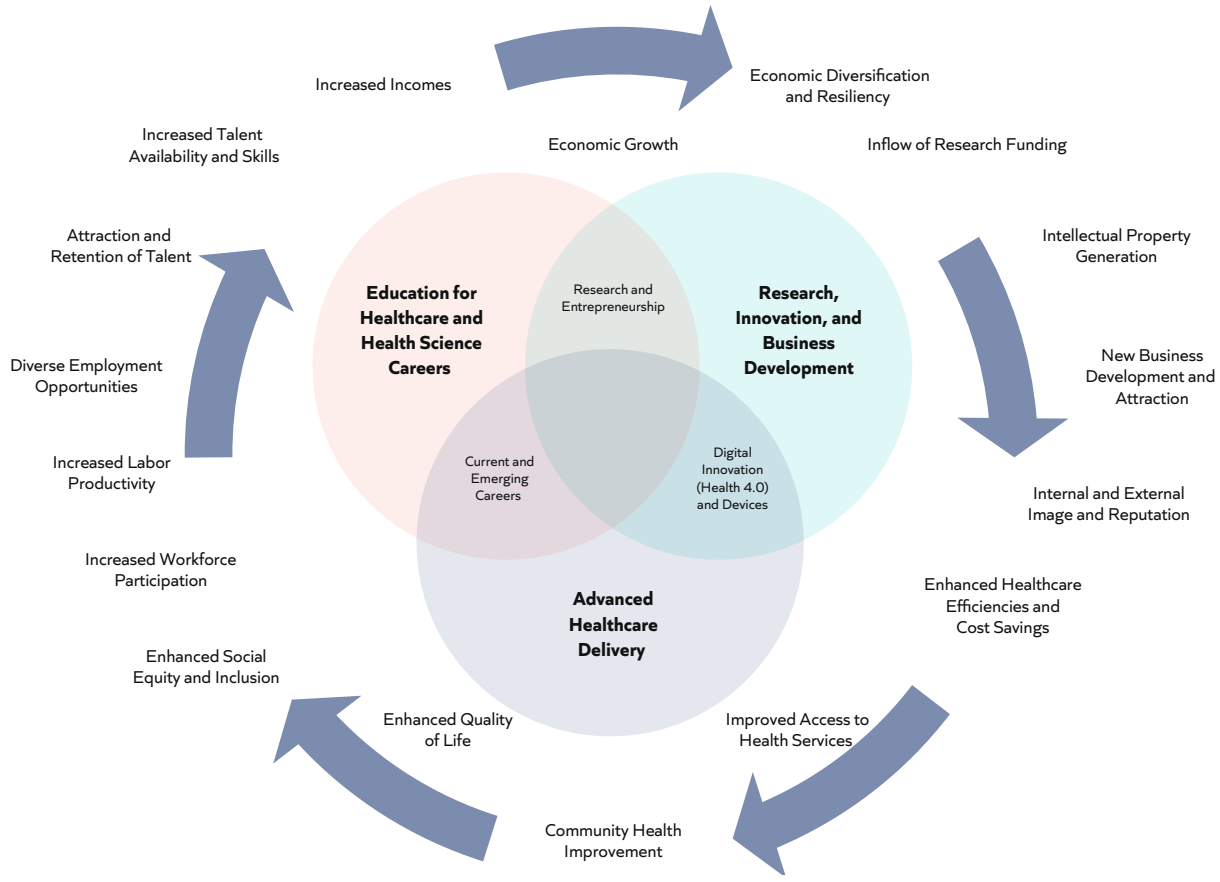
Strategy Focus	Description
1. Education for Healthcare and Health Science Careers	**Aligning educational institutions and their offerings with the types of jobs available in the region's healthcare and health sciences workforce.** The signature higher education assets of the region need to be better aligned with the sustained demands of the regional healthcare system for skilled workers. This presents opportunities to enhance economic development along multiple pathways, including growing the existing higher education businesses as an economic driver, reducing personnel acquisition and retention costs across the healthcare system, improving the quality of healthcare services and their productivity, and helping to assure the region educates the necessary personnel to advance digital healthcare and other fast-moving opportunity spaces.
2. Research, Innovation and Business Development	**Developing research and development, innovation, and business development opportunities based on pre-existing and evolving healthcare and higher education assets.** Joplin may leverage its distinctive higher education (especially KCU and MSSU), healthcare, and business assets to build a presence in selected R&D and business innovation opportunities. Emerging technologies in healthcare present multiple pathways for new business development and expansion, especially, but not limited to, the rapidly developing digital health space. As expertise in research builds, this may also become an attractor for existing businesses to consider a Joplin region location.
3. Advanced Healthcare Delivery	**Advancing healthcare delivery to meet the region's unique community health challenges and increase workforce availability and productivity.** The healthcare delivery system within the region may become a leader in the development of an advanced healthcare delivery model that integrates technology, innovation, and new workforce skills to build an expanding position in digital health (Healthcare 4.0). This strategy leverages emerging technologies to significantly improve regional healthcare access and outcomes via the use of telemedicine, medical IoT, remote patient monitoring, emerging AI solutions, and other technologies and innovative approaches to care suited to enhancing healthcare in rural and small community settings. Through enhancements to the healthcare system, this strategy will have the additional benefit of increasing patient access to care and overall community health, thereby promoting increased workforce participation and productivity levels across the economy and boosting GDP.

Source: TEConomy Partners, LLC.

The strategies are designed to stand individually, but as shown in Figure ES-1, they also intersect with and reinforce each other to produce positive strategic outcomes. The strategies are deliberately advanced with a focused eye on generating multiple economic and community development impacts for Joplin and the MOKAN region.



Figure ES-1: Strategies and Associated Economic and Community Development Impacts



Source: TEConomy Partners, LLC.

Under each strategy area, specific actions rooted in the situational assessment and subsequent deliberations are proposed. These are outlined within Table ES-2, collectively presenting a series of 17 actions.

Table ES-2: Actions Recommended Under Each Strategy

Strategy 1 Education for Healthcare and Health Science Careers	**Strategy 2** Research, Innovation, and Business Development	**Strategy 3** Advanced Healthcare Delivery
Action 1.1: Expand higher education programs and enrollments to meet anticipated regional health system needs. Anticipate at least a 2x output of students with focus on nursing, allied health, and emerging digital health fields.	**Action 2.1: Build a presence in 3-4 selected areas of research:** • Digital Health Solutions • Population and Community Health • Medical Devices • Health EdTech	**Action 3.1: Primary and Community Care Delivery Network expansion and coordination.** Increase primary and family care networks in the community, including addressing physician gaps, patient navigation, and financial assistance.
Action 1.2: Extend and integrate regional articulation across K-12/CC/Univ systems. Build and expand the high school CAPS programs, creating clear articulation pipelines across strategic career pathways.	**Action 2.2: Seek to establish a signature longitudinal health study connected to regional health improvement and digital health.** Establish as a multistate regional study to engage with NW Arkansas interests in healthy community innovations.	**Action 3.2: Become an early adopter of telehealth and digital health solutions.** Expand use of telehealth, remote patient monitoring, and similar patient-facing digital technologies to significantly improve health service access. Enhance broadband and transportation access to serve the needs of remote and disadvantaged populations.
Action 1.3: Connect higher education degree programs to emerging signature research platforms and encourage student research engagement. Encourage both undergraduate and graduate student research engagement.	**Action 2.3: Establish a small support stipend program for innovative postdocs to advance promising technologies.** Innovative ideas can be imported by offering supported positions (perhaps joint between hospitals and universities) for those with interesting, vetted concepts in signature research areas.	**Action 3.3: Develop shared data architectures and resources to capture and analyze clinical and population health data. Leverage and integrate Telehealth, patient-facing digital health and EMR data to seed research and innovation.** Consider the launch of patient gene sequencing to build a shared resource for research and clinical care advancement.
Action 1.4: Explore collaborative program delivery across regional institutions to leverage faculty and scarce resources. Many new areas of education are multidisciplinary, engaging computer and data sciences, engineering, biosciences, and other disciplines. Skills may exist across institutions to build novel programs.	**Action 2.4: Establish pre-seed fund to help advance IP commercialization and maximize connection building to MO funders and existing support programs.** Seek to establish a moderate $1-2 million pre-seed fund able to provide up to $50,000 seed investments in promising concepts.	**Action 3.4: Implement caregiver support technologies and workforce management systems.** Adopt technologies to improve workforce efficiency, clinical decision making, workforce skills development, and labor productivity. This may include integration of AI-based solutions.
Action 1.5: Expand opportunities for internships and other employer-student connectivity building activities. Seek to maximize the retention of regionally educated students by building early career connections with local employers.	**Action 2.5: Assure availability of incubator space and accelerator/mentor services.** Assure budding entrepreneurs have access to space and support to advance early-stage commercial concepts.	**Action 3.5: Care Model Innovation.** Joint initiative to design, pilot, and implement changes to health roles and delivery models (new roles, flexible scheduling, remote workforce, shared employees/pool/agency). This may include integration of AI-based solutions.
Action 1.6: Form a series of certificate programs, or stackable credential programs, designed for continuing education in fast moving health tech fields. e.g., cybersecurity, telemedicine, EMR analytics, wearable systems, etc.		**Action 3.6: Healthy Community Coalition.** Joint coalition (delivery system, business, government) promoting and funding healthy community initiatives in schools, businesses, and the broader community.

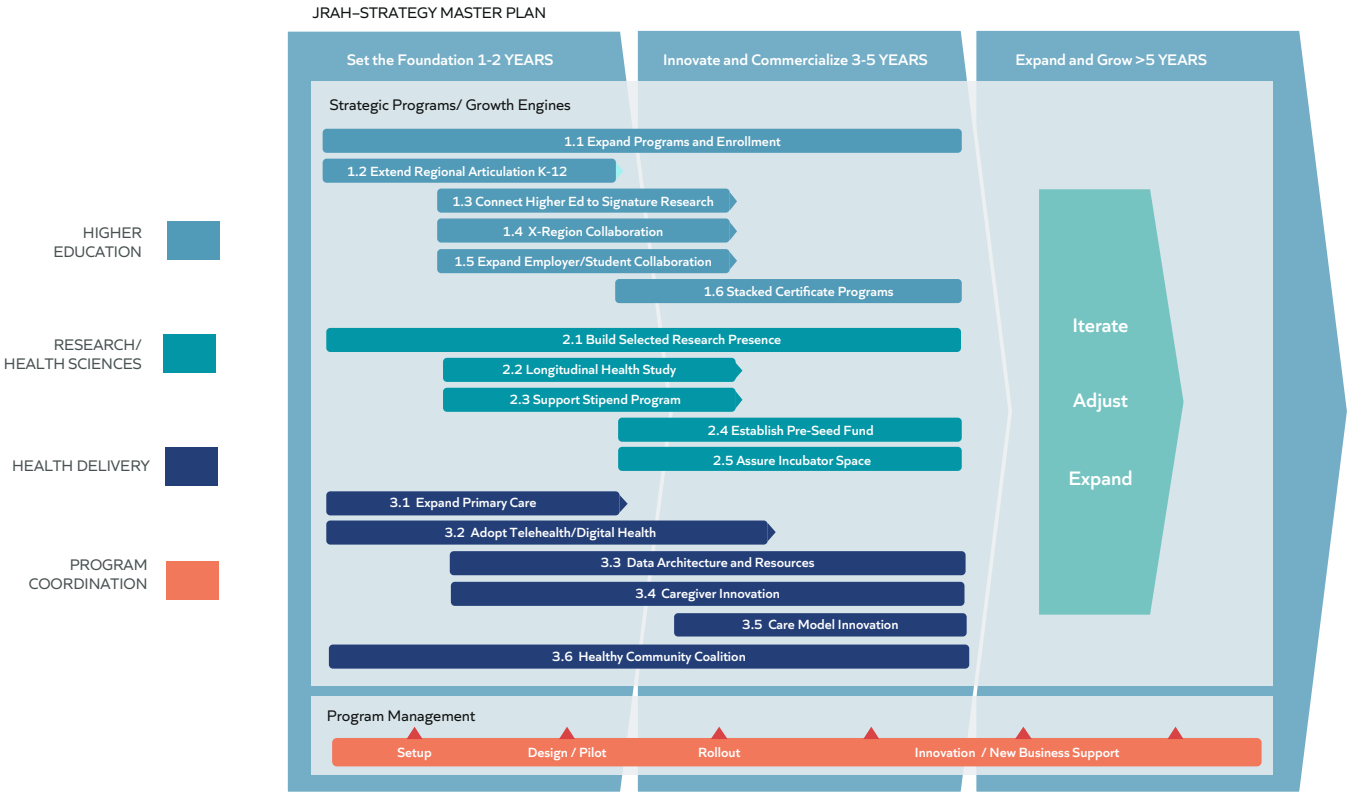
Each of these actions is profiled in detail within the strategic plan report, and specific examples of programs and initiatives around the United States are provided to illustrate types of positive impacts.

Organizing for Success

Many of the strategies and actions highlighted above require the ongoing operation of the Joplin Regional Alliance for Healthcare and Health Sciences (JRAH) as a leadership organization. This would entail developing a new charter based on the strategies and actions outlined above, sources of shared funding, a dedicated staff and leadership model, and the support of interdisciplinary task forces that will help to implement the plan. It is also recommended that the JRAH develop a program management team consisting of two or three staff who would manage the day-to-day work effort. This would include mobilizing and managing resources, executing the program of work, communicating progress to the JRAH and other stakeholders, estimating and sourcing required financial and technical resources, and ensuring on-time, on-budget delivery.

Figure ES-2 provides an initial timeline for the JRAH stakeholders' consideration as they finalize the implementation of the recommended strategies and actions.

Figure ES-2: Envisioned Timeline of Strategic Plan



Source: TEConomy Partners, LLC.

Ultimately, the success of this strategic plan will rest on the ability of the Joplin Region to implement its recommendations. It is anticipated that the JRAH will be able to act as the strong backbone organization required to support such ambition, with the senior stakeholders at the table able to make the long-term commitments needed to bring about the desired benefits for the community.

It is expected that the expansion of the healthcare and higher education sectors will bring numerous benefits to the Joplin region, encouraging stakeholders to commit to the long-term strategy. (Figure ES-3).

Figure ES-3: Shared Investments, Shared Benefits, and Positive Economic and Community Outcomes



Higher Education

Bring to:
- Resources/expertise
- Technology
- Funding
- Training

Take away:
- Higher enrollment
- Research platform
- Commercialization

Delivery System

Bring to:
- Resources/expertise
- Technology
- Training space/environment
- Funding

Take away:
- More patient volume
- Less chronic disease
- Research platform
- Commercialization

Local Businesses

Bring to:
- Workforce needs
- Awareness with employees

Take away:
- More productive workforce
- Commercialization

Community Members

Bring to:
- Attention, awareness, participation
- Commitment to healthy lifestyles

Take away:
- Better health
- Better economic opportunity
- More attractive community

Local Government

Bring to:
- Coordination
- Regulatory easement
- Built Infrastructure
- Funding/tax abatements

Take away:
- Diverse business environment
- Higher tax base/fiscal efficiency

Source: TEConomy Partners, LLC.

Conclusion

Joplin and the multicounty MOKAN region benefit from the presence of multiple signature assets in healthcare and higher education that present a robust platform for ongoing economic growth. Aligning healthcare workforce demands and regional higher education programming will provide a multifaceted series of benefits for the region, bringing students (and their dollars) into the community for education, increasing opportunities for students to gain stable employment in the region with good prospects for career advancement, and improving the quality of regional care while lowering costs. As the higher education and healthcare sectors advance collaborations, opportunities will also exist to build distinctive R&D programs designed to improve both systems and spark innovations that engender entrepreneurship and the growth of new and existing regional business enterprises. Because the availability of a skilled, high participation, and productive workforce underpins the ability of Joplin to continue to achieve economic growth, the strategy also advances a community-health-focused approach designed to significantly advance a healthier, more productive regional population while also engendering innovation.

I. Introduction

At the heart of 21st-century economic development is the notion that a region's traded industry sectors are an essential contributor to increasing gross domestic product (GDP) and enhancing the quality of life of its citizens. Traded sector industries refer to those sectors of a region's economy that focus on serving customers and markets beyond the residents and businesses in that community. By bringing new dollars into a regional economy, traded-sector industries exhibit a strong multiplier effect: new jobs are created as exporting firms buy from local suppliers and their workers make purchases from local businesses.

Located in Southwestern Missouri but serving as the "capital" of the multistate MOKAN Region, Joplin has multiple traded sector assets to help advance its economic future.[1] Among Joplin's distinctive strengths are two sizeable institutional businesses in healthcare and higher education, which both serve as traded sectors by bringing in revenues from outside the community and expanding the local economy with "imported" dollars.

On the healthcare side of the equation, Joplin is home to two major hospitals: Freeman Hospital West (part of the Freeman Health System) and Mercy Hospital Joplin (part of Mercy Health System). Overall, the healthcare and health sciences employment in the two-county Joplin Region was 6,858 jobs in 2021. This number extends to 8,918 jobs when surrounding counties are included in the analysis.[2] Healthcare-related employment in the two-county Joplin region is 36% more concentrated than the U.S. average, which is evidence of a specialized advantage for the region.[3] Beyond serving local residents, Joplin's healthcare service providers also attract patients from outside the region by offering select areas of excellence. Furthermore, the availability of quality local education and healthcare providers is one of the critical quality-of-life factors considered by site location consultants and businesses when locating new business investments.

Higher education also acts as a traded sector in the region, serving many students who come to Joplin from outside of the immediate community. Joplin's status as a hub for higher education is anchored by Missouri Southern State University (MSSU), a public university with a growing emphasis on health sciences education. This emphasis is evident in an updated mission and a forthcoming new building to promote modern health sciences education and innovation. Joplin is also the

1 Throughout this report, TEConomy uses the terms Joplin, Joplin Region, Greater Joplin, and MOKAN Region somewhat interchangeably. TEConomy's analysis focused on three tiers of geography: Joplin proper (the city), the Joplin Region (defined as the two-county MSA of Jasper and Newton Counties in Missouri), and the MOKAN Region (Barton, Jasper, Newton, and McDonald in Southwest Missouri, Cherokee and Crawford counties in Southeast Kansas, and Ottawa County in Northeast Oklahoma).

2 TEConomy analysis of Bureau of Labor Statistics, QCEW data from Lightcast (Datarun 2023.1).

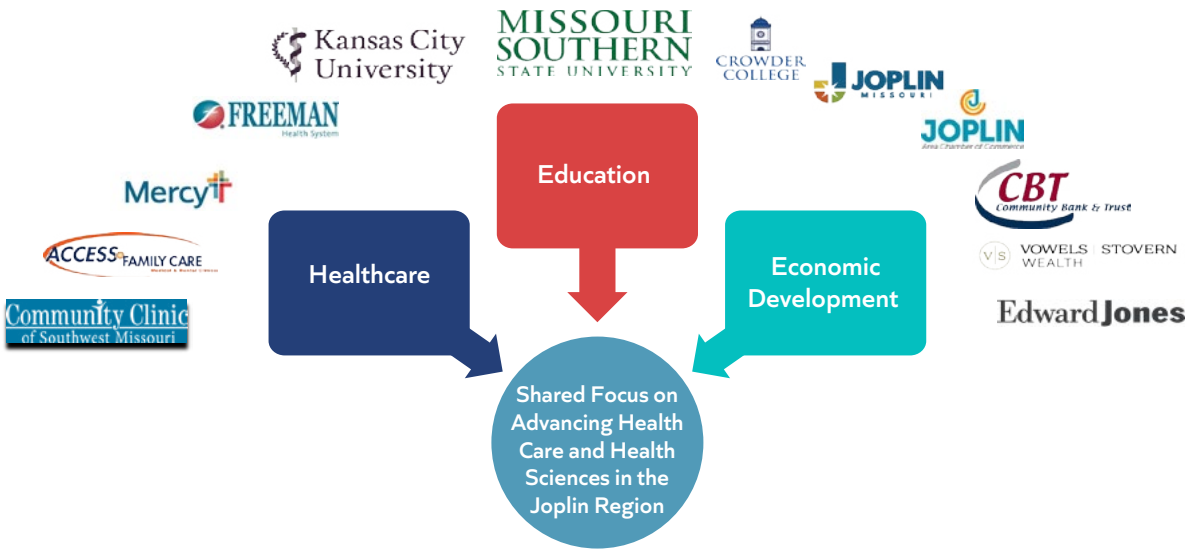
3 Ibid.

home to community college programs operated by Crowder College (at the Advanced Training and Technology Center), where programs are applied to pragmatic needs facing the healthcare sector.

At the intersection of healthcare and higher education, Joplin has also become an essential location for medical education, with Kansas City University–Joplin opening a medical school, part of the KCU College of Osteopathic Medicine, and a new KCU College of Dental Medicine. The relationship between KCU and Joplin's major hospitals is robust with the development of the Joplin campus (named the Farber-McIntire campus) supported by multiple community partners, including Mercy Hospital, Freeman Health System, the City of Joplin, and community philanthropic donations.

There is broad recognition across the Joplin region that the community's efforts to attract colleges of medicine and dentistry are just one piece of an ambition to drive further economic development through the healthcare and health sciences industry cluster and via higher education. Recognizing the opportunity, representatives of multiple major stakeholder organizations formed the Joplin Regional Alliance for Healthcare and Health Science (JRAH). Beginning in April 2023, this leadership group and TEConomy Partners, LLC (TEConomy) worked together to develop a strategic roadmap that guides the long-term growth of Joplin's healthcare and health science cluster and aims to maximize economic development opportunities at the intersection of "eds and meds."

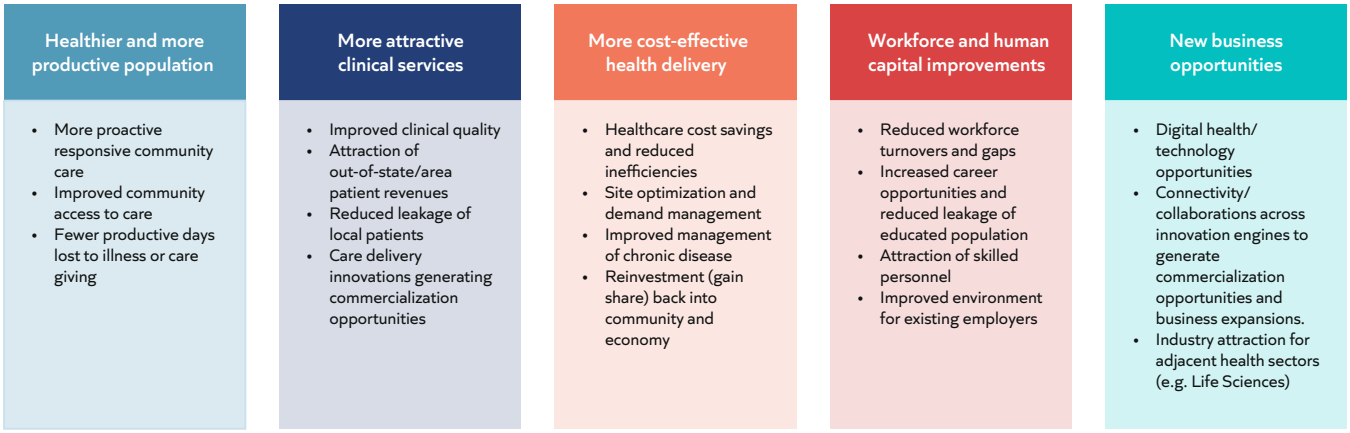
Figure 1: Representation of the Joplin Regional Alliance for Health Care and Health Science (JRAH)



Source: TEConomy Partners, LLC.

Ultimately, a wide array of potential economic development impacts are associated with a thriving healthcare and higher education ecosystem. As highlighted in Figure 2, these impacts generally align across five dimensions: new business opportunities, workforce and human capital, a healthier and more productive population, more attractive clinical services, and more cost-effective health delivery. While each of these is important on its own, the ability to cut across each of these dimensions makes a focus on eds and meds especially appealing.

Figure 2: Desired Impacts from Strategic Action Plan



Source: TEConomy Partners, LLC.

To achieve wide-ranging economic benefits from leveraging higher education and healthcare assets, the JRAH retained the services of specialized economic development consultants at TEConomy Partners to undertake an in-depth situational assessment leading to developing a strategic action plan. The situational assessment used quantitative analytics to assess the regional economy and relevant industry businesses and multiple qualitative interviews with key stakeholders representing business assets, regional businesses, local government, higher education, and healthcare provider organizations. Findings from the situational assessment have been presented in PowerPoint form to the JRAH during the project, with discussion regarding the strategic implications of the strengths, weaknesses, opportunities, and threats thereby identified. The resulting strategic plan, presented herein, does not provide a complete rehash of the situational assessment but rather provides a synopsis of key takeaways from the analysis that drive the subsequent development of recommended strategies and actions.

In the following section, the strategic assessment is briefly summarized—taking stock of the Joplin region's position and performance in healthcare and higher education and examining corresponding growth opportunities. Next, a strategic action plan is informed by this assessment, which seeks to guide the long-term growth of Joplin's healthcare and health science businesses and maximize economic development opportunities at the intersection of higher education and healthcare (eds and meds). The intent is that this strategic document will help to guide the coordination of resources and activities across the healthcare, higher education, and overarching economic development ecosystem in Joplin to help ensure that the city and surrounding region leverage and reinforce their strengths, address ecosystem gaps or weaknesses, offsets threats, and best advances opportunities to achieve economic growth.

II. Situational Analysis:

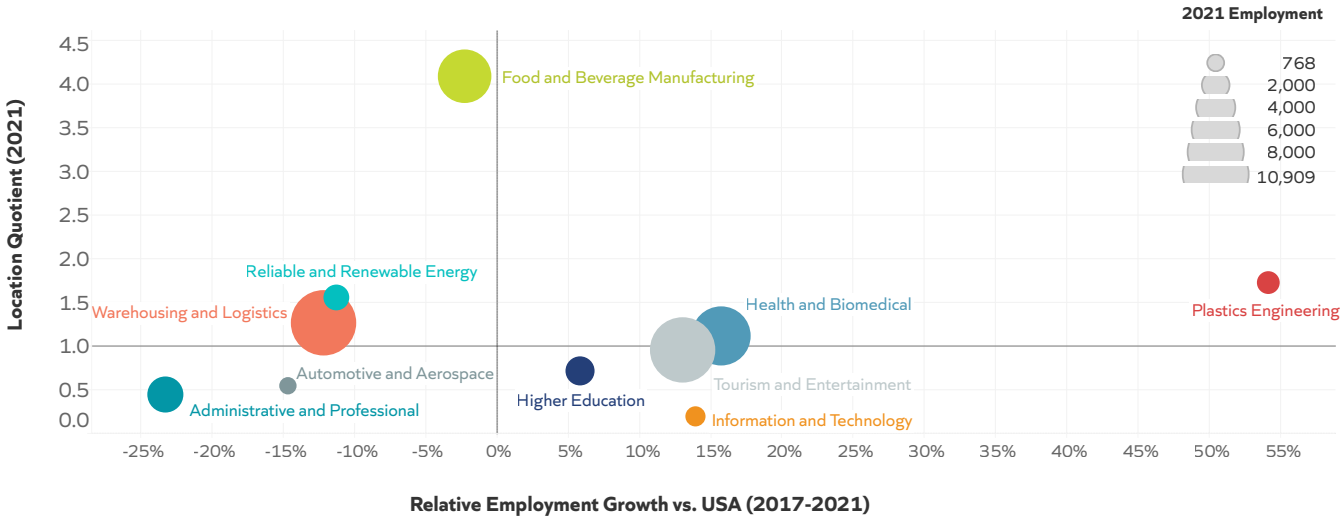
Seizing the Healthcare and Health Sciences Opportunity

As part of this project, TEConomy embarked on a detailed mixed-methods assessment of the Joplin regional economy. This approach included a robust quantitative analysis that leveraged public data sources, proprietary subscription-based data sources, and other data from JRAH institution members. In addition to in-person site visits to meet with community members, TEConomy also spoke to a wide range of individuals in small-group and one-on-one conversations as part of this project. The names of these individuals can be found in Appendix 1.

The sense of momentum across Joplin is palpable, from its new medical education facilities to the developments in its downtown core, like the Cornell Arts Center. While a tornado and its recovery may have defined the last decade of Joplin's story, there is an inspiring feeling of "newness" throughout Joplin, framed by community investments in new parks, schools, and libraries. Community leadership and locally empowered decision-making, in conjunction with the presence of the JRAH, suggest that the time is ripe for the region to move forward in a concerted way. Meanwhile, an engaged and supportive City Council, with a leadership group that seeks to understand economic development and the importance of the health sciences opportunity, is a further sign of encouraging progress.

Joplin's growing health and biomedical industry stands out as an established strength for the region and is driving overall economic growth. Joplin's two large hospitals are significant for a community of its size and contribute to the robust healthcare ecosystem in the MOKAN region. These hospitals reflect the region's considerable growth rate in the health and biomedical industries (21% from 2017-2021), outpacing the U.S. average of 5.2% by more than 15 percentage points during the same period.

Figure 3: Specialization (Location Quotient), Total Employment (2021), and Relative Employment Growth (2017-2021) in Key Industries Across the Joplin and MOKAN Regions



Source: TEConomy analysis of Bureau of Labor Statistics, QCEW data from Lightcast (Datarun 2023.1).

Note: Higher Education employment includes both private and public employees.

An additional asset for the Joplin Region is the presence of a complete continuity of educational options, and the higher education sector is emerging as a strength for the region (not yet specialized but growing significantly faster than the nation). Higher education sector employment increased by 1.3% in the Joplin region from 2017-2021, bucking national trends, whereas the U.S. average saw a 4.5% decline across this sector. Joplin is relatively unique in that, for a region of its size, it is home to relevant higher education through a broad range of certificates, associate's, bachelor's, graduate degrees, and DO degree programs. Beyond these options, the region is also home to novel partnerships across industries and institutions. In numerous interviews, stakeholders repeatedly mentioned the responsiveness of Crowder College to industry training needs and the promise of unique programs such as the KCU/MSSU Accelerated Partnership, Crowder-MSSU Partnerships, and the MOSO CAPS Program. However, the state regulates enrollment across specific degree programs in healthcare, which challenges future growth across programs, including at MSSU.

Despite growth and progress, there are three key barriers that the Joplin region must acknowledge to truly advance its healthcare, health sciences, and higher education sectors:

- **The Joplin Region faces a tight labor market, complicating economic development efforts.** Despite fast growth in health sciences industries, the regional economy saw modest declines from 2017 to 2021: While the U.S. declined by a moderate 0.1% from 2017-2021, the Joplin Region saw employment declines of 0.3%, and the broader MOKAN Region saw 1.1% employment declines. Meanwhile, the labor force in the region is very tight, with unemployment rates below 3% for the first half of 2023.[4] Despite a low cost of living, wages are also much lower than in major metros, posing comparable challenges for further growing this labor force. As a result of this challenge, Joplin must emphasize workforce development by improving the skills, training, and educational attainment of its existing population.
- **Talent attraction remains a core challenge for community leadership.** Despite a wide range of natural resource amenities and recreational opportunities, the Joplin region struggles to coordinate and communicate these valuable assets in a way that comparable regions have been able to do successfully. Talent attraction for healthcare occupations such as physicians is challenged by various items, including limited availability of higher-end retail, the perceived attractiveness of the region and its downtown, limited housing options, and opportunities for trailing spouses. Greater Joplin is also seeing increasing competition for students coming out of MSSU and KCU, which may threaten the retention of its existing students.
- **The growing presence of Northwest Arkansas is impossible to ignore.** The rapid population growth of the Northwest Arkansas region, just one hour to Joplin's south, will likely have a major impact on the area in the coming years. First, the Alice Walton Medical School in Northwest Arkansas is well-resourced and already beginning to approach/poach local talent. Given the regional growth in this direction and the new freeways connecting Northwest Arkansas with Joplin, identifying pathways to collaborate with the Northwest Arkansas Region instead of competing with them is an important opportunity for the region.

Although developing strategies to overcome these barriers is outside of the confines of this project, a recognition of their importance is critical to encouraging economic development in the health and life sciences. Strategic opportunities have emerged from the situational assessment specific to growing the eds and meds sectors. For the Greater Joplin Region to advance its healthcare and higher education sectors to the next level, it will be critical to understand each of these opportunities and the corresponding strategic actions. **The three strategic opportunities that emerge for the Joplin Region from this analysis include:**

- Aligning educational institutions and their offerings with the types of jobs available in the region's healthcare and health sciences workforce.
- Developing research and development, innovation, and business development opportunities based on pre-existing healthcare assets.
- Advancing healthcare delivery to meet the region's unique community health challenges.

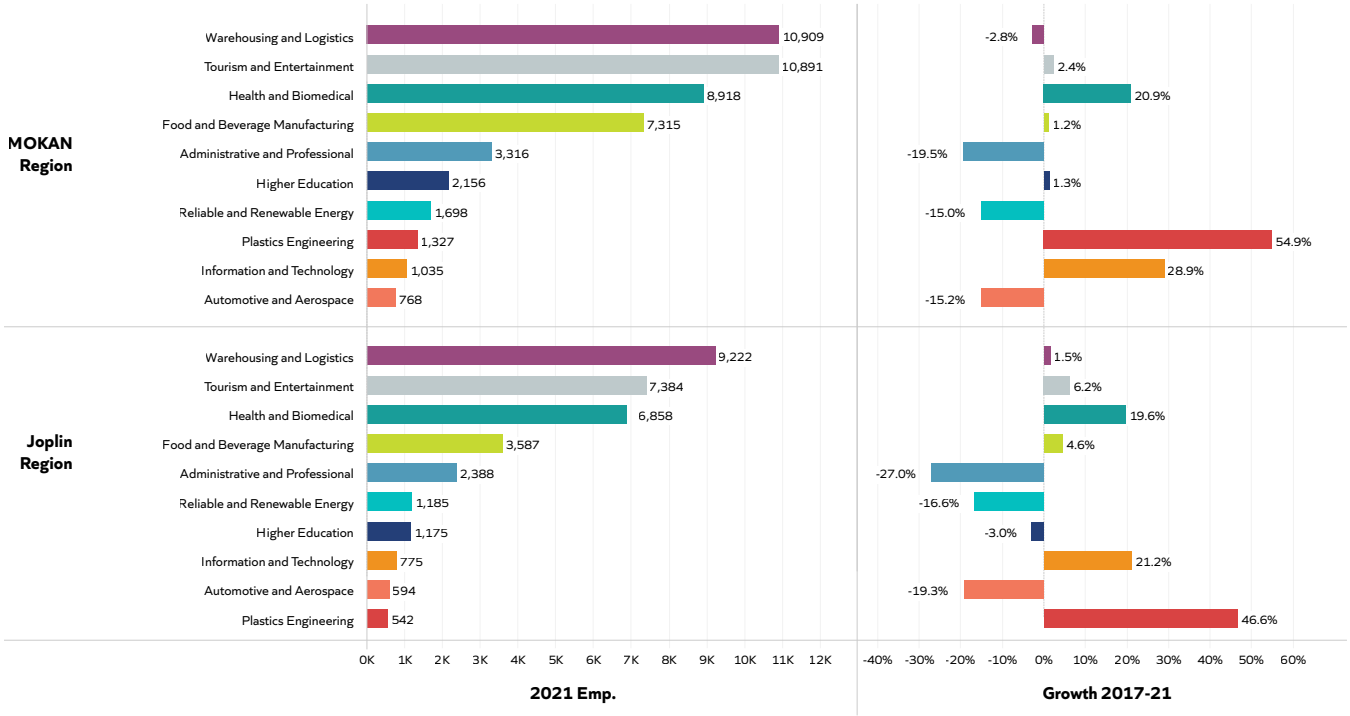
The following sections describe each of these opportunities in more detail.

4 https://www.bls.gov/eag/eag.mo_joplin_msa.htm

Opportunity 1: Aligning educational institutions and their offerings with the types of jobs available in the region's healthcare and health sciences workforce.

As one of the region's largest and fastest-growing industries, the Health and Biomedical Sector drives economic growth in both the Joplin and MOKAN Regions. An analysis of industry dynamics across these interrelated regions finds that health and biomedical is the third largest sector in terms of employment (trailing only warehousing and logistics and tourism and entertainment) and is also the third fastest growing (trailing only plastics engineering and information technology). However, the health and biomedical sector is distinct in that it is both large and fast-growing—logistics and tourism are growing at a slower pace than health and biomedical, and plastics and IT are growing faster but from a much smaller base.

Figure 4: Total Employment (2021) and Employment Growth (2017-2021) in Key Industries Across the Joplin and MOKAN Regions

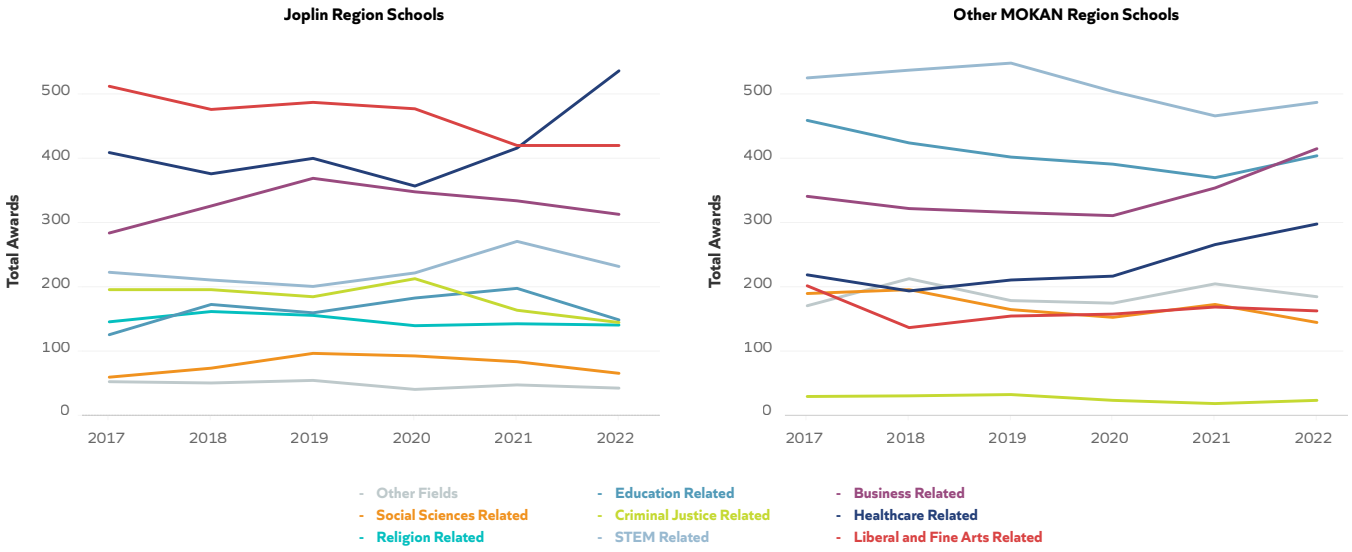


Source: TEConomy analysis of Bureau of Labor Statistics, QCEW data from Lightcast (Datarun 2023.1).

Note: Higher-Education employment includes both private and public employees.

Joplin is also emerging as a hub for education. From 2017 to 2022, the output of all degrees at the associate level and above grew by 13.8% in the Joplin Region, in large part due to growth in healthcare-related degrees. As seen in Figure 5, healthcare-related degrees are a primary driver of educational attainment in the region, and this growth is most pronounced in the years since 2020, coinciding with the development of Kansas City University's Joplin campus and emerging healthcare programs. There has also been some growth in healthcare-related degrees in the extended MOKAN region (including at schools such as Pittsburg State University), though this has been more moderate. As these results show, there is a clear logic behind the coming together of the healthcare and higher education sectors to form the JRAH and develop a shared economic development strategy.

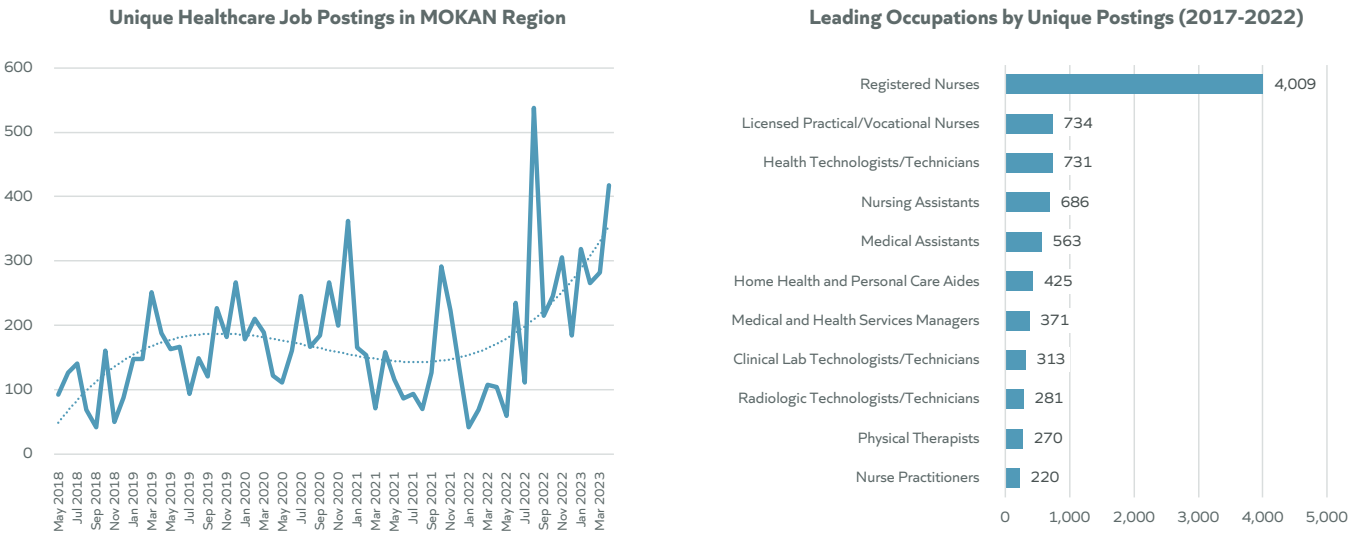
Figure 5: Total Degrees in Joplin and MOKAN Regions by Year (Associates Level and Above)



Source: TEConomy Analysis of NCES IPEDS Data.

Across interviews, a clear and persistent challenge facing the region is concern regarding the **availability of workers** across the spectrum, but especially in nursing. The growth in healthcare-related degrees noted in Figure 5 represents progress for the region, but TEConomy analysis suggests that the healthcare job postings in the MOKAN Region have also seen significant and sustained growth, especially in the past year (Figure 6). Of this growth, there were more than 4,000 postings for nursing from 2017-2022, which suggests an ongoing and persistent need for this critical position.

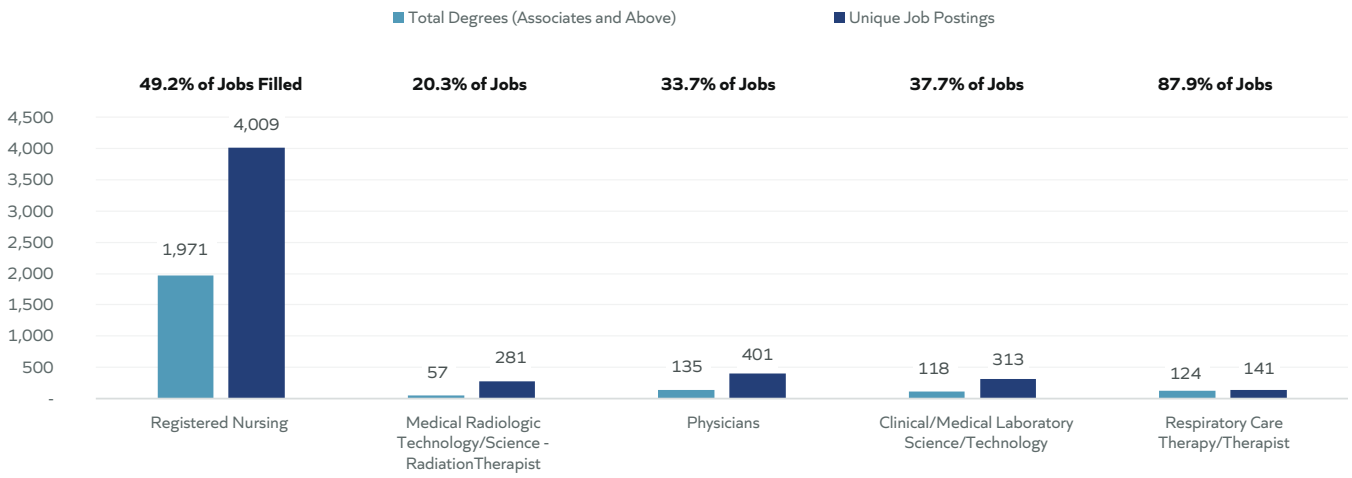
Figure 6: Unique Healthcare Job Postings in the MOKAN Region and Leading Occupations (2017-2022)



Source: TEConomy analysis of Lightcast Job Postings data (Datarun 2023.2).

An assessment of this growth in occupations alongside the increase in healthcare-related degrees finds a significant disconnect, which suggests difficulty filling these roles (Figure 7). For the 4,009 registered nursing postings in the region, there were 1,971 new registered nurses developed at regional institutions of higher education—less than half (49.2%) of the amount needed. A similar pattern is clear across other occupations, such as radiologic tech (just 57 new therapists created for 281 positions, 20% of jobs) and in clinical/medical lab techs (just 118 new technologists developed for 313 positions, 38% of jobs).

Figure 7: Total Degrees and Unique Job Postings for Key Roles (2017-2022) in the MOKAN Region



Source: TEConomy Analysis of Lightcast Job Postings (Datarun 2023.2) and NCES IPEDS Data.

The ability to attract and retain physician talent also stood out in interviews within the healthcare system. As seen in Figure 7, 135 new physicians developed from 2017-2022, but there was demand for more than 400 of these medical professionals across the region. Even if the Joplin region could retain 100% of all physicians developed at KCU Joplin, this would still only be 1/3 of the amount needed based on job postings.

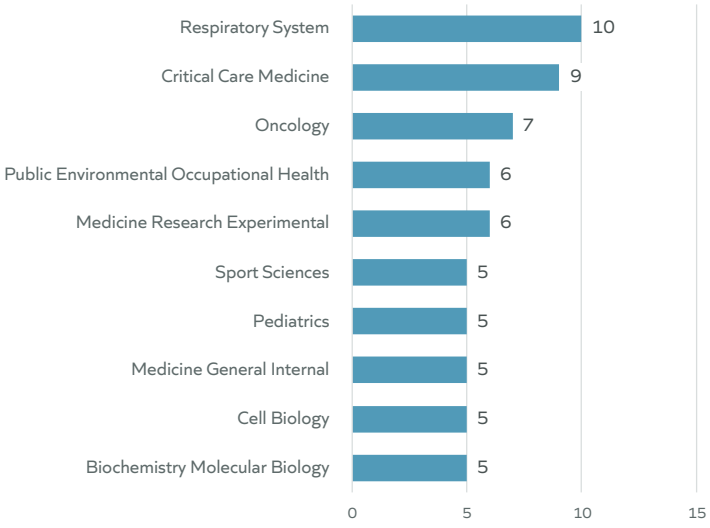
Overall, to help meet the needs of the region's large and fast-growing health and biomedical industry, it is apparent that more graduate output is needed from regional institutions of higher education.

Opportunity 2: Developing research and development, innovation, and business development opportunities based on pre-existing healthcare assets.

While several manufacturing firms are engaged in R&D within the region, there is limited evidence of technology-based start-up ventures coming out of academic research or innovations within the region's healthcare sector. In most towns and cities in the United States with a significant presence of universities, medical schools, and large health systems, there is evident activity around health science and biomedical innovation. This has not yet occurred in the Joplin region, but an emerging opportunity exists to spark development along this pathway.

Despite the growth in healthcare and biomedical employment, TEConomy's analysis of healthcare innovation finds limited output so far. Since January 2020, there has been evidence of clinical trials and publications activity occurring in the region. As shown in Figure 8, there are ten thematic topic areas across JRAH entities with more than five publication records. Of Joplin's 93 biomedical-related academic publications and presentations, leading topics include respiratory systems (10), critical care medicine (7), and oncology (7). KCU is affiliated with more than half of these total biomedical records. KCU is also seeking to expand its research and is considering establishing a public health-oriented research program.

Figure 8: Leading Topics Among JRAH Entity Publication Records (min. 5)



Source: TEConomy Analysis of Web of Science Data.

Clinical Trials are an area of emerging activity for the Joplin region. An analysis of clinical trials in the region finds the presence of 294 clinical trials active at some point since 2020.[5] Freeman Health is a site for 245, and Mercy Hospital Joplin is a site for 196, with numerous trials recruiting at both sites.

Despite clinical trial and publication activity, since January 2020, no patents have been granted to any of the core JRAH institutions, and there was no biomedical-related patent activity in Joplin during that time. Meanwhile, no NIH research

5 TEConomy Analysis of ClinicalTrials.gov data

awards have been granted to JRAH entities, and no R&D expenditures are recorded in national surveys.[6] That is not to say that innovation is not presently occurring in the region. While Joplin's Health and Biomedical Sector is driving economic growth, other advanced industries are also playing an essential role in boosting development prospects. In particular, plastics engineering, information technology, and food and beverage manufacturing stand out as areas of opportunity for the region.

Joplin is home to several health-related opportunities that may be leveraged to encourage economic development. First, there are distinct economic development prospects related to BioHealth business attraction in areas adjacent to pre-existing strengths:

- Joplin's strength in food and beverage manufacturing and processing suggests opportunities to attract functional food companies—those focusing on the intersection between food, health, and wellness.
- Located at the intersection of I-44 and I-49, Joplin is an important logistics and distribution location. The region's strong geographic positioning and strength in transportation/distribution could help lure biomedical logistics operations.
- Across the region's advanced manufacturing sectors, there are also opportunities related to healthcare, especially in the region's plastics engineering sector—fastest-growing from 2017-2021. For example, Pitt Plastics products used in healthcare include gloves, isolation liners, and water-soluble bags. Other examples of advanced manufacturing companies with a presence in the region developing new products for healthcare markets include:
    - In Joplin, leading companies like Eagle Picher see their batteries used in wheelchairs, scooters, pumps, ventilators, beds, and x-ray applications.
    - In Webb City, Detecto is among the nation's largest manufacturers of medical scales and weighing products.
    - In Carthage, Leggett and Platt is developing innovative medical chairs, while a main subsidiary is innovating in foam production, with applications that include medical masks, wound therapies, orthotics, and toppers for hospital mattresses.

It may be that product development synergies may be encouraged by connecting the work of JRAH organizations to these health product manufacturing companies and their innovation pipelines. By serving as product development partners, early adopters, and demonstration sites, healthcare and higher education systems can help advance regional innovative products towards faster commercialization and market success.

Importantly and related to this, there are also opportunities for Joplin to grow from within by fostering entrepreneurship in eds and meds. The region has had some success with health-related startups developing in the Joseph Newman Innovation Center, and there are opportunities to expand this pipeline of companies. Similarly, as the region seeks to grow a future-ready workforce, developing entrepreneurs in educational technologies may offer an economic development benefit. The region's growing information technology sector, in conjunction with a growing focus on community health and wellness, may attract companies wishing to use Joplin's population for testing and piloting digital health technologies.

6 TEConomy Analysis of NSF HERD Survey and NIH RePORT Database

Opportunity 3: Advancing healthcare delivery to meet the region's unique community health challenges.

Both Joplin and the Greater MOKAN Region are geographically diverse, with mostly rural counties based around the urban center of Joplin. From a community health perspective, this diversity presents both benefits and challenges.

The region benefits from two well-established health delivery systems (Freeman and Mercy), which treat over 25,000 inpatients and over a quarter of a million outpatients annually through their networks of over 25 hospitals and ambulatory facilities. Both systems have a long and successful track record in the region, providing a comprehensive suite of primary, acute, and tertiary services. They have also both been recognized for quality of care and patient service from national ratings agencies during the past five years.[7]

Primary care, specifically, is provided by these two systems along with other providers, including Access Family Care and the Community Health Clinic of Southwest Missouri. Students in the region's nursing, medical, and dental schools also provide care through a variety of hands-on learning programs. Finally, rounding out community health services, public health departments at a county level support basic programs like vaccinations, preventive services, and public health information.

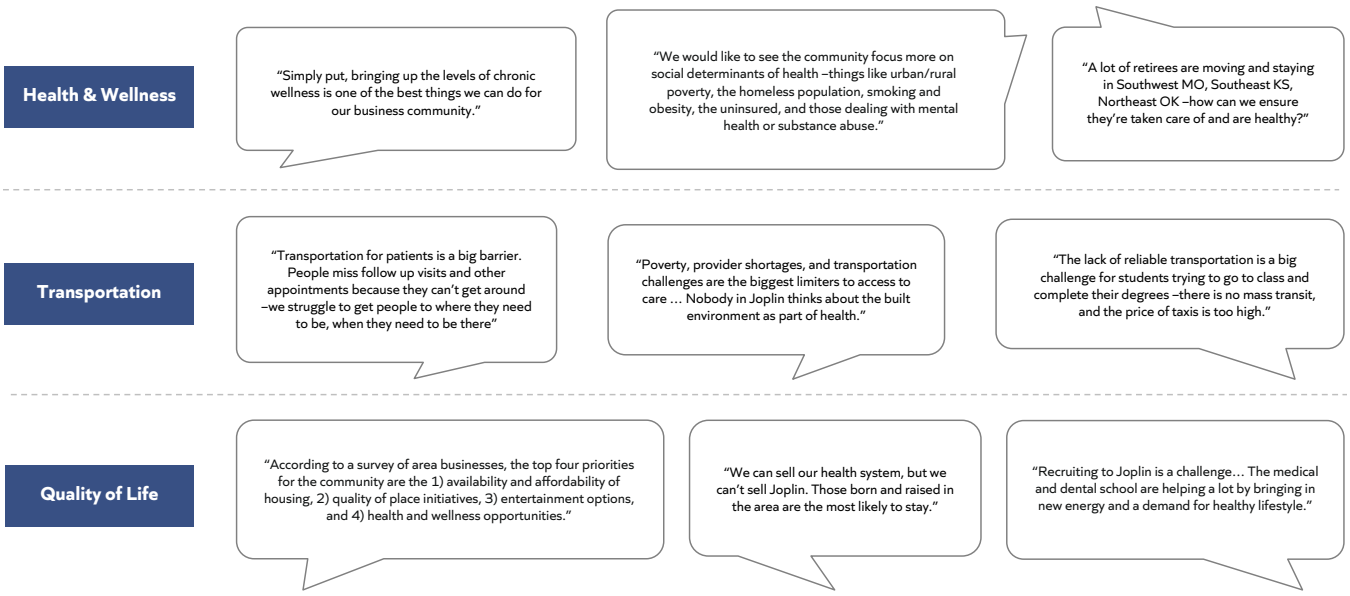
Community Health Challenges

Even with this strong foundation, the region lacks community access to health services compared to state and national averages. This is due to several factors, including population density, overall poverty levels, and a lack of community-based primary care services.

Physical access to care is complicated by the largely rural nature of the region. With most healthcare facilities located in urban centers, patients living in more rural counties must travel long distances for care. This issue is further exacerbated by the region's lack of public transport options, an issue frequently highlighted in community needs assessment surveys. Conversations with stakeholders frequently referenced the importance of health, wellness, transportation, and other community issues facing the Joplin region (Figure 9).

7 https://www.hospitalsafetygrade.org/h/mercy-hospital-joplin, https://www.freemanhealth.com/freeman-health-system-accomplishments-and-awards

Figure 9: Sampling of Representative Quotes with Community Stakeholders



Source: TEConomy Analysis of Stakeholder Interviews (Quotes are Approximate); MOKAN Survey Results

Poverty levels in the region are also high. In Jasper and Newton counties alone, poverty levels and low-income levels are well above state and national averages, with 18% of the population in Jasper living in poverty and 39% living at low income.[8] These figures are worse for in-need populations such as people over 65 or children under the age of 5. For example, McDonald County has a child poverty rate of 26% compared to the U.S. average of 17%.[9]

This level of income challenges directly correlates to higher rates of uninsurance (See Table 1). Jasper and Newton counties have a 16% uninsured rate, 33% higher than the Missouri average and 60% higher than the U.S. average. People without insurance at low incomes often go without necessary preventative and therapeutic care. Diseases left untreated in their early stages regularly develop into chronic, more costly ailments, leaving those without insurance to seek pro bono care within the system or forgo care altogether.

Community Health Challenges are Impacting Economic Development

Community health issues directly impact economic development in multiple ways, most notably in terms of workforce participation and workforce productivity. Simply put, a healthy community will see more people willing and able to work, lower absenteeism, and higher productivity on the job. With the Joplin region presently experiencing very low levels of population growth and low unemployment, the economy is highly constrained in its ability to expand GDP through the typical pathway of expanding employment. Building a healthier community, with improved healthcare access and outcomes, is a means to build a more resilient base of labor in the community to meet the expansion needs of existing employers and attract new employers to the region. It is fundamental to the economic development prospects for Joplin and the surrounding region.

8 As defined as 2x the poverty level income
9 https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model/health-factors/social-economic-factors/income/children-in-poverty?year=2023&county=29119

A Lack of Primary/Family Care

The supply of caregivers in the community providing front-line primary services is also low. Primary care coverage, as defined by the ratio of primary care physicians to the population, for Jasper and Newton Counties, the region's most populated, is 26% lower than the U.S. average. This average is worse in more rural counties with lower population density (Lawrence 46%, MacDonald 582%).[10] In fact, all the Missouri counties in the southwest region are classified as Medically Underserved Areas (MUA) for the Primary Care discipline by the Health Resources and Services Administration (HRSA).[11]

Table 1: Highlighted Measures of Health Access in Two-County Joplin MSA

Category	Topic	Jasper	Newton	Missouri	U.S.A
High Rates of Uninsurance	Uninsured	16%	16%	12%	10%
	Uninsured Adults	20%	19%	14%	12%
	Uninsured Children	8%	9%	7%	5%
Provider Shortages	Primary Care Physicians	1,650:1	1,650:1	1,410:1	1,310:1
	Dentists	1,540:1	4,240:1	1,620:1	1,380:1
	Mental Health Providers	410:1	2,700:1	430:1	340:1
Limited Preventative Care	Preventable Hospital Stays	3,428	3,505	3,052	2,809
	Mammography Screening	44%	37%	40%	37%
	Flu Vaccinations	52%	45%	49%	51%

Source: TEConomy analysis of ACCESS Needs Assessment (2023) and University of Wisconsin Population Health Institute's County Health Rankings & Roadmaps 2023.

Although staffing shortages in primary care appear to be most acute, the broader hospital system also experiences a lack of essential clinical personnel. Human resources leaders from both hospital systems reported nursing staffing operating at roughly 90% of budgeted levels and shortages of key medical and allied positions. Although this was a common concern across the country during the COVID pandemic, these shortages remain persistent and have proven difficult to resolve post-pandemic.

10 https://www.countyhealthrankings.org/
11 https://data.hrsa.gov/tools/shortage-area/mua-find

Poor Population Health Outcomes

The lack of coverage and service access is, in turn, reflected more broadly in poor health outcomes across southwest Missouri. As shown in Table 2, the Southwest region trails the Missouri average across multiple indicators such as health access, health risk behaviors, and use of preventative services.

Table 2: Health, Risk Factors, and Preventative Practices in Southwest Region

Topic	Measure	Southwest Region	Missouri	Percentage Point Difference
Healthcare Access	Poor general health	21.5%	19.7%	1.8%
	Last had routine physical checkup >2 years	20.0%	16.3%	3.7%
	Did not get medical care due to cost	56.4%	52.7%	3.7%
	Needed to see a dentist in past 12 months but could not due to cost	23.0%	19.0%	4.0%
Risk Behaviors	Currently use smokeless tobacco	6.7%	5.0%	1.7%
	Current electronic cigarette use	6.2%	5.3%	0.9%
	Currently smoke cigarettes	22.6%	21.9%	0.7%
Previous Diagnoses	Ever told had arthritis	30.2%	28.3%	1.9%
	Ever told had COPD, emphysema, or chronic bronchitis	10.3%	8.5%	1.8%
	Ever told had a depressive disorder	25.4%	23.0%	2.4%
	Ever told had coronary heart disease	5.3%	4.6%	0.7%
	Ever told had heart attack	6.6%	5.1%	1.5%
	Ever told had stroke	5.1%	4.5%	0.6%
Preventative Care	Obese (>30 BMI)	32.8%	31.2%	1.6%
	No mammogram within past 2 years for women age 50-74	33.3%	26.3%	7.0%
	No pap exam in last 3 years among women age 18 and older	33.9%	27.0%	6.9%
	Never had a sigmoidoscopy or colonoscopy among men and women age 50+	34.6%	30.5%	4.1%

Source: TEConomy Analysis of ACCESS Needs Assessment (2023).

Taken in total, these shortcomings bear some responsibility for the lack of overall healthiness of the population. Recent community health needs assessments conducted by Access Health and the Ozark Health Commission highlight higher levels of disease in the community.[12] Mental health, lung disease, cardiac health, and substance abuse are all cited as major concerns, exceeding both state and national averages.

12 Access Health CHNA, Joplin CHNA

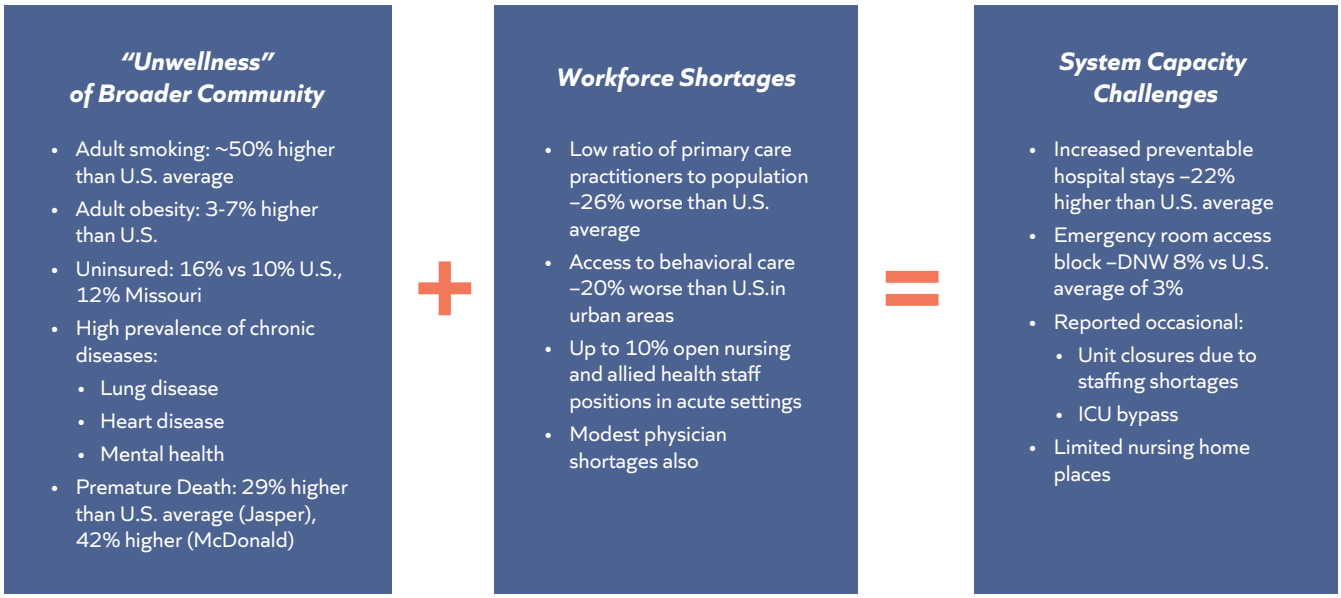
These challenges are further reinforced through feedback from the community. The ACCESS stakeholder outreach asks, "What are the most significant health care needs in the community?" and the most common responses were:

- Mental health care—including medication management, increased availability of psychiatrists and psychologists, and case management services—was the most reported concern of respondents.
- Affordable and accessible dental care for all ages, especially for the uninsured and those with Medicaid.
- Behavioral health/substance use disorder services.
- Healthcare literacy and patient education re: the importance of routine wellness visits, preventive care, health screenings, and managing chronic conditions.

System Capacity Challenges

The combination of a generally "unhealthy" community and the challenges of health service access in the community has resulted in increased demand and greater stress on downstream delivery facilities. The number of preventable hospital stays, as measured by ambulatory sensitive conditions (ASC), is 22% higher than the U.S. average.[13] These are often chronically ill patients who end up in the hospital through a lack of community-based services and education. Increasingly, healthcare payers, both public and private, are penalizing delivery systems through reduced reimbursement for high levels of ASC patients.[14]

Figure 10: Community Health and Workforce Shortages Pose Challenges to System Capacity



Source: TEConomy analysis of University of Wisconsin Population Health Institute's County Health Rankings & Roadmaps 2023.

13 https://www.countyhealthrankings.org/
14 https://www.healthaffairs.org/content/forefront/growth-value-based-care-and-accountable-care-organizations-2022

Importantly, a higher prevalence of illness and workforce limitations put additional capacity stresses on the delivery system. High bed utilization also negatively impacts the ability to treat and admit emergency patients leading to long wait times in the emergency department. One hospital in the region registered an 8% "Did Not Wait" (DNW) among patients in their emergency room, almost 3x higher than the national average. Both hospital systems also reported unit closures due to nursing shortages and ICU's having to go on occasional bypass during periods of heavy patient volume.

Conclusions

As the above situational assessment indicates, the Joplin region is confronted with three strategic opportunities to grow its healthcare and health sciences industry. The first opportunity is to align educational institutions and their offerings with the types of in-demand jobs available in the region's healthcare and health sciences workforce. Second, there is an opportunity for Greater Joplin to develop research and development, innovation, and business development opportunities based on pre-existing and evolving healthcare assets. Lastly, there are opportunities to advance healthcare delivery to meet the region's unique community health challenges. Each of these needs or opportunities connects to economic development—impacting the overall attractiveness and functionality of the business and institutional ecosystem in the region and the economy that depends on it.

Technology will clearly play a critical role in future success. As an important part of the strategic planning process, TEConomy has prepared a summary of major technology disruptors facing the industry (see Appendix 2). Recent advances in information, communication, and clinical technologies are transforming education, health sciences, and healthcare like no other time in human history. The ability to leverage artificial intelligence, advanced analytics, robotics, the Internet of Things (IOT), advanced networking and computing power will be key success factors moving forward.

Based on the situational assessment, a series of interconnected strategies and actions are outlined in the rest of this report that provide a strategic vision for the Greater Joplin region to achieve its ambitions related to growing its healthcare and associated higher education sectors.



III. Strategic Vision

The situational assessment and key findings outlined in the previous chapter form the foundation for developing an integrated strategy—a strategy designed to realize opportunities and leverage evident regional strengths while at the same time addressing challenges and gaps in the economic development ecosystem.

The multiple findings of the research phase of this project lead to three core strategic focus areas for the Joplin region:

- Aligning educational institutions and their offerings with the types of jobs available in the region's healthcare and health sciences workforce.
- Developing research and development, innovation, and business development opportunities based on pre-existing healthcare assets.
- Advancing healthcare delivery to meet the region's unique community health challenges.

Table 3: Three Strategic Foci

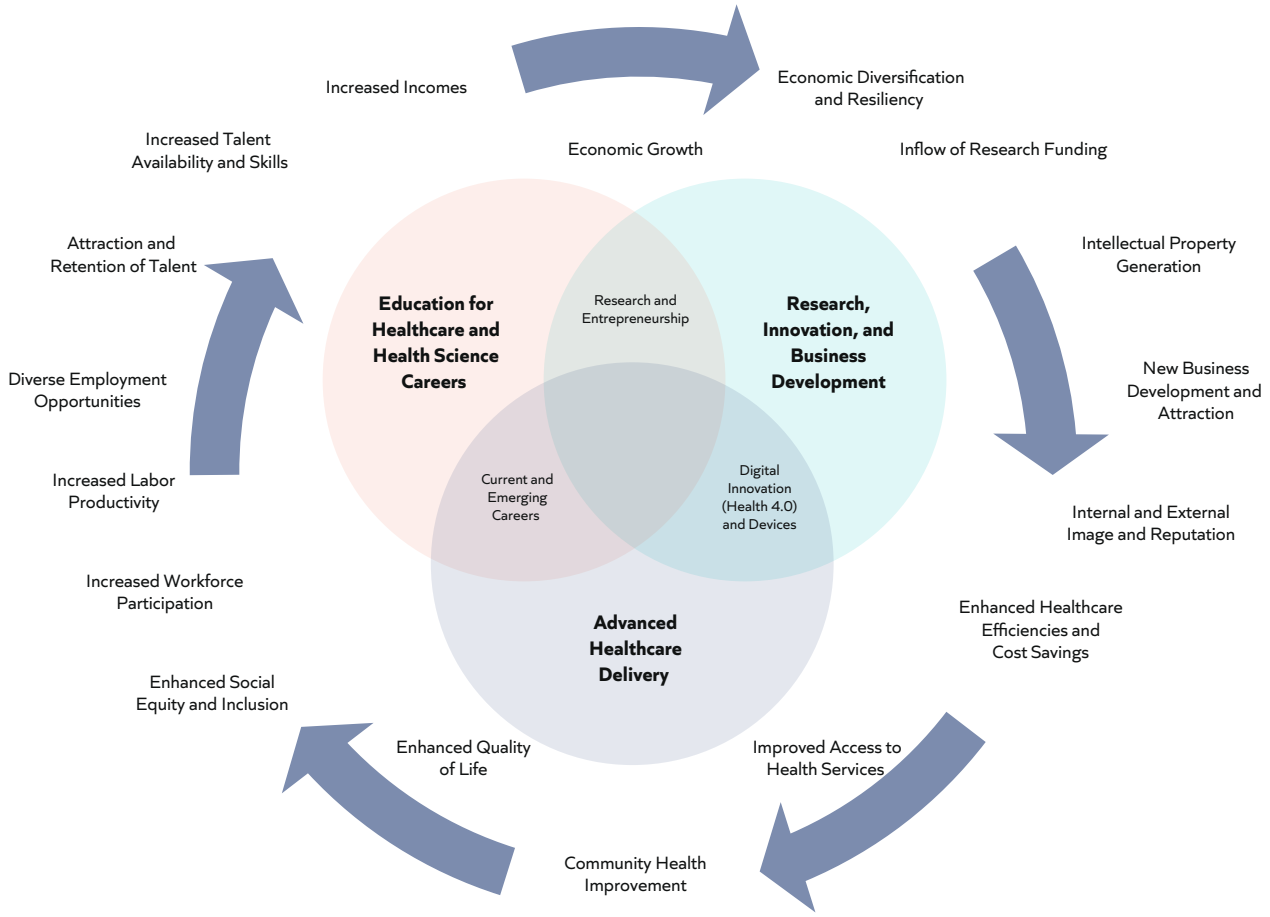
Strategy Focus	Description
1. Education for Healthcare and Health Science Careers	**Aligning educational institutions and their offerings with the types of jobs available in the region's healthcare and health sciences workforce.** There is a strategic need and opportunity to better align the signature higher education assets of the region with the sustained demands of the regional healthcare system for skilled workers. This presents opportunities to enhance economic development along multiple pathways, including growing the existing higher education businesses as an economic driver, reducing personnel acquisition and retention costs across the healthcare system, improving the quality of healthcare services and their productivity, and helping to assure the region educates the necessary personnel to advance digital healthcare and other fast moving opportunity spaces.
2. Research, Innovation and Business Development	**Developing research and development, innovation, and business development opportunities based on pre-existing and evolving healthcare and higher education assets.** Joplin may leverage its distinctive higher education (especially KCU and MSSU), healthcare, and business assets to build a presence in selected R&D and business innovation opportunities. Emerging technologies in healthcare present multiple pathways for new business development and business expansion, especially, but not limited to, the rapidly developing digital health space. As expertise in research spaces builds, this may also become an attractor for existing businesses to consider a Joplin region location.

Strategy Focus	Description
3. Advanced Healthcare Delivery	**Advancing healthcare delivery to meet the region's unique community health challenges and increase workforce availability and productivity.** The healthcare delivery system within the region may become a leader in the development of an advanced healthcare delivery model that integrates technology, innovation, and new workforce skills to build an expanding position in digital health (Healthcare 4.0). This strategy leverages emerging technologies to significantly improve regional healthcare access and outcomes via the use of telemedicine, medical IoT, remote patient monitoring, emerging AI solutions, and other technologies and innovative approaches to care suited to enhancing healthcare in rural and small community settings. Through enhancements to the healthcare system, this strategy will have the additional benefit of increasing patient access to care and overall community health, thereby promoting increased workforce participation and productivity levels across the economy (thereby boosting GDP).

Source: TEConomy Partners, LLC

Evident in Figure 11 is the integrated and overlapping connectivity of key finding areas from the situational assessment to the recommended individual strategies. As will be discussed herein, the strategies stand alone, but they also intersect with and reinforce each other to produce positive strategic outcomes, with a focused eye on achieving economic development for the Joplin region. Figure 11 expands upon the three strategies to show the extensive range of economic development benefits likely to be associated with the implementation of these strategies.

Figure 11: Strategies and Associated Economic and Community Development Impacts



Source: TEConomy Partners, LLC.

As illustrated using a Venn diagram, the multifaceted economic and community benefits associated with the proposed macro-strategy derive from the individual strategies and the natural intersections between them. The strategies are designed to be mutually reinforcing.

Under each strategy area, a series of specific actions are recommended that are rooted in the situational assessment and subsequent discussions. These are outlined within Table 4, collectively presenting a series of 17 total actions.

Table 4: Actions Recommended Under Each Strategy

Strategy 1 Education for Healthcare and Health Science Careers	**Strategy 2** Research, Innovation, and Business Development	**Strategy 3** Advanced Healthcare Delivery
Action 1.1: Expand higher education programs and enrollments to meet anticipated regional health system needs. Anticipate at least a 2x output of students with focus on nursing, allied health, and emerging digital health fields.	**Action 2.1: Build a presence in 3-4 selected areas of research:** • Digital Health Solutions • Population and Community Health • Medical Devices • Health EdTech	**Action 3.1: Primary and Community Care Delivery Network expansion and coordination.** Increase primary and family care networks in the community, including addressing physician gaps, patient navigation, and financial assistance.
Action 1.2: Extend and integrate regional articulation across K-12/CC/Univ systems. Build and expand the high school CAPS programs, creating clear articulation pipelines across strategic career pathways.	**Action 2.2: Seek to establish a signature longitudinal health study connected to regional health improvement and digital health.** Establish as a multistate regional study to engage with NW Arkansas interests in healthy community innovations.	**Action 3.2: Become an early adopter of telehealth and digital health solutions.** Expand use of telehealth, remote patient monitoring, and similar patient-facing digital technologies to significantly improve health service access. Enhance broadband and transportation access to serve the needs of remote and disadvantaged populations.
Action 1.3: Connect higher education degree programs to emerging signature research platforms and encourage student research engagement. Encourage both undergraduate and graduate student research engagement.	**Action 2.3: Establish a small support stipend program for innovative postdocs to advance promising technologies.** Innovative ideas can be imported by offering supported positions (perhaps joint between hospitals and universities) for those with interesting, vetted concepts in signature research areas.	**Action 3.3: Develop shared data architectures and resources to capture and analyze clinical and population health data. Leverage and integrate Telehealth, patient-facing digital health and EMR data to seed research and innovation.** Consider the launch of patient gene sequencing to build a shared resource for research and clinical care advancement.
Action 1.4: Explore collaborative program delivery across regional institutions to leverage faculty and scarce resources. Many new areas of education are multidisciplinary, engaging computer and data sciences, engineering, biosciences, and other disciplines. Skills may exist across institutions to build novel programs.	**Action 2.4: Establish pre-seed fund to help advance IP commercialization and maximize connection building to MO funders and existing support programs.** Seek to establish a moderate $1-2 million pre-seed fund able to provide up to $50,000 seed investments in promising concepts.	**Action 3.4: Implement caregiver support technologies and workforce management systems.** Adopt technologies to improve workforce efficiency, clinical decision making, workforce skills development, and labor productivity. This may include integration of AI-based solutions.
Action 1.5: Expand opportunities for internships and other employer-student connectivity building activities. Seek to maximize the retention of regionally educated students by building early career connections with local employers.	**Action 2.5: Assure availability of incubator space and accelerator/mentor services.** Assure budding entrepreneurs have access to space and support to advance early-stage commercial concepts.	**Action 3.5: Care Model Innovation.** Joint initiative to design, pilot, and implement changes to health roles and delivery models (new roles, flexible scheduling, remote workforce, shared employees/pool/agency). This may include integration of AI-based solutions.
Action 1.6: Form a series of certificate programs, or stackable credential programs, designed for continuing education in fast moving health tech fields. e.g., cybersecurity, telemedicine, EMR analytics, wearable systems, etc.		**Action 3.6: Healthy Community Coalition.** Joint coalition (delivery system, business, government) promoting and funding healthy community initiatives in schools, businesses, and the broader community.

Source: TEConomy Partners, LLC.

Each of the three strategies and their associated actions are detailed in individual chapters that follow.

IV. Strategy 1:

Education for Healthcare and Health Science Careers

Aligning educational institutions and their offerings with the types of jobs available in the region's healthcare and health sciences workforce.

Rationale:

There is a strategic need and opportunity to better align the signature higher education assets of the region with the sustained demands of the regional healthcare system for skilled workers. This presents opportunities to enhance economic development along multiple pathways, including growing the existing higher education sector as an economic driver, reducing personnel acquisition and retention costs across the healthcare system, improving the quality of healthcare services and their productivity, and helping to ensure the region educates the necessary personnel to advance digital healthcare and other fast-developing opportunity spaces.

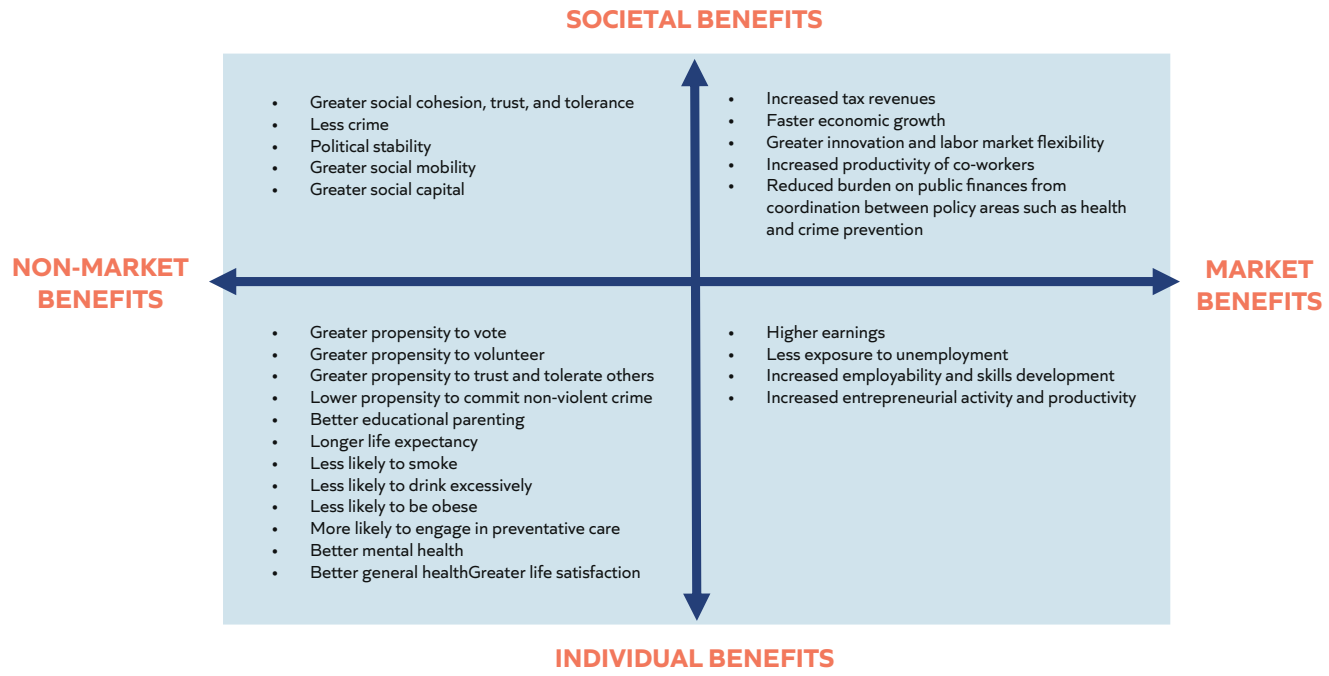
Potential Impacts:

Benefits for the economy may be derived from the following:

- Attraction of student funds from outside the immediate region. Students who are not from the immediate region generate income that leads to higher education being a "traded" industry, expanding regional GDP. Also, retaining regional students in Joplin regional higher education institutions prevents the leakage of education spending that would occur were they to attend colleges or universities outside of the region.
- Having a reliable, local supply of educated human capital able to meet the healthcare sector's diverse workforce needs helps build early connections between students and potential employers (via internships, residencies, job shadowing, etc.) This enhanced connectivity helps healthcare employers reduce recruitment costs and likely results in improved staff retention as the student has previously engaged with the employer and knows what to expect in the work environment.
- Participation in higher education typically exposes students to research and can be a pathway for potential innovation activity.
- Continuing education programs and opportunities for healthcare workers to continue their education to higher levels (for example, a licensed practical nurse continuing their education to achieve an ASN or BSN) increase the skill base of the workforce and provide pathways to higher earnings and associated economic impacts.
- Access to higher education provides individuals with education and skills that will enhance their productivity in the workplace.

Higher education is associated with a multifaceted suite of public and private economic and societal returns. Expanding the higher education sector in Joplin and capturing a significant volume of graduating students for employment within the region will provide wide-ranging positive impacts. A useful overview of these benefits is provided in a paper by the Department for Business Innovation and Skills (BIS) in the UK, which examined the private/social and market/non-market returns of higher education.[15] The BIS authors note that "The report covers only benefits from higher education participation, so that benefits arising from research exploitation, spin-off companies, export earnings through international student fees and spending, and other aspects of higher education are not included." The report provides a useful "two-way taxonomy of benefits, with individual/society as one dimension and market/non-market (or wider) benefits as the other"[16] which is shown in Figure 12.

Figure 12: Categorization of Positive Impact Benefits Associated with Higher Education



Source: UK Department of BU.S.iness Innovation and Skills.

Because the benefits of higher education are so strong, and because health sciences education ties into support of Joplin's large healthcare sector, investing in further education in the region focused on meeting the needs of the healthcare sector represents a high priority strategic imperative.

15 Department for Business Innovation and Skills. 2013. "The Benefits of Higher Education Participation for Individuals and Society: Key Findings and Reports." October 2013, BIS Research Paper No. 146.

16 Ibid

Strategic Actions:

Six actions are recommended for implementation under Strategy 1:

- **Action 1.1**—Expand higher education programs and enrollments to meet anticipated regional health system needs.
- **Action 1.2**—Extend and integrate regional articulation across K-12/community college/university systems. Build and expand the high school CAPS programs, creating clear articulation pipelines across strategic career pathways.
- **Action 1.3**—Connect higher education degree programs to emerging signature research platforms and encourage student research engagement. Encourage both undergraduate and graduate student research engagement.
- **Action 1.4**—Explore collaborative program delivery across regional institutions to leverage faculty and scarce resources. Many new areas of education are multidisciplinary, engaging computer and data sciences, engineering, biosciences, and other disciplines. Skills may exist across institutions to build novel programs.
- **Action 1.5**—Expand opportunities for internships and other employer-student connectivity-building activities. Seek to maximize the retention of regionally educated students by building early career connections with local employers.
- **Action 1.6**—Form a series of certificate programs, or stackable credential programs, designed for continuing education in fast-moving health tech fields. (e.g., cybersecurity, telemedicine, EMR analytics, wearable systems, etc.)

Details for each of these recommended actions follow:

Action 1.1—Expand higher education programs and enrollments to meet anticipated regional health system needs.

Expand programs to meet key health workforce gaps and broaden workforce supply chain. Anticipate at least a 2x output of students with focus on nursing, allied health, and emerging digital health fields.

Workforce issues, particularly those related to training, recruitment, and retention of staff, emerged as a top concern in the analysis. Even post-pandemic, the recruitment of nurses and other clinical staff and allied health professionals has been challenging for Joplin area hospitals and health care practices. Local delivery system management has responded by offering higher wages, bonuses, and employment of migrant staff (e.g., traveling nurses, which command significantly higher compensation rates), increasing the cost of operating the healthcare system. Despite these efforts, staff levels for critical health system personnel remain lower than targets.

Shortages are being experienced across a broad range of healthcare positions, including, but not limited to: nurses (LPN, RN), nurse assistants, surgical technicians, respiratory therapists, medical laboratory technicians, radiology and imaging (CT) technicians, sterile processing technicians, pharmacy technicians, and housekeeping personnel. The scope of the challenge is illustrated by Figure 7 in the situational analysis, which provides data for 2017 through 2022 for the supply and demand of selected clinical positions in the MOKAN region. Across this six-year period, for example, there was a shortfall in production of 2,038 registered nurses (with supply only meeting 49.2% of potential demand), equal to a 334 annual shortfall. Significant shortfalls are shown for physicians and allied health positions also. These data reveal a significant supply and demand mismatch across multiple important clinical job functions.

The region does benefit from the presence of multiple institutions engaged in the education and training of students for healthcare careers. The primary challenge is that the volume of graduates from these programs is insufficient to meet demand—and the high demand for healthcare workers nationwide makes it challenging to retain all graduates (or recruit-in graduates from outside of the region).

There is a clear need for action to be taken to better align educational supply to the current and future demand for an educated and skillful healthcare workforce. Based on the input from interviews, nursing talent represents the largest pressing need.

Nursing is a career that provides job opportunities across a range of progressively higher education levels. Figure 13, produced by nurse.org, summarizes from top to bottom the progression of higher levels of nursing qualification and the education, salaries (national), and growth prospects associated with them.

At the entry level are Certified Nursing Assistants (CNA) who help patients with activities of daily living and other healthcare needs under the direct supervision of a Registered Nurse (RN) or Licensed Practical Nurse (LPN).

Missouri Southern State University

MSSU is a critically important institution working to solve the workforce challenges facing healthcare in the region. The University is already engaged in extensive educational programs that bring high quality education to students studying healthcare and life science focused majors. Indeed, Missouri Southern has the greatest number of undergraduate programs in these areas among all public universities in Missouri. The delivery of healthcare and life sciences education will be further enhanced by forthcoming investment on the MSSU campus in the Health Science Innovation Center, a $37.5 million facility set to open in 2026.

Next come Licensed Practical Nurses (sometimes termed Licensed Vocational Nurses) who work in hospitals, nursing homes, and long-term care facilities and are typically responsible for more basic kinds of patient care and comfort measures. Usually, they work under the guidance of an RN or MD.

A fully qualified "nurse" is found at the Registered Nurse (RN) level. These positions require either an Associate Degree in Nursing (ADN) or a Bachelor of Science in Nursing (BSN). "A registered nurse administers hands-on patient care in a variety of settings, including hospitals, medical offices, nursing homes, and other facilities. RNs work with physicians and other members of the health care team to provide the best course of treatment possible. They also help to educate patients and their families about health issues."[17]

Nurses may also choose to continue their education, undertaking masters or doctoral degree training to achieve Advanced Practice Registered Nurse qualifications. It is this level of training that is required for Nurse Practitioners and for certain nursing specialties such as Nurse Anesthetist or Clinical Nurse Specialist. Master's and doctoral degrees may also be pursued by nurses seeking qualifications for nursing administration positions or as nurse educators.

Multiple colleges and universities provide nursing and allied health professional higher education programs within the MOKAN region. Appendix 3 provides details on nursing-focused degree and allied health degree outputs. In terms of nursing, Pittsburg State University produces the highest number of graduates (168), followed by Crowder (140), Northeastern Oklahoma A&M (69) and MSSU (30). Notable in these data is the absence of advanced practice registered nurse degrees—an area that may well present opportunities for MSSU to expand its degree offerings. For Joplin, and its economic development, the expansion of nursing degree programs at MSSU is a primary need. Programs at MSSU provide robust opportunities for students to connect with the large Joplin-based hospitals and other local clinical service providers.

17 https://nurse.org/education/nursing-hierarchy-guide/

In registered nursing, Figure 7 shows a typical annual shortfall in regional higher education output of 334 graduates. For MSSU alone to meet this demand would require an increase in BSN student volume of 1,237% (moving from an output of 30 graduates to 401). Clearly, this would be a very heavy lift and quite unrealistic. Indeed, for MSSU to produce that many nursing students would require it to be one of the largest colleges of nursing in the nation. Development of a college of nursing able to accommodate that volume of students would mandate a very substantial increase in the nursing faculty at MSSU and the supply of expanded space and other infrastructure required to accommodate such a student increase. It is not realistic to anticipate that MSSU can solve the nursing shortage for the region on its own, but it should receive significant emphasis as a key Joplin-based contributor to the solution, working towards the production of 90-100 nursing graduates a year as soon as faculty recruitment and the Missouri State Board of nursing allows.

MSSU can also be seen to be the clear leader in the provision of allied-health-focused higher education, and expansion of its programs in this regard is encouraged given the supply/demand imbalance shown in the situational analysis (whereby higher output in most allied health degrees sees a high likelihood of regional absorption). Any expansion of nursing graduation from Pittsburg State would also be helpful, and PSU has recently opened expanded nursing education facilities and a simulation hospital that enable the university to expand from cohorts of 90 students to accommodate 120.[18]

Crowder College is an exceptionally important contributor to nursing education for the region, with the college noting that it places the most RNs into the workforce in the region among all colleges and universities. Indicative of demand, and the quality of education and training, ADN graduates who

Figure 13: Levels of Nursing Education

	Education	Career & Salary Opportunities
CNA Certified Nursing Assistant	• 4-12 week program • CAN certification exam • Earn a state license	CNA Salary: • $30,290 per year • $14.56 per hour Job Outlook: • 8% growth
LPN Licensed Practical Nurse	• 1-year program • NCLEX-PN licensing exam • Earn a state license	CNA Salary: • $48,070 per year • $23.11 per hour Job Outlook: • 9% growth
RN Registered Nurse	Associate Degree in Nursing (AND) • 2-3 year program • NCLEX-RN Bachelor of Science in Nursing (BSN) • 4-year program • NCLEX-RN	Registered Nurse Salary: • $77,600 per year • $37.31 per hour Job Outlook: • 9% growth
APRN Advanced Practice Registered Nurse	Master of Science in Nursing (MSN) • 2-3 year post-graduate program • APRN roles must also complete in-person clinical hours and pass a certification exam in the area of specialization Doctor of Nursing Practice (DNP) • 3-4 year post-graduate program • Requires capstone DNP project	Nurse Practitioner (NP) • $120,680 per year Clinical Nurse Leader (CNL) • $104,107 per year Clinical Nurse Specialist (CNS) • $106,407 per year Certified Registered Nurse Anesthetist (CRNA) • $195,610 per year Certified Nurse Midwife (CNM): • $112,830 per year
Non-Clinical Specialties	• MSN • DNP • PhD	Nurse Administrator • $101,340 per year Nursing Informaticist • $79,720 per year Nurse Educator • $77,440 per year Nurse Researcher • $99,372 per year

Source: Nurse.org

18 https://www.pittstate.edu/gorillaconnection/2023/04/construction-wraps-up-at-nursing-schools-simulation-hospital-.html

seek immediate nursing employment have 100% placement rates. Crowder College also has articulation agreements in place that facilitate CNA certificate and qualifying practical nurses to enter its ADN program and has articulation agreements with BSN programs in place for its ADN graduates. Both Crowder College and Missouri Southern State University are important Missouri institutions contributing to solving the regional nursing challenge.

Announced Facilities Under Consideration for the New MSSU Health Sciences Building

- Simulated hospital with acute care, labor and delivery, emergency care, and examination rooms
- Skills lab
- Radiological technology lab
- Cadaver lab

Working in Joplin's favor is the forthcoming investment in a new $35.7 million, circa 70,000 square foot health sciences building on the MSSU campus. The review of market conditions suggests that this building should be predominantly focused on nursing education, although the envisioned facilities (see sidebar) would also be able to be used to support education programs in multiple allied health degree programs. One of the challenges that will need to be addressed in parallel is maximizing the opportunities for the nurses-in-training to receive practical training (practicums) within regional hospitals and other healthcare settings.

While MSSU is the primary focus of this action for expanding educational programs for the region, other institutions should be encouraged to expand their offerings, especially, but not limited to, in nursing (at the pre-baccalaureate certificate and associate level). Articulation agreements should be a priority, enabling certificate and pre-baccalaureate program courses to transfer into the MSSU and other regional BSN and ADN programs (see Action 1.2).

Existing Stakeholders and Relevant Programs:	Supply Side: • MSSU (Joplin) • KCU Colleges of Medicine and Dentistry (Joplin) • Franklin Technology Center (Joplin) • Crowder College (Neosho, Pineville, Nevada, and Cassville) • Missouri State University–Springfield • Cox College (Springfield) • Ozarks Technical Community College (Springfield) • Pittsburg State University (Pittsburg, KS) • Northeastern Oklahoma A&M College (Miami, OK) • Regional high schools Demand Side: • Freeman Health System • Mercy Health System • Private clinical practices • Nursing and long-term care facilities
Lead Implementing Organizations:	• MSSU • Crowder College • Freeman Health System • Mercy Health System
Prioritization:	High
Timing:	Short-term

Potential Action Components:

- Continuously define and forecast health delivery system human resource requirements over time (headcount, roles, skills) based on shared input from key delivery employers (Freeman, Mercy, Access, et al). Define a delivery system workforce resource "ask" (forthcoming year, 3- year forecast, 5-year forecast) for key roles across the region.
- Develop comprehensive and shared pipeline view across regional institutions to guide ongoing program planning and development.
- A core challenge to be addressed is the recruitment of nursing faculty. Such faculty are in high demand and relatively short supply nationally.[19] Compensation packages will need to be generous to attract new faculty to Joplin, and it may be important to provide faculty with collaborative faculty practice arrangements with the hospital systems to help meet compensation demands.
- MSSU, perhaps in collaboration with KCU, will need to structure a program to allow masters students in nursing to study for a doctorate in nursing practice or a PhD in nursing to provide an expanded interregional pipeline of faculty candidates.

Examples:

Multiple colleges and universities have established new or significantly expanded nursing programs in recent years. Some examples include:

- Providence College in Rhode Island established a new school of nursing. It is constructing a new 10,000 sq. ft. building to accommodate the program and intends to cap enrollment at 75 students per year.
- The University of Northern Iowa is starting a new program in nursing, with four-year BSN degrees. It anticipates enrollment of 100 students per year.
- Merrimack College in Massachusetts inaugurated its School of Nursing and Health Sciences with its first class of nursing students in 2019. It opened a 20,000 sq. ft. nursing education center in January 2020 and has 11 faculty members. Its first graduating class was 38, but freshman enrollment for the BSN has now increased to greater than 100.

19 The challenge noted by the American Association of Colleges of Nursing (AACN). The ACCN notes that:

- "According to AACN's report on 2021-2022 Enrollment and Graduations in Baccalaureate and Graduate Programs in Nursing, U.S. nursing schools turned away 91,938 qualified applications from baccalaureate and graduate nursing programs in 2021 due to an insufficient number of faculty, clinical sites, classroom space, clinical preceptors, and budget constraints. Most nursing schools responding to the survey pointed to faculty shortages as a top reason for not accepting all qualified applicants into their programs.
- According to a Special Survey on Vacant Faculty Positions released by AACN in October 2022, a total of 2,166 full-time faculty vacancies were identified in a survey of 909 nursing schools with baccalaureate and/or graduate programs across the country (84.4% response rate). Besides the vacancies, schools cited the need to create an additional 128 faculty positions to accommodate student demand. The data show a national nurse faculty vacancy rate of 8.8%. Most of the vacancies (84.9%) were faculty positions requiring or preferring a doctoral degree."

Source: https://www.aacnnursing.org/news-data/nursing-faculty-shortage

Action 1.2—Extend and integrate regional articulation across K-12/CC/Univ systems. Build and expand the high school CAPS programs, creating clear articulation pipelines across strategic career pathways.

After higher education, many local graduates seek employment outside of the region. Given the amount of time, effort, and expense required to recruit clinical staff from outside the region, it makes sense to maximize the placement of local candidates by aligning and integrating candidate pipelines with local secondary and higher education institutions. The MOSO Caps initiative is a great local example of identifying and incentivizing local candidates to be educated, work, and stay in the Joplin Region.

The Centers for Advanced Professional Studies (CAPS) in Missouri represent innovative initiatives that engage high school students in a career-oriented professional culture, using industry-standard tools and mentorship by employers to engage in problem-solving and applied learning. Students participating in CAPS earn high school credit and transferable college credit. **The transfer of credits facilitated by articulation agreements is an intensely important component for encouraging local high school students to stay in the region for their higher education.** Articulation agreements are formal agreements between two or more educational institutions that outline the transfer policies for specific courses at one institution into academic programs or degrees at another. These can be high school courses (including the well-known advanced placement courses) transferring to colleges or articulation agreements between community colleges and four-year colleges for credit transfer. **What will be most important for the Joplin region is assuring a network, or shared system, of articulation agreements be established between all regional high schools, the community college system, and MSSU for coursework relevant to healthcare college degrees.** Doing so will require the development of a shared vision between the high schools and colleges, setting out clear pathways for education articulation that provide opportunities for local students to pursue local healthcare careers.

Best practices suggest that:

- A joint committee be established between area high school leaders, the community colleges, and MSSU senior leadership to develop, oversee, and regularly review the implementation of the agreement(s).
- Faculties at respective institutions, together with major healthcare system employers, should be convened in workshops to ensure the development of an efficient shared curriculum and alignment of the curriculum to professional and career standards. Periodic review should occur to evaluate the curriculum, together with the implementation of a feedback system that will enable refinements to be made as gaps, issues, needs, or opportunities are observed.
- The articulation program should have a student-centered structure that works to spark initial student interest and then provides proactive counseling for students to help them understand and navigate the courses and connectivity across institutions that will get them to Joplin regional healthcare careers. Ideally, students will have access to regional articulation counselors who will stay engaged with them as a single point of contact across their educational pathway.
- The agreements need to be transparent, clearly communicating and delineating the educational pathway options and the specific course credits that transfer. These agreements need to be long-term, assuring that changes are not made that undercut the program or negate the transfer of credits.
- The program needs to be actively promoted to high school students and their parents, clearly communicating the advantages of the program in terms of providing cost-efficient and time-efficient paths to secure credentials for in-demand local careers.



Existing Stakeholders and Relevant Programs:	• Regional K-12 school districts, especially at the high school level • Crowder College • MSSU
Lead Implementing Organizations:	• Purpose formed committee of stakeholder institutions
Prioritization:	High
Timing:	Short-term

Potential Action Components:

- Extend/expand MOSO CAPS program-like initiatives to expand visibility of health careers in secondary education and promote student enrollment for post-secondary, bachelor's, and advanced degrees.
- Work closely with delivery system recruitment teams to provide employment "landing pad" for local students through local internships, practicums, and residencies.
- Provide or expand student-facing resources to facilitate career planning, education enrollment and job placement.

Examples:

There are many examples of innovative articulation programs, and multiple pathways that have been developed for achieving articulation goals. Some examples include:

Individual Institutional Partnerships—Comprising agreements between specific high schools and individual colleges that create unique pathways for students.

Dual Enrollment Programs—Allowing high school students to take college-level courses for credit. For example:

- **Running Start in Washington State:** This program enables high school juniors and seniors to take college courses at Washington's public community, technical colleges, and some four-year colleges and universities.
- **Middle College High Schools:** A network of high schools that are located on community college campuses and allow students to take college courses while still in high school.

Career and Technical Education (CTE) Agreements—Whereby students earn college credits for technical courses taken in high school. For example:

- **Tech-Prep Programs:** These are nationally established programs where students can earn college credits for technical courses taken during high school.
- **Career Pathways in Oregon:** Which established a statewide framework for high school students to earn college credit in career and technical education courses. It began in 2004 with five colleges. In 2006, the initiative expanded to 11 colleges and scaled to all 17 community colleges in Spring 2007.

Early College High Schools—Comprising partnerships between high schools and colleges where students can earn both high school and college credits simultaneously. For example:

- **P-TECH (Pathways in Technology Early College High School):** A program where students can earn a high school diploma and an industry-recognized associate degree.
- **Early College High School Initiative:** Supported by the Bill & Melinda Gates Foundation, this initiative has sponsored the development of early college programs nationwide. The Rochester Early College International High School and Monroe Community College Partnership is an example of this. The NY collaboration allows students to earn college credits while in high school.

Statewide Articulation Agreements—Comprising large-scale, state-organized programs. Examples include:

- **The North Carolina High School to Community College Articulation Agreement** is an agreement between the North Carolina Department of Public Instruction and the North Carolina Community College System.
- **Ohio's Transfer to Degree Guarantee:** Allows students to transfer credits earned in high school to any Ohio public college or university.
- **Florida Statewide Articulation Agreement.**

Action 1.3—Connect higher education degree programs to emerging signature research platforms and encourage student research engagement. Encourage both undergraduate and graduate student research engagement.

As discussed under Strategy 2 in the next chapter, there is a need for the Joplin region to become more engaged in research in higher education and healthcare to:

1. Bring in research dollars from outside of the economy (providing economic stimulus).
2. Provide opportunities for students to improve their education through research engagement.
3. Provide a base platform for innovation (that may be potentially commercializable) and associated student-driven entrepreneurship.

Action 2.1 in the following chapter outlines several areas of potential research focus that would likely be a fit for the assets and interests of the healthcare and higher education sectors in the Joplin region. As the research programs are developed, it will be important to connect education programs to these programs, providing a flow of students engaging in research at both undergraduate and graduate levels. Student engagement in research is both educationally beneficial and provides a support workforce for research faculty and/or clinical researchers. This also provides a pathway forward for personnel to continue to hold research positions post-graduation and may be beneficial in terms of generating student derived innovations (not just faculty innovations) with economic development potential.

Existing Stakeholders and Relevant Programs:	• KCU • MSSU • PSU • Crowder College
Lead Implementing Organizations:	• KCU • MSSU
Prioritization:	Medium
Timing:	Mid-term

Potential Action Components:

- Because MSSU is predominantly an undergraduate-focused institution, it will be important to put in place initiatives that encourage undergraduate engagement in research. Ideally, a model could be developed similar to that used in the Undergraduate Research Scholars Program (URS) at the University of Wisconsin–Madison, which provides first and second-year students with opportunities to earn credit for participating in research with UW-Madison faculty. By building early engagement in research, students will have more opportunities to engage in innovation across their undergraduate education and may be more encouraged to continue their studies at a graduate level.
- To keep students engaged in the community and the universities during the summer, a series of grant-supported summer research programs should be developed, linked to each of the research platforms (see Action 2.1), that will provide students with an intensive research experience.

Examples:

Student entrepreneurship during undergraduate education and in graduate school is a focus of multiple innovative initiatives across U.S. colleges and universities. The Arrowhead Center programs at New Mexico State University are well-recognized as an example, but there are many others, such as:

- The Lassonde Entrepreneurship Institute at the University of Utah.
- The Baiada Institute for Entrepreneurship at Drexel University.
- The Garage at Northwestern University.
- The Zell Lurie Institute for Entrepreneurial Studies and the TechArb Student Venture Accelerator at the University of Michigan.
- eLab at Cornell University.

Action 1.4—Explore collaborative program delivery across regional institutions to leverage faculty and scarce resources. Many new areas of education are multidisciplinary, engaging computer and data sciences, engineering, biosciences, and other disciplines. Skills may exist across institutions to build novel programs.

Although institutions of higher education within a region may compete for students, funding, faculty, and other resources, they may also choose to combine their respective strengths to develop innovative programs responsive to regional needs. Many areas of science and emerging technology development are inherently multidisciplinary, and instead of competing there may be opportunities for regional colleges and universities to develop collaborative degree programs or alternative credential (see Action 1.6) programs. Fast emerging areas of activity, for example the Internet-of-Things, require expertise in engineering, computer science, statistics, and data analytics, etc. for their development and deployment—academic disciplines that may not be sufficiently covered at an individual institution. In the MOKAN region, for example, MSSU has significant coverage of allied health areas, Pittsburg State has engineering, and KCU has medicine—but none covers all three. By working together, institutions can bring their respective strengths to the table and stand-up programs responsive to emerging demands.

Areas likely to experience increasing demand that may lend themselves to multi-institutional collaborations might include:

- Telemedicine and rural health
- Health informatics and clinical data (genotype and phenotype) analytics
- Patient remote monitoring and wearable health technologies
- Medical device innovations and development

This is somewhat complicated in the MOKAN region by the fact that colleges and universities are a mix of public (e.g., MSSU and Crowder College) and private (e.g., KCU) institutions, and the public institutions in the region exist in multiple states (e.g., PSU in Kansas, MSSU and Crowder in MO, Northeastern Oklahoma A&M in OK). Governance boundaries can make collaborations more complex but should not be an insurmountable barrier. There are multiple examples of

public and private universities developing shared programs. For example, Carnegie Mellon University (private) and the University of Pittsburgh (public) operate a joint graduate degree program in computational biology that leverages the respective institutional strengths in computer science and biomedical sciences.

Existing Stakeholders and Relevant Programs:	• KCU • MSSU • PSU • Crowder College
Lead Implementing Organizations:	• KCU • MSSU
Prioritization:	Medium
Timing:	Mid-term

Potential Action Components:

- Form a working group to consider and prioritize fast-growing multidisciplinary areas that link especially to digital healthcare technologies. This group should comprise senior college leadership with a particular emphasis on the following disciplines:
  - Engineering (primarily mechanical, electrical, and computer engineering)
  - Computer science
  - Advanced analytics and statistics
  - Clinical medicine and nursing.
- Convene a focus group comprising Freeman and Mercy surgeons who are frequent users of medical devices (most likely to be in orthopedics and interventional cardiology). Discuss interests in providing advice and conceptual concepts to a multidisciplinary program and device innovation initiative formed by regional colleges and universities.
- Inventory and canvas local precision manufacturing firms and software development/IT companies to categorize their capabilities and interests in engaging in medical innovation activities in collaboration with newly established college or university multidisciplinary programs.
- Examine opportunities for industry representatives and clinical specialists to be adjunct faculty within multidisciplinary programs.

Examples:

The Carnegie Mellon University and University of Pittsburgh example, cited above, is not the only such collaborative program between universities with respective specializations that combine to build multidisciplinary programs. Another prominent healthcare-oriented example is the partnership between the Georgia Institute of Technology and Emory University which brings together the medical expertise of Emory's School of Medicine with Georgia Tech's engineering and computational sciences strengths. Also in the biomedical engineering space is the development of the Joint Department of Biomedical Engineering operated by North Carolina State University (known for its engineering) and the School of Medicine at the University of North Carolina–Chapel Hill.

Action 1.5—Expand opportunities for internships and other employer-student connectivity building activities. Seek to maximize the retention of regionally educated students by building early career connections with local employers.

Among the most effective ways to retain talent graduating from regional colleges and universities is to work far in advance of a student's graduation to build connections and relationships with local employers. When internships, practicums, and other career-facing opportunities are provided to students, they experience first-hand the relevance of their education to application in the workplace and are exposed to potential future employers—thereby building connections that can enhance their local employment interests and opportunities. For careers in healthcare, internships, job shadowing, and other connectivity-building activities are particularly important in helping students or potential students understand how their education will connect to real-world applications and opportunities. Such experiences carry multiple advantages for workforce development and local economic development. Most notably they are likely to promote:

- Retention of local talent by building pre-graduation connectivity and relationships between students and employers.
- An increase in the effectiveness and work-readiness of graduates through building real-world employment experiences that complement the more theoretical or conceptual education of their college coursework.
- Improved dialog between the education sector and employers, as internships are established and discussions take place over program design and outreach.
- An ability for employers to temporarily supplement their workforce, take on projects that they may otherwise not have pursued, and gain from the fresh perspectives of students.

From an employer standpoint it is important that interns and others engaged in work experience programs not simply be viewed as "cheap labor." The experiences need to be set-up to be win-win for both the student and the employer, which ideally requires that:

- Internships are established with well-defined goals both in terms of outcomes for the employer and valuable knowledge and experience building for the student.
- Students should receive onboarding instructions and be assigned a mentor or supervisor who will answer questions, provide guidance, and ensure a two-way flow of feedback.
- Opportunities are provided for interns to rotate through multiple departments or work teams, thereby providing a well-rounded overview of the types of career opportunities the employer provides.
- Interns are given opportunities to work on meaningful projects or tasks rather than simply assigned "grunt work" or menial tasks. They need to feel needed, wanted, and respected and see meaning in their assigned work.
- Feedback from the students is encouraged to ensure that they can provide perspectives on what they are finding most valuable and educational in the experience and to secure ideas on how to improve the experience and value provided by the internship.
- Periodic communication should be maintained between the internship provider and the student after the internship is concluded—serving to sustain the relationship and keep the employer front-of-mind with potentially in-demand talent.

Existing Stakeholders and Relevant Programs:	• Joplin Area Chamber of Commerce • Regional hospital systems • MSSU • Crowder College
Lead Implementing Organizations:	• Joplin Area Chamber of Commerce • MSSU
Prioritization:	High
Timing:	Short-term

Potential Action Components:

- The Joplin Area Chamber of Commerce, together with the health systems, MSSU, and Crowder Community College should jointly work on establishing a web-based internship platform similar (but on a smaller scale) to the best practice example developed and operated by Ascend Indiana (see example below). This will allow students to build a profile of their interests, see available internships, and be able to apply online for the available internships.

Example: Ascend Indiana

Ascend Indiana is an initiative of the nonprofit Central Indiana Corporate Partnership, headquartered in Indianapolis. Ascend helps both employers and students connect for internships and full-time positions. Using a robust online platform, students can register with Ascend for free, building an online profile of their education and interests and being connected to internship opportunities that fit these. The students who sign up receive proactive advice and mentorship from Ascend staff and can apply for internships directly through the Ascend online platform. The Ascend platform also works proactively for employers, with participating employers able to access the online profiles of the students' seeking internships or employment. Almost every employer of size in Indiana is a participant in Ascend, as are most colleges and universities. Early funding for Ascend Indiana came from a $5 million grant from the Lilly Endowment which supported the first three years of operations. Multiple other philanthropies have provided financial support together with the Indiana Department of Workforce Development.

Action 1.6—Form a series of certificate programs, or stackable credential programs, designed for continuing education in fast moving health tech fields (e.g., cybersecurity, telemedicine, EMR analytics, wearable systems, etc.).

In recent years, the concept of "stackable credentials" has received increasing attention in education and career development circles. Particularly in fast-moving technology fields, where skills and credentials can evolve quickly, the concept of stackable credentials and digital badges has received quite rapid acceptance. Basically, these approaches enable students to earn meaningful credentials through relatively short and affordable courses, and these then can be joined (or "stacked") to further a student's career prospects and credentialing.

Nursing may be considered one of the original pioneers of "stackable credentials" whereby there is a progression of qualifications available starting with Certified Nursing Assistant, onwards to Licensed Practical Nurse, to Registered Nurse, and Advanced Practice Nurse.

This approach to education is modular and credential-focused and, therefore, practical in application. It also leads to credential earning with relatively short time horizons and is generally affordable. Combined with articulation agreements for courses (see Action 1.2) these can also be integrated into degree-earning programs.

The approach is particularly relevant for building workforce development programs for fast-moving digital health careers (see Actions 3.2 and 3.3). These careers require specific skills in the understanding and use of digital technologies, software, and analytical techniques that lend themselves well to a stackable credential/digital badge approach to learning and credentialing. Because they are often developed with input from industry, the earned credentials typically align well with industry needs and are well-suited to engagement in continuous, career-spanning education and skills enhancement for the workforce—serving to maximize the productivity and capabilities of the workforce.

Existing Stakeholders and Relevant Programs:	• Crowder College • MSSU • PSU • Regional hospital systems and community health organizations
Lead Implementing Organizations:	• Crowder College
Prioritization:	High
Timing:	Short-term

Potential Action Components:

Creating digital badge programs for healthcare-facing career skills should be undertaken as a collaborative effort between stakeholder organizations, and it is important that the developed credentials be accepted by each of the major healthcare sector employers in the region. It is recommended that the following actions be undertaken with a focus on the digital health areas discussed under Actions 3.2 and 3.3:

- Engage stakeholders in the joint design and conduct of a needs assessment to identify the areas of education and skills that the healthcare system requires to meet emerging digital health demands. Areas likely to be considered may include, but not be limited to telemedicine proficiency, health data analytics, mobile health systems, and healthcare cybersecurity.
- Evaluate the alignment of identified needs with those of existing professional standards to ensure any digital badge credentials work to meet accepted standards.
- Examine existing digital badge programs or stackable credential programs currently in operation in the United States that may meet the goals identified in the needs assessment and align with identified standards (if applicable). Discuss the success of these with various operators of the programs and seek to duplicate best practices proven to be successful.
- Develop an initial pilot program focused on an area of key need identified by participating stakeholders and ensure there is a credential stack that enables multiple credentials to be earned. Commit to long-term recognition of these credentials to assure sustained value for students. It is imperative that the badge credentials are recognized by the healthcare industry and other relevant sectors as valid indicators of skills and competencies.
- Pursue opportunities for the badge credentials to articulate as credits for enrollment in regional higher education institutions.

The stakeholder organizations may also wish to consult with a digital credential management organization, such as Credly by Pearson or Badgr, which can advise on digital credentialing approaches and provide secure hosting services for digital credentials. Credly can also advise stakeholders regarding existing digital credentials that may serve Joplin's needs or be adapted to do so. LinkedIn Learning (formerly the Lynda.com platform) is also a good source for examining short-course options.

Examples:

Multiple case studies are included in a very useful summary of digital badges and their application to higher education provided in the October 2021 publication of J. Rodenfels at the University of North Carolina–Chapel Hill titled "Badging Usage in Higher Education."[20]

The document contains case studies in an emerging program in digital badging at the University of Denver, an established initiative at the University of Buffalo, and an advanced program in digital badge implementation at Northeastern University.

20 Available online at: https://dll.unc.edu/wp-content/uploads/sites/1206/2021/11/Digital-Badge-Overview.pdf

V. Strategy 2:

Research, Innovation, and Business Development

Developing research and development, innovation, and business development opportunities based on pre-existing and evolving healthcare and higher education assets.

Rationale:

For the Joplin Region to take full advantage of the economic development opportunities that exist due to the presence of its large hospitals and institutions of higher education, there is a need to emphasize the growth of research, leading to innovation and business development. This requires developing an ecosystem of support services across various dimensions. As Figure 14 shows, the Joplin Region has an emerging healthcare and health sciences industry ecosystem—meaning that while it has a well-established patient-serving clinical care community and a higher education presence of relevance, it has limited research activity (leading to innovations) and minimal presence of a traditionally defined commercial bioscience or medical device industry. A central goal for the Joplin region is to enhance elements of the healthcare and health sciences ecosystem to help advance the business ecosystem from an emerging status to one that is more mature and advanced.

Figure 14: Characteristics of the Various Stages of Healthcare and Health Sciences Cluster Development



Characteristics of Development			
	Healthcare providers are mainly focused on treating patients.	Healthcare providers are participating in research and development.	Healthcare providers are clinical excellence hubs in research & practice.
	Education providers are mainly focused on serving local industry.	Education providers serve local industry with pockets of excellence.	Education providers are viewed by industry as a gold standard in training.
	Biosciences industry presence is minimal.	Biosciences industry is growing or established.	Biosciences industry is a regional strength, with numerous businesses.
	Healthcare entrepreneurship and access to capital is limited.	Healthcare entrepreneurship and access to capital is supported.	Healthcare entrepreneurship and access to capital is thriving and robust.
	Availability of talent is very difficult across business type.	Availability of talent remains difficult, but workers are generally available.	Talent is readily available and easy to identify and leverage for growth.

Source: TEConomy Partners, LLC.

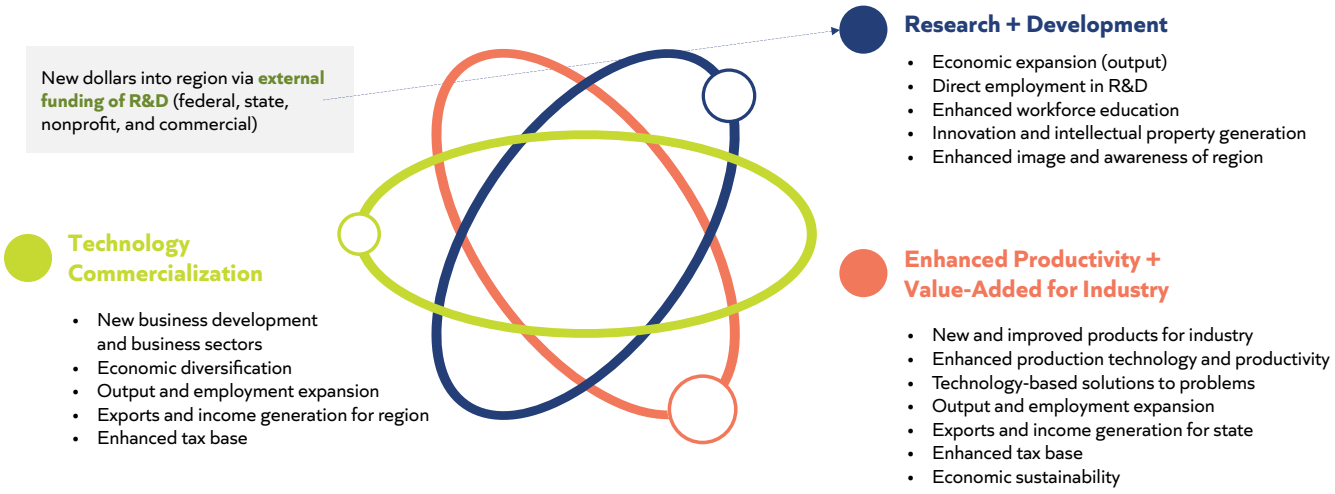
A key determinant of any region's long-term economic prosperity lies in its ability to innovate and enhance economic output based upon that innovation. Innovation serves as the basis for new businesses and can enhance the products and productivity of existing regional enterprises leading to business growth. Because of these benefits, generating an economic ecosystem conducive to innovation is increasingly important to the future resiliency of the Joplin region's economy.

Joplin should leverage its distinctive higher education (especially KCU and MSSU), healthcare, and business assets to build a presence in selected R&D and business innovation opportunities. Emerging technologies in healthcare present multiple pathways for new business development and business expansion, especially in, but not limited to, the rapidly developing digital health space. As expertise in research spaces builds, this may also become an attractor for existing businesses to consider a Joplin region location.

Potential Impacts:

Economic development approaches that emphasize innovation-based economic development can result in a variety of positive impacts for regions such as Joplin (Figure 15). Notable areas of impact include benefits tied to research and development expenditures, the commercialization of research into new technologies, products, and services, and the benefits to industry. Within each of these categories of activity, there is a wide array of positive impacts.

Figure 15: Innovation-Led Development is a Key Driver of Economic Growth



Source: TEConomy Partners, LLC.

Strategic Actions:

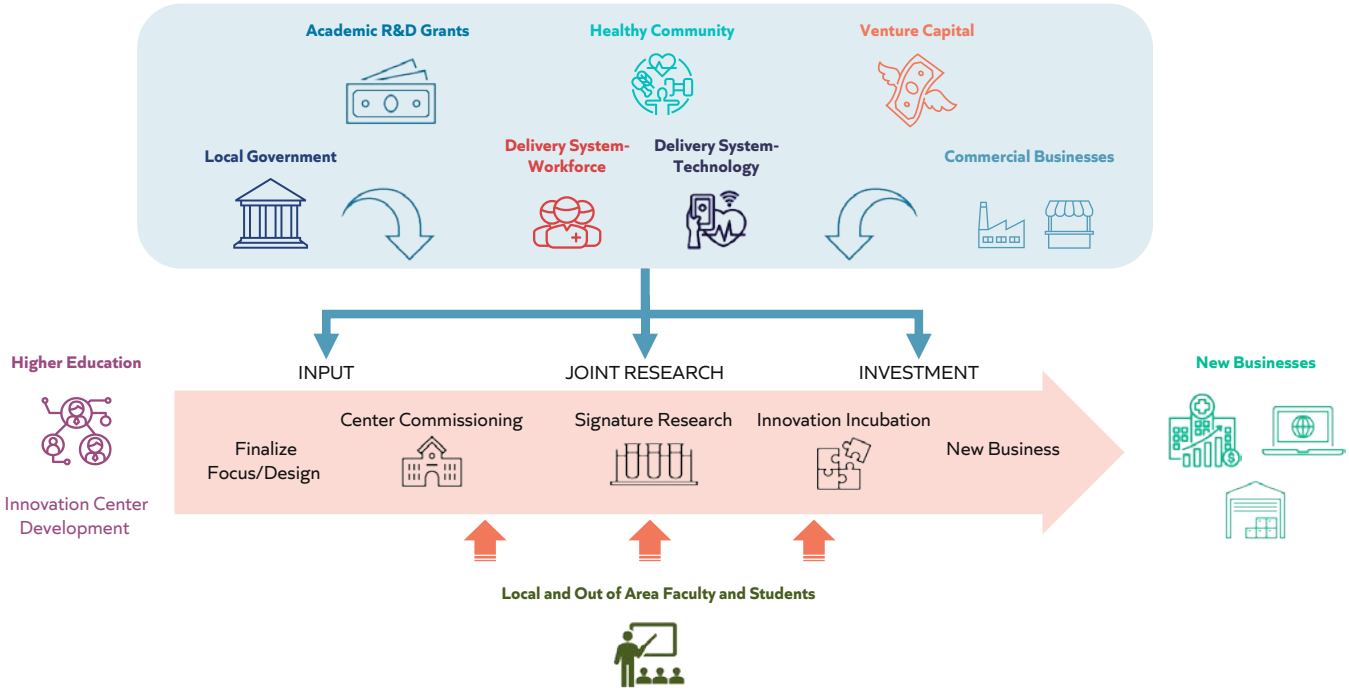
- **Action 2.1**—Build a presence in 3-4 selected areas of research:
  - Digital Health Solutions
  - Population and Community Health
  - Health EdTech
  - Medical Devices
- **Action 2.2**—Seek to establish a signature longitudinal health study connected to regional health improvement and digital health. Establish as a multistate regional study to engage with NW Arkansas interests in healthy community innovations.
- **Action 2.3**—Establish a small support stipend program for innovative postdocs to advance promising technologies. Innovative ideas can be imported by offering supported positions (perhaps joint between hospitals and universities) for those with interesting, vetted concepts in signature research areas.
- **Action 2.4**—Establish a pre-seed fund to help advance intellectual property (IP) commercialization and maximize connection building to Missouri funders and existing support programs. Seek to establish a moderate $1-2 million pre-seed fund able to provide up to $50,000 seed investments in promising concepts.
- **Action 2.5**—Assure availability of incubator space and accelerator/mentor services. Assure budding entrepreneurs have access to space and support to advance early-stage commercial concepts.

Action 2.1—Build a presence in 3-4 selected areas of research:

As an emerging industry sector for the Joplin region, it should not be expected that Joplin can compete with established industry biosciences hubs that have robust industry and academic assets capable of sophisticated drug discovery and development. Instead, it is recommended that the region build a research presence in three or four selected areas of research where there is an overlap with the current strengths and ambitions of the region.

On their own, none of the hospitals, colleges, or universities in the Joplin region may be defined as research-intensive. However, there is a shared desire to build a capacity for greater research activity and for the innovation and business development opportunities that can result from healthcare and health sciences research. To build this capacity, it is recommended that the Joplin Region develop a Research and Innovation Collaborative. This recommended activity would revolve around building "innovation centers" around identified research thrusts. These centers would help drive signature research and incubate new innovations and, eventually, businesses and entrepreneurs. It is envisioned that the collaborative effort would include both the public and private sectors, as well as a range of educational institutions in the region and healthcare providers.

Figure 16: Visualization of the Research and Innovation Collaborative



Source: TEConomy Partners, LLC.

As part of its assessment of the Joplin Region, TEConomy assessed technologies that have the potential to substantially change health care and health sciences over the coming decade (Appendix 2). Based on this assessment, in conjunction with the apparent strengths and assets that exist within the region, TEConomy considers the following four platforms as opportunities for a Research and Innovation Collaborative to focus on moving forward:

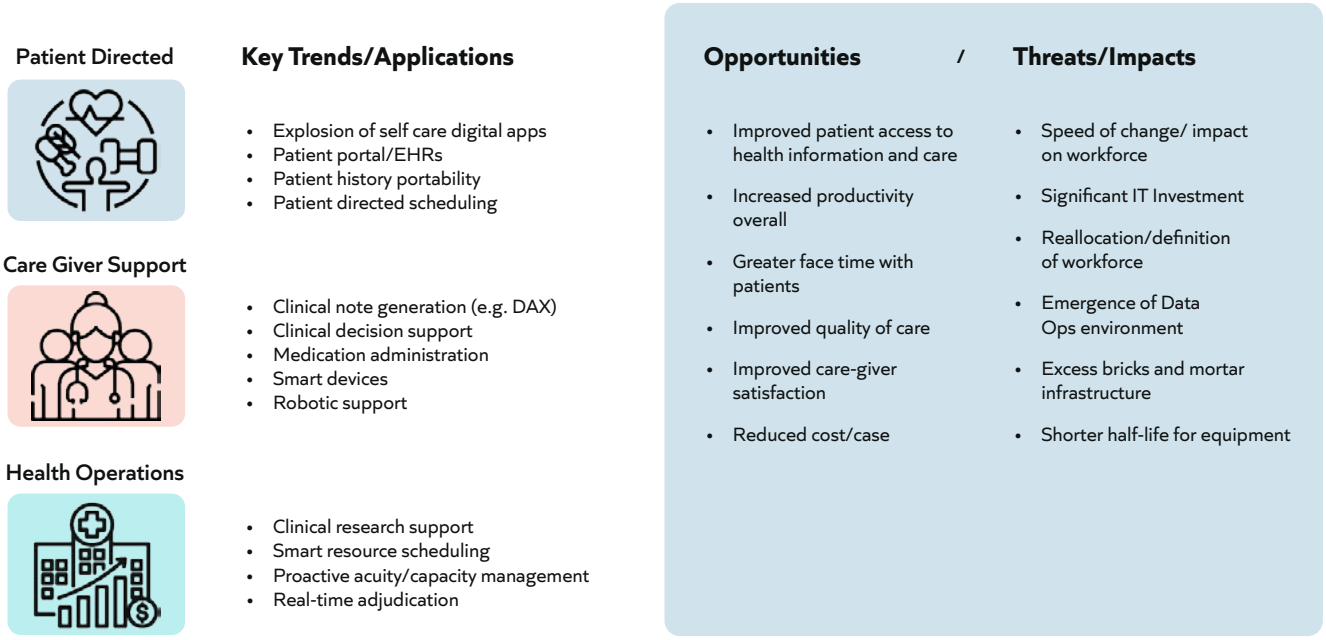
Platform 1: Digital Health Solutions:

Digital health refers to the deployment by healthcare organizations of new technologies to change how healthcare is delivered and the ways that healthcare is experienced. Examples of digital health technology solutions could include electronic health records (EHRs), cloud computing, telemedicine, cybersecurity, artificial intelligence (AI), and machine learning (ML). As explored further in Appendix 2, AI and ML are quickly changing the practice of healthcare delivery, and the further digitization of health processes will transform health delivery over the next 5-10 years. From a Health Delivery standpoint, these impacts can be discussed across three classifications:

- Patient-facing/directed—used by individuals to track and improve their health.
- Caregiver support—applications to support caregiver decision-making and work processes.
- Overall health operations—applications that support larger-scale operations.

Figure 17 summarizes these classifications and the trends, opportunities, and impacts associated with them.

Figure 17: Trends, Opportunities, and Impacts of Artificial Intelligence on Health Delivery



Source: TEConomy Partners Analysis

For the Joplin Region, the opportunity in Digital Health Solutions is embraced by both major health systems, as well as education providers such as KCU.



Platform 2: Population and Community Health

Although the U.S. spends a higher percentage of its GDP on healthcare than other nations, these high levels of expenditures are not producing the lengthened life expectancy and prevention of chronic diseases that might be expected. While focus on individual patients is highly important, a population health approach is required to overcome some of the shortcomings of the current system by:[21]

- Focusing on wellness instead of sick care.
- Using data more effectively to improve care.
- Engaging patients in their care.
- Coordinating care that was previously siloed and fragmented, something that is easier to do as accountable care organizations and patient-centered medical homes have evolved.

Population and community health also have an important technology and innovation component, such as using health informatics tools, health information technology programs, and medical devices within clinical care. Oftentimes, population and community health focuses on behaviors known to impact health and not the healthcare delivery mechanism directly. For example, technology investments in population and community health could include investments related to prenatal care, early childhood development, public school education, or local food systems.

21 https://www.ama-assn.org/delivering-care/population-care/what-meant-population-health-and-why-it-matters

Platform 3: Health EdTech

Health care is a content-rich environment requiring years of focused study to master and effectively apply the lessons learned to real patients with life-threatening illnesses. The average physician spends anywhere from 8 to 14 years in graduate and postgraduate training (medical school, residency, fellowship) to become a certified clinician in the United States. Nurses also have significant training requirements: 2 to 4 years as an undergraduate, and then 2 to 4 years advanced practice. Considering the fast-changing landscape of clinical practice and the critical situations clinicians often deal with, there is immense pressure to stay abreast of the latest developments and breakthroughs in the field.

Modern advances in Education Technology (EdTech) are transforming how education is conceived and delivered. In recent years, we have seen five significant technology trends influencing medical pedagogical approaches: micro-learning, virtual reality/augmented reality, online training, artificial intelligence, and personalized medicine. More information on each of these elements can be found in Appendix 2.

Figure 18: Elements of Health EdTech



For the Joplin Region, the Health EdTech opportunity is embraced by a range of educational institutions, including Missouri Southern State University, Crowder College, and Kansas City University's Medical and Dental Schools. Given the recent establishment of medical education facilities at these institutions, and the forthcoming Healthcare Sciences Innovation building at MSSU, there is a unique opportunity to explore the deployment of cutting-edge technology and advance research in these new facilities.

Platform 4: Medical Devices and Equipment

Medical devices, equipment, and technologies refer to the various devices, equipment, diagnostic tests, and health information systems that are transforming health care through earlier disease detection, less-invasive procedures, and more effective treatments.[22] As a hub for advanced manufacturing, Joplin has an opportunity to diversify this sector by expanding further into medical devices and equipment. This is not an easy task, but the region is already home to opportunities in areas adjacent to pre-existing strengths.

As noted previously, the MOKAN region's advanced manufacturing industry, which includes sectors such as plastics, batteries, electrical instruments, and food and beverage processing, has applications in and relevant to the healthcare sector. Examples of advanced manufacturing companies with a presence in the region developing new products for healthcare markets include Pitt Plastics (gloves, isolation liners, and water-soluble bags), Eagle Picher (batteries for wheelchairs, scooters, pumps, ventilators, beds and x-ray applications), Detecto (medical scales and weighing products), and Leggett and Platt (medical chairs, foam production for medical uses).

At these companies and others, there may be opportunities to encourage the development of nascent medical devices and equipment businesses in the Joplin Region. It is recommended that the MOKAN Partnership and the Joplin Area Chamber of Commerce lead the effort to expand the region's advanced manufacturing sector and begin to place a growing emphasis on health-related opportunities.

Existing Stakeholders and Relevant Programs:	• Freeman Health System • Mercy Joplin • Missouri Southern State University • Crowder College • Kansas City University—Joplin • Joplin Area Chamber of Commerce
Lead Implementing Organizations:	Research and Innovation Collaborative, comprised of above entities, would provide leadership across the platforms
Prioritization:	High
Timing:	Short-Term

22 https://www.advamed.org/medical-device-industry-facts/



Potential Action Components:

- Establish health research capabilities that will incentivize innovation and commercialization in select fields.
- Consider establishing expertise and shared infrastructure in Biostatistics and Population Research.
- Work with Delivery Systems to aggregate and analyze population data.
- Consider research alliances with relevant organizations/regions, e.g., Northwest Arkansas or Tulsa.
- Seek out research grants and funding sources to support ongoing innovation.
- Establish innovation centers on the sites of MSSU and KCU in signature areas that benefit the local community.
- Innovation centers will survey, research, and apply disruptive technologies (e.g., AI, IOT, Robotics, Advanced Networks, Quantum) to specific areas of the health economy.
- Support key development stages and coordinate design input, research, and financial support with key community stakeholders.
- Use innovation centers to attract innovative and research-oriented faculty and expand program development.
- Coordinate with local business, philanthropic and venture capital to promote innovation and commercialize new local businesses.

Action 2.2—Seek to establish a signature longitudinal health study connected to regional health improvement and digital health. Establish a multistate regional study to engage with NW Arkansas interests in healthy community innovations.

The development of the Alice B. Walton School of Medicine and the Whole Health Institute presents an opportunity for the Joplin Region to broaden its goals around healthy community innovation. Set to open next year at the Crystal Bridges Campus in Bentonville, the Whole Health Institute and the Alice L. Walton School of Medicine are separate entities founded by Alice Walton with the goal of transforming health care by taking a "whole health" approach. This includes a focus on physical, emotional, and mental health, as well as emphasizing preventative care and healthy lifestyles. As noted by Axios, the institute will include four divisions: care delivery, research and technology, community engagement, and behavioral health.[23] Whole Health intends to be a community resource to help the public live healthier, so they ultimately spend less on health care. The organization is planning to research outcomes in patients with chronic diseases like diabetes alongside existing local clinics like Community Clinic.

While the initial inclination for many in the Joplin region was to view the Whole Health Institute as a competitor, TEConomy recommends that the Joplin Region instead view the Northwest Arkansas Region as a collaborator. A central element of this collaboration would be a partnership around health delivery, including a multistate longitudinal health study that is connected to regional health improvement and digital health.

Existing Stakeholders and Relevant Programs:	• Kansas City University has professed interested in rural population health. • Freeman and Mercy Health Systems offer access to patient populations. • Access Health, Community Clinic, and other organizations necessary for targeting populations most at risk.
Lead Implementing Organizations:	• Joplin Research and Innovation Collaborative
Prioritization:	High
Timing:	Mid-Term

Potential Action Components:

- Develop relationships within the Northwest Arkansas Region.
- Identify potential research thrusts for longitudinal study and seek grant funding to implement.
- Work to implement study with participation of the regional health systems, KCU and MSSU.
- Work to identify and recruit participants across the region.
- Work with ongoing engagement.

23 https://www.axios.com/local/nw-arkansas/2023/09/05/bentonville-medical-school-health-nonprofit-alice-walton

Example: Geisinger's Program in Medical Genomics

Geisinger is an integrated healthcare system headquartered in Pennsylvania integrating "primary care and specialists, hospitals and trauma centers, insurance, medical education and research." Geisinger has been at the forefront in terms of recognizing the clinical insights and utility that genomic data and health record data that are mined together provide. Begun in 2007, Geisinger's MyCode Community Health Initiative has seen over 250,000 patients consent to participate in a research program that has been performed in collaboration with Regeneron's genetics research center. More than 100,000 whole exomes had been sequenced (as of reporting in April 2019). Motivated by the MyCode experience, Geisinger launched a "clinical whole-exome population screening program in mid-2018 as part of routine clinical care in a variety of Geisinger clinics, developing an end-to-end implementation platform—from patient engagement and consenting, to whole exome sequencing in a certified clinical laboratory, to physician education, to genetic counseling at scale, and to integration of clinical results into the electronic health record."[24] The main focus of MyCode is finding and confirming new disease-causing variants (changes) in patient genes, with research programs directed at:

- Searching for changes in genes that protect against disease.
- Targeting new drug development.
- Researching and learning what are the best ways to share medically actionable genetic results with patient-participants and then how to facilitate the sharing of that information with other potentially affected family members.
- Translating the results into clinical care.

The CEO of Geisinger, Jaewon Ryu, notes that:

> *About 90 percent of the patients we ask let us look at their entire genomes. That's huge trust; a typical rate is 15 percent. Our patients come from an unusually stable population—giving us volumes of data from more than 15 years of electronic health records. MyCode therefore provides unprecedented opportunity for early diagnosis and developing new and tailored treatments, or precision medicine. MyCode is already letting us help participants and their families prevent or mitigate the impacts of some identified genetic risk factors, including cancer and heart disease.*[25]

Some of the results emanating from MyCode in terms of advancements in breast cancer genetics have been called out as among the most significant applications of medical genetics in the "Genomic Medicine Year in Review." BRCA1 and BRCA2 are genes associated with hereditary breast/ovarian cancer syndrome. They have a high degree of sequence variation, but the population prevalence of "pathogenic" and "more likely pathogenic" variance (P/LP) has not been known. The research team used 50,000+ whole exome sequences from MyCode to examine the frequency of P/LP variants, finding a frequency significantly higher than other estimates. Importantly, it was found that "almost half of all variant carriers did not meet current criteria for clinical testing, and of those meeting testing criteria, nearly half had not undergone clinical testing. Thus, 3/4 of at-risk women were not identified as such and are not benefiting from evidence-based interventions; this is a significant care gap with implications for population health."[26] This represents a prime example of how the assembly and analysis of big data enables robust functional impacts to be generated in clinical care.

24 Huntington Willard in "Luminaries Share Their Thoughts on Advances in 'Omics Over the Past Five Years." *Clinical Omics Magazine.* Vol. 6, Issue 2. March-April 2019.
25 https://www.geisinger.org/about-geisinger
26 Teri A. Manolio et al. 2019. "Genomic Medicine Year in Review: 2019."—"What We're Missing: Most BRCA1 and BRCA2 Variant Carriers are Undetected." The American Journal of Human Genetics 105. December 5, 2019. Reporting on original research by Manickam, K. et al. (2018) JAMA Netw Open. 1, e182140.

Action 2.3—Establish a small support stipend program for innovative postdocs to advance promising technologies. Innovative ideas can be imported by offering supported positions (perhaps joint between hospitals and universities) for those with interesting, vetted concepts in signature research areas.

Although the Joplin region currently lacks the deep bench of faculty scientists found in other regions with research-oriented universities and hospitals, the area is still a suitable location to advance new technologies. In addition to homegrown ideas, one possible approach to identifying promising talent and businesses is to target post-doctoral students and other recent PhD-level graduates with technology or business ideas. This model would be based on the Cyclotron Road program at Lawrence Berkeley National Lab, though obviously tailored to the Joplin region. As another example, the Sync Space Rural Health Accelerator provides an approach that targets health tech companies on the coast with a rural emphasis (see box).

Recent research from the National Bureau of Economic Research developed a cost index based on wages for scientists, engineers, support personnel, and land for development.[27] Their analysis found that the Joplin Region is the area where the production of R&D is the least expensive of all metropolitan areas studied. With a cost index of 87, Joplin is considerably more affordable for R&D than the national average, especially when compared to places like San Jose (127 cost index), Boston (116), or San Diego (115). It is possible that this cost advantage could make the region a viable home for attracting innovative startups concerned with the costs of doing business in expensive coastal locations.

Based on the identified areas of research presented in Action 2.1, it is envisioned that this program would be the region's primary attractor for innovative postdocs and other skilled scientists seeking to advance their potential commercial concepts.

Existing Stakeholders and Relevant Programs:	Currently, limited research activity and infrastructure are necessary to attract postdoctoral students without a stipend and associated projects. Missouri Southern State, Kansas City University, Freeman Health System and Mercy Joplin all make sense as logical partners for such a project moving forward, with financial support from the philanthropic and economic development sectors.
Lead Implementing Organizations:	Joplin Research and Innovation Collaborative
Prioritization:	High
Timing:	Long-Term

27 https://www.nber.org/system/files/working_papers/w30416/w30416.pdf



Potential Action Components:

- Deploy a competitive application process, with applications reviewed by an advisory board from the participating organizations.
- Assemble seed funding for the program to provide applicants with access to a moderate salary and benefits for two years.
- Provide space within the region's designated innovation centers or at other spaces across the Joplin region.
- Offer business development counseling and opportunities for introductions to capital providers able to support the ongoing development of promising start-up ventures.

Example: Sync Space Rural Health Incubator

The Sync Space Rural Health Incubator manages a direct "pipeline of resources" for regional entrepreneurs to develop and establish businesses in East Tennessee. The organization provides multiple services to young business owners and start-ups, including:

- 1-on-1 business management mentoring
- Investor pitching coaching and event hosting
- Innovation conference sponsoring
- Government partnership and research development
- Nationwide workforce and business networking

Sync Space has supported more than 200 startups in 2022 alone, ranging from regions like San Fransisco to New York City. They have successfully established investor pitching boot camps, funded multiple investor centers, and engaged companies in more than 7 national programs. Through more than a dozen corporate partnerships, Sync Space has additionally been able to relocate multiple businesses to the East Tennessee area.

Example: Cyclotron Road program at Lawrence Berkeley National Laboratory

Cyclotron Road is a not-for-profit venture accelerator captive to DOE Lawrence Berkeley Laboratory (LBL) at the University of California (UC) Berkeley. Through a competitive program, Cyclotron Road seeks entrepreneurs—typically recent PhDs and postdocs worldwide—with ideas for energy-related business dependent on the physical sciences. The accelerator program is aimed at bridging gaps between idea and commercialization and is aimed especially at high-potential businesses that do not start out as obvious candidates for venture capital funding because of outsized technical and/or market risks.

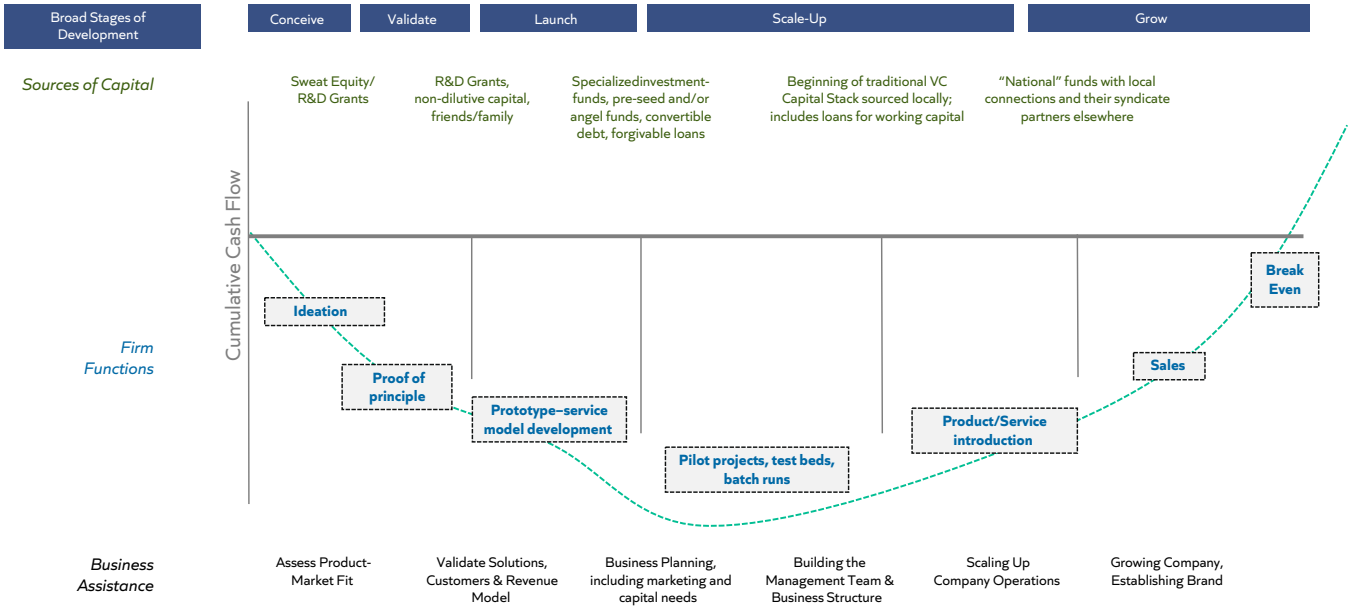
The accelerator provides a modest living stipend and health insurance to the selected entrepreneurs and complete access to the Lab, shop, user facilities, and (to an unspecified but clearly limited extent) the research services of LBL scientists so that entrepreneurs with energy-related ideas dependent on the physical sciences and engineering technology can prototype and "de-risk" venture ideas before entering into customer relationships and/or negotiation with private market investors. It also provides mentoring and connectivity of a kind completely conventional for private venture accelerators. Indeed, it is organized on a similar cohort basis, although cohorts are much longer (2 years) than the 12 weeks conventional in software/Internet sectors, and concludes with a typical "demo day" introducing graduates to private investors.

There were no capital costs involved in starting up Cyclotron Road because it is purely a virtual program. The Cyclotron Road program's success has led to it being recognized as a model for technology commercialization and innovation support within the national laboratory system. The program has been successful in fostering entrepreneurship and technology commercialization, leading to the spin-off of multiple companies based on the innovations developed by its fellows.

Action 2.4—Establish a pre-seed fund to help advance intellectual property (IP) commercialization and maximize connection building to Missouri funders and existing support programs. Seek to establish a moderate $1-2 million pre-seed fund to provide up to $50,000 seed investments in promising concepts.

Financial backing and support are key elements for successfully transitioning innovative ideas into new, marketable businesses. As shown in Figure 19, a range of capital sources may be required to meet a company's needs, depending on their stage of technology and business development. In a company's earliest stages, "sweat equity," R&D grants, nondilutive capital, and support from friends or family drive initial investment. Financial capital is especially important for helping entrepreneurs and startups overcome the "valley of death." At this stage, companies may face a critical gap in funding where they have likely exhausted the previous stages of capital and are not yet mature enough to begin accessing formalized venture capital or traditional debt markets. Specialized investment funds, convertible debt or forgivable loans, pre-seed funds, or angel investments are critical forms of risk capital to help companies succeed.

Figure 19: Sources of Capital, Firm Functions, and Business Assistance by Stage of Development



Source: TEConomy Partners, LLC.

Since 2010, there has been limited venture capital activity in the immediate Joplin Region. TEConomy analysis of Pitchbook data shows 15 total deals accounting for $62.4 million over the 13 years assessed (an average of 1.1 deals and $4.8 million in capital raised annually). As noted in Table 5, most of this deal flow has been driven by ZAF Energy Systems. It is worth noting that none of the companies listed are actively working in spaces directly related to healthcare and health sciences.

Table 5: Joplin Region Companies Identified in Pitchbook Database

Companies	Description	Total Raised	Year Founded
ZAF Energy Systems	Operator of a battery technologies company intended to develop high-performance batteries that are safe, environmentally responsible, sustainable, and economical.	50.27	2011
Æsir Technologies	Developer of battery technology designed to provide a viable and safe alternative to lithium-ion and lead-acid counterparts.	8.94	2011
BBC Electrical Services	Provider of electrical construction services intended to provide a safe workplace.	2	2005
LocalRaces	Developer of cloud-based race registration and event management software designed to process race participants, sponsors, and club member registrations.	0.15	2014
Roam Telecoms	Developer of clean and green tech solution designed to zero out everyday use from basic tech.		2017
Vivify Beverages	Producer of alcohol beverage products intended to address unmet consumer needs in the alcohol beverage space.		2015

Source: TEConomy Partners analysis of Pitchbook Data (2010-2022)

To improve the availability of venture capital in the Joplin Region and take advantage of the new ideas emanating from its research foci (Action 2.1), it is recommended that the Joplin region partner with community capital sources, nearby entrepreneurial service providers, and the state's technology-based economic development agency, Missouri Technology Corporation, to raise a capital fund that helps encourage small business growth within the region. It is recommended that such a fund be moderate in size (between $1-2 million) and focus on pre-seed investments, providing up to $50,000 seed investments in promising concepts. Given the relatively limited number of companies seeking investment, it might be possible that funds from the seed fund could go to piloting new programs or initiatives throughout the Joplin region.

Existing Stakeholders and Relevant Programs:	• The Missouri Technology Corporation has historically been a funder of the Joseph Newman Innovation Center. The MTC also has programs that can be used to encourage the availability of venture capital and entrepreneurial support services. • Various local financial institutions are a current provider of access to capital, though the pool is somewhat limited and unorganized for venture activity
Lead Implementing Organizations:	• Joplin Research and Innovation Collaborative
Prioritization:	High
Timing:	Long-Term

Potential Action Components:

- Identify programs at the state or federal level to tap into as a way of providing venture capital and entrepreneurial support.
- Identify sources of local investment for venture capital funds.
- Develop parameters for investment.
- Develop due diligence protocols for investment.

Action 2.5—Assure availability of incubator space and accelerator/mentor services. Assure budding entrepreneurs have access to space and support to advance early-stage commercial concepts.

Incubators and accelerators play an important role in the development of early-stage, technology-based businesses. One important way incubators can advance their client companies and add value to startups is by providing mentoring and startup support.

Historically, the Joplin region has had some success with developing startups through the Joseph Newman Innovation Center. There are opportunities to support this center further through the addition of value-added entrepreneurial support services, access to capital (Action 2.4), and other resources to serve small businesses. The region's growing information technology sector, in conjunction with a growing focus on community health and wellness, may attract companies wishing to use Joplin's unique population for testing and for piloting digital health technologies—these companies will all have facility and space needs.

Although the Joseph Newman Innovation Center offers suitable space for many types of small businesses, for companies developing innovative products, especially in the healthcare space, there may be a need for additional physical space. Given the nature of these types of facilities, there may be opportunities to align this incubator space with new developments at KCU Joplin or the new Missouri Southern State University Health Innovation building.

Instead of delivering services on its own, it is recommended that the Joplin Region pursue partnership opportunities with established entrepreneurial service providers with a deeper and more established network of connections and mentors. One example of an ideal partnership may be eFactory, an entrepreneurial support organization based in Springfield (see Example textbox). The eFactory is considered a best practice in offering support services to advance entrepreneurship, and they also have the cultural context necessary for working with companies in Southwest Missouri and elsewhere in the MOKAN region. The eFactory has been successful at scaling its operations across Southern Missouri and could be a strong fit for the Joplin region.

Existing Stakeholders and Relevant Programs:	• Joplin Area Chamber of Commerce and the Joseph Newman Innovation Center • Missouri Technology Corporation: Offers state funding through MOBEC awards and Physical Infrastructure Grants.
Lead Implementing Organizations:	• Joplin Area Chamber of Commerce • Missouri Southern State University • KCU Joplin
Prioritization:	High
Timing:	Mid-Term

Potential Action Components:

- Following on from 2.3 and 2.4—as promising research comes online—provide a space and support structure to germinate new businesses.
- Provide mentoring and support to startup activities.
- Provide physical space for product/service development.
- Advise on access to startup capital (seed funding, venture capital).

Example: eFactory Program Delivery

Missouri State University is creating an "eFactory" where a variety of innovation-focused programs are being delivered to the surrounding regions, including:

- Business planning and creation
- Financial management
- Workforce training
- Investor pitching
- Government contracting

The program's goal is to encourage and incentivize new, small businesses to root and be created in the region surrounding Missouri State University and in Springfield, MO, by creating various amenities and reducing the burden of managing a new business. The university also partners with multiple innovating companies and governments, including healthcare insurance, various financial institutions, the Springfield government, development holding corporations, and enterprise development funders.

Since its creation in 2013, the eFactory delivery program has supported more than 3,000 companies in development, workforce management, or scaling, and successfully created more than 2,900 jobs through client companies in the Springfield region.

VI. Strategy 3:

Advanced Healthcare Delivery

Advancing healthcare delivery to meet the region's unique community health challenges and increase workforce availability and productivity.

Rationale:

The healthcare delivery system within the region may become a leader in the development of an advanced healthcare delivery model that integrates technology, innovation, and new workforce skills to build an expanding position in digital health (Healthcare 4.0).[28] This strategy leverages emerging technologies to significantly improve regional healthcare access and outcomes via the use of telemedicine, medical IoT, remote patient monitoring, emerging AI solutions, and other technologies and innovative approaches to care **suited to enhancing healthcare in rural and small community settings**. Through enhancements to the healthcare system, this strategy will have the additional benefit of increasing patient access to care and overall community health, thereby promoting the economic development benefit of increased workforce participation and enhanced productivity levels across the economy (thereby boosting GDP).

The health and wellness of people living in Joplin and MOKAN Region is a key concern among primary and community care providers and is relevant to this strategic plan. Improving innovation and expansion in primary and community care can help improve access, the overall health of the Joplin Region, and the economy of the region.

Potential Impacts:

- Improve healthcare operational cost efficiency.
- Improve the health of the community.
- Improve workforce productivity.
- Increase workforce participation.
- Expand health market through telehealth/digital health platforms.
- Increase research and associated commercialization opportunities.

28 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8423174/#:~:text=2020).,Figure%206

Strategic Actions:

- **Action 3.1**—Primary and community care delivery network expansion and coordination. Increase primary and family care networks in the community including addressing physician gaps, patient navigation, and financial assistance.
- **Action 3.2**—Become an early adopter of telehealth and digital health solutions. Expand the use of telehealth, remote patient monitoring, and similar patient-facing technologies to significantly improve health service access. Enhance broadband and transportation access to serve the needs of remote and disadvantaged populations.
- **Action 3.3**—Develop shared data architectures and resources to capture and analyze clinical and population health data. Leverage and integrate telehealth, patient-facing digital health and EMR data to seed research and innovation. Consider the launch of patient gene sequencing to build a shared resource for research and clinical care advancement.
- **Action 3.4**—Implement caregiver support technologies and workforce management systems. Adopt technologies to improve workforce efficiency, clinical decision making, workforce skills development, and labor productivity.
- **Action 3.5**—Care Model Innovation. Joint initiative to design, pilot, and implement changes to health roles and delivery models (new roles, flexible scheduling, remote workforce, shared employees/pool/agency).
- **Action 3.6**—Healthy Community Coalition. Joint coalition (delivery system, business, government) promoting and funding healthy community initiatives in schools, businesses, and the broader community.

Action 3.1— Primary and community care delivery network expansion and coordination. Increase primary and family care networks in the community, including addressing physician gaps, patient navigation, and financial assistance.

Recent studies have clearly shown that the Joplin region has a scarcity of primary and family care practitioners. This lack of frontline community health contributes to negative health outcomes across the region and more broadly impacts the health delivery system's stability. Over the next 10 years, public and private health payers will increasingly shift from fee-for-service payment models to value-based models tied directly to total quality and cost of care.[29] This shift to population-based payments will negatively impact providers with poor population health outcomes. An unhealthy population also contributes to lower economic productivity overall.

As an immediate first step, this action seeks to fill the provider gap through targeted recruitment, deployment, and additional training of primary care workers in the community. Its aspirational goal should be to boost primary care coverage to a level meeting the U.S. average (currently 1 practitioner per 1,310 of the population) and to support those practitioners with appropriate clinical and information technology so that they can work as efficiently and effectively as possible.

Aligned with Action 1.1, the strategy should also seek long-term approaches to encouraging local medical students to pursue a career in rural primary care through scholarships, special studies, immersion programs, residencies, etc.

The region should also employ non-physician resources (nurse practitioners, community health professionals, patient navigators) and use mobile health clinics to further address community access gaps.

29 https://innovation.cms.gov/strategic-direction#

This action will enhance regional economic development through expanding patient volumes, adding primary care jobs, and increasing downstream patient revenue in the broader health system.

By providing sufficient frontline staff, community members will be able to access primary health services and better manage chronic disease, improving population health outcomes over time.

Existing Stakeholders and Relevant Programs:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System • KCU Colleges of Medicine and Dentistry • MSSU • Philanthropic Organizations
Lead Implementing Organizations:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System • KCU Colleges of Medicine and Dentistry
Prioritization:	High
Timing:	Immediate

Potential Action Components:

- Establishment of a Primary/Family Care action team comprised of key delivery system, higher education, and community stakeholders to own the strategy and implementation.
- Agreement on a regional based "goal state" for primary care, considering physician, nursing, allied health, and community health worker requirements. This goal should aspire to provide coverage equivalent to the U.S. average.
- Establish a shared action plan to recruit, train and deploy primary/family care practitioners through existing delivery organizations.
- Coordinate with local medical (KCU-Joplin) and nursing schools (MSSU, Crowder, et al.) to specifically bolster the regional primary care network through internships and residencies.
- Provide funding (private and philanthropic) to support recruitment incentives (bonuses, housing support, etc.)
- Train and deploy health navigators/community health workers for specific populations (geographic, disease specific) as needed.
- Explore/expand mobile specialty clinics for specific populations.
- Maximize coverage options for in-need populations (e.g.: Medicaid re-enrollment, pro-bono care).
- Advocate for appropriate coverage from key payer groups (public and private).
- Increase community knowledge of health services and options through targeted communication campaigns.

Examples:

Hawaii Island Family Medicine Residency, Hilo, HA[30]

(HIFMR) is a locally managed residency program that aims to train 4-6 family practice residents annually and encourage them to stay and practice in rural Hawaii after graduation. Residents work with other providers, such as Advanced Practice Registered Nurses (APRNs), behavioral psychologists, community health workers, and clinical pharmacists to care for their patients' needs. Of five graduating classes to date, over 85% have remained in the state to practice.

University of Missouri - Rural Scholars Program and Health Immersion Initiative[31]

The University of Missouri has established a Rural Scholars program to improve the supply and distribution of physicians in rural Missouri. The program is designed to offer students a variety of educational and hands-on experiences around rural healthcare. As part of the program, a Clinical Rural Immersion (CRI) initiative was set up to provide medical students with a 2-week immersive experience in rural health.

St Mary's Health Wagon of Central Appalachia - Mobile Outreach Services[32]

Like numerous examples across the country, the Health Wagon of Central Appalachia is a nonprofit organization providing healthcare services to residents in Southwest Virginia, including primary care, preventive care, chronic disease management, dental, vision care, and select specialty care. Care is delivered by mobile health clinics servicing 13 locations augmented by three stationary clinics. The St Mary's Health Wagon is funded by a variety of sources, including individual donations, grants, and government funding.

Missouri Health Professional Loan Repayment Program[33]

The Health Professional Loan and Loan Repayment programs administered by the Department of Health and Senior Services (DHSS) are designed to increase access to health care for Missourians in Health Professional Shortage Areas (HPSAs). In parts of Missouri, a shortage of primary health care providers makes it difficult for low-income, uninsured, and geographically isolated Missourians to receive health care. By working with health care providers and communities, access to care can be improved for the underserved.

30 https://www.hifmr.org/
31 https://medicine.missouri.edu/offices-programs/education/rural-scholars-program/
32 https://thehealthwagon.org/mobile-clinics/
33 https://health.mo.gov/living/families/primarycare/hpl-lr/

Action 3.2—Become an early adopter of telehealth and digital health solutions. Expand the use of telehealth, remote patient monitoring, and similar patient-facing technologies to significantly improve health service access. Enhance broadband and transportation access to serve the needs of remote and disadvantaged populations.

This action seeks to closely monitor advances in patient-facing and telehealth technologies and develop shared strategies for their promotion and usage across the region.

AI, mobile computing, remote monitoring, and telehealth technologies have the potential to transform health delivery in the JRAH region over the next 5-10 years. Greater digitalization and virtualization of care will help to overcome the physical access limitations of traditional, site-based clinic locations, yielding:

- Better informed patients
- Reduced wait times for care
- Improved data collection
- Enhanced caregiver productivity

These technologies are gaining ground rapidly, as evidenced by the recent uptake of telehealth during the COVID-19 pandemic. Increasingly, governments and other payers are encouraging their use as a way to deliver sustainable health outcomes at a lower cost. Telehealth will also be a critical tool for training and supporting care teams in rural locations through virtualized communications with specialist and tertiary centers.

Figure 20: Snapshot of Telehealth Usage

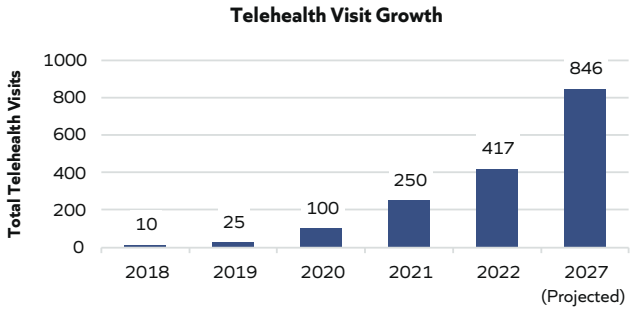
Key modalities:
- Synchronous –virtual visit
- Asynchronous –patient portal, questions/texting
- Remote patient monitoring
- Direct to patient or caregiver assist

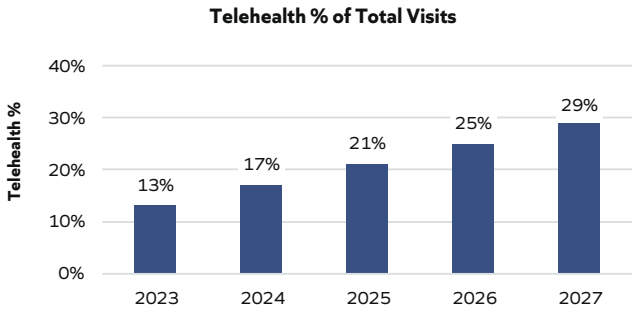
Leading specialties:
- Behavioral health
- Radiology
- Pediatrics and family care
- Cardiology

As much as 25% of total visits by 2027

Interview feedback: should be expanded for community outreach and improved access in rural communities

Missouri was 41st in adoption of Telehealth in 2022





From an economic development perspective, telehealth and patient-facing platforms should improve system efficiency by increasing patient throughput over time, reducing the friction patients experience when accessing care (wait times, travel times, navigation questions) and improving caregiver productivity. This system-level capability will also "seed" innovation and business opportunities through the capture of patient data, which can support clinical research and population health analytics (See Action 3.3). There will also be additional jobs generated through the establishment and maintenance of telehealth, digital health, data architectures, and their associated tools.

While caregivers across the region have in the past received moderate exposure to these technologies, there remain several barriers to regional expansion (technical, cultural, and financial) that could be better managed through joint commitment.

Existing Stakeholders and Relevant Programs:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System • KCU Colleges of Medicine and Dentistry • MSSU • Philanthropic organizations
Lead Implementing Organizations:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System
Prioritization:	High
Timing:	Near Term

Potential Action Components:

- Identify, plan, and facilitate the rollout of transformational digital health technologies in the areas of healthy life-styles/wellness, health access in the community, and chronic disease management.
- Establish a shared initiative to expand Telehealth/Virtual health services across the community. Expand broadband coverage to remote locations. Provide funding support for infrastructure development, data plan costs, and training of caregivers and community members.
- Facilitate and accelerate direct patient scheduling/communication with caregiver network.
- Aligned with Action 3.3, explore and develop health data management requirements and opportunities from access to patient data.
- Aligned with Action 2.2, seek shared initiatives (Higher Ed and Delivery System) to drive research, rollout, and funding.
- Formulate and execute a sustainable patient transport strategy across the region.
- Actively seek grant funding to support expansion of the Telehealth platform (Health Resources and Services Administration, Federal Communications Commission, other regional philanthropies).
- Adopt new innovations to drive economic development.

Examples:

Rural Arizona Mobile Telehealth Initiative[34]

The Rural Arizona Mobile Telehealth initiative works to expand healthcare and telehealth, through the implementation of broadband infrastructure to rural communities. In northern rural Arizona, the project prioritized three aspects of telehealth:

- Real-time communication through two-way connection and consultation over phone and video.
- Store information in remote and cloud-based databases that remains forwardable to other rural healthcare providers.
- Remote patient monitoring availability for doctors across long distances allowing for vital-checking and data recording without requiring large amounts of travel.

Emergency vehicles, specifically ambulances, have been additionally commissioned and sponsored to implement telehealth measures to reduce inefficient travel and emergency visits. As a result, 12-lead EKG transmissions has more than doubled since 2018, leading to a greatly reduced mortality rate during transportation. Chronic disease education participation, because of the telehealth network expansion, increased from 2% in July 2017 to 26% in 2019.

Show-Me ECHO, University of Missouri[35]

Show-Me ECHO (Extension for Community Healthcare Outcomes) uses videoconferencing to connect interdisciplinary teams of experts with primary care clinicians and other professionals. They collaborate in interactive case-based learning to develop advanced skills and best practices, which improves patient care access, quality, and efficiency. It aims to build capacity among primary care providers in rural areas by connecting them with specialist teams through videoconferencing technology. Through regular virtual meetings called ECHO sessions, primary care providers present patient cases to specialist teams and receive guidance on diagnosis, treatment plans, and management strategies.

North Carolina Telehealth Network Association[36]

This is a nonprofit technology company that works to enable Telehealth across the state for public and nonprofit healthcare providers focusing on broadband connectivity and access to federally funded discounts for eligible providers. The NCTNA provides members access to a secure, state-wide fiber-optic network for telehealth processing.

Rural Health Information Hub (RHI Hub)[37]

Supported by the Health Resources and Services Administration (HRSA), the RHI Hub provides a range of design and implementation tools supporting telehealth platforms in rural areas including ongoing research, links to regional telehealth organizations, funding sources, and design and implementation tools.

34 https://www.ruralhealthinfo.org/rural-monitor/improving-rural-emergency-care
35 https://showmeecho.org/
36 https://nctna.org/
37 https://www.ruralhealthinfo.org/topics/telehealth

National Consortium of Telehealth Resource Centers (NCTRC)[38]

The NCTRC is a collaborative of 14 regional and two national Telehealth Resource Centers (TRCs), committed to implementing telehealth programs for rural and underserved communities. Funded by the U.S. Department of Health and Human Services and Health Resources and Services Administration (HRSA), the NCTRC provides timely and accurate information on telehealth across the nation.

New Growth Transit, West Central Missouri[39]

New Growth Transit, an affiliate of the West Central Missouri Community Action Agency, is a volunteer network that provides transportation to residents within the region. The volunteer drivers are reimbursed per mile via a stipend, and currently serve 12 counties in the West Central Region of Missouri. Ridesharing is personalized and scheduled on an individual basis, rather than following fixed routes and times. More than 106 transportation networks have been established, leading to successful development of more than 1,200 food distribution nodes and events. The program also directly led to residents attending more than 3,300 wellness events and classes that they would not have had access to otherwise. Expanding this program to Joplin could be a small but impactful step towards resolving transportation gaps.

38 https://telehealthresourcecenter.org/
39 https://newgrowthmo.org/rural-living/transportation/

Action 3.3—Develop shared data architectures and resources to capture and analyze clinical and population health data. Leverage and integrate telehealth, patient-facing digital health and EMR data to seed research and innovation. Consider the launch of patient gene sequencing to build a shared resource for research and clinical care advancement.

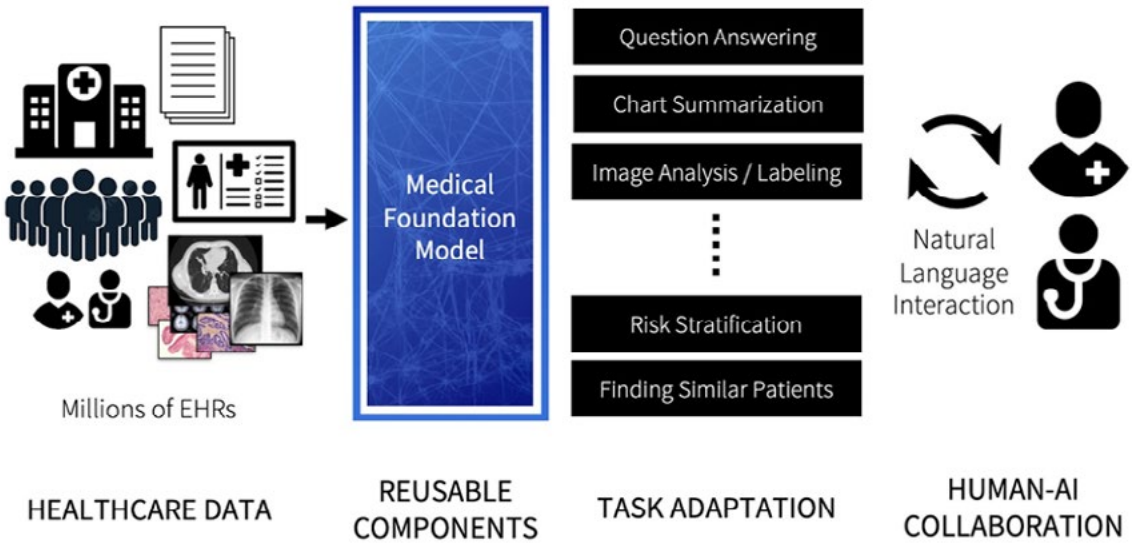
Actions 3.1 and 3.2 address the primary care workforce shortage while establishing the digital foundation for care delivery to the community. Action 3.3 seeks to capitalize this digitization through system-level approach to health data capture, analysis, and clinical innovation.

TEConomy recommends an active partnership be established to implement a shared health data infrastructure leveraging the priorities, skills, and technologies from both the higher education and health delivery sectors. This action would be closely aligned with Actions 1.3, 2.1, and 2.2.

Through this strategy, data captured from digital health, remote diagnostics and telehealth applications can be combined with existing EMR systems to support research and innovation in areas such as:

- **Population Health**—longitudinal health studies, geo-spatial analysis, population data analytics, social determinants of health studies, and public health surveillance.
- **Diagnostics and Treatment**—remote data monitoring, real world data capture, natural language processing, predictive analytics, and clinical decision support.
- **Health Operations Management**—patient flow analysis, workflow optimization, capacity management, supply chain management, and business intelligence.

Figure 21: Areas of Innovation Related to Healthcare Data Capture



Source: Jason Fries, Stanford University, Center for Artificial Intelligence in Medicine and Imaging.

Also, in line with trends in personalized medicine, the Joplin Region could consider the launch of patient **gene sequencing services** and associated opportunities for clinical research and medical advancement.

This will require a more sophisticated and holistic level of data architecture and management. This would be accomplished through a structured program of joint development, including required:

- **Infrastructure development** –data capture and integration, data storage, analytical tools
- **Data governance**—data standardization, stewardship, and security
- **Collaborative Research**—joint study design, data collection, analysis, and publication
- **Selected commercialization**—new tools, new insights, applied solutions.

Existing Stakeholders and Relevant Programs:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System • KCU Colleges of Medicine and Dentistry • MSSU • County health departments • Philanthropic organizations
Lead Implementing Organizations:	TBD
Prioritization:	High
Timing:	Mid Term

Potential Action Components:

- Conduct a shared Needs Assessment across existing health data infrastructure and management services. Determine gaps in existing infrastructure and data sources. Identify shared data analysis opportunities and required investment in line with other regional health and education priorities.
- Establishing joint program for health data infrastructure development to include shared data structures (e.g.: data integration, data lakes, analytical tools), governance frameworks and maintenance responsibilities.
- Work through HIPAA and associated privacy and consent requirements.
- As infrastructure rolls out, conduct collaborative research in areas of population health, care delivery and operations management.
- Provide data and expertise to shared research. Leverage insights and innovations (new products/approaches) within the broader Delivery System.
- Establish associated health data science training programs for researchers, caregivers, and IT support personnel.
- Establish a gene sequencing and counseling service. Use data to seed additional clinical research.
- Actively seek grant funding to support expansion of data and analysis infrastructure (HRSA, Patient Centered Outcomes Research Institute (PCORI), Robert Wood Johnson Foundation, other regional philanthropies)
- Commercialize and apply research-driven insights and solutions as appropriate.

Examples:

Hampton Roads Biomedical Research Consortium

The Hampton Roads Biomedical Research Consortium (HRBRC) is a state-sponsored partnership between Old Dominion University, Eastern Virginia Medical School, Sentara Healthcare, and Norfolk State University. HRBRC's objective is to address health disparities, jumpstart scientific research, and advance bio-health development and innovation within the region. By partnering with community leaders, entrepreneurs, scientists, and professionals in government and industry, the Consortium has successfully established a robust innovation pipeline in Virginia. The Consortium is also now lab-capable, developing and creating a prototyping and integration center as well as 5G research locations. Multiple training, research, and biomedical centers have also been opened across the state.

University of California at San Francisco—Biostatistics and Population Health[40]

The UCSF Epidemiology and Biostatistics Program is a top-ranked program that offers PhD, MAS, and Certificate programs in epidemiology and biostatistics. Local hospitals are actively collaborating with UCSF to enhance the quality of care provided to patients through research collaboration, data analysis and interpretation, quality improvement initiatives and education and training. UCSF provides access to a variety of health datasets covering: Population Health, Medicare/Medicaid, Health Cost and Quality, Health Equity, Health Policy, Public Health, and Social Services.

40 https://epibiostat.ucsf.edu/, https://guides.ucsf.edu/pophealthdata/national

Action 3.4—Implement caregiver support technologies and workforce management systems. Adopt technologies to improve workforce efficiency, clinical decision making, workforce skills development, and labor productivity.

This action seeks to closely monitor advances in caregiver support technologies and develop shared strategies for their promotion and usage across the region. This should be an active partnership between higher education, health science research, and health delivery sectors.

This will include new technologies supporting:

- **Diagnostic and clinical decision support**—Automated guidelines adherence, image and pattern recognition, smart sensors, dosage calculation, predictive analytics.
- **Surgical/procedural support**—anatomical visualization, augmented reality, real time sensors, robotic surgical platforms.
- **Clinical documentation**—Voice-to-text transcription, point-of-care documentation, ambient clinical intelligence.
- **Cross team coordination**—EHR interoperability, care management platforms, unified communication platforms.
- **Patient/Family communication**—synchronous and asynchronous communication, medication reminders, and appointment scheduling.

Although management of these applications has traditionally been the responsibility of individual provider networks, Action 3.4 seeks to build on those foundations through shared research and development of new solutions in decision support, informatics, and administrative support.

This action would also monitor advances in EdTech (e.g., Micro Learning, AR/VR, Online/Remote Training, and AI) as well as advanced education management systems to develop shared strategies for their promotion, development, or deployment across the region.

Existing Stakeholders and Relevant Programs:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System • KCU Colleges of Medicine and Dentistry • MSSU • Crowder College • Pittsburg State University
Lead Implementing Organizations:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System
Prioritization:	High
Timing:	Mid Term

Potential Action Components:

- Continue to evolve and improve Acute Delivery system clinical information infrastructure (as per organization IT strategies).
- Identify, plan, and facilitate the rollout of transformational care giver support technologies in both primary and acute care leveraging shared data and research infrastructure. Areas to include: clinical decision support, predictive and prescriptive analytics, smart sensor and robotics technologies, clinical documentation, caregiver communications, etc.
- Seek shared initiatives to drive research, rollout, and funding.
- Apply ongoing research to front-line care delivery from data obtained.
- Aligned with Action 2.1, work with Higher Ed to leverage disruptive technologies in EdTech (AR/VR, Online, Micro-learning, AI) that improves the skills of front-line clinicians.
- Actively work with Higher Ed to co-develop content for CPE tracks as well as new micro-credentialing programs.
- In conjunction with Action 3.2 configure both patient and caregiver scheduling systems to support Telehealth/ Virtual Care (synchronous, asynchronous, caregiver assist, remote patient monitoring).
- Support Delivery System HR Strategies to strengthen staff retention and career development

Examples:

Brigham and Women's Hospital, MA—AI-Supported Cancer Predictive Analytics[41]

A study from researchers from the Mahmood Lab at Brigham and Women's Hospital uses AI to combine multiple types of data from different sources to predict patient outcomes for 14 different types of cancer. The model interprets several sources of data, including genomic sequencing, pathology, and patient history, to diagnose and predict different types of cancer. Experts see the tool's ability to integrate and predict outcomes from multiple sources as a significant advance.

Vanderbilt University Medical Center (VUMC), TN—Using Large Language Models to Support Clinical Decision Support[42]

VUMC conducted research validating ChatGPT explanation of 65 patient clinical alerts compared to those elicited from clinical experts. The study found that ChatGPT was competitive with human expert input and could further provide valuable insights refining CDS tools, ultimately improving alert fatigue among clinicians. "AI-generated suggestions could be an important complementary part of optimizing CDS alerts, can identify potential improvements to alert logic and support their implementation, and may even be able to assist experts in formulating their own suggestions for CDS."

Northwell Health System, NY—AI-Supported Clinical Risk Assessment[43]

Northwell Health has made significant advances in applying AI to clinical risk assessment across a range of patient situations including identifying patient risk for respiratory failure, patient falls, medication errors, and readmission. Northwell uses machine learning to train patient risk models from their extensive EMR system and apply the learnings to hands-on patient care.

41 https://www.brighamandwomens.org/about-bwh/newsroom/research-briefs-detail?id=4227#
42 https://academic.oup.com/jamia/article/30/7/1237/7136722?
43 https://feinstein.northwell.edu/news/the-latest/machine-learning-tool-predicts-respiratory-failure-in-covid-19-patients

Action 3.5—Care Model Innovation. Joint initiative to design, pilot, and implement changes to health roles and delivery models (new roles, flexible scheduling, remote workforce, shared employees/pool/agency).

This action seeks a shared approach to workforce design based on the investments made and lessons learned from other strategic actions in higher education and advanced care delivery. Specifically, it will focus on innovations involving:

- **Job design**—for delivery system jobs including direct clinical, diagnostic, and clinical support, patient and information management, and support services.
- **Team design**—covering multidisciplinary team structure, team processes, and continuity of care between teams.
- **Resource management**—including staff sourcing/scheduling, site of care deployment and overall workforce management.

Workforce design will be greatly influenced by the disruptive technologies discussed in Appendix 2—Major Technology Trends Disrupting Education and Healthcare. Healthcare is likely to experience the formation of entirely new jobs/roles, greater job specialization of existing jobs, increased use of more sophisticated tools, and improved multidisciplinary coordination overall. With telehealth enabled consultations, health professionals will increasingly deliver care virtually. Interoperable EMR systems and communications platforms will enable decentralized coordination across care teams.

In time, with advances in precision medicine, care will become more personalized, and inpatient demand will shift to more ambulatory and home-based settings. A more comprehensive view of workforce requirements across the system will assist with overall staff scheduling and capacity management.

Action 3.5 will generate economic development mainly through increased labor productivity and cost efficiency of the broader health workforce. As with Action 3.4, there will also be greater EdTech opportunities through tertiary and ongoing professional development.

Given the regional management talent residing in both the Higher Education and Delivery sectors, multiple opportunities for shared innovation may be anticipated.

Existing Stakeholders and Relevant Programs:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System • KCU Colleges of Medicine and Dentistry • MSSU • Crowder College • Pittsburg State University • County health departments • Philanthropic organizations
Lead Implementing Organizations:	• Primary care organizations (Access, other) • Freeman Health System • Mercy Health System • KCU Colleges of Medicine and Dentistry • MSSU
Prioritization:	Medium
Timing:	Mid-term

Potential Action Components:

- Participate in shared workforce needs assessment (Delivery and Higher Education) aligned with Actions 1.3 and 1.4. Identify anticipated clinical and technology driven changes to clinical job definitions and associated care models.
- Make changes to tertiary and CPE curricula to reflect ongoing workforce design changes.
- Proactively plan for specialization and "site of care" shifts (e.g.: ambulatory, virtual, home) that will impact skills, teaming, and resource deployment (See Action 3.2).
- Identify joint areas for research and development programs, specifically those focused on the impacts of disruptive technology (AI, IOT, Robotics, etc.) on workforce design.
- Address training of important non-clinical support staff (i.e.: telehealth, data analytics, etc.).
- Commercialize and apply insights from research as appropriate.

Examples:

University of Colorado Health[44] —use of AI to Improve Patient Flow

UC Health has implemented an AI-driven platform that analyzes data collected from their EMR and other systems to optimize patient flow and transport across internal departments (ED, Inpatient Units, Surgery, etc.) and downstream facilities (external discharge). The tool provides a system-wide dashboard, predicts bed demands, highlights potential bed deficits, and supports overall capacity planning and resource allocation across shifts. Outcomes include reductions in ED admit times, quicker ICU transfers, and reductions in lengths of stay.

National Health Service (NHS)[45]—Transformation Directorate, England

The NHS Transformation Directorate acts as an aggregator and coordinator of innovations in healthcare technologies across the public system. It develops and manages essential tools and approaches for digital transformation, including a data strategy, an applied AI Lab, an Information Governance portal, remote monitoring tools, and infrastructure to support collaboration in digital health across care teams.

Evolve Health Alliance

The Evolve Health Alliance is a collective effort and organization by health systems in Florida, North Carolina, Michigan, Utah, New York, and Ohio to address diversity, well-being, and retainment of regional workforces. The core tenets of this alliance include the following:

- Information sharing: The health systems involved in the alliance share data regarding best practices, workforce analytics, diversity program results, and reciprocal staffing and expertise-sharing agreements.
- Staff sharing: Beginning in the COVID-19 pandemic, health institutions share teams of upwards of 40 doctors, nurses, and auxiliary health staff to meet workforce gaps and seasonal shortages.
- Leadership development: The member organizations, from 2022 onward, host leadership development programs that allow members from each health system to participate in skills development in leadership, administration, and management. This program is additionally open to nonclinical staff, expanding the opportunities for the health system workforce to maintain an education and up-to-date administrative staff.

44 https://www.hcinnovationgroup.com/analytics-ai/predictive-analytics/article/21247463/at-uchealth-reengineering-bed-capacity-management-in-real-time
45 https://transform.england.nhs.uk/key-tools-and-info/

Action 3.6—Healthy Community Coalition. Joint coalition (delivery system, business, government) promoting and funding healthy community initiatives in schools, businesses, and the broader community.

Like many communities in the United States, the Joplin Region benefits from a having multiple organizations (government, delivery system, philanthropic) that seek to promote health and well-being for its citizens.[46] These groups have separate charters, staff, and budgets. When they do collaborate, they tend to operate in a loose collective with variable results. Stakeholder feedback during the analysis phase highlighted the need for stronger integration and coordination of these community groups.

Community Health Needs Assessments performed by various groups over the past 5 years are clear on current community health shortcomings; however, the implementation of programs to address these disparities is not well-funded and suffers from a lack of a unified approach. It could also benefit from greater participation from Higher Education stakeholders.

While Action 3.1 seeks to close the workforce gap specifically in primary care, Action 3.6 casts a wider scope, aiming to improve coordination and strengthen community and population health outcomes by mobilizing a broader group of stakeholders including delivery systems, government health departments, private community groups and more. It is recommended that the JRAH establish a "Healthy Community Coalition" to better engage existing stakeholders in a more expansive and unified approach.

Based on an initial scoping exercise, this could include stronger integration of existing community health programs and, in line with action 3.3, expand targeted research and development in areas such as population health management, health equity, and the social determinants of health.

Additional scope could include programs that promote community attractiveness including built infrastructure which support broader workforce recruitment strategies.

A more comprehensive approach to community and population health will also increase economic development through:

- A healthier workforce, with fewer productive days lost to disability and illness.
- More jobs supporting health delivery and education based in the community.
- Attracting health and nonhealth professionals to Joplin through built infrastructure initiatives.
- Attracting and retaining new businesses through a better understanding of the relative strengths and weaknesses of the population and rural economies more broadly.
- Targeted research and development opportunities (see Action 3.3) in rural health, biostatistics, health informatics, population health, and innovations that accrue from this work.

46 https://www.joplinmo.org/440/Community-Resource-Guide

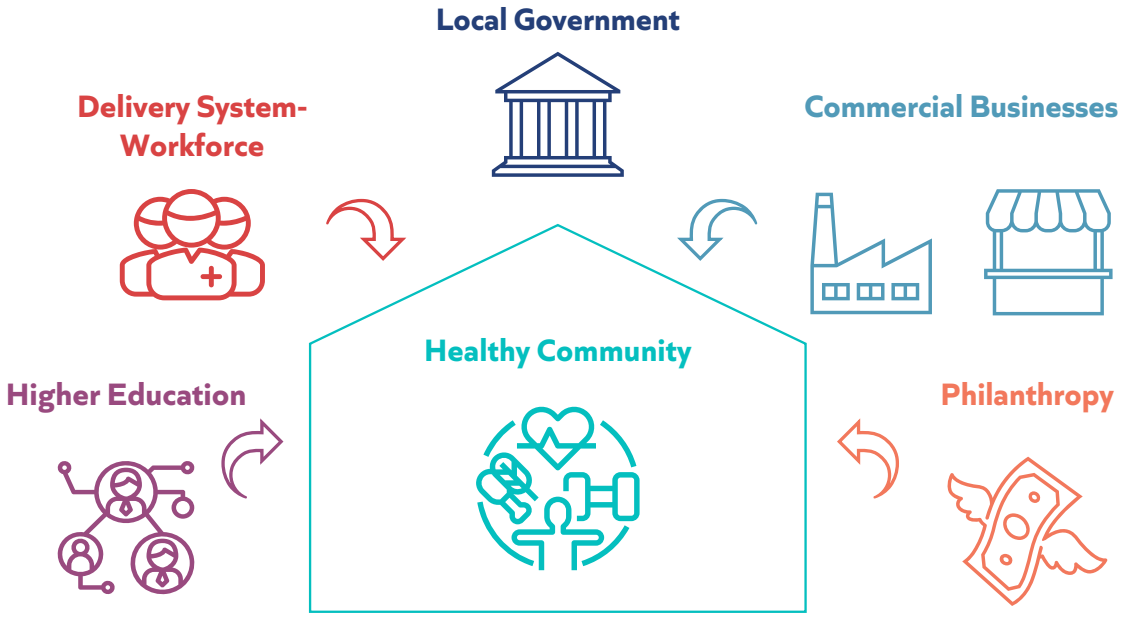
Existing Stakeholders and Relevant Programs:	• Health Departments (county and city based)
	• Primary care organizations (Access, other)
	• Freeman Health System
	• Mercy Health System
	• KCU Colleges of Medicine and Dentistry
	• MSSU
	• Crowder College
	• Pittsburg State University
	• Philanthropic organizations
	• City of Joplin
	• Joplin Chamber of Commerce
	• Other local/regional health related programs
	  • Healthy Joplin
	  • OneJoplin

Lead Implementing Organizations:	• Newly established Healthy Community Coalition
Prioritization:	High
Timing:	Short Term

Potential Action Components:

- Establish central coalition to network, coordinate and direct common community health programs with clear governance and secured funding.
- Define a shared charter and multiyear strategy across key community stakeholders (government, business, education, delivery, community members).
- Conduct an initial scoping exercise considering priorities from existing Community Health Needs Assessments. Prepare a shared action plan and budget.
- Participate, coordinate, and align existing population health initiatives deployed by delivery system partners.
- Guide community health education initiatives.
- Aligned with Action 3.2, encourage adoption of patient-facing digital health technologies.
- Manage data collection and reporting around critical community health outcomes/KPI's.
- Scope of management to include health equity issues and social determinants of health.
- Coalition scope to include community attractiveness projects and built infrastructure (e.g., shared spaces, bike and hiking trails, food options) related to healthy communities.

Figure 22: Visualization of the Joplin Healthy Community Coalition



- One organization, shared strategy, one management
- Appropriately resourced
- Shared community health initiatives
- Built infrastructure to improve attractiveness and healthy lifestyles
- Tax abatements/incentives

Source: TEConomy Partners, LLC .

Examples:

Health Care Collaborative of Rural Missouri (HCC)[47], Lafayette MO

Made up of over 40 organizations, the HCC provides a range of community health, advocacy, transport, and health education services to 5 counties in western Missouri. Community-based programs include case management, counseling and assessment, health education, transportation, translation services, rural health professional recruitment, ACA Marketplace enrollment, Medicaid and Medicare enrollment, and more. Collaborative membership is comprised of primary and community care providers, local hospitals, school districts, community NGOs, local churches and charities, local business leaders, and county health departments. It receives funding from federal and state grants, private donations, and membership dues.

Thrive Regional Partnership in the Chattanooga Area

The Thrive Regional Partnership is a coalition of 16 neighboring counties across state lines in Alabama, Georgia, and Tennessee. By convening stakeholders across a wider variety of demographics and constituents, the county governments were successful in petitioning the federal government for resources. They were additionally successful in organizing and distributing those resources across participant schools. Successes include the following:

- Secured federal transportation grant through inter-state freight partnerships (one of four regions in the country to do so successfully).
- Developed personalized resource utilization plans and provided digital management tools to 15 rural communities in the area to expand education efforts.
- Created an open-source Geo hub that allows the public and policymakers to access organized and up-to-date information about the region, the partnership, and participating education institutions.

Rural Wisconsin Health Cooperative

The Rural Wisconsin Health Cooperative is a coalition of 44 rural hospitals dedicated to sharing medical and surgical resources across historically underserved areas. The cooperative is owned equally by participating members and, since its inception in 1979, has accomplished significant gains in the following areas through its networking, resource sharing, and government petitioning:

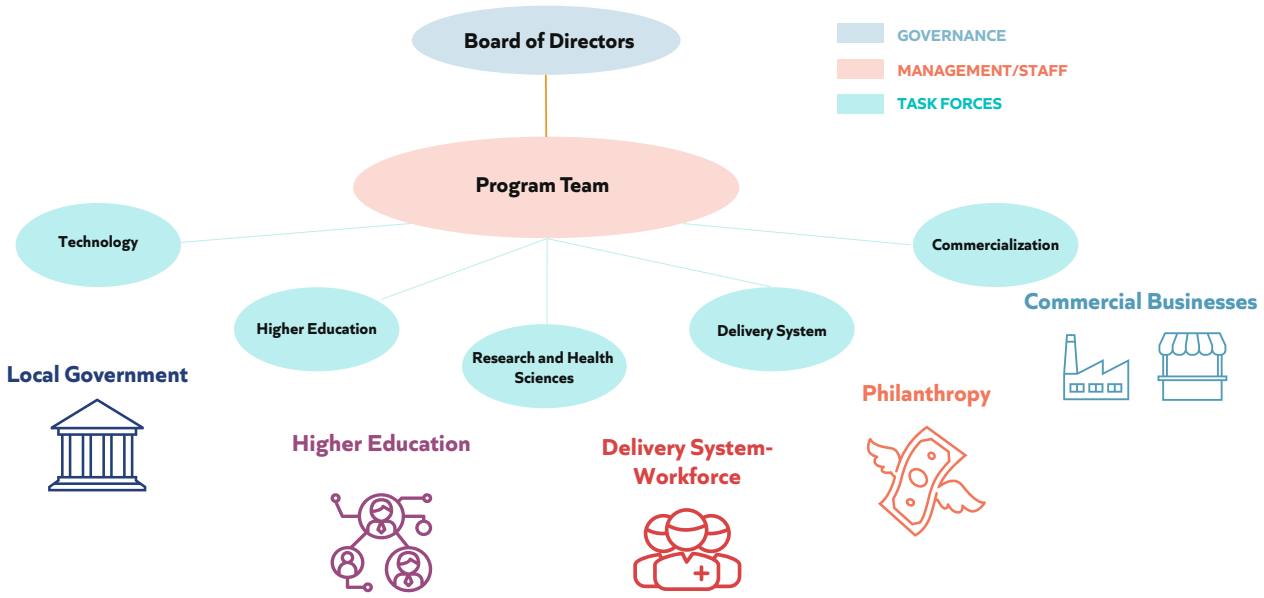
- Workforce retention, upskilling, and distribution
- Developing education efforts throughout rural communities
- Maintaining Medicare/Medicaid funding for less regulated areas
- Reimbursement for community-led health initiatives

47 https://hccnetwork.org/about/#

VII. Organizing for Success

Many of the strategies and actions highlighted above rely heavily on the Joplin Regional Alliance for Healthcare and Health Sciences (JRAH) to play either a leadership or complementary role. As a result, it is recommended that the JRAH act as an anchor and help enhance the region's ability to organize for success. This would entail a new charter based on the strategies and actions outlined above, sources of shared funding, a dedicated staff and leadership model, and the support of interdisciplinary task forces that help to enable the implementation of the plan. Figure 23 provides a visualization of this approach.

Figure 23: Organization Model for Joplin Regional Alliance for Healthcare and Health Sciences



Source: TEConomy Partners, LLC.

It is recommended that the board of directors be similar to the current JRAH composition and be comprised of business leaders across higher education, health delivery, local government, local business, and community representatives. Central to the success of this leadership model is the ability to tap into leadership at the highest levels of an organization and ensure that these roles are able to stay actively involved, even across transitions.

To help enact the actions outlined in this strategic document, it is also recommended that the JRAH develop a program management team. It is envisioned that this small team (2-3 FTE's initially) would manage the work effort, including mobilizing and managing resources, executing an agreed program of work, communicating program progress to the Board and other stakeholders, estimating and managing required financial and technical resources, and ensuring on-time, on-budget delivery. The program staff would also work closely with the various task forces outlined in Figure 23. It is envisioned that these task forces are comprised of part and full-time teams of subject matter experts, arranged by program/project area. The task forces would work to define outcomes, workplans and timeframes across their various topics.

Key factors behind the success of such a model are the effective inter-organizational collaboration among the various actors. It is intended that the JRAH be an alliance and not dominated by any single sector or institutions. The ability for organizations to agree on facts, priorities, and ideal end-states will also be critical, as communication and the levelling of expectations will be necessary both at the onset of the project, and throughout the various tranches. It is also important to note that adequate personnel and financial support will be necessary for these actions to see success.

Importantly, a key factor for the success of this project is the ability for tangible benefits to flow from both individuals and groups. The value of such an approach is that the various actors in the healthcare and health sciences ecosystem are able to benefit from the investments they make. As outlined in Figure 24, individual stakeholder investments and benefits can drive something greater for the broader community.

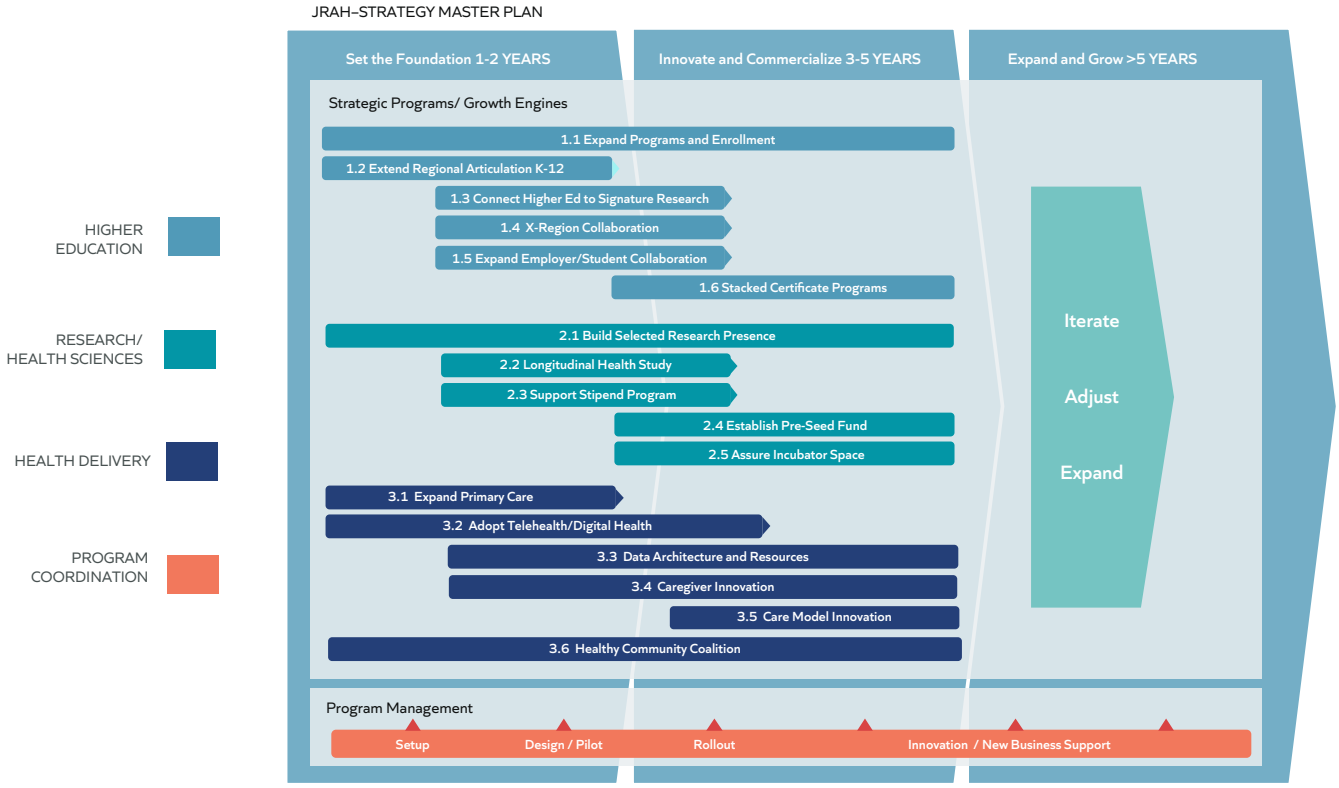
Figure 24: Shared Investments and Shared Benefits



Source: TEConomy Partners, LLC.

Moving forward, it will be important that the JRAH act with both intentionality and vigor to achieve its lofty ambitions and advance its healthcare and health sciences sector. In the earliest stages, there are several strategic programs and growth engines that can serve as anchors for the strategy; it is recommended that these actions be pursued immediately, or else within the first two years. Furthermore, it is important that the region continues to iterate, adjust, and expand their models to align with new trends and thinking. Figure 25 seeks to approximate the timing of the various actions and strategies outlined in this document.

Figure 25: Envisioned Timeline of Strategic Plan



Source: TEConomy Partners, LLC.

Ultimately, the success of this strategic plan will rest on the ability of the Joplin Region to implement it. It is believed that the JRAH can act as the strong backbone organization to support such ambition, but this initiative requires both investment and patience.

Conclusion

Joplin and the multicounty MOKAN region benefit from the presence of multiple signature assets in healthcare and higher education that present a robust platform for ongoing economic growth. Aligning healthcare workforce demands and regional higher education programming will provide a multifaceted series of benefits for the region—bringing students (and their dollars) into the community for education, increasing opportunities for students to gain stable employment in the region with good prospects for career advancement, and improving the quality of regional care while lowering costs. As the higher education and healthcare sectors advance collaborations, opportunities will also exist to build distinctive R&D programs designed to improve both systems and spark innovations that engender entrepreneurship and the growth of new and existing regional business enterprises. Because the availability of a skilled, high participation, and productive workforce underpins the ability of Joplin to continue to achieve economic growth, the strategy also advances a community-health-focused approach designed to significantly advance a healthier, more productive regional population while also engendering innovation.

Appendix 1:

List of Stakeholders and Interviews

Name	Position	Organization
Paula Baker	President and CEO	Freeman Health System
Jeremy Drinkwitz	President	Mercy Hospital Joplin
Stephanie Brady	Executive Director	Community Clinic of Southwest Missouri
Dean Van Galen	President	Missouri Southern State University
Travis Stephens	President and CEO	Joplin Chamber
Rudy Farber	Chairman	Community Bank and Trust
Bryan Vowels	CEO	Vowels Stovern Wealth
Ryan Stanley	Financial Advisor	Edwards Jones
Keenan Cortez	Mayor Pro Tem	Joplin
Rick Schooler	Vice President, Joplin Campus	Kansas City University
Haley Reardon	Community Relations	Kansas City University
Shelli Hewitt	Dean of Admissions	Missouri Southern State University
Bethany Kendrick	Communications	Missouri Southern State University
Lisa Toms	Provost/VP of Academic Affairs	Missouri Southern State University
Brad Hodson	Executive Vice President	Missouri Southern State University
Erin Tabor	Director, EMS	Missouri Southern State University
Jill Pyle	Director, Dental Hygiene	Missouri Southern State University
Melinda Brown	Director, Healthcare Admin.	Missouri Southern State University
Sherri Whiteman	Chair, Respiratory Care	Missouri Southern State University
Lisa Beals	Chair, Nursing	Missouri Southern State University
Kimberly Medicheck	Chair, RadTech	Missouri Southern State University
Mary Frerer	HR Director	Freeman Health System
Steve Graddy	Chief Financial Officer	Freeman Health System
Nick Edwards	City Manager	City of Joplin
Jake Heisten	Executive Director	MOKAN Partnership
Tony White-Robyn	Assistant City Manager	City of Joplin
Amy Kauffman	Workforce Development	Joplin Chamber
Phil Witt	Associate Vice President for CTE	Crowder College

Name	Position	Organization
Doug Hunt	Director of Entrepreneurship	Joplin Chamber
Michael Herr	VP Operations	Mercy Joplin
Mark McNeemer	Regional Physicians Executive	Mercy Joplin
Scott Watson	Director, Carthage	Mercy Joplin
Tyler Sturgeon	Finance	Mercy Joplin
Tracy Godfrey	Chief Medical Officer	Access Health
Kerry Sachetta	Superintendent	Joplin K-12 Schools
Skip Rollins	Chief Innovation Officer	Freeman Health System
Dr. David Baker	Chief Medical Officer	Freeman Health System
Dr. Katricia Pierson	President	Crowder College
Dr. Marc Hahn	President	Kansas City University
Jerrod Hogan	CEO	OWN, Inc.
Matthew Johnson	CEO/Founder	Midwest Interactive
Mitch Dolloff	CEO/President (Automotive Group)	Leggett and Platt
David Humphrey	President and CEO	TAMKO
Veronica Miller	Manager, Human Resources	MAPP Tech
Dr. Rob McNab	Owner	McNab Wellness
Christina Williams	City Council Member	City of Joplin
Stephanie Brady	Executive Director	Community Clinic

Appendix 2:

Major Technology Trends Disrupting Healthcare and Education

We live in exciting times, with advances in information, communication and clinical technologies promising to transform education and healthcare like no other period in human history. Indeed, the COVID pandemic provides recent proof of these technologies in action as genetically derived vaccines were delivered, at scale, within 12 months of the pandemic's outbreak.

Because Joplin is focused on developing a strategy and action plan with a 10+ year time horizon, there is a distinct need to inform strategy development with consideration of emerging trends, clinical frontiers, disruptive healthcare technologies, and market changes (including potential changes in the U.S. healthcare system) that may impact development trajectories.

For this analysis, TEConomy has identified four major technology trends that are now disrupting and transforming how education and healthcare will be delivered for generations to come. They represent both opportunities and threats to the current order redefining:

- the "what" of healthcare: the nature of disease, and our understanding of the underlying systems of disease onset and progression,
- the "how" of healthcare: the tools, modalities, and techniques used to diagnose and treat disease, and
- the "who" of healthcare: the skills and credentials required to manage these changes, including the redefinition of clinical jobs, the use of new tools and technologies, and the deployment of care teams, both physically and virtually.

Any effective strategy will seek to actively understand, contribute to, and exploit these new technologies.

Artificial Intelligence and Digital Health Solutions

Perhaps the most immediate of these trends is the advent of Artificial Intelligence (AI) and Machine Learning (ML) in the practice of healthcare delivery. Recent cross-industry analysis of AI impacts and opportunities often lists healthcare near the top. In a recent analysis of the top 100 AI investments in 2023, of the 34 industry-related investments, eight of them (24%) were healthcare investments.[48]

Artificial intelligence and the further digitization of health processes will transform health delivery over the next 5-10 years. From a health delivery standpoint, these impacts can be discussed across three groups:

- **Patient-facing/directed**—used by individuals to track and improve their health.
- **Caregiver support**—applications to support the caregiver decision-making and work processes.
- **Overall health operations**—applications that support larger scale operations.

Figure A1: Trends, Opportunities, and Impacts of Artificial Intelligence on Health Delivery

	Key Trends/Applications	Opportunities / Threats/Impacts	
Patient Directed 	• Explosion of self care digital apps • Patient portal/EHRs • Patient history portability • Patient directed scheduling	• Improved patient access to health information and care • Increased productivity overall • Greater face time with patients • Improved quality of care • Improved care-giver satisfaction • Reduced cost/case	• Speed of change/ impact on workforce • Significant IT Investment • Reallocation/definition of workforce • Emergence of Data Ops environment • Excess bricks and mortar infrastructure • Shorter half-life for equipment
Care Giver Support 	• Clinical note generation (e.g. DAX) • Clinical decision support • Medication administration • Smart devices • Robotic support		
Health Operations 	• Clinical research support • Smart resource scheduling • Proactive acuity/capacity management • Real-time adjudication		

Source: TEConomy Partners, LLC

48 https://www.cbinsights.com/research/artificial-intelligence-top-startups-2023/

Patient Facing/Directed AI

Patient-directed AI, often combined with other digital health applications, refers to those functions designed and developed to be used by patients or individuals to manage their health.

Investments in these platforms have boomed over the past 5 years, and while spending has recently leveled off, the use and integration of these applications continue to increase, especially with the advent of Large Language Models (LLM).[49] These tools tend to focus on three areas:

- Quantification and tracking of patient information
- Advice on healthy lifestyles and interventions
- Assistance with health system navigation.

Empowered by detailed patient data, these applications have the potential to identify disease trends early, guide patients toward more healthy lifestyles, and help schedule critical healthcare services.

Currently, as much as 42% of the U.S. population has used these tools.[50] As uptake increases, an added benefit will be the further digitization of patient health data (both structured and unstructured) that can be leveraged to drive health education and research. In recent years, prestigious research institutions have emerged, backed by significant investment, in the fields of biostatistics and population health (Johns Hopkins, Harvard, U Cal Berkeley, et al.). These institutions seek to innovate and commercialize solutions in the public health market, leveraging an immense proliferation of digitized patient data.[51]

A major challenge from a community health perspective is that the patient populations that would most benefit from these solutions are often slow to adopt. This is further complicated by a lack of technical infrastructure (e.g., broadband) in rural counties, which can be a barrier to effective uptake.

Given the current analysis from Joplin Regional Community Health Assessments, patient-directed digital applications combined with telehealth platforms have the potential not only to improve chronic disease management but also to seed significant health research opportunities at a population level. They should be encouraged through public information and programmatic support as a more holistic approach to community health and economic development.

49 https://www.forbes.com/sites/forbestechcouncil/2023/06/20/the-impact-of-large-languages-models-on-healthcare/?sh=abbc66d62924.
50 https://www2.deloitte.com/us/en/insights/industry/health-care/consumer-health-trends.html
51 https://www.usnews.com/best-graduate-schools/top-science-schools/biostatistics-rankings

Caregiver Support AI

From a caregiver perspective, new digital and AI-powered technologies will be some of the most exciting applications to emerge in the near term (1-5 years).

AI is currently used to diagnose digital images for cancer, develop treatment plans in primary care, assist complex surgeries, support patient monitoring in the ICU, predict acute onset of disease, streamline clinical note-taking, calculate complex drug dosages, and more. In 2023, AI tools trained on LLMs were able to pass the Medical License Exam (U.S.MLE) at 60% accuracy without prior reinforcement or training.[52]

As is often the case, these groundbreaking capabilities have been enabled by foundational infrastructure investments made over many years. In this case, investments in Electronic Medical Records (EMR) over the past 20 years, especially those funded and encouraged by the HITECH Act of 2009, have provided a foundation of data and functionality that, when leveraged using artificial intelligence, are yielding new insights for diagnosis and treatment.

AI tools will be able to evaluate individual patient data held in EMRs, comparing them to large datasets of similar patients to identify diseases and prescribe the most efficacious treatment. Coupled with new advances in medical science and personalized medicine (discussed later in this section), we are likely to witness entirely new definitions of disease and wellness.

Clearly, if only a modest percentage of these innovations become reality, there will be a transformational impact on clinical decision-making as:

- Diseases will be diagnosed earlier,
- Therapies will become more effective, and
- Adverse events and unwanted side effects will decrease.

An additional benefit will be the clinical time saved by these innovations. A recent innovation, Ambient Clinical Intelligence (ACI) systems, actively monitors caregiver-patient conversations and, using natural language processing, summarizes key aspects of those conversations and drafts clinical notes and orders. These systems, while in their early stages, have the potential to save time and reduce errors significantly. Caregivers should also be able to spend more time face-to-face with patients as these applications continue to "mop up" tedious administrative and data entry activities.

52 https://www.ama-assn.org/practice-management/digital/chatgpt-passed-U.S.mle-what-does-it-mean-med-ed#

Overall Health Operations AI

At a health delivery system level, these technologies will alter the way health resources are defined and deployed to meet a given level of demand. This will happen in a few distinct ways:

- **Clinical Research**—Large-scale data repositories, supported by advanced analytics and distributed clinical trials technology, will give rise to whole new areas of clinical research. For example, trends in decentralized clinical trials using mobile technologies have expanded the reach and conduct of drug and therapy trials, accelerating drug approval times and expanding commercialization opportunities.[53]
- **Site of Care**—Care consultation and treatment will increasingly shift to sites based in the community, either at home as enabled through Telehealth or to ambulatory clinics. By some estimates, brick-and-mortar requirements for hospital beds will reduce the need for hospital bed stock by as much as 30% over the next 10 years.[54]
- **Overall Patient Flow**— All of this, of course, will alter the overall flow of patients (community >emergency> acute> post-acute) through the system. These new applications will be able to predict seasonal flows (e.g., flu season) as well as scenario-play one-off shifts in demand (e.g., epidemics) to guide staff allocation and system flexing. Operational key performance indicators (KPIs) will evolve, and AI-enabled resource management will be used to manage labor, medicines, equipment, and facilities more efficiently.

This AI enabled health system will be built on significant investment in technical infrastructure (technical, communication, application, data). Some estimates are that Health IT spending will increase 16.5% annually through 2030.[55] As these large infrastructure platforms expand, increased investment in cyber security, risk management, and advanced analytics capabilities will also be required.

53 https://www.sciencedirect.com/science/article/abs/pii/S0025619622005602
54 https://www.oliverwyman.com/our-expertise/insights/2020/oct/health-innovation-journal/healthcare-supply-will-be-right-sized.html
55 https://www.grandviewresearch.com/industry-analysis/healthcare-it-market

Telehealth

According to the state of Missouri "Telehealth" or "Telemedicine" is defined as: "the delivery of health care services by means of information and communication technologies which facilitate the assessment, diagnosis, consultation, treatment, education, care management, and self-management of a patient's health care while such patient is at the originating site and the health care provider is at the distant site. Telehealth or telemedicine shall also include the use of asynchronous store-and-forward technology."[56]

While Telehealth has been in use in one form or another since the 1990s, uptake has been constrained by a variety of issues (lack of infrastructure, poor video conferencing applications, lack of support from key payers).

One bright spot of the recent COVID pandemic is that the use of Telehealth rose by up to 70% of ambulatory visits in the early stages of the pandemic. While overall usage has tapered off post-pandemic, according to the American Telemedicine Association, Telehealth has grown 20% per annum between 2017-2022, with similar growth expected over the next five years.[57] Some estimates have Telehealth handling up to 25% of all outpatient visits by 2027.

Telehealth is typically employed across the following modalities:

- **Synchronous visits**—real-time teleconferencing between patient and caregivers reduce or eliminate the need for patient travel and often reduce the overall wait times for care. Specialist outreach through remote caregiver-assisted consultations (e.g., critical care, radiology) extends the reach of specialist knowledge.
- **Asynchronous communications**—texting questions or requests through a patient portal enables near real-time communication and ongoing care management.
- **Remote patient monitoring** through devices such as wearables provides more realistic and extended tracking of patient vitals.

It's clear from recent trends that Telehealth is especially well suited for such specialties as primary care, pediatrics, behavioral/psychiatry, radiology, and cardiology. As such, it represents a significant solution pathway to address community outreach in these specialties for the Joplin Region.

Recent changes by large Payer Organizations have opened the door to increased investment and usage.[58] Both public and private payers have also loosened requirements for Telehealth services in terms of services covered and the locations from which both practitioners and patients can participate.

Unfortunately, according to a 2022 study done by the CHARTIS group,[59] Missouri, as a state, ranked 41st in terms of uptake of Telehealth services. According to the study, only 6% of Missouri practitioners use Telehealth versus a high in Hawaii of 22%. Although its performance in Telehealth lags behind other states, Missouri has recently changed its parity laws, and there are state and national programs organized to help grow Telehealth services, such as the Missouri

56 https://www.cchpca.org/missouri/?category=private-payer&topic=definitions-private-payer
57 https://www.americantelemed.org/
58 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9035352/
59 https://www.chartis.com/insights/telehealth-now-permanent-fixture-U.S.-healthcare-delivery

Telehealth Network, Show-Me Echo Program, and several Health Resource and Service Administration (HRSA) Telehealth Programs.

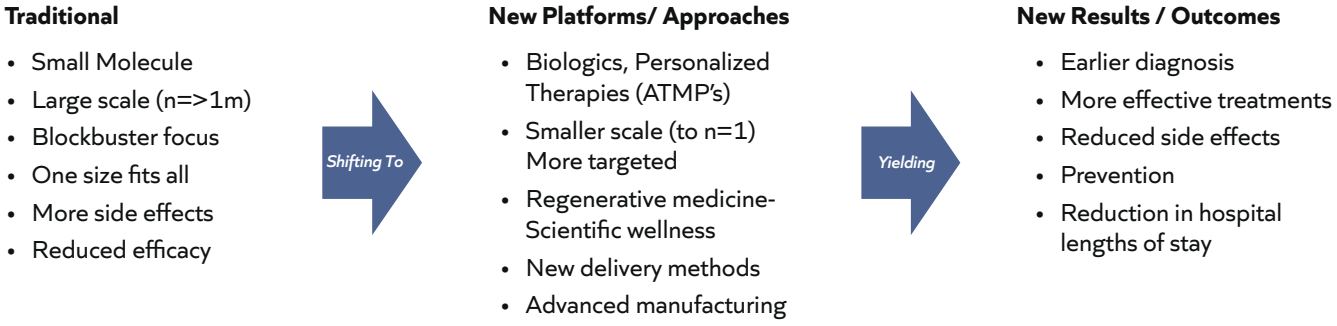
In the Joplin Region, recent Telehealth investments have shown great promise. Key stakeholders point to recent successes at Neosho Hospital, Ozark Behavioral Health and various school located clinics around the region. Given Joplin regional challenges around access to care in the community, Telehealth is clearly a technology to be further expanded moving forward.

Personalized Medicine

Based on the recent progress in human biology and our cutting-edge technologies for studying biological systems, there is increasing optimism about potential breakthroughs that could improve both lifespan and quality of life. The successful sequencing of the human genome in 2003 and the subsequent deepening of our comprehension of the fundamental elements of biological processes (genomics, epigenomics, proteomics, and microbiomics) are revolutionizing the clinical practice landscape.

Although difficult to predict in the short term, the level of investment has been significant with literally trillions being spent across the globe pursuing new solutions. While these approaches and technologies address a broad range of biologic areas, they are increasingly being bundled into the overarching category of "personalized" or "precision medicine." In 2022 alone, the global personalized medicine market was valued at $539M, with a compound annual growth rate estimated at 7.2% through 2030.[60]

Figure A2: Potential Outcomes from Advances in Biotechnology and Precision Medicine



Source: TEConomy Analysis of Grandview Research, "Personalized Medicine Market Share and Research"

Personalized medicine represents a significant departure from traditional approaches, especially in terms of drug therapies. Traditionally, pharmaceutical companies focused on medications developed through chemical synthesis that could treat the greatest number of patients. This was (and still is to a certain extent) the era of the "blockbuster" drug, where one drug could treat literally hundreds of millions of patients (e.g., statins, antihypertensives).

60 https://www.grandviewresearch.com/industry-analysis/personalized-medicine-market#:~:text=Report%20Overview,7.20%25%20from%202023%20to%202030.

Given the biological breakthroughs in genetics, drug therapies are increasingly biological in nature, that is, produced by living organisms. The resulting Biopharma industry seeks solutions that recognize the uniqueness of each person's genetic makeup and the complex variables that trigger illness. This new science is leading to more biologically generated therapies which are far more targeted and individualized, produced at smaller scale but with far greater efficacy. The hope is to identify disease states much earlier, leading to more effective preventative and curative treatment with reduced side effects. Beyond that, the biopharma industry is further transforming through advances in drug discovery, regenerative medicine, new delivery methods and advances in manufacturing and distribution.

The impact on the delivery system will be gradual but widespread. In general, we should see a reduction in acute hospital bed days as populations benefit from these new therapies. Surgical interventions in areas like cancer are likely to be reduced. From a workforce perspective, we will also see further specialization of acute and tertiary facilities, as well as the expansion of new job categories like genetic counseling.

Health EdTech

Health care is a content-rich environment requiring years of focused study to master and effectively apply the lessons learned to real patients with life-threatening illnesses. The average physician spends anywhere from 8-14 years in graduate and postgraduate training (medical school, residency, fellowship) to become a certified clinician in the United States. Nurses also have significant training requirements: 2-4 years undergraduate and 2-4 years advanced practice. Considering the fast-changing landscape of clinical practice and the critical situations clinicians often deal with, there is immense pressure to stay abreast of the latest developments and breakthroughs in the field.

Modern advances in Education Technology (Educ-Tech) are transforming how education is conceived and delivered. In recent years, we've seen five significant technology trends influencing medical pedagogical approaches): Micro-Learning, Virtual Reality/Augmented Reality, Growth in Online, Artificial Intelligence, and Personalized Medicine.

Emergence of Micro-Learning

Micro-Learning refers to the concentration of learning goals and aptitudes to match specific activities, in the case of healthcare, in the clinical environment. Traditionally, curricula were organized into larger areas of study learned over many years and reinforced through on-the-job residencies and internships.

While much of this remains, as tools and interventions advance, we are now able to concentrate and credential skills in smaller, more bite-sized components that can be consumed and applied more quickly and represent more up-to-date knowledge.

These credentials can be tool-based, as in the case of certain surgical or telehealth equipment; informatics-based, as being certified in the use of a specific EMR system; or therapy-based, as in deeper knowledge of chronic disease management.

Micro-credentials allow for a more tailored portfolio of skills that can more precisely fit the needs of a given work environment.

Virtual Reality/Augmented Reality

Significant advances have been made in simulated training for health practitioners in the fields of Virtual and Augmented Reality. Indeed, the medical and nursing schools operating in the Joplin region have sophisticated simulation environments supporting their coursework.

The global Virtual Reality (VR) in healthcare market size is projected to grow from $3.11 billion in 2023 to $25.22 billion by 2030, at a CAGR of 34.9%.[61] With improvements in headset and simulation technology, these tools will become even more targeted and effective, allowing students to learn more quickly, in physical locations convenient to them, and operate more confidently in the day-to-day health delivery environment.

Online Training

Like the virtual nature of Telehealth, online or remote training frees up participants to consume knowledge at a time and place that suits them. There has been significant growth in online clinical training by some measures of up to 30% of class time can be consumed remotely.[62]

Once in place, online training can be more easily standardized and is far more cost-efficient on a cost-per-student basis.

Artificial Intelligence

As mentioned in the previous section, AI will impact both what needs to be learned and the critical tools and applications required to be a caregiver in the 21st century. From a pedagogical perspective, AI has the potential to significantly accelerate learning rates by tailoring specific learning regimes based on user preferences and skill levels.

Personalized Medicine

Finally, as trends in Personalized Medicine play out, EdTech will play an important role in training caregivers for that complex environment.

Caregiver education will become more flexible, tailored to specific caregiver skill levels and each patient's unique needs. Diagnostic and therapeutic pathways will evolve based on patient needs, as will caregivers' ability to interrogate, evaluate, and adapt to those changes. EdTech will play a vital role in real-time learning rather than being limited to scheduled class time.

61 https://www.fortunebU.S.inessinsights.com/industry-reports/virtual-reality-vr-in-healthcare-market-101679
62 https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0257394

Appendix 3:

Nursing Education and Allied Health Education in the Mokan Region

Providers of Nursing Education in the MOKAN Region. Annual Graduates by Program and Qualification/Degree Awarded.

		Certificates	Associate	Bachelor	Master's degree	Doctoral degree	Grand Total
Nursing Assistant/Aide and Patient Care Assistant/Aide	Crowder College	5					5
	Total	5					5
Licensed Practical/ Vocational Nurse Training	Franklin Technology Center Adult Education	25					25
	Crowder College	8					8
	Total	33					33
Practical Nursing, Vocational Nursing and Nursing Assistants, Other	Carthage R9 School District-Carthage Technical Center	25					25
	Total	25					25
Nursing Practice	Pittsburg State University					18	18
	Total					18	18
Nursing Science	Pittsburg State University				10		10
	Total				10		10
Registered Nursing/ Registered Nurse	Pittsburg State University			140			140
	Crowder College		127				127
	Northeastern Oklahoma A&M College		69				69
	Missouri Southern State University			30			30
	Total		196	170			366

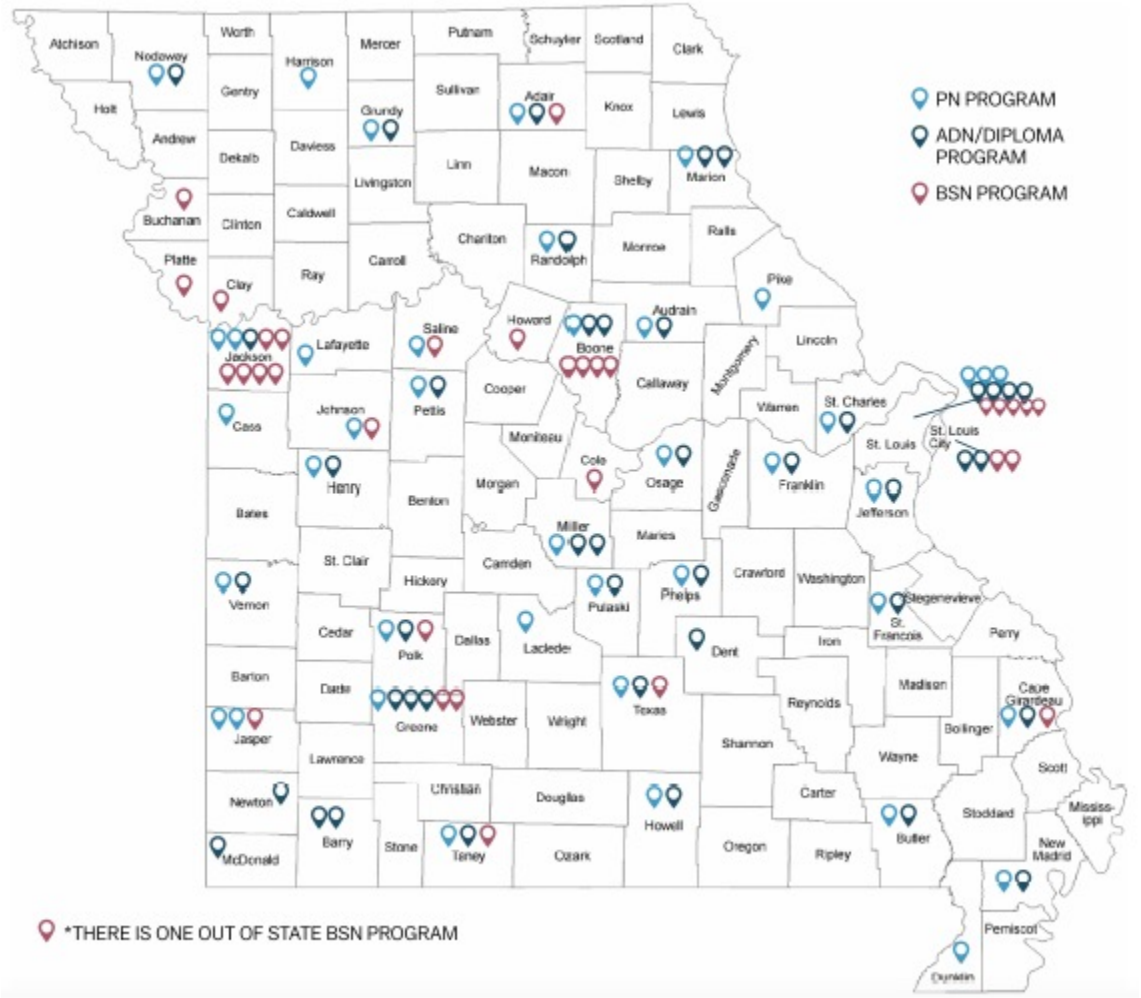
Source: TEConomy Analysis of NCES IPEDS

Providers of Allied Health Education in the MOKAN Region. Annual Graduates by Program and Qualification/Degree Awarded.

		Certificates	Associate	Bachelor	Master's degree	Doctoral degree	Grand Total
Clinical/Medical Laboratory Science/ Technology	Northeastern Oklahoma A&M College		21				21
	Missouri Southern State University			2			2
	Total		21	2			23
Dental Assisting/ Assistant & Dental Hygiene/Hygienist	Missouri Southern State University		22				22
	Franklin Technology Center Adult Education	8					8
	Total	8	22				30
Emergency Medical Technology/ Technician (EMT Paramedic)	Missouri Southern State University	20					20
	Crowder College	12	5				17
	Total	32	5				37
Health Professions and Related Clinical Sciences, Other	Missouri Southern State University			60			60
	Total			60			60
Medical Radiologic Technology/Science - Radiation Therapist	Missouri Southern State University		8				8
	Total		8				8
Other Healthcare Related Degrees	Missouri Southern State University	23		62			85
	Crowder College	3	39				42
	Pittsburg State University			23			23
	Northeastern Oklahoma A&M College		17				17
	City Pointe Beauty Academy	17					17
	Franklin Technology Center Adult Education	6					6
	Total	49	56	85			190
Respiratory Care Therapy/Therapist	Missouri Southern State University		15				15
	Total		15				15

Source: TEConomy Analysis of NCES IPEDS

Figure A3: Missouri Approved Nursing Schools by County



Source: https://pr.mo.gov/nursing-schools-of-nursing.asp


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